Ronggui DING

Key Project Management Based on Effective Project Thinking

中国电力出版社
CHINA ELECTRIC POWER PRESS

Springer

Key Project Management Based on Effective
Project Thinking

Ronggui DING

Key Project Management Based on Effective Project Thinking

Ronggui DING
Department of Management Science and Engineering
School of Management, Shandong University
Jinan, Shandong
China

Foreword to the First Edition

As the person who coined the words project thinking and project mindset, my dear friend Prof. Ding wanted me to write a little bit about its origin and implications in the coming decade.

I first introduced the word 'project thinking' while conducting a half-day seminar in Stockholm, Sweden in 1999, that was organized by the Swedish Project Management Academy. The title of the seminar was 'Why project mindset is the key to competitiveness?'

The twentieth century gave us a sense of mastering our operational thinking. At the peak of the industrial age, operational thinking was more focused on optimizing men−machine interactions. It was the age of continuous improvement.

Project thinking is more of an outcome of the knowledge age. For the first time in the history of civilization, global human networks are being formed. 'Time' is turning out to be the most crucial resource. Never before have we witnessed such a mind-boggling jump in the quantum of changes. The rate of change, therefore, is unprecedented. An outcome of such a rate of change is to face uncertainties and the unknown more than ever before. We start to realize that the more we know, the more we find that we know less. This is one of the main reasons for the formation of project thinking shaping the mindset to be more project-oriented.

We all know (may be difficult to practice) that the only thing we can influence is the FUTURE and that too only in the PRESENT. It is fairly evident that we have inherited TODAY based on what we did YESTERDAY for TOMORROW. It is in this process of influencing tomorrow that the project thinking gets support. If the past is not going to provide a recipe for the solutions of tomorrow's problems, our mind should be able to investigate the new situation with an open mind and without any barriers.

I may briefly give three examples in differentiating Operational thinking from Project thinking. Project thinking views the totality instead of parts and views project success as a function of many variables instead of limited factors constrained by operational thinking. In view of the unprecedented rate of change, project thinking is more proactive in nature as opposed to reactive thinking which analyses the cause and effect relationship after the occurrence of an event. Another

special attribute of project thinking is its capability and capacity to handle a large number of issues with varied characteristics instead of being merely focused on a few issues. It may be mentioned here that the implementation of solutions is more focused but the view is more generic.

In conclusion, I would like to congratulate Prof. Ding Ronggui for having done great service to his country in publishing this book covering various facets of management of projects.

The readers will find in this book a roadmap to move ahead in practicing the scientific aspects of modern day project management.

I wish all the readers Happy Reading.

July 2004
<div align="right">
Adesh Jain
President, IPMA
President, PM Guru Inc., USA
Director, European Centre
for Project Excellence, UK
</div>

Preface to the First Edition

Project management has gained increasing attention from various industries recently. I am involved in a large number of training programs and consultancies to illustrate my opinions and researches about project management. As my opinions are acknowledged by lots of project management practitioners, they encourage me to write a book for them. Therefore, this book is written for them in the first place. Project managers are in general facing enormous pressure. I hope this book helps them find ways of relieving pressure and enjoy the achievability of successful project management. Moreover, I would be honored if this book could provide value to you.

Before I start writing this book, I have been thinking about what project managers need and what's most valuable to them.

As effective project managers, they should have three fundamental competencies, including the competency of understanding project information, the competency of identifying and integrating project resources, and the competency of transforming conceptions into project deliverables. To possess the three competencies, project managers should have effective ways of project management thinking.

Many managers would like me to provide specific methods and tools of project management for them. However, in my opinion, the effective ways of project management thinking are more useful to project management practitioners. In fact, it is common that various project tools (e.g. Critical Path Management, Work Breakdown Structure, and Earned Value) are not applied in projects even though project managers have learned these tools. In worse cases, some project managers even have doubts about these tools. Why would project managers learn methods and tools which they do not employ and do not even trust? As each project is unique, the knowledge and expertise would ordinarily lose efficacy. It is useless to master the best tools and methods, when we do not know what we should do. Under such circumstance, only the effective ways of project management thinking could help us handle the changing environment and identify the principles of managing different projects.

This book covers main aspects of project management. Accordingly, key ways of thinking and action strategies are provided to manage various issues. To facilitate project managers' reading and understanding, this book has a popular way of expression. Some fables and games abound in the text. In fact, this style of expression is welcomed by project managers attending my training sessions. And I hope you would enjoy it as well when you read this book.

There are 16 project management templates in the appendix; however, only when you understand how to apply project management thinking appropriately would these templates work.

It is not my intention to cover everything useful to project managers in this book. However, I hope everything covered in this book is useful to project managers. This is not a textbook or encyclopedia for project management, nor is it intended for those without any experience related to project management.

I would like to appreciate the following people for their contributions to this book.

The 7-year management consultant experience at CVIC SE helped me a lot to form my own ways of project management thinking. Many viewpoints of this book come from the process of facilitating project management in CVIC SE. Therefore, I would like to acknowledge Mr. Xinhai Jing (Chairman), Ms. Jianping Cheng (Vice Chairman) and other colleagues for their efforts to promote project management in the company.

Some ideas of this book are derived from my collaborative research with Professor Tiqin Zhang. It is not exaggerated that he has devoted himself to helping me accomplish this book. I learned a lot from his dedication to teaching and research as well as from caring colleagues.

Besides, a great deal of ideas of this book is derived from a large number of project management practitioners such as project managers, entrepreneurs, and researchers. In particular, I have learnt a lot of expertise and experience from project managers. It is definitely not a coincidence if some of the viewpoints or even ways of expression are derived from you. And do not be surprised if some of the viewpoints in this book are not in accordance with yours because it is normal that different people have different ideas about management after all. Anyway, I would like to acknowledge all the project managers and researchers who provided reference materials for this book.

My postgraduate students, Yanan Sun and Zongxing Wang, helped to compile my record materials on my training courses which are the foundation of completing this book. I would like to thank them for their endeavors.

In addition, I would like to acknowledge colleagues from the military electronic office of the PLA General Armament Department. They provided me with a comfortable workplace so that this book could be completed successfully.

My wife and my son provided irreplaceable support as well. At the same time, I would like to apologize to them for not sparing much time to accompany them. This book is dedicated to them too.

At last, I would like to acknowledge Ms. Shucha Chang. Without her passionate support, it would have taken much more time for this book to be published.

Wuyi Mountain Villa, Fujian   Ronggui Ding
June 2004

Preface

The first edition of the book *Key Project Management Based on Effective Project Thinking* has been printed five times since it was published in 2004. It has been widely recognized by readers and was awarded the "Gold Medal Book" by China Machine Press in 2006, and its traditional Chinese version was published twice by Illinois International Press in Taiwan in the same year. The past decade witnessed a number of events such as Beijing Olympic Games, Shanghai World Expo, launch of Shenzhou spacecraft, Global financial crisis, Wenchuan earthquake, etc. From a professional perspective, both positive and negative changes provide opportunities for project management theories and practices, and these changes present significant challenges to researchers and practitioners in the field of project management. For me, the most direct task is to produce the second edition of the book.

Driven by demand as well as practitioners' efforts, project management has gained growing attention on a global scale. Project management is widely applied in enterprises, public investment activities, and even in Chinese family plan departments and kindergartens. Some people even assert that "everything is a project" and "everything can be managed in a *projectized* way". These brought both happiness and anxiety to me. On one hand, I am happy as a wider community eventually recognizes the value of project management; however, on the other hand, I am concerned as project management might become a vague and general concept sooner or later due to a lot of misleading reorganization. As a result, the true value of project management is undermined.

Some misunderstandings on project management do exist, which are the main reasons that the average success rate of projects has still remained around 30 % during the past two decades. There are three aspects of these misunderstandings: perceptional aspect, organizational aspect, and methodological aspect. In terms of perception, people, especially decision makers, perceive that project management is the project manager's business. The management of a project decision-making process and a project environment is largely overlooked. As a result, project managers have to take those responsibilities that they should not and are not able to

take. In many cases, project managers become the scapegoat of project failures. In terms of project organization, a common misunderstanding that exists is that project organizations are equal to project management teams, which lack in efforts to make stable departments to be outcome-oriented rather than function-oriented; role-oriented rather than position-oriented; process-oriented rather than functional structure-oriented. In addition, a project needs cooperation between various organizations/enterprises, which is largely overlooked. As a consequence, a narrow vision limited within the project team emerges, and it is difficult to find solutions to project problems. Misunderstandings regarding methodologies lie in that the current methodologies emphasize talent of people rather than systems, hard technologies rather than soft leadership, economics rather than management, etc. These misunderstandings lead to an imbalance between management science and management art.

To deal with these misunderstandings, this book is updated as follows:

(1) Expanded the readers. The first edition of this book mainly catered to project managers while the second edition serves senior executives of enterprises and organizations. Accordingly, more contents are added on an understanding of enterprise itself, how to establish a beneficial environment for project management (e.g., project governance), how to make project decisions, and how to ensure the feasibility of a project with feasibility study. In particular, efforts were made to analyze why senior executives who do not trust management could work for their enterprises' development and improvement. These contents were drawn from Executive Master of Business Administration (EMBA) and Executive Developing Program (EDP) classes at various universities such as Shandong University, Tsinghua University, Peking University, Hunan University, Dalian University of Technology, Shanghai Jiao Tong University, Southwest Jiao Tong University, Politecnico di Milano, Heriot-Watt University, and Macau University of Science and Technology, as well as interviews with a number of senior managers from enterprises and governmental agencies. As an Award Management Board member of International Project Management Association (IPMA) and a Team-Leader-Assessor (TLA) of its Project Excellence Award (PE Award), I visited many projects in different industries and different countries, learned a number of lessons from them and put these lessons in this book. They should provide valuable references for senior executives.

(2) Supplemented the project life cycle. In the first edition, the project life cycle is covered from initiation to closure. Such a life cycle focuses on the duties of project managers rather than on aims of enterprises. In the second edition, contents of project decision-making and other top management responsibilities are added. The starting point of the project life cycle is expanded for exploring and acquiring business opportunities. Similarly, the project closure is expanded to the maximization of an enterprise's profit through complementing the project and gaining project outputs (e.g., deliverables and knowledge). In other words, the second edition places greater focus on the life cycle of project management than that of a project in the first edition. As a result, projects are not independent of other operations

of the enterprise anymore and project management is therefore not isolated from functional management. These supplements can truly reflect real enterprise operations and can provide more useful references and proposals for project management practices.

(3) Made some additions to the scope of project management. The first edition is based on nine knowledge areas (Project Management Body of Knowledge, PMBoK) specified by the Project Management Institute (PMI). PMBoK basically aims at individual and independent projects and project managers are their responsibility takers. Such assumption is not much valid in real projects. The second edition addressed this issue by recognizing the background that multiple projects exist in the same enterprise and that—projects needs multiple enterprises to cooperate with each other. Some corresponding contents are added such as constructing the project governance infrastructure and the core competence of an enterprise. As a result, project management is integrated with enterprise management. These contents were derived from the project management practices of my team in diverse sectors and enterprises. This book attaches importance to illustrating the way of thinking for project management and critical success factors, while a number of specific and proved methods and tools are provided as well. I hope these supplemental contents would help readers to understand better the entire system of project management via the lens inside and outside of the project.

(4) Deleted the templates in the appendix in the first edition. I have emphasized in the first edition that the templates would not be beneficial to readers until the fundamental principles of this book are fully understood by them. However, many readers ignored my advice and used these templates without proper understanding of these principles, which is detrimental to the project management performance. Therefore, all those templates are removed from this edition.

(5) Updated the data and information. The world is changing rapidly. Some data and information presented in the first edition are not accurate or appropriate anymore. They are rectified in the new edition. Similar efforts will be made for future editions as well.

(6) Added postscript. This book has been adopted as a key reference for MBA, EMBA, CEO class, and Master of Project Management. A common question from students is how to put project management knowledge into practice effectively. Therefore, a postscript is added in this edition, which shows my professional experience of project management in research, teaching, and practices, and provides a guide on learning and developing project management theories.

Writing a book by typing one word after another is like bringing up a child. It seems a kid has become an adult suddenly when he will leave the parents, however, his growing up is actually under the parents' care, one second by another. Ms. Shucha Chang is the accoucheuse of the first edition of this book, and without her encouragement this second edition would have taken much more time to be completed. I would like to acknowledge Dr. Tao Sun, Mr. Shukuan Zhao, Dr. Yueping Fa, Dr. Yanwei Wang, Dr. Xingzhi Liu, Dr. Hua Sun as well as my postgraduate students, Ning Zhang and Jin'An Wang. Your support to my teaching

and research was essential for me to write this book. I also acknowledge Prof. Antonio Calabrese from the Politecnico di Milano. My discussion with Prof. Antonio Calabrese forms the structure of this book. My gratitude is extended to all students enrolled in the Master of Strategic Project Management European (MSPME) at the Politecnico di Milano. They provided valuable writing topics and suggestions for this book during the class discussions. I also gained support from numerous enterprises, governmental agencies, universities, research institutes, and colleagues.

Some contents of this book were shown in the journal of Project Management Technology and other journals/magazines. These contents are systematically integrated into the structure of this book. Readers can also refer to my other book Project Governance: Achieving controllable innovations (published by the Publishing House of Electronics Industry in 2008) for more information.

This book is dedicated to my wife and my son. They are the motive power of my work. My wife has to look after the family matter apart from hard work at the workplace. She is the genuine effective project manager at home. My son was only five-years old during the first edition of this book. He is now 14-years old, and I wish this book could be used as a reference for his learning management. No matter which industry he is going to work for in the future, it is necessary for him to have a management, especially based on effective project thinking.

Have a happy reading.

Politecnico di Milano   Ronggui Ding
July 2013

Contents

Chapter 1
Recognize the True Value of Management

If names of things are not properly defined, words will not correspond to facts. When words do not correspond to facts, it is impossible to perfect anything.

— Tsze-Lu • *Confucian Analects*

Management is already an academic discipline; however, no disciplines sufferes embarrassment as management, as it does not have concepts of consensus, system in itself, and specific methodology different from other disciplines. For many years, management has been in "theory jungle". People have different perceptions on management, so they always use a self-deprecating and less-confident tone to explain this discipline in a way like, for example, "management is a science, but also an art." To make things even worse, many people who do management also do not recognize the value of their own work and do not think management is a profession which needs special learning and training to master.

1.1 Company Profit Comes from the Profit Model Rather Than Management

If the world we live in is really dominated by the God, then the God is not that fair and reasonable, some good people live in poverty and suffer difficulties, while some brutal people enjoy the splendor. However, if we complain about the God's injustice, he may give another explanation: He is fair, because no matter we are rich or poor, in pain or pleasure; he gave us a fair public resource, that is, the time. Time is a very special kind of resource; whether we are generous or stingy, it will just go away mercilessly. The God gives us 24 h a day, no more, no less, and we can neither store the time, nor advance it.

For ordinary people like us, factors like innate intelligence do not have great impact on our future life, and the thing really matters is the time. What kind of life we will live in the future, except for the environmental factor that we cannot

control, mostly depends on where we devote our time from the past to now. If you devote your time to reading, you will become a knowledgeable person; if you devote your time to building networks, you will become a person with wide range of social resources. In fact, even the environmental factor, which could be issues for some people, can be well controlled for the others. For example, for ordinary people, food safety and air quality are environmental issues for them, but for national policy makers, they are able to solve the issues. The reason for emphasizing the "ordinary people" is because management is primarily aimed at this group of people, who have both advantages and disadvantages, considering others as well as their own interests. The saints, God, and evils are the minority in the world and should not be the focus of management. They are never the cornerstone for either the long-term stability of a country, or the long-term prosperity of an enterprise. In fact, most outstanding managers and entrepreneurs are also ordinary people.

We are living in a complex world, but it does not mean that we need to look at the world with sophisticated eyes and take sophisticated approach. We can use sophisticated algorithm of calculating the happiness index, GDP, Gini index, CPI, PM2.5 etc., to make comprehensive comparison of the gap between countries, but we can also use intuitive and simple way to look at the differences between countries and regions like the video "Earth at night" released by National Aeronautics and Space Administration (NASA). In the society where people are highly associated with each other, those who can make their own free time are very enviable. The managers are people who can make use of others' time, while whose time is also taken up by others. The renowned management thinker Peter Drucker recognized this long time ago. He said "time is the scarcest resource. Without good time management, nothing can be assumed. The analysis of the time is also a way to systematically analyze and prioritize the work."[1]Therefore, if we observe the managers, especially the business and organizational decision-makers, see where they spend their time, we can easily detect if they really value management and really do something.

I have my reasons to emphasize the business decision-maker, that is, the top management of a company. Nowadays, everyone is talking about the importance of talents. Countries and companies have spent tremendous efforts and money in attracting talents. However, who can be called "talents"? Talents are not the people who master some particular ability, nor do those have special titles. Talents are those who can solve the major problems for the country or company. Although we may look at the company as a business entity, this entity does not directly serve us, nor provide us with the products, it is in fact the people within the entity who really do these things for us.

From the legal perspective, the juridical person is the one who can represent the company, not an office, not a position, but a specific, alive, and named person. There is only one juridical person for a company. Then, what are the major

---

[1]Ducker, P.F.: The Effective Executive. Heinemann, London (1967).

problems of a company? To the end, it will be problems of people, to be more specific, of the juridical person, or of the management team who makes decisions. If you are not clear about this, you will encounter the awkward situation that "you are the leader; however, you cannot lead anyone at the critical point of time." Some heroes are glorious only temporarily, because they do not understand their true value. Their true value lies in resolving the others' problems, but their problems may change along the time.

Many surveys were conducted to investigate how the corporate executives allocate their time, and these surveys were mostly conducted through interviews and observations. A simple observation can be used to judge how much the executives value their management work, that is, to look at the attendance rate of the EMBA and EDP students at each university. In interviews, people will consciously or unconsciously conceal the information that they do not think is good for them; however, the attendance rate is an objective fact. The students attending the EMBA or EDP classes are usually the senior management of their companies. They generally have to finish about ten management courses within a year or two. The tuition fees are not cheap, and the course contents are not as easy and pleasant as they listen to a speech from a well-known name or attend a short-time training program. According to my experiences of working at many universities, including the foreign universities, there are very few universities that do not require the students to sign on the attendance sheet and gave credits based on their attendance rate. Some universities even use fingerprint or charge "sponsorship fees" for the absent students to encourage the attendance of the students. Therefore, it seems not very easy to maintain a high attendance rate for these management courses. Many students are not active in attending classes, but enthusiastic about group activities. Some universities even invite people who have no theoretical foundation and practical experiences to gag "academic comics" to attract the students. Why do these executives dislike to attend the classes? Except for the pedagogic reasons like the course contents and teachers' capability, a very important reason is that they do not believe the value of management, and the teachers cannot convince them either. They think it is no better to put their time in classes than in negotiation with customers and business partners. They do not believe that management can solve the problems in their companies.

Generally speaking, management is not the major problem the executives face, especially for Chinese companies. People say "money is not everything, but without money you cannot achieve anything." Companies are profit-chasing organizations. Though many things need to be taken into consideration for a company, profit is one of the most important things on the list. Particularly for the executives in the listed companies, they have to report the profit to shareholders in a shorter period.

The profit of a company roughly comes from four areas: political profit, policy profit, business model profit, and management profit. Political profit has the highest profit margin. It refers to the economic gains through meeting some political

requirement (including meeting the personal requirements of the people who master the power). It is the result of transactions between politics and economy. The economic base determines the superstructure. Normal people need food to eat, clothes to wear, and rooms to live in. All peasant revolts happened because of the livelihood issues, and the livelihood issues are the foundation of a regime. Government cannot solve the livelihood issues without the involvement of business people. Politics and business can never walk on their own way since ancient times. Those people from as far away as Lu Buwei in the Qin Dynasty, to the "red top" Hu in the Qing Dynasty, to Hammer who was called a "red capitalist" by Lenin, to those who sponsored the American presidential campaign, which are all interpretations of the transaction between politics and economy. A company which does not study on politics and make use of politics cannot grow bigger. Don't we have a lot of entrepreneurs who are also delegates of National People's Congress (NPC) and members of the Chinese People's Political Consultative Conference (CPPCC)? Isn't the former president of South Korea Lee Myung-baka business man? Isn't Ruimin Zhang from Haier an alternate member of the CPC Central Committee? This is not unusual. Gaining political profit cannot be achieved through enhancing management.

Broadly speaking, policy profit is also a kind of political profit, but it has wider range of benefits, and these benefits are more open. Political profit is often materialized in the relationship between those who have power and those who have money, whereas policy profit reflects the relationship between the policies and companies. The most typical representative is the industry monopoly. The monopoly may be established either depending on the government, or the companies themselves. There is a well-known saying that "the first-class companies build up standards, the second-class companies explore market, the third-class companies develop technology, and the fourth-class companies make products." Monopoly is about to set a threshold to some extent, which could be technology (such as patents), or policy (such as National Grid), or national security (such as arms). Monopoly greatly enhances the position of the companies when negotiating with customers, that is, the ability to obtain profits. This ability has nothing to do with the management efficacy.

Business model reflects the status of a company in its business ecosystem; in other words, it reflects the status of a company in the business relationships with other companies, customers, suppliers, and so on. The core talents of the restaurants are chefs; however, McDonalds have no chefs at all; they earn money through systems. Therefore, business model is determined by strategies and has nothing to do with management.

When companies have to gain profits through enhancing their level of management, it indicates that the competition between companies becomes very intense, and the companies step into the bloody "Red Sea." Very few entrepreneurs want their companies to stay at this stage. If their companies come to this edge, they will find all the way to jump back to the profit modes of political, policy, and business models, reengineer their companies, and recreate the "Blue Sea."

   Profit comes from the outside of the companies, that is, the business relation-
ships with the outside world. Political profit comes from the relationship between
companies and politics (i.e., entrepreneurs and politicians). Policy profit comes
from the relationship between companies and government. Business model profit
comes from the relationship between companies and the other companies and peo-
ple. All of them are from the outside of the companies. Management which builds
its bases on the relationship between companies and their own employees cannot
bring profit for the company; it can only reduce or increase the cost for companies
in gaining profits.
   Political profit, policy profit, and business model profit can be collectively
referred to as profits from the profit model of companies. They are the main
sources of the company profits. Thus, the executives will spend most of their time
in working with government officials, government departments, customers, and
suppliers, instead of the internal management of the companies.

*Guanzi believed that "grasping the best opportunities is of first importance, and
concrete fighting plans are of second importance." People should follow devel-
opment trends of the time and grasp the main contradiction in this trend to seek
strategic advantage rather than rely on their intelligence and wisdom. The Art
of War also approves of this point of view by that "an expert at battle should
seek his victory from strategic advantage rather than demand it from his men."
The Romance of the Three Kingdoms actually talks about one topic, i.e. strategic
advantage from the outset of these stories, as it is said in the first paragraph of
this book "the general trend under heaven is that there is bound to be unification
after prolonged division and division after prolonged unification." Any person's
endeavor could not change the general trend. Although Zhuge Liang has always
been worshiped as a wisdom god in China, Shu Kingdom that he dedicated
is the earliest kingdom brought to ruin. No wonder there is an aphorism on a
couplet in his Chengdu Temple states that "If people do not follow the devel-
opment trends and seek strategic advantage to implement policy, then it would
bring about fault whether this policy is elastic or rigid." Similarly, Thirty-Six
Strategies help people to make a decision by effectively applying Yin and Yang to
create a beneficial strategic advantage rather than pondering one thing capri-
ciously. Just as the "Flowers Bloom in the Tree" says that "If a small army can
exploit external forces to create favorable conditions, it will be able to acquire
great energy."*

Company profit model should be built on understanding the social and political
trend of the society, looking at the major contradiction of the society according to
the trend, further analyze the business demand based on the major contradiction of
the society, and finally evaluate own value along with the business demand. The
contribution from the profit model to the growth and profit of the companies is
much bigger than management. As F. W. Taylor said in his "Principles of Scientific
Management," in many cases, if not in most cases, there is no clear relationship
between the quality of management and the success of the company. In many fail-
ure companies, their management is not bad, while in many profitable companies,

their management is just opposite. Companies like Kodak and Nokia face difficulties not because their management is not good, but their profit models do not acclimate to the trend of the time. In China, manufacturing profitability is not as good as that of the real estate industry; we cannot simply say that the management level in the real estate industry is higher than manufacturing.

Swiss watches are very popular in China, especially the expensive mechanical watches. Some government officials even lost their jobs because of wearing these expensive Swiss watches. The quality standard of watches in China is the industrial standard issued in 1991. The instantaneous walking time error of the calendar mechanical watch type I falls in −30 *to* +40 s *in a day is excellent goods. The mechanical watch accredited by the Swiss Official Chronometer Control (SOCO) has the day error from* −4 *to* +6 s. *The watchmakers who can make watches with such precision generally have more than ten years of working experiences. The certified chronometer Swiss watches usually cost more than CNY 10,000, or CNY 100,000, or even more expensive. The ordinary quartz watches have the day error within* 0.5 s *and cost very cheaply and generally without the indication of the "watchmaker." To achieve better time precision, you do not need a better watchmaker; instead, you only need to change a material. Similarly, to achieve a higher return, you do not need a better management; instead, you need another profit model. The famous brand, like Rolex, its annual sales is only* 3–4 *billion US dollars, not even higher than Shandong Commercial Group.*

Because of the importance of the profit model, the executives pay more attention to politics and economy over management. Many universities in China assign economists to be the deans of management schools. That is why so many topics of EMBA theses in strategy (although often be called as "strategy management". but it has little to do with management). Because of the little contribution of management to company profit, it seems reasonable for entrepreneurs and politicians looking down upon management.

1.2 The Value of Management Lies in Improving Efficiency and Reducing Risks

People say "gaining profits through management," but in fact, the company profits are determined by their profit models. The true value of management lies in realizing the profit models in a quick, cost-effective, and reliable manner. In other words, the true value of management is "increasing efficiency" and "controlling risks."

Many decision-makers in companies do not know the true value of management; in addition, in the process of developing market economy in China, we still have a lot of insufficiencies in terms of legislations and policies which result in higher profit margin by building up a better profit model than enhancing management. Therefore, they put a lot of energy on capital utilization, maintaining social

networks, and getting commercial contracts, etc., rather than on management. Some regions blindly pursue GDP and short-term benefits, which compels the companies to pursue the profit model with quick return, rather than to pursue better management.

Lessons of Li Zicheng are worthy of thinking for entrepreneurs. Normal people may think the failure of Li Zicheng is because of the indiscipline of the army and corruption of the officials. The typical argument is Guo Moruo's opinion. However, if you think through, Li Zicheng's lessons can be divided into two parts: the first half started from his dispatch in Mountain Shangluo to take Peking; and the second half started from his Shanhaiguan defeat to him being killed in Hubei province. In the first half, his offensive was formidable, because it conformed to the social trend. The severe corruption, natural disasters and widespread poverty in the end of Ming Dynasty made the "No Tax" profit model of Li Zicheng very attractive. However, after the Shanhaiguan defeat, Li Zicheng retreated and was soon wiped out; it was not because his model violated the general trend, but ignored the management. In the good situation, he failed to establish the base, and implement the land reform. Instead of allocating land to farmers, he just distributed food and property to people. Because he could not build a solid foundation, his army can only be called brigand. The bigger his army grew, the farther away he drifted from the people. Shanhaiguan defeat exacerbated the nonconfidence of the people, the surrendered officials and troops on Li Zicheng, and they betrayed him one after another, which resulted in the quick failure of Li Zicheng.

Li Zicheng's lessons tell us the fact that in order to improve the profitability, companies have to choose the right profit model; however, if there is only right profit model but without strengthening management, it will increase the company risks and finally lead to failure. Simply speaking, companies in the good situation are those which have the right profit model, and they should strengthen their management at this time, because employees have confidence in their company and it is easier for them to accept the management measures which may set constraints to them or change their behaviors. To the opposite, if companies are not in a good situation, they should firstly reflect on their profit model, but not simply strengthen their management, because once the employees have lost their confidence in the company future, there will be no effect to set constraints on them. Only if the employees believe "the future is bright," they will endure "the route is flexuous."

Profit model and management are the two wheels of the company survival and development. They are the two sides of a coin. Profit model can make us successful, but management can lead us to failure. With a good profit model, many companies do not improve their management, and it leads to the inefficiency and uncompetitiveness. When the risks increase the threshold, they just disappeared quickly. Many famous entrepreneurs lost their political profit, policy profit, and business model profit just because they ignored the "risks." Many namable politicians got into jail because they ignored the "risks." In addition, ignoring the

"efficiency" leads to the serious waste of land and resources. Ignoring both "risks" and "efficiency" makes many well-known companies go bankruptcy.

We can use political profit, policy profit, and business model profit to guide our investment decision-making, but the realization of the objectives should rely on the effective management. How to do the right things correctly is not a thing just the subordinates think about, but it should be the management who take careful consideration. It is the people who master the resources to make the decision, but once decided, it is the people who accomplish the tasks determine whether the expected results can be achieved. No one can bear risks for us.

Jerry-built is a major reason for quality issues. In fact, it is the management who can decide on "reducing materials"; the works can only decide on "working less."

People in the financial industry are most likely to believe that they master the resources, because they know the differences between owning resources and using resources, and they also know that money can beget money. "Investment" has become the most fanatical slogan. It's an "invest, and gain, invest again, and gain again" cycle. This profit model indeed makes people excited, and this thinking attracts a lot of investors (even if those who have no financial knowledge and take out their pensions to invest stocks can be called investors). In the old "Pinocchio" story, the cat and fox cheated puppet Pinocchio: If bury money into the ground, it will grow a cash cow fully covered with gold. Similarly, the ancient Chinese peasant expect the chicken egg regeneration cycle. Only multilevel marketing has similar fanaticism.

At 10:30 Beijing time on June 9, 2012, the "Buffett Lunch" 2012 auction results were announced. A bidder paid nearly $3,460,000 to obtain the eligibility to have lunch with Warren Buffett. This bid largely breakthrough the 2011 dealing record of $2,626,400. It is said that some Chinese entrepreneurs are very keen on this, so the "Godfather of the emerging market" Mobius specially mentioned the Chinese person who paid more than 2 million dollars just for a lunch with Buffett: "He wants to become the Chinese Warren Buffet, right? I bet he has no chance at all. The reason being when Buffet was young, he would never spend $20,000 having lunch with Graham. It is said that the Chinese guy even recommended stock for Buffet when they were having lunch. This is nothing more than to tell the world's most professional investors not to hold his stock. Recommending stocks in public is a taboo. Real investors believe that silence is golden. If he wants to raise the price of his stock through Buffet, then he has the occupational ethics problem. This Chinese guy has embarked on a crooked road, if I were his investor, I would consider redemption.
Morning news on May 15, 2013 Beijing time, American charity auction website Charity Buzz just finished an auction of having coffee with APPLE CEO Tim Cook. The final price is $610,000. According to the auction terms, the bidder will meet Cook for 30–60 min *in the headquarters of APPLE.*

In this world there are still many uncovered mysteries, one of those is that some people are called "God-man", like Warren Buffet, Steve Jobs from Apple, Matsushita, and Inamori. People worship these "God-men", and hope to become them by learning from them. However, this is a paradox, because if we worship them, then we had better not expect to make use of them or become them. Moreover, the ability of these God-men is born, and they themselves may not be able to figure out why they are so successful. You can use them to hype, but it will not last long. They themselves may not stay long as well. In fact, no enterprise can stay long just by relying on "God-men."

The investors decide their investment projects (including financial projects) according to their business models, political relationships, and policy advantages. This process is to decide what is right. Whether these projects can gain benefits (i.e., doing the right things correctly) is determined by the management effectiveness of their own and their investment objects.

> *The competition in the financial industry nowadays is very severe. With the entry of foreign banks, the competition will become even severer. To open the "blue sea", the financial industry needs to make different strategies, establish different organizational structures, systems, skills, staff, management styles and shared value. The seven "Ss" support each other, and their synergy forms the basis of the enterprise growth. Among the seven "Ss", the strategy determines the organizational structures. That means, different strategies are assured through different organizational structures. If two companies have the same organizational structure, the one which does not have an appropriate strategy will not effectively achieve its strategy. Although many banks have different names, but they share a similar organizational structure. We may detect that most banks do not form specific strategies, are not well prepared for competition. They are still operating by politics and policies.*
>
> *When business performs well, people expect to gain profits through working. Then opportunities from the stock market thick as hail, the management put more and more energy on the investments. However, this approach of one eye on business operation and the other eye on the stock market will not lead to good company performance. Focusing on the stock market will inevitably shift the concentration off the company business operation, and slow down the company development.*

<div align="right">

—Henry Ford • *The Great Management*

</div>

There is never a lack of talents in the financial industry. The banking sector, even the financial industry highly values economists. This is not wrong. However, though many regions and governments benefit from relying on economists' theories, we seldom see companies which develop well by following those theories. Those companies which adopted different, or even contradictory opinions, grow better and better. We cannot derive any statistic rules until the sample size is big enough. However, if we all obey these rules, the company will fall into the competitive "Red Ocean," and the survival of the company will be even difficult. Therefore, to some extent, to understand the economic theories is to better break them, and only in this way could the company continuously improve. Of course, the economic theories for government are helpful, because they can make use of the theories to make policies to help those weak companies which obey the economic rules, in order to assure the stability and order of the society.

A hundred years ago, F. W. Taylor got to understand that among a variety of industrial risks, the biggest risk was bad management. Management is like the villain, you may not become better if you do not offend them, but you will definitely get into trouble if you indeed offend them. Taylor also said "the most serious challenge faced by any system is the fierce competition, while labor costs are accounted for the most of the production cost. Only in such companies, we can hope to find the best form of management." This is because another feature of management is to improve efficiency. Good management can enable enterprises to produce more qualified products with fewer people in the same time frame and cost range, so the companies can reduce labor costs to improve business competitiveness.

Chairman Mao thought with the correct line the cadres become the decisive factor. For businesses, with the right profit model, the management is the decisive factor.

1.3 The Understanding of Personality Is the Foundation of Effective Management

The management is a science and an art. It reflects a fact that poor management practices exist despite a large number of related books available.

Due to lack of an understanding of the essence of management, many managers prefer so-called leadership art. As a result, sinology (e.g., management practices in history) has been very popular. To many managers, management is not a discipline which requires proper trainings. Some of them even refuse to recognize management as a discipline as many successful entrepreneurs did not go through formal training or have management-related qualification, e.g., Jobs, Bill Gates, Chuanzhi Liu, and Zhengfei Ren. These people are more interested in investing a lot in attending seminars of management gurus or securing an EMBA certification rather than receiving proper trainings at universities.

One businessman stated "what can be learned from the university? Has the lecturer on marketing ever sold a needle?" Many gynecology doctors are male. They never gave birth but have successfully provided various services to pregnant women. Doctors can provide medical advice to patients without suffering the same kind of diseases. The knowledge derived from scientific research is different from personal experience. No matter how successful, personal experience will never replace knowledge.

During EMBA classes, I always ask trainees some questions. The responses truly reflect the fact that many enterprise managers are lacking understandings of fundamentals of management.

For example, most trainees' answer was bank when they were asked which organization should be approached for funds. This seems to be a fair answer, but

clearly, there is a certain level of misunderstanding. The building with a signage of bank will not provide loan to you. Rather, those creditors will provide loans. Indeed, loans, salary, and contracts are all provided by human beings. No matter how specific related clauses are, someone will be in charge of decision-making for loan. This is due to the fact that specifications cannot replace human beings' judgement. Indeed, the main focus of management is people. Excellent management is not possible without great attention to people.

The fundamental difference between managers and other personnel lies in that they achieve their goals and realize their values through other people's work. Managers are not required if a work can be done automatically by means of tools and devices. Surely, we can apply management in other activities that require reasonable utilization of resources so that everyone becomes a manager. However, this will cause a mess in the management theory.

The value of management is reflected in efficiency improvement and risk reduction that both rely on human resources. A simple approach to improving efficiency is to employ someone with higher efficiency or lower salary to work for us. Some tasks can be completed by means of machines and equipment. These tasks have a comparatively higher level of stability which demands less for management. However, automatic processing is not possible for most of the important tasks in enterprises, e.g., the decision-making process. In other words, human beings will be in a dangerous position if all decision-making can be undertaken by computers. There is a certain level of risk associated with human resource management. Trust plays a critical role in delegating authorities. However, the trust must be based upon certain grounds.

Trainees were asked another question "do you wish truth or fake story from me?" Most of them said "truth." However, effectiveness is what managers pursue or rely on. Manager's statement is either effective or not, rather than true versus false. Indeed, there are various perspectives for a single matter. For instance, we have been encouraged to save others by sacrificing ourselves. However, according to the safety instruction in flights, we should wear safety masks in the first instance before helping others. We encourage generals to appreciate their soldiers. However, as shown in the following story, it has made soldiers' mother crying.

As a general of Kingdom Wei, Wu Qi was going to attack Zhongshan. Some soldiers were wounded. Wu Qi knelt and sucked the pus. This soldier's mother cried. She was asked "why did you cry even general Wu is so nice to your son?" She responded by saying "Some years ago General Wu did the same thing to my husband. My husband was motivated to battle and lost his life. Now General Wu is treating my son nicely as well. What happened to my husband may happen to my son as well."

—Liu Xiang • *Shuo yuan*

Guanzhong suffered from severe illness. Duke Huan of Qi visited him and asked "Apparently Zhongfu is very ill. If you passed away, who should I appoint as the Prime Minister?" Guanzhong did not respond. Duke Huan of Qi further asked "is Baoshuya a good candidate?" Guanzhong replied "Baoshuya is too noble to act as the Prime

Minister. He is so honest and fair that he may extremely hate those not that fair. He will never forget mistakes made by others."

<div align="right">

—Guanzi • *Of Failure Caused by Wrong Tactics*

</div>

It is well known that there are certain rules for literature. These matrices can be used for evaluation of performance such as Nobel Prize in Literature. However, the litterateur takes different perspectives on literature from managers. This is exactly why Chairman Mao emphasized "who does literature serve?" This is a critical issue from management point of view. This also applied to religions (e.g., crusades). Managers place more focuses on effectiveness rather than being true or false. Similarly, managers are more interested in the competency and value of personnel. Indeed, the emphasis of management is on relative effectiveness rather than absolute answers. No one will be good or bad for ever. Management is end-product-oriented which relies on competency of personnel. All businesses should be trustworthy. However, no one will disclose confidential information (e.g., net price and supply chain) to anyone else.

Many people suggested Liu Bang should not employ Chen Ping as he was regarded as crafty. However, Liu Bang employed Chen Ping as the Prime Minister of Han Dynasty. Wei Wuzhi, the referee of Chen Ping made such advice to Liu Bang "will you employ Weisheng and Xiaoji if they are still alive?" Weisheng died to his agreement and Xiaoji was a filial son. Both were exemplars for being nice and noble. However, Liu Bang perceived that it was not that useful to be such nice and noble under the throat-cut environment. Chen Ping had made some effective plans for Liu Bang that worked very well. These plans would not be taken by those noble people. According to Shiba Ryōtārō, a number of theories have been proposed and used since the ancient time. In fact, many of these stories were established on the fragile basis such as lie. Liu Bang did not have knowledge. As a result, he was not affected by hypocritical issues associated with the Confucian school and the Taoist school.

<div align="right">

—Shiba Ryōtārō • *Xiang Yu and Liu Bang*

</div>

Management refers to doing right things properly using the right method with right people. In essence, managers rely on right methods that can also be learned. Other key elements to success rely on right methods. Indeed, right methods are the core of management education. Right methods in project management will be further discussed in other chapters of this book. In addition, management is more flexible than other disciplines, i.e., all roads lead to Rome. However, all right and effective methods share the same characteristic, i.e., an understanding of personality. Many management failures are due to lack of an understanding of personality or even deliberately denying personality. The most common phenomenon is fulfilling one person's demand by sacrificing all others.

The reason why he could make Qi become the strongest state of five overlords in the Spring and Autumn Period was that he recognized deeply that "policies can be carried out if they are in accordance with the will of the people; policies will be annulled if they are against the will of the people. The people hate hardship and I am going to make them happy; the people hate poverty and I am going to enrich them; the people hate disaster and I am going to secure their safety; the people hate being uprooted and I am going to help them in propagating themselves. If I can make them happy, they will worry about my

problems in return; if I can enrich them, they will put up with poverty for my own sake; if I can secure their safety, they will support me any time when I am in danger; if I can help them in propagating themselves, they will devote their lives for me."

—Guanzi • *On Governing the People*

During the annual meeting, it is not unusual that the boss kept talking about the future of the company, while employees were playing their smartphones. I did an experiment in a high-tech company. After an annual general meeting, all employees were invited to join the party where lucky numbers would be drawn. The employee picked up would be able to win a prize only if he/she can answer a randomly selected question. At 11 pm, the chairman drew the number for the first prize. A professional staff member was picked up yet to answer a question related to marketing. Surprisingly, she had no problem to answer this question at all and consequently took the first prize, a notebook computer. It was found that all employees have tried to remember all contents in the memo. They were afraid of being picked up but did not know the answer.

1.4 Fundamentals of Effective Management

James P. Lewis, an American management guru stated "many people want to become managers even though many of them are not willing to manage." In fact, this is mainly attributed to their misunderstanding of the complex nature of project management.

There are a number of managerial concepts. Harold Koontz proposed the concept of "management theory jungle." "What Management Is" published by Joan Magretta and Nan Stone was rewarded as the most popular book in 2002 by Economist and Business Weekly. This clearly indicates the importance of clarifying the essence of management.

The following simple exercise can be used to assist in understanding the essence of management. This exercise simulates the management process in practice. During this exercise, complex management activities are simplified; however, key issues are highlighted. Effective conclusions can be drawn by summarizing solutions to these issues.

This is a group exercise with two rules: enthusiasm and disciplined; and telling truth.
Everyone was provided an A4 sheet. They were asked to use both hands to press two ends of the paper. They were then asked to close their eyes until the instructions are made by the trainer.
Instructions of the trainer were as follows:

First, fold the paper as tidy as possible. Then, tear a square with 1 cm length each based on the top right angle of the paper.

Second, fold the paper again. Then, tear a triangle with 1 cm length each based on the top left angle of the paper. Then, tear a quarter-circle with a radius of 1 cm based on the bottom right angle of the paper.

Third, fold the paper again. Then, tear a triangle with 1 cm length each based on the top right angle of the paper. Then, tear a quarter-circle with a radius of 1 cm based on the bottom right angle of the paper.

Once all finished, trainees were asked to open their eyes and unfold the paper. They were asked to compare the end products of this exercise. During this exercise, the trainer took actions according to his instructions as well, although he kept his eyes open.

It is interesting to find that no one produced the same thing with others, even under the same instructions.

This exercise simulated the behavior of the leader (trainer) and employees (trainees). To achieve a certain goal, the leader provides clear instructions. Employees took these instructions seriously but did not achieve the desired outcome. In other words, something went wrong during the management process. So, what went wrong?

In summary, there are five managerial issues reflected from the above exercise.

1. Lack of clarity of instructions

It is not unusual that employees have their own interpretation of instructions. There are many ways to handle each step of the exercise. There is lack of clarity of instructions.

Many employees have written report for the boss. They have similar experience that a report cannot be completed until numerous amendments. In addition, new problems emerged from every draft which was shown to the boss. A common question is "why can't the boss tell us precisely what he needs?" The reality is the boss most possibly does not know precisely what he wants at the beginning. His mind may get clarified when he was shown the report. It is also common that senior executives learn from criticizing employees.

It takes two to tango. Employees also bear the responsibility. During a number of exercises with a different group of trainees, very few of them asked for clarifications.

There are a number of reasons, e.g., (1) no time given by the trainer for questions; (2) they thought they understood instructions clearly; and (3) they perceive this is just a game.

These psychological issues exist in management practices as well. During this exercise, all psychological activities of trainees are normal. However, these psychological activities led to undesired management outcomes.

2. Lack of clear goals

During the exercise, the trainer never explained the final shape of the paper. Similarly, almost all trainees admitted that they never thought about the final shape of the paper.

A common assumption made during management practices is the goal of enterprise can be decomposed and assigned to each department. The achievement of goal of each department will guarantee the achievement of the enterprise's goal.
In Fig. 1.1, an assumption was made for the simplest scenario, i.e., only two departments in the enterprise. According to the principle of goal decomposition, the goal of enterprise can be decomposed and assigned to each department A and department B. However, a critical issue of such practice is lack of adaptation capacity to the changing environment. Two departments' performance is shown in Fig. 1.2 during the environmental changes. Some of department goals were not achieved, while others were exceeded. Both scenarios have negative impacts on the enterprise. On the one hand, inventory is required for excessive production. On the other hand, the enterprise did not reach the desired outcome if some of departments' goals were not achieved. However, each department will ask for bonus from their own perspectives for those exceeded goals.
Therefore, achievement of goal of each department will guarantee the achievement of the enterprise's goal.

We could be narrow-minded even though an overall goal exists. The issue can exaggerate if such an overall goal is not clearly defined.

3. Lack of process monitoring

During the exercise, mistakes are inevitable as trainees had their eyes closed. By contrary, the leader (trainer) had his eyes opened. However, the leader did not rectify these mistakes for a variety of reasons. In practice, these reasons include mismatch between performance evaluation cycle and goal management; and unawareness of leaders on the mistakes made by employees. Currently, there is a growing attention from senior management on performance evaluation. However, most of these cavities are postevent check (e.g., forensic pathology), which is not helpful to take corrective measures and consequently improve the organizational performance.

Fig. 1.1 Breakdown of goal
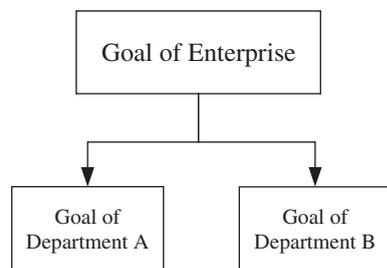
Fig. 1.2 Achievement of goal
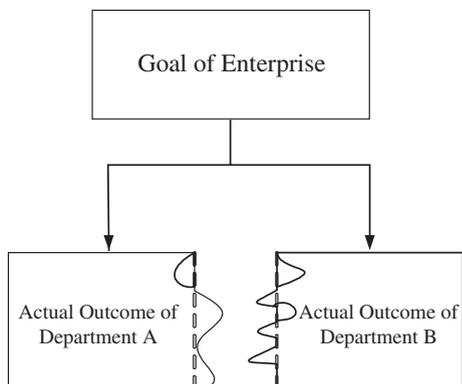
It is also worth noting that very few employees proactively demand the confirmation from leader of their work during the exercise. They may perceive they have done right, or gauge leader's intension, or simply follow other employees.

4. Lack of tools

In practice, there would be another situation: Although subordinates understand the intention of the leader, the products were not satisfactory. This is because the leader did not provide tools and the subordinates work based on their understandings.

One important difference between human beings and other animals is the ability to create and use tools. Similarly, the ability to create and use management tools distinguishes excellent companies from the average ones.

5. Blindness actions

Another critical issue is that all trainees had their eyes closed during the exercise. This is common in practice as we are always told to do our own stuff. Similarly, there is misconception that it is easy to manage by hiding information from employees due to mysterious power.

This is detrimental to the communication between the leader and employees, and between departments.

6. Lack of incentives

Another managerial issue derived from this exercise is lack of predefined incentives, which does not motivate all trainees to strive for optimal outcomes.

These are all typical managerial issues that affect the essence of management.

Effective management methods are applicable to ordinary people that have their own target apart from contributing to the enterprise. Those talents are ordinary people as well by nature. It is not appropriate to expect everyone to be noble and self-disciplined. Management and moral cannot replace each other. This has to be taken into consideration when managing projects.

Chapter 2
Enterprise Cannot Survive Without Projects

Any circumstance hitting a limit will begin to change. Change would in turn lead to an unimpeded state, and then lead to continuity. If someone obey rules of moral and law, his or her life would be very smooth.

—Book of Changes

We live in an era of great revolution. As a result, a number of new products emerged, which brings new kinds of experience and achievements. At the same time, depression and failure is accompanied. Both "deep reform" and "continuous innovation" place emphasis on changes. Many people, especially senior executives of enterprises, are struggling with the paradox of failure with or without changes. Projects exist for dealing with changes. It provides a way of surviving and developing to accommodate these challenges.

2.1 Issues Associated with Successful Experiences

What is most dangerous to a successful enterprise or individual? The following parable may provide a clue.

There was an old man selling straw hats. During a hot summer day, he took a rest under a tree with a straw hat on his head. A stack of straw hats were put aside. When he woke up, all straw hats disappeared. Sooner he found that all straw hats were taken by monkeys. With knowledge that monkeys tended to imitate human being's behavior, he threw his straw hat to the ground. Not surprisingly, monkeys followed the lead. He was very happy to have all straw hats back and passed on this experience to his family.

A few years later, his grandson experienced the similar situation. He recalled the story told by his grandfather and threw his straw hat to the ground. The tactic did not work this time. Monkeys not only kept their straw hats, but also took away

those on the ground. He was confused why the experience from his grandfather did not work. Suddenly, one monkey said: "Everyone has grandfather!"
As shown in this parable, past successful experience should not be used as the only guidance for future works.

The contemporary business environment is featured with turbulence. It is not appropriate for enterprises or individuals to purely rely on previous successful experience.

Why the previous successful experience is not dangerous for a successful enterprise? There is only one reason, i.e., changes. We are within an environment which is changing constantly. Furthermore, the speed of changing is growing.

In 1990, Mr. Jack Welch, former CEO of General Electric, made a prediction that "compared to the growth rate in 1990s, the pace of 1980s is like picnic and walking in parks." In 1999, Mr. Bill Gates, former CEO of Microsoft, predicted that "with the growth of digitalization, the changes to enterprises in next 10 years will be equivalent to those been made in last five decades." To address this challenge, Bill wrote a book "Business @ the Speed of Thought." However, he did not realize that even such a new way of business thinking cannot fulfill the demands derived from the fast change. Ten years' time, Microsoft did not realize that mobile terminals such as tablets and mobile phones are replacing notebooks gradually. In fact, Microsoft has fallen much behind from iOS and Android in terms of the operation system of mobile terminals. The last decade has witnessed the fallen of giants such as Kodak, Nokia, BlackBerry, Sharp, Panasonic, LG, and Hummer. By contrast, other enterprises are rising such as Google and Samsung. Under the modern business environment, it is not unusual that enterprises lose their competitive advantages in comparatively short period of time. One of the typical examples is that Apple is facing significant challenges from Samsung.

The significance of experience depends on the similarity between the past and the future. In such a fast changing environment, the previous successful experience becomes irrelevant to the environment, even becoming a risk. This is especially the case for successful enterprises and individuals. This is mainly due to the fact that they have more successful experience and are more confidence to rely on this experience!

There is a common speaking in Western countries, i.e., nothing is certain but death and taxes. For enterprises, nothing is certain but competition and insolvent. All enterprises are facing fierce competition. Even for those enterprises in the monopolized market, it is not appropriate to perceive a safe future.

PricewaterhouseCoopers released a research report in 2011 on the long-term incentive mechanisms for Chinese enterprises. According to this report, small- to medium-sized enterprises in China only lasted for 25 years on average. The 2012 bankrupt auditing report released by the Zhejiang Higher People's Court on May 6, 2013, showed that there had been 65 insolvent cases in the first season, nearly

half of the total number of cases in 2012. As an indicator of the national economy, the economy of Zhejiang Province is in a predicament which brings financial difficulties to banking sector.

As the largest manufacturer of modern office equipment and the inventor of photocopier, Xerox has enjoyed a glorious era. Indeed, for a certain period of time, Xerox has been regarded as equivalent to photocopying. With the leading-edge photocopying technologies, Xerox has joined the Fortune Global 500 list, ranked 182th in 1999. In 1998, the total revenue of Xerox reached more than US$20 billion, with company assets of more than US$30 billion and profit of US$395 million. Only one year later, this giant struggled in the market. Its share market value was as low as US$8 billion with a debit of US$18 billion. In the end, Xerox went bankrupt and was acquired by other companies.

A typical example of glorious stories in high-tech sector is Apple. However, even high-tech firms are facing enormous pressures in terms of business competition. A number of Chinese high-tech firms proactively pursue public listing. These entrepreneurs either have transformed their business (e.g., Mr. Lei Ding) or are on their way of transformation (e.g., Mr Yun Ma). This is mainly attributed to the dilemma of annual reports. On the one hand, a negative annual report results in falling share prices. On the other hand, a positive annual report with less profit will bring the general manager into trouble.

In the USA, only 6 out of 1000 high-tech firms secured investment from venture capital funds for their business proposals, among which only 10 % can successfully be public-listed. More than 60 % of these companies went bankrupt or with minor profit. In those successfully public-listed companies, a vast majority of them did not enjoy the long-term success. In past 17 years, only 4 % of public-listed companies in the technology category have their share price grow by 67 %. In other words, 96 % of high-tech public-listed firms only generated one-third of the total value after having been public-listed. The success of high-tech firms has become special cases rather than a rule.

According to many people, Apple cannot be defeated. Since the release of iPhone in 2007, the global revenue of Apple has roared from US$24.6 billion to US$156.5 billion. However, the share price of Apple dropped to a historic low of just over US$398. This was the first time that the Apple's share price dropped below US$400. As a result, the share price of Apple declined nearly 43 % since September 2012, resulting in around US$289 billion of loss from the market.

The era has gone that someone will get security of job and promoted as long as working as instructed. Enterprises are facing significant challenges of "terminator era" where the average life of enterprises is much lower than the career life of individuals. Even giants like Microsoft keep reminding themselves that it may take only 18 months from the involvements. Under such context, it is not feasible to

expect loyalty from employees. Indeed, many employees are loyal to their professions or occupancies, rather than the enterprise they work for.

"Those staffs made redundant were not aware of that at all. Prior to the interview, all procedures went through. Sooner after they were called into the meeting room, their mailbox, human resources directory, and IC card were deregistered. They have to leave the company in next two hours." Such a scene is not unusual in practice. In the fast moving era, no enterprise can guarantee employees the future. For survival and further development, a number of actions could be taken by enterprises such as transformation, merger and acquisition and closedown. Not being loyal to employees, how could enterprises expect loyalty from employees?
On June 11, 2011, Mr. GenshengNiu left Mengniu Dairy Co. Ltd. for the so-called dedicated charity. This famous entrepreneur has gained reputation for representing domestic brand and charity. Since then, Mengniu Dairy Co. Ltd. enjoys a new era.

The rapid change within the business environment has forced enterprises to be adaptive. As a result, employees have to face a number of challenges in their career. The fierce competition not only presents significant risks to enterprises but also leaves everyone in an instable social environment. It is imperative for enterprises and individuals to explore ways to survive and sustain development in such fierce competitive environment.

This not only applies to enterprises but also applies to regions and countries. Ghost town in Ordos and Icelandic financial crisis are two of typical examples. There seems to be a number of drivers, but essentially, it is due to changes. These include changes to economic situations, business environments, customer requirements, and attitudes of individuals. These changes occurred either slowly or dramatically. Those countries, enterprises, and individuals not responsive to changes will struggle.

2.2 Effective Measures to Deal with Changes

Negative psychological behavior such as complaint and depression is mainly derived from the confusion between the environment and problems. We cannot change environment but are able to deal with problems. Change is not our problem. Rather, it is an environment we have to face. It is imperative to understand that it is not our problem if we cannot decide or change. Many people are used to mixing the environment with problems and simply blame the external environment. It is not unusual that we are told that "it will be great the executive is in this seminar" or "if it is not a state-owned enterprise, we will succeed." This is a typical behavior of blaming others, which is a reflection of confusion between the environment and problem.

As change is inevitable, the only thing enterprise can do is to adapt to changes. Therefore, the most critical issue managers should consider is how the enterprise can adapt to changes. Indeed, this is the most crucial strategy for the enterprise to survive and sustain development. The book "Who Moved My Cheese?" is very popular as it points out that human beings have to adapt their own behavior according to changes. However, Spencer Johnson does not explain how we can adapt to changes!

Christopher Columbus was a well-respected explorer and voyager. There is also Columbus style of managers. Their management style is very ad hoc without a good plan in place. This is not useful for enterprises to deal with changes.

There are generally three ways to adapt to environmental changes.

The first approach is to learn. A number of new products, things, ideas, and phenomenon emerged. As a result, we should learn new theories, technologies, tools, and methodologies accordingly.

Training has drawn a growing attention. When Jack Welch took over the CEO of General Electric, he cut the budget of almost all departments. However, US$45 million was invested in the GE training center, which well paid off. GE gained remarkable success due to well-trained human resources.
All universities are crowded at weekends. A variety of training camps such as CEO, EMBA, and sinology have become the most profitable business of universities. With some connections with Harvard University or MIT, these training camps charge at a very high rate, although the quality varies significantly.

It is not doubtable that many executives participate in these training camps for learning. New knowledge and technologies emerge constantly. To keep pace with the market, an enterprise has to maintain an adequate learning capability. As a result, learning enterprises have gained a wider popularity.

Some enterprises regard trainings as the best welfare to employees. In fact, such statement is not that appropriate. If training is welfare, employees can use it for anything else not relevant to the enterprise. For future-oriented enterprises, training is not only the best welfare to employees, but also the necessary operational activities. Consequently, enterprises should have a good planning of training contents and reasonable investment. Similarly, training outcomes should be evaluated.

In a comparatively stable environment, those enterprises capable of learning are always able to achieve the competitiveness advantages. However, due to rapidly changing environment and fierce competition, in most cases, resources are only allocated to those most competitive enterprises. In general, only the champion is recognized by the market. As a consequence, enterprise cannot succeed by simply learning. This is due to the fact that those to be learned are not the most advanced, not to mention the amount of time required to learn. It is likely that what you are learning becomes outdated before you have mastered it (see Fig. 2.1). This is compounded by the fact that the time required to learn new thing will increase along with our age.
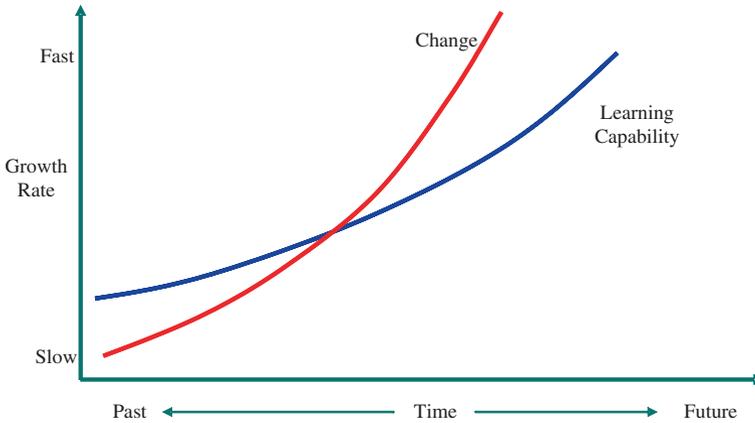
Fig. 2.1 Change and learning capability curve

The importance of training is well recognized in both military and business con-texts. There is a growing awareness of the critical role of training to employees. Enterprises are willing to invest time and money in training their staff members. From a long-term perspective, trainings are helpful to improve the competency of employees. However, it is not necessary beneficial to the enterprise. Effectiveness of technological and skill trainings is straightforward. By contrast, it may take a long period of time to capitalize from management trainings. It is not unusual that employees are motivated during trainings and then back to normal afterward. In some cases, there are negative outcomes from trainings. Employees did not have their management awareness and skills improved as their managers expected. Rather, they found excuses to criticize the enterprise through the training. Some observations are as follows: It is difficult to manage employees because they are too smart. Employees become smarter as a consequence of training, which makes it even more difficult to manage.

Normally, the HR department is in charge of internal training. In extreme cases, a training manager is responsible for running training sessions. It is very rare that executives are part of a training process. This is probably the reason why a num-ber of trainees state "it will be good if our general manager is here as well." By contrast, executives frequently join the marketing analysis meeting, technological analysis meeting, financial analysis meeting, and even sports event. Internal train-ing is largely overlooked by executives.

The second approach to adapting to changing environment is innovation. Learning means following. Even if following very closely, learning does not indicate lead-ing. Under the context of fierce completion, innovation has featured the agenda of many enterprises, regions, and countries.

According to Mr. Andrew Grove, followers will not succeed. "When driving in the fog, it is a lot easier to drive fast if we are chasing the taillights of the car ahead of us. The danger in the "taillight" strategy is that, once we catch up and pass the car ahead of us, we will find ourselves without a set of taillights to follow. And we may not have the confidence and competence to set our course in a new direction." Therefore, "… early movers are most influential to the future industry structure and to change the rules of the game. It is more likely to achieve success if taking actions earlier."

—Andrew Grove • *Only the Paranoid Survive*

As the baseline of survival, profit is the issue which has to be taken into consideration by every single enterprise. What are sources of profit? Profit comes from the innovative advantage of the enterprise. Profit will disappear if the enterprises lose the innovative advantage. Therefore, in order to adapt to the environmental changes, enterprise should learn to do something different from previous experience that is non-repetitive.

A simple curve can be used to depict the value-adding potentials in each component of value chain (see Fig. 2.2). This curve appears like a "smile" and therefore is called "smiling curve."

In Fig. 2.2, value-adding potential is the largest at two ends of the curve. They come from the R&D and service activities within the value chain.

A typical example of high added value from R&D is the rapid growth of Apple via iPhone. There is also high added value from service within the value chain. The massive business value associated with service has attracted attention from multinational companies worldwide. As Mr. Peter Drucker stated, "the only thing customer wants to know is the service or products he will receive. What he cares most is his value, demand and status. From this perspective, everyone should try to show that our service is customer-oriented, based on their situation, environment, behaviour, expectation and value."

Another typical example is the transformation of IBM from a computer supplier to a service-oriented enterprise. An IT hardware supplier is transformed to a

Fig. 2.2 Smiling curve
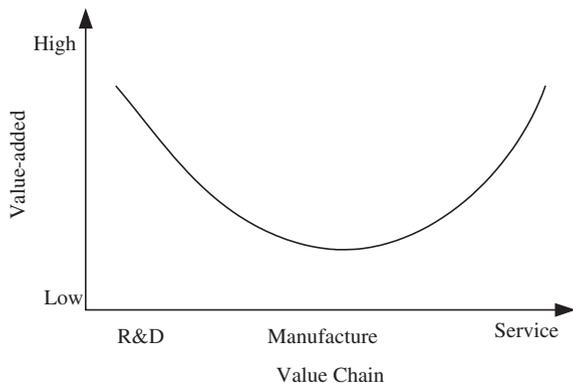
one-stop solution supplier which provides comprehensive services to clients. As a result, IBM has become an elephant which can dance.

The theme of IBM between 1992 and 1996 is survival. Accordingly, IBM aimed to provide one-stop solution by integrating software and hardware to meet customers' requirements. IBM's situation was largely improved; however, not all products gained profit. In the next 6 years, IBM devoted itself to transforming to an "IT service company" where service is the core business driving hardware and software sales. During this period, IBM acquired a number of software products and consultancies. As a result, service and software replaced hardware to become the main source of revenue, while the profitability of the entire enterprise improved. Since 2003, IBM has paid attention to the business integration at the global scale. Service, software, and high-end hardware become the major businesses. By means of global integration of sales, R&D, implementation, and delivery, IBM shaped as a partner to assist clients to achieve their business goal. As a result, IBM has its profitability and productivity largely improved. Indeed, IBM is an exemplar for the global integration of enterprises.

R&D and service activities share one common feature, i.e., non-repetitive. These activities are subject to changes in customers' requirements. As shown in the smiling curve, manufacturing activities have the lowest added value. China is regarded as the world's factory. Within such environment, it is crucial for every single manager to explore the way to achieve the largest added value.

Thomas Alva Edison was an American inventor and businessman. Dubbed "The Wizard of Menlo Park," he held a number of patents under his name. He was one of the first inventors to apply the principles of mass production and large-scale teamwork to the process of invention. He owned more than 2000 inventions, including the phonograph, the motion picture camera, and the tungsten bulb. As a prolific inventor, Edison held 1093 US patents under his name and more than 400 patents in the UK, France, and Germany. Edison General Electric Company (the predecessor of GE) was established in 1890. Edison is the greatest inventor and his record in terms of number of inventions has never been broken. In October 22, 1879, Edison ignited the first electric light bulb that was commercially practical. After experiments with more than 6000 materials, Edison and his team discovered a carbonized bamboo filament that could last over 1200 h. As a result, a long-lasting, practical electric light bulb is achieved.

In 1956, Genrich Altshuller and Raphael Shapiro's "On the psychology of inventive creation" was published in "Issues in Psychology." This paper presented groundbreaking findings in the field of innovative psychology. In past, psychologists believed that inventions took place occasionally. Genrich Altshuller reviewed a number of patent abstracts in order to find out in what way the innovation had taken place and developed the concept of technical

contradictions. He argued that a number of technical contradictions can be solved comparatively easily by means of basic principles. As he stated, "you can either wait for 100 years to gain insights or solve the problem within 15 min by using these principles." In 1969, Genrich Altshuller published a new book: Algorithm of Inventing. In this book, 40 inventive principles (i.e., the first complete set of principles to solve complex problems) were proposed. He proposed "the theory of inventive problem solving" (TIPS). Currently, TIPS has "been applied in a number of engineering fields to develop the innovative solutions. However, there are very few successful cases of applying TIPS in management decisions.

During examinations, students often say "Answers are much more difficult than examination questions." Similarly, "the process to control innovation is much more difficult than the innovation itself." There are much more inventions reached via inspiration than scientific experiments. Of course, rigid logic and scientific evidence should be sought post the invention. This is especially the case in the management decisions which is called "leadership art" and "leadership intelligence." This is not only the beauty of innovation but also a significant challenge to managers. Steve Jobs is popular as he brought surprise all the time. His successor, Tim Cook is often criticized as all are expected. In fact, managers should pursue the controllable rather than surprise. From this perspective, Steve Jobs is an entrepreneur with excellent innovative inspiration and capability. By contrast, Tim Cook is more like a professional manager.

In a dramatically changing environment, it is a luxury to wait for unknown innovation. Therefore, enterprises should not rely on those innovations unexpected or difficult to control. Innovation is always associated risks. This is exactly the reason why we expect and admire heroes. Excellent entrepreneurs have unexpected intuition and inspiration. As a result, experiences drawn from their success seem less useful to others, despite some inspirational effects. The return of investing a large amount of money to having a meal with Warren Buffett is very little except some advertisement effects. More importantly, Warren Buffett's enterprise is in a most dangerous position as he will pass away one day. Similarly, it is not feasible to expect Warren Buffett always has the proper intuition. This is the reason why innovation is advocated largely in concept rather in practice.

The third approach to adapting to environmental change is cooperation. New products, demands, and ideas are proposed by someone(s). The styles of these people vary significantly. However, very few of them have ongoing innovative capacity as Edison. Similarly, new concepts are generated from a variety of sources. From a management perspective, it is better to cooperate with them than to learn from them.

Steve Jobs' iPhone is the most successful product in recent years. Excellent industrial design and unexpected application functions provide enormous economic benefits and brand value to Apple. Steve Jobs is also regarded as the best entrepreneur. However, there is always someone stronger. iOS has been prison broken constantly. It is not effective for Apple to invest in a new operation system.

The product costing a large amount of resources might be cracked by some talents when eating hamburger. It is an appropriate decision for Apple to cooperate with these talents, no matter how good Steve Jobs is.

Comex is a famous prison-breaking hacker who developed the JailbreakMe 3.0 to crack iPad2. On August 26, 2011, he announced via Twitter that he had been invited to join Apple as an apprentice. His real name is Nicholas Allegra, a gifted student of Brown University. He was only 19 years of age that time. Forbes had an exclusive interview with him which displayed various aspects of this talent programmer. At the end of the interview, the columnist from Forbes suggested Apple to recruit Nicholas Allegra. It was beyond everyone's imagination that Apple took actions so quickly. Comex did not disclose his work assigned by Apple. However, it will definitely not be developing prison-breaking tools.

In fact, the attractiveness of iPhone largely came from a large number of unknown Apps developers. Apple simply provides a platform for them to show their talents. Currently, Samsung is the biggest rival of Apple. However, there is nobody in Samsung well known as Steve Jobs.

Most of enterprises are facing a similar issue, i.e., retaining employees fit into the enterprise. However, is this really an issue which needs to be resolved? From economic rationality perspective, no economic benefit will be generated from inside of an enterprise. Rather, benefits are generated from the exchange between the enterprise and other organizations. An enterprise will not be able to produce profit and hence survive without the marketing relationship with customers as well as business relationships with suppliers and subcontractors. From this perspective, all internal activities are costs. Retaining talents itself is an activity which increases the enterprise cost. Therefore, it is not appropriate to retain staff unless such an activity can provide more profits for the enterprise. However, it is a proper but not necessary action to retain talents. This is due to the fact that there are more approaches than retaining talents for enterprises to earn profits. Indeed, it is imperative to distinguish goals from processes.

Talents owned by the enterprise are a kind of risk cost. Rapid changes of the business environment present significant threats to the enterprise due to rapid depreciation. With a growing salary of talented staff, it is more costly to own them fully. As a consequence, the input–output ratio declined. In addition, professionals are more inclined to be loyal to their professions rather than an individual enterprise. The number of freelances grows continuously. As a consequence, enterprises will place more focuses on those sectors they are most capable of. Indeed, an increasing number of projects will be undertaken by multiple enterprises due to this reason.

A simple way for an enterprise to adapt to changes (and continuously) is to acquire those enterprises that are capable of adapting to environmental changes. Similarly, the simplest way to grasp the most advanced technology is to recruit personnel familiar with this technology. Therefore, the BOT type of enterprise can

last longer under a rapidly changing environment. BOT refers to acquiring qualified companies when business opportunities emerged (B, Build), running this business (O, Operate), and closing down or transferring the business when the business opportunity has gone (T, Transfer). The BOT approach benefits both small- and medium-sized firms but also large-scale firms.

IBM experienced a difficult period of time during the late 1990s. Under the leadership of Mr. Louis V. Gerstner, IBM was transformed from a hardware manufacturer to one-stop solution service provider. In the manufacturing sector, standardized products can be provided to different customers. For instance, computers of schools, governments, army, and companies are literally the same. By contrast, the service sectors are entirely different. Service varies significantly in different sectors and organizations. As a result, service has to be customized. How did IBM achieve this?

BOT is one of the most critical approaches that allow this transformation in IBM. In 2002, the entire consultancy sector suffered from creditworthiness crisis due to the Enron scandal. However, IBM went ahead to invest around 3.5 billion US$ in acquiring the PricewaterhouseCoopers. By contrast, it only costed Lenovo 1.25 billion US$ to acquire the ThinkPad notebook business. Other acquisitions include the following:

- *Lotus, 1996, office automation*
- *Tivoli, 1997, IT systems management*
- *Informix, 2002, database market share*
- *Rational, 2003, development tools and project management capacity*
- *Cognos, 2007, business intelligence capacity*
- *SPSS, 2009, data analysis functions*

In addition, IBM got rid of some businesses such as hardware manufacturing. All these actions have allowed IBM to become an enterprise capable of adapting according to demands. IBM is also widely recognized as the best project-oriented enterprise. Indeed, IBM has become an exemplar of business integration at the global scale.

By using the BOT approach, enterprises can survive and sustain development in a changing environment. This is attributed to the adaptive capability of enterprises to eliminate those outdated and unprofitable businesses. In other words, enterprises may have to sacrifice some businesses proactively for the benefit of the whole organization. There are three conditions for the utilization of the BOT approach, i.e., fund, qualification, and knowledge. Available fund allows the enterprise to pay for partners and acquire required businesses. The changing era is full of risks. It is difficult to locate partners unless funds are made available. As defined in the legislation, it is compulsory to cooperate with firms with relevant qualifications. Qualification of construction firms, patents of high-tech companies, and registration of business mark are typical examples. Knowledge is the specialized technology and methods for the enterprise to undertake projects, which is necessary for working with partners.

Learning, innovation, and cooperation are three approaches for enterprises to deal with changes and to survive and sustain development in a changing environment. Among these three approaches, cooperation is the most effective, sustainable, and manageable. All cooperation activities undertaken by enterprises are undertaken in the form of projects.

2.3 Project Paves Way for Enterprise Success

Under the context of fierce competition, enterprises cannot afford repetitive mistakes. Rather than relying on previous successful experience, they should pay attention to those non-repetitive activities. Enterprises have to be responsive to accommodating every single customer's demand. One way of doing that is to become a knowledge-oriented enterprise. This is not achievable without proper project management. Enterprises will struggle if they are not project-oriented or do not manage project successfully. Operation thinking has to be replaced by project thinking when running an enterprise.

An experienced hound was chasing up a rabbit. This hound was very strong and ran very fast. However, rabbit managed to escape. One monkey laughed at the hound by saying "it is shameful that you cannot catch rabbit even you are so strong and eat a lot." However, the hound responded by saying "it does not matter that I can not catch the rabbit. What I missed is simply a meal. However, rabbit will lose its life if it was caught!" In the growing and fiercely competitive business environment, every single enterprise is a rabbit being chased up. If caught, they will be eliminated (by rivals).

There are generally two types of operation activities of enterprises. The first type of operation activities is featured with repetition, which is called daily operations. The other type of operation activities is featured with non-repetitive, which is called project. Projects exist everywhere and have become one of the key approaches for enterprises to survive.

According to the Project Management Institute, a project is "… a temporary endeavor undertaken to create a unique product, service, or result."

Project is a temporary endeavor. The temporary nature of projects can be explained in the following aspects.

1. Temporary time

A project has a definite beginning and end. However, sometimes the beginning and end dates of the project can be not determined by managers. In practice, many projects are commenced without being noticed.

Presales marketing activities fall into this category. Although these activities have definite beginning and end dates, it is difficult to define when potential

customers have been approached beforehand. As a result, it is difficult to define the end date of the project.

Similarly, it is difficult to define the end date for those internal projects such as R&D of new products. In some cases, it is due to the nature of projects, e.g., Afghanistan War. In fact, a number of projects were not completed on time due to the lack of clear definition of under what circumstances the project should end.

Of course, a proper project should have predefined beginning and end dates.

2. Temporary resources

No project can be completed without resources. However, these resources are assigned to the project temporarily.

The duration of project (i.e., project life cycle) varies, from minutes, hours, weeks to years. In general, the organizational structure of enterprise exists before the formation of project team. Such organizational structure remains even after the project team is dismissed since the project completion. Therefore, from economical perspective, it is not appropriate to assign dedicated resources to a single project team.

Similarly, specific skills and knowledge are required from project team members. Therefore, these employees can only be assigned periodically. Along the project progress, the composition of a project team may change within the project life cycle. It is very rare that some employees remain in the project team all the time. Indeed, it is a challenge for a project manager to acquire, manage, and release these temporary resources.

3. Temporary project leaders

Project managers are temporary as well. It is crucial to clearly define the power of a temporary position.

There are three sources of power of project managers, i.e., position, incentive, and authority. However, the effectiveness of these three sources is limited. The power refers to the capability to guide others, which is affected by the size of population to be affected. First, the size of population to be affected is small due to the temporary nature of the position. Second, a project manager has very little authority in terms of incentives. For those external projects undertaken by the enterprise, the contract value (if all been realized) is the sales income. However, this income is not allocated by the project manager. What a project manager can allocate is the sales income subtracted by the gross profit, i.e., cost. In terms of cost management, a project manager is more guided toward savings. For those internal projects, it is not unusual that project cost is not allocated properly. As a result, incentive is beyond the reach. Finally, a project is end-product-oriented where project managers have to manage the entire project life cycle. Consequently, project managers are not specialized in scope management as functional managers who restricted their power significantly.

External environment changes constantly. As a result, an enterprise is not able to fulfill the demand derived from uniqueness nature of a project by relying on its own resources. It is a common practice that an enterprise completes the project with partners. A stakeholder is an individual, group, or organization who may affect, be

affected by, or perceive itself to be affected by decisions, activities, or outcomes of a project. These stakeholders play specific roles and take certain actions according to their expectations and responsibilities. A social network is formed based on roles of stakeholders. Within the social network, stakeholders exchange information, resources, and outcomes. Uncertainties associated with stakeholders' behavior present significant risks during the project management process. In essence, project management is a process of managing the dynamic relationship among stakeholders, which involves a lot of coordination and conflict management. Therefore, a project can be defined as "a social network platform in order to complete temporary and unique tasks and to satisfy expectations of various stakeholders."

The value project brings to enterprises is mainly reflected in the following aspects.

1. Projects drive growth of enterprises

In a changing environment, the development of an enterprise cannot simply rely on day-to-day operation. It has to be agile in order to be able to be responsive to customer requirements. The growth of an enterprise relies on projects rather than daily operation. Daily operation is essential but does not help to improve the enterprise performance.

During the start-up phase, an enterprise has to rely on new customers and new products, i.e., project-oriented. However, a profitable product will not last that long in such a rapidly changing environment. It is imperative for the enterprise to develop new projects.

The contribution of daily operation and projects to the enterprise is shown in Fig. 2.3. As shown in Fig. 2.3, daily operation can only maintain the function of an enterprise, whereas projects are the driver of growth.

The major challenge for enterprises during adapting to customers' demand is to reduce the time required and to deal with associated changes. This is an ongoing
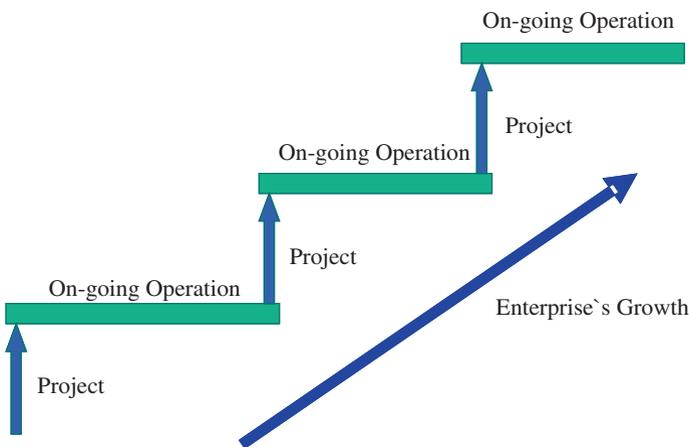
Fig. 2.3 Impacts of projects and daily operation on enterprise's growth

Fig. 2.4 Life-cycle curve of a typical product
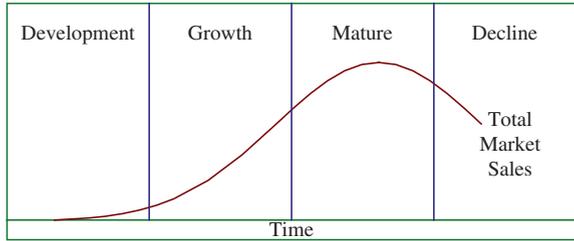
Fig. 2.5 Life-cycle curve of product under time pressure
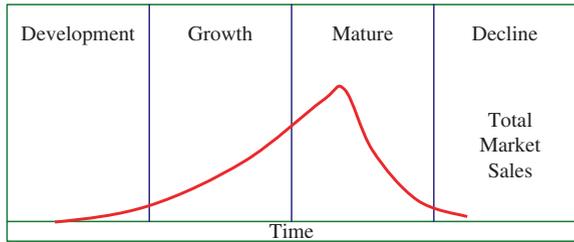
rather than one-off process. A typical product's life cycle is shown in Fig. 2.4. All products go through various life-cycle stages, i.e., development, growth, mature, and phase out. In a slowly changing business environment, the development and growth stages of a product may take a long period of time. Similarly, an enterprise will be able to enjoy benefits from products at the mature stage for a long period of time. However, due to changing environment and time pressure, the life cycle of a product is shown in Fig. 2.5. The life-cycle curve of a product showed a sharp decline since the mature stage due to loss of profitability. An enterprise has no chance to be prosperous unless it is responsive to customers' new demand. Indeed, the frequency of initiating and completing new projects should be in accordance with the speed of changes.

Previous studies showed that those products with 6-month delay to the market earned 33 % less profit than expected despite within the budget. For those products to the market on time, the profit earned was only 4 % less profit than expected, although with 50 % overrun of budget. In other words, customers are happy to pay extra for those good ideas to achieve goals more quickly.

2. Projects provide a necessary platform for enterprises to use external resources

There are more and more freelances that rely on their knowledge to survive. As broader human resources, they are "flexible" staff members of enterprises based on agreement. Knowledge can be utilized by the enterprise, but the owner of knowledge is not a staff member. These include adjunct personnel, consultant, and those undertaking outsourced activities.

At the end of 1990s, 10 million new jobs were created. These new jobs were substantially different from those in the past. There were very few positions with permanent offices. Offices, staff members, alliances, partners, and project team members are mobile. This is exactly the reason why Mr. Peter Drucker called them as knowledge worker rather than knowledge staff. In era of free agent, knowledge workers are more loyal to their professions rather than the enterprise. They pay more focuses on working on what they like and are capable of rather than in a specific enterprise. Under such context, it is very difficult to understand who, when, and how long they have worked for.

In general, an enterprise utilizes external resources in order to achieve three goals: (1) to solve those short-term issues that cannot be solved internally; (2) to increase the manufacturing capacity in order to relieve the short-term pressure; and (3) to outsource the non-core business. In other words, external resources are utilized for undertaking projects rather than daily activities. The real value of external resources will not be achieved until they are used for projects.

However, it is worth noting that a project platform is required to ensure these external resources are in place. Otherwise, negative effect is expected.

In terms of human resource management at the enterprise level, there is a common assumption that a good performance will be guaranteed as long as we can locate personnel who is capable of and willing to act. It is not always the case in practice. Some years ago, during a training camp, I experienced difficulties in wiping out the whiteboard. One trainee tried to help me by using mop even with some water but did not succeed. In the end, he managed to wipe out the whiteboard by means of using cloth with petrol. However, the whiteboard was damaged as well. It is an interesting case. This trainee had both capability and willingness but could not accomplish easy tasks such as wiping out whiteboard. The thorough investigation showed that this was a new whiteboard with a plastic film remained on the top. Without a platform matching resources and tasks, a good performance is not guaranteed.

3. Projects are the source of individual's performance

Projects are not only the driver of enterprise growth but also the main source of individual's performance, especially the management.

Annual performance evaluation is widely adopted in enterprises. It is likely a functional manager provides such statement "… executives, colleagues, I would like report what I have done this year. There are 365 days this year with 280 working days. I came to the company 8:30 am every morning and left the company 5:30 pm every afternoon. This is my report. Please review." This general journal style of report is not appropriate. What were covered were daily activities rather than the contribution to the enterprise. Senior management is more interested in understanding the performance of individuals and the department. Some examples include "new incentive measure is in place and the relocation of the company is

accomplished." Therefore, both the enterprise and individuals are closely con-
nected with projects.
This is even more important for government-invested projects. The performance
of a government is normally measured by the completion of certain type of pro-
jects, e.g., road infrastructure, new firms, and attraction of talents. The strategic
demand of a region has to be fulfilled by a large number of projects. Government
officials make the decision in terms of which projects to be initiated. However,
the success or failure of project is determined by the project undertaker. These
are exactly the drivers of corruption in government-invested projects. Since
project is initiated, government officials are gradually influenced by the project
undertaker.

There have been a number of books and articles on flattening the organizational
structure, restructure of business processes, and goal management. However, the
effectiveness of these approaches remains unclear. The number of positions at the
middle management level reduces significantly due to the simplification of organi-
zational structure. This presents a new challenge to the senior management to pro-
mote someone without promising a position.

In an enterprise, Parkinson's disease could be triggered if there are a growing
number of managers with stable positions. More people, more work. It is not nec-
essary for completing more works. In order to prove their own value, managers
may "create" a number of issues from a variety of perspectives. However, the large
number of project managers does not scare enterprises.

On the one hand, project managers are end-product-oriented. By contrast, func-
tional managers are function and process-oriented. There is a proverb in enterprise
management "everyone in the enterprise is busy to cover the truth from the general
manager." In order to protect their own position, functional managers try to gloss
over the truth, no matter on purpose or not. However, project managers cannot
cover the truth as all projects have the final and definite outcomes. On the other
hand, project managers are not required if there are no projects. As a result, issues
associated with availability of manager positions are resolved naturally.

4. Projects are the main source of enterprise image

Good customers are neededby every single enterprise. However, an enterprise will
not be attractive to good customers without a good image.

Attractiveness of enterprise to potential customers is determined by the image
obtained from undertaking projects with existing customers. This image is a crit-
ical asset of the enterprise. Customers normally made the decision according to
reputations if they do not have a deep understanding of an enterprise.

Successful projects are the main source of an enterprise image. This is espe-
cially the case for knowledge-oriented enterprise. Manufacturing-oriented
enterprises can improve their image by product advertisement. By contrast,
knowledge-oriented enterprises have to rely on publicizing projects they have suc-
cessfully completed. More precisely speaking, the advertisement of manufactur-
ing-oriented enterprises can only improve the public awareness of the company

and products, rather than the enterprise image. The only way to improve the enterprise image is via the successful completion of projects.

The construction industry is a typical sector where projects are the main source of profits. It is very rare that construction firms run general advertisement. Rather, they always promote the landmark buildings or those projects that have been awarded, i.e., successful projects.

It is a similar story for software integration companies. It is most likely that an ERP developer publicizes their major clients and sectors. For these enterprises, they will not be able to survive without successfully completed projects.

In a fast changing era, the business logic of enterprises is shown in Fig. 2.6.

Step 1   Win customers/projects.

Enterprises are featured with fully satisfying customers' needs. The operation of enterprises should start from wining customers or projects.

Fig. 2.6 Business logic of enterprise
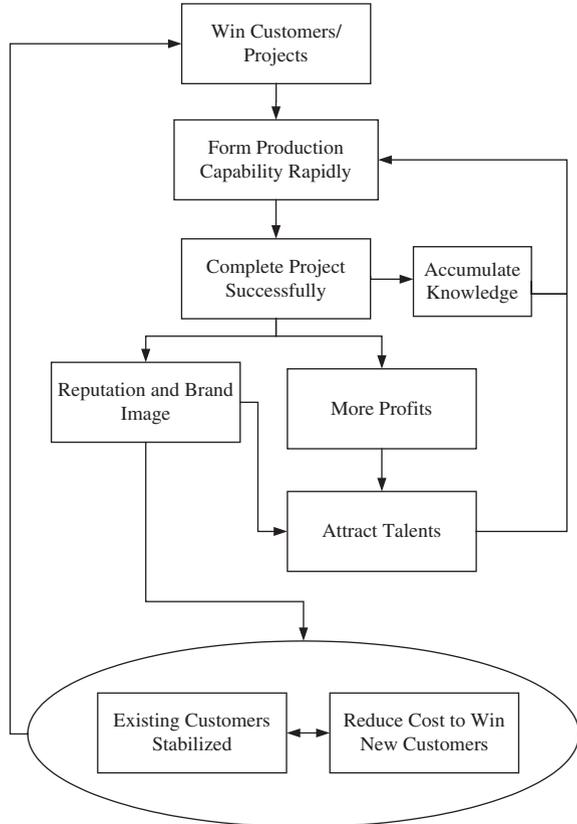
Step 2   Establish the production capacity as soon as possible

It is imperative to establish the production capacity when projects are secured. We cannot afford to prepare human resources and to undertake projects slowly. Enterprises should combine various internal and external resources in order to establish the production capacity.

Traditionally, enterprise human resource management covers recruitment, train-ing, and performance evaluation. Nowadays, HRM departments are facing more significant challenges. They have to transform from an administrative department to a productivity management department. Recruiting proper human resources is not the main goal of HRM anymore. Rather, HRM places more focuses on coor-dinating internal and external human resources in order to establish a productive team.

Step 3   Successful completion of projects

This will be addressed in other chapters of this book.

Step 4   Earn reputation, enhance profits, and accumulate knowledge

Enterprises will benefit from successfully completed projects by earning reputa-tion and profits, and enhancing the enterprise image. It is imperative to accumulate knowledge for every single project completion. Only knowledge allows the enter-prise to be responsive to changes.

The accumulation of knowledge helps the enterprise to integrate temporary resources so that the production capacity can be established rapidly. Similarly, knowledge helps to simplify sales process and to improve the success rate of marketing. Various management tools and concepts developed by management consultancies are typical examples of knowledge. Management consultancies accumulated knowledge from practice and consequently promote the knowledge via publications, books, and trainings. The aim is to attract customers and increase the market share.

Step 5   Win customer resources and talents

The focus of competition is placed on winning customers and talents. Therefore, we have to formulate two strategies, i.e., one for attracting and sustaining custom-ers and another for talents. These two strategies are closely related.

Due to the enhancement of the enterprise image, it is not difficult to have stable customers due to their loyalty to enterprises and personnel that delivered excellent outcomes. In addition, these customers are willing to promote the enterprise and products free of charge. This helps to attract new customers for the enterprise.

Talents are always undersupplied. They are always more selective in terms of companies they work for. However, there are normally three factors most attractive to talents, i.e., the enterprise image, enterprise knowledge, and enterprise profits. With a sound enterprise image, the enterprise will be more attractive to talents. This is due to value added to their CV from the enterprise image. As a result, they

will be more attractive to new employees. The unique knowledge will also help enterprise to attract talents as it helps to improve their competitiveness. Of course, the attractiveness of profitability to talents is well recognized.

Step 6   Turn to step 1

Projects help enterprises to survive under the future changing environment. However, it is not an easy task to implement principles of project management fully. Without a full understanding and appreciation of project management, its effectiveness will be seriously doubted. The credibility crisis of ISO 9000 commonly existing in Chinese enterprises should be taken as an example. In order to avoid such an issue, senior management has to facilitate the implementation of project management proactively.

Chapter 3
Fundamental Principles of Project Management

> *Although the changes are various and infinite, the principles remain the same. The first step is to get familiar with the moves and applications, then gradually master the art of knowing and applying energy, finally, to approach the intuitive understanding of this art.*
>
> —Wang Zongyue • *Taijiquan Theory*

There is a growing awareness of the importance of project management. There are a number of proverbs related to project management, such as

If you are not part of a project, most likely you are doing some boring and repetitive works. However, it is more challenging to run a project.

A project is an explosive package which has been ignited (see Fig. 3.1).

Fig. 3.1 Project is an ignited explosive package

3.1 Project Management is Based on Principles

According to the prediction made by management gurus such as Tom Peters, project management will be on the center of stage. *Fortune* magazine even asserted that project management would feature the twenty-first century. It is not doubtful that excellent project management capacity will become the core competitive advantage of an enterprise. However, it is worth noting that project management is among those disciplines that have not made significant development in last few decades.

Since 1994, Standish Group has spent a large amount of time on investigating success and failure of IT projects. The *Standish Group CHAOS Report* is the largest scale research in the history of IT sector, which was the most time consuming.[1] In 1994, Standish Group's research of 8400 IT projects (with a total investment of US$25 billion) showed that 31 % of the projects were called off or the deliverables were not usable. A total of 52.7 % of the projects were completed and their deliverables are usable. However, not all planned functions were achieved, not to mention the time and cost overruns. Only 16.2 % of the projects can achieve expected functions within the schedule and budget. These proportions were 24, 44, and 32 %, respectively, in 2009. Even in 2012, the project success rate was less than 40 % on average.

During a software industry event, all delegates were asked "do you dare to take this flight if the software was developed by your company?"
Only one delegate had his hand up by saying "I do."
Other delegates were surprised and asked him to introduce how projects were managed successfully in his company.
This delegate replied "this plane will not move at all if its software was developed by my company."

The project management discipline in China is facing a similar or even more significant challenge. It is not unusual that project failure features the media, which resulted in massive loss to the nation. This has significantly negative impacts on the government, officials, enterprises, and residents.

In general, there are two ways of managing enterprises, i.e., institution and culture.

Institution is more effective for repetitive issues. It is rare for an enterprise to develop an institution dedicatedly for one-off and unique projects. Similarly, expressway authority will not set up a "danger zone" sign if there is only one accident, even if it is a very serious accident. Due to its nature of uniqueness, rigid institution can hardly fulfill project requirements. "Analysis case by case" becomes a common excuse during the project management process. It is very common that senior executives intervene in the project management process either actively or passively. The effectiveness of this approach is doubtful.

---

[1]Refer to www.standishgroup.com.

Job description is a typical example of weakness of institutions when dealing with changes. It is very common to have a note at the end of position description, i.e., other tasks assigned by the line manager. Even in legal binding documents such as business contracts, there is a common clause that both parties will negotiate for those unexpected issues. Indeed, this is a compromise that rigid measures fail to adapt to environmental changes.

Organizational culture plays a crucial role in organizational development. When dealing with those difficult issues (e.g., difficulties experienced in drawing lessons learnt from enterprise management practices), we can always blame the organizational culture. Is organizational culture really a panacea?

Organizational culture is overemphasized because rigid institutions, which used to be the backbone of business administration, cannot fulfill demands to manage changing and special activities. Being less rigid, organization culture can be applied broadly. Therefore, more exemptions are made in institution-based enterprise management than culture-based management. Even in the same enterprise, the management measures should vary from project to project which could be dealt with by the same organizational culture. However, it is not effective any more by using organizational culture to manage enterprise and projects.

In Algeria, the HR director of a large construction company described the following scene. His company ran a number of projects in Africa with a large number of employees working on these sites. These employees are always relocated and some of them even have not made a trip to headquarter. Therefore, it is difficult to develop an organizational culture within this group of employees. They have to manage projects effectively without relying on the organizational culture. This is a common issue with the project management discipline. The organizations and personnel of the project are mobile. This will become a norm.

It is not necessary that those favor of organizational culture understand what it is. Therefore, they make up their definition of organizational culture. Alternatively, they draw lessons from a few cases to a so-called organizational culture. This is detrimental to the enterprise

In an experiment, five monkeys were placed in a cage with a branch of bananas hanging on the top. Initially, all monkeys rushed to jumping for bananas. When it occurred, high-pressured tap was used to brush them away. With a few iterations, all monkeys learned and did not jump any more. Consequently, one new monkey was put into the cage to replace an old one. This new monkey tried to jump for bananas. Sooner after he made jumping action, he was caught and hit by other monkeys. Sooner he realized that he will be hit if trying to get bananas. As a result, he followed other monkeys to stay seated. All five original monkeys were replaced one by one. Finally, no one monkey tried to get bananas and therefore did not been penalized by the high-pressured tap.

It is a common sense that organizational culture is accumulated during a long period of time. Without significant amount of time required, the organizational culture will not be formed.

In essence, it is difficult to manage projects due to changes to techniques, personnel, and environment. These changes result in project risks and reduce the productivity. Similarly, we cannot rely on organizational culture during project management processes due to these changes. It is especially the case when a project has to be undertaken by multiple enterprises. This is due to the fact that culture varies from enterprise to enterprise, whereas it is a luxury to allow related personnel to take time to adapt themselves to each other.

So, can we change to deal with changes? The book "*Who moved my cheese?*" told a good story of two mice adapting to environmental changes. Many companies bought copies for their employees by conveying the message: "you have to change yourself to adapt to environmental changes."

The first issue of Reader's Digest in 2006 published an article which reported the experiment conducted by Professor Mayr to observe adaptability of mice. When the cheese was relocated, mice followed in order to get the food. However, with a few rounds of relocation, mice were reluctant to change themselves. Rather, they persistently went for one direction without getting the cheese. This conclusion is applicable to human being as well.

All projects are different. Therefore, we have to use new ways and methods to deal with them. However, efforts are required to control the magnitude of changes so that projects can be managed successfully with a high level of efficiency. We have to learn how to manage projects and enterprises stably and effectively when organizational culture does not work anymore.

Management principles sit between instructions and organizational culture. It is well known that China has fundamental principles for both diplomatic affairs and national political systems. These fundamental principles were announced decades ago and remain unchanged in spite of significant changes to both the external and internal environment. These changes include new national leaders, and amendments to laws and regulations. The stability of these fundamental principles ensures the stable political environment of China, which is essential for its economic growth.

The cultural and political environment varies significantly from country to country, so as the policies on diplomatic affairs. Under such context, it is not appropriate to rely on an institution to determine the national policy for diplomatic affairs with all other countries. It is not feasible at all to expect that all countries to share the same cultural values. However, agreements can be reached on the basis of "Five Principles of Peaceful Coexistence" among these countries. Without fundamental principles, these agreements will not be reached.

It is a common practice to decorate new property according to individual's preference. Individual's preference varies significantly, e.g., carpet versus titles, wall painting versus wall paper, and western style versus eastern style.

The most critical factor to be considered is the structural integrity of the property.

> *The questions of contemporary time can be explained by examining similar questions of the past. The future can be foreseen by doing research on history. The nature of everything is the same even though things appear different from one another. This is true to reality from the very beginning till the end of history.*
>
> —Guanzi • *The situation*

A butcher was cutting up an ox for Wen Hui. Wherever his hand touched, his shoulder leaned, his foot tread, and his knee thrust, there was the sound of ripping and the sound of slicing, which kept time with the rhythm of the dance of Mulberry Grove and were as melodious as the music of Jingshou.

"Ah! Very good!" Wen Hui said, "How did you achieve such perfection in your skill?"

The butcher put down his knife and replied, "What I love is the Tao, which is more advanced than skills. When I first began to cup up an ox, I saw nothing but the whole ox. Three years later, I saw no more the whole ox. Now I deal with the ox in my mind instead of my eyes. The senses stop functioning, but the mind has been activated. Following the ox's natural veins, my knife slips through openings between its muscles and slides through crevices in the joints. I take advantage of what is already there. The knife has never hesitated at the juncture of blood vessels, not to mention the big bones. A good butcher changes his knife every year because he uses his knife to cut. An ordinary butcher changes his knife every month because he uses his knife to hack. My knife has been in use for nineteen years and has cup up several thousand oxen, and yet its edge is still sharp as if it were newly whetted. There are crevices in the joints, but the blade of the knife has no thickness. There is certainly plenty of room for the blade of a knife without thickness to enter the joints where there are crevices. This is why the blade of the knife that has been in use for nineteen years is still sharp as if it were newly whetted. Nevertheless, when I come to a complicated joint and see that there will be difficulty, I proceed cautiously, fixing my eyes on it, moving slowly and cutting gently until the part is quickly separated and drops like a clod of earth to the ground. Then standing with the knife in my hand, I look all around with triumphant satisfaction. I then clean the knife and put it away."

> *Wen Hui said, "Very good! From the butcher's words I have learned the way of nurturing life."*
>
> —Chuang-Tzu • *The Fundamentals for the Cultivation of Life*

This butcher could serve as an exemplar for project managers. Indeed, project managers should pay more attention to the fundamentals as they are consistent across projects. Otherwise, the project success will rely on individuals which reduce the reliability of the project management process.

It is an effective project management approach to integrating the stakeholders from different disciplines and with various working styles. This cannot be achieved unless comparatively stable principles are used to deal with constantly changing tasks. A fine balance is required between fundamental principles and a certain degree of flexibility. This is crucial for the successful management of both projects and enterprises.

3.2 Awareness of Project Stakeholders

Most people perceived the main function of enterprises as earning profit. This is a common misunderstanding.

An enterprise most likely has to deal with six groups of people.
Group 1: give and take money from the enterprise. They will be happy only if profit is earned.
Group 2: give and take money from the enterprise. They are happy no matter of profitability.
Group 3: work for enterprise and enjoy income as a return.
Group 4: provide goods and service for the enterprise; enjoy income as a return.
Group 5: pay the enterprise for goods and service.
Group 6: get payment from the enterprise without noticeable contribution.

These stakeholders are shareholders (investing the enterprise with expectation of profit), creditor (e.g., banks that provide loan to the enterprise for interests), employees, suppliers, and government (providing related regulations for the market).
Successful enterprises are those lasting for a long period of time. These enterprises share one common characteristic: all stakeholders are satisfied with the enterprise.

Profit is one of the critical factors for an enterprise to survive. In other words, profit represents one aspect of shareholders' goals. As shown in Fig. 3.2, some stakeholders (e.g., suppliers, creditors, and customers) do not care the profitability of the enterprise. Many enterprises fail due to the ignorance of real concerns of stakeholders. It is worth noting that rivals were not considered in the above analysis. In practice, rivals attract much more attention than other stakeholders such as customers.

We believe our first responsibility is for the doctors, nurses, and patients, for mothers and fathers, and all others who use our products and services.
We are responsible for our employees, the men and women who work with us throughout the world.
We are responsible for the communities in which we live and work and for the world community as well.
 Our final responsibility is for our stockholders. Business must make a sound profit.

                  —Credo of Johnson & Johnson Inc.

Similar to enterprise management, project stakeholders should be satisfied. There are five stakeholders in a typical project.

Sponsor. A sponsor is the person or group who provides resources and support for the project and is accountable for enabling success. They are normally senior management of the enterprise and expect business value derived from the project.
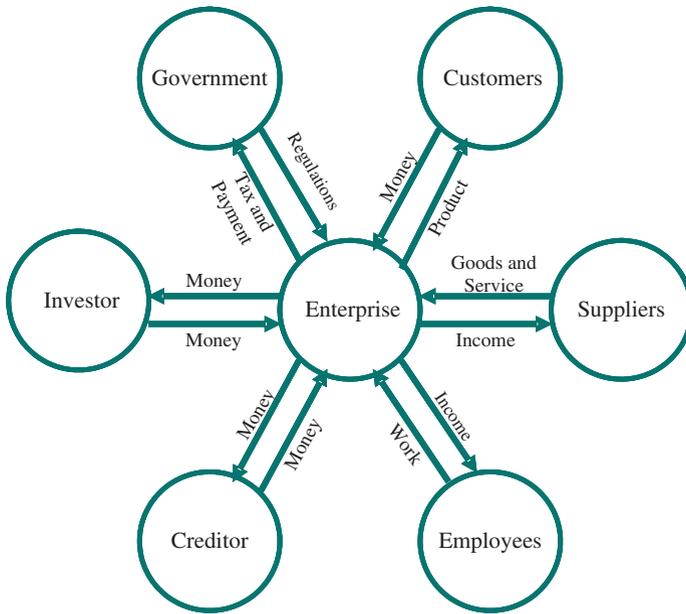
Fig. 3.2   Stakeholders of enterprises

Customers and users. Customers are the persons or organizations who will approve and manage the project's product, service, or result. Users are the persons or organizations who will use the project's product, service, or result. They hold the expectation that project deliverables (products) will fulfill their needs.

Project manager. A project manager is in charge of project execution and takes accountabilities for the success of the project.

Project management staff. The members of the team who perform project management activities such as scheduling, budgeting, reporting and control, communications, risk management, and administrative support under the leadership of project manager.

Functional managers. Functional managers are key individuals who play a management role within an administrative or functional area of the business, such as human resources, finance, accounting, or procurement. They assigned their own permanent staff to carry out the ongoing work, and they have a clear directive to manage all tasks within their functional area of responsibility. The functional manager may provide subject matter expertise or their function may provide services for the project.

There are many other stakeholders for those large-scale and special projects, such as contractors, suppliers, and government authorities.

It is not unusual that various excuses were used for variations during the project execution process, even for those been preorganized. It is imperative to understand the reason for this phenomenon. Otherwise, it is detrimental to the cooperation among project stakeholders.

Maybe we can consider this issue from another perspective. Will the leader of staff bear the responsibility if a problem occurs? In reality, it is not a single party's responsibility. Rather, there is something wrong with the connection between the leader and staff. Figure 3.3 shows the path of rising problems due to inappropriate connection between the leader and staff. There might be some potential issues associated with the instruction provided by the leader. However, these potential issues will not be harmful without normal but wrong reactions from staff. However, it is common that the leader makes mistakes. It is worth noting that project outcomes may not reach expectation despite normal actions of both the leader and staff. It is rather difficult to change this normal behavior. There is a misunderstanding of management practice, i.e., relying too much on ideal potential rather than normal behavior of staff.

In summary, there are seven key reasons of unco-operation among project stakeholders.

1. They do not know why they should do this

This is a common misunderstanding that no commitment is required from the project sponsor during the project management process. Being different from products, projects on the one hand require the cooperation between stakeholders; on the other hand, projects have a certain level of influence on stakeholders' work and life. Projects are always associated with a kind of revolution. The acceptance of this revolution plays a critical role in achieving project success. One most important issue associated with IT projects failure is the lack of recognition of revolution and changes required.

To avoid this issue, efforts are required to engage stakeholders as early as possible and as much as possible. It is not unusual that communication is covered in project plans. There is lack of recognition and commitments from project stakeholders. Normally, a project plan is made confidential mainly due to the

Potential issues associated with superordinate's behaviour	Potential issues associated with subordinate's instruction receiving	Potential management issues emerge

Unclear instructions	→	Discrepancy on understandings	→	
Lack of instructions	→	Lack of confirmation	→	
Lack of tools/methods	→	Rely on personal experience	→	Occurance of
Lack of sufficient information	→	Rumors	→	unexpected results
Lack of clear goals	→	Pay too much on details	→	
Lack of incentives	→	Passive response	→	

Fig. 3.3 How management issues emerge

consideration of financial issues, which has negative impacts on project perfor-
mance. Win–win cannot be achieved via game playing, which is popular in the
economic theory. Fundamentally, game playing aims to hiding information from
counterparts.

2. They do not know how to do it

Project tasks require specialized skills and expertise. As a result, professional
qualification is required such as certified structural engineers, certified construc-
tors, certified quantity surveyors, and certified project managers. However, it is not
necessary that all stakeholders should have related professional qualifications. In
most cases, stakeholders are willing to assist; however, they do not know how to
do. Indeed, professional expertise of the client is crucial for project success.

The first choice is to provide trainings to stakeholders for professional exper-
tise. If this is beyond reach, we have to simplify the procedure to allow smooth
communication with them.

*There is an Islamic saying that "If the mountain won't come to Muhammad then
Muhammad must go to the mountain."*
If we cannot change project stakeholders, we should change ourselves.

3. They doubt the effectiveness of your method

Doctors mostly hate those skeptical of their skills. It is likely some project stake-
holders are skeptical of the project management plan. Under such context, special
attention needs to be paid to gaining their cooperation.

Firstly, it is necessary to gain their trust. In fact, the selection of the project plan
purely depends on its effectiveness to achieve project success. We should be open-
minded and run brainstorming session when developing project plans. Indeed,
experience and intuition of project stakeholders are equally important for making
project plans. However, it is not appropriate to demonstrate good ideas based on
mistakes made by others.

4. They do not prioritize this task

It is very common that stakeholders are involved in more than one project. They
normally invest resources in the project they perceived as most important and most
urgent. It is not appropriate to expect that all stakeholders to assign the top prior-
ity to this project. However, we should try to request top priority on key project
activities. A project can be broken down to a series of work packages to be imple-
mented in stages. There are not many key activities in a typical project, which
minimize the potential conflicts with other projects in terms of resources required.
The connection between project activities forms a system. As a result, the shortest
piece of barrel exists, i.e., the weakest component of the system. Efforts should
be made to improve these components in order to enhance the resilience of the
project team to resource demand in a multiproject environment. Similarly, it is not
realistic to pursue perfection. Sometimes compromise is a more effective approach
to gaining support from stakeholders in other areas. This helps to achieve a com-
mon goal, i.e., project success.

5. They doubt the positive outcomes from this task

Due to a long project life cycle, it often takes a long period of time so that project outcomes become effective. It is not necessary that all stakeholders have the adequate patience. As a consequence, they may lost confidence and refuse to cooperate.

Someone was riding a donkey. He held a bamboo stick with a bunch of carrots. The donkey kept running so that it can catch the carrots. However, it is worth noting that the donkey might get crossed and revenge on its owner.

It is one of effective approaches to maintaining the confidence of project stakeholders by means of transparent reporting of the project progress and deliverables. During the project execution, efforts should be made to engage stakeholders as much as possible. The influence of stakeholders on the project is correlated with their time commitments. The project plan and milestone evaluation should be made available to project stakeholders. In addition, personal friendship and proper incentives are as important as business relationship. Incentives apply to client, suppliers, and users.

6. They think they are cooperating

It is a common misunderstanding that cooperation refers to acting according to the contract. There will be no legal dispute at all if everything can be defined clearly in the contract. Therefore, the requirements for project stakeholders should be defined clearly and appropriately. This plays a crucial role to promote cooperation between project stakeholders and to achieve project success.

7. This is beyond their control

There is Chinese saying that "Forgive others but not yourself". However, in practice, it is more common to "forgive yourself but not others." In some case, we are too demanding when requiring cooperation from stakeholders. For instance, they do not have the authority or resources.

To avoid such an issue, attention needs to be paid to the organizational design. All issues derived from enterprise management can be classified into two groups, i.e., organization cultural related and competency related. Organizational culture is more influential but cannot be formed overnight. It is even more challenging to share same organizational culture when multiple companies are involved in the project. Similarly, individual's competency can play a critical role in enterprise management but is largely affected by the organization. Therefore, two responsibility matrixes should be developed, i.e., one for the project team and another for all stakeholders. With a clear definition of responsibility matrix for all project stakeholders in place, it is more likely that they will cooperate with each other.

There is absolutely no such thing as love or hatred without any reason or cause. It is necessary that we think from stakeholders' perspective to identify fundamental issues and hence ensure the project success.

Some statements made by Chairman Mao can be learned and applied into project management practice. For example, it is paramount to identify project

stakeholders in order to achieve project success. In addition, project stakeholders
have their own expectations and objectives. It is not feasible to expect their com-
mitments unless their expectations can be achieved from the project.

Therefore, projects provide a infrastructure to achieve project outcomes and
satisfy project stakeholders. Project management aims to align different objectives
of project stakeholders toward a common goal, i.e., project success.

*Traditionally, cost, time, and quality are most common indicators to measure pro-
ject success. Nowadays, more attention is paid to achieving the project outcomes
and satisfying project stakeholders.*

3.3 Manage the Project Life Cycle

Due to uniqueness of deliverables and temporary activities, a project has to inte-
grate and engage stakeholders from different enterprises with unique organiza-
tional structure and culture. A project is more risky than daily operation due to
new activities, temporary organizations, and stakeholders with different aims, cul-
tural, and professional backgrounds.

A project has definite dates for begin and end. Along the project progress, accu-
mulated resources will grow. The losses will be exaggerated if issues were not
identified earlier during the project process (Fig. 3.4). The necessary and effective
way of project risk management is to control the project life cycle.

All projects face constraints on time and resources. The life cycle of a typical
project consists of a series of stages such as initiating, planning, executing, and
closing. With a good understanding of project life cycle, a project manager is able
to manage the project properly.

There are three benefits associated with managing project life cycle.
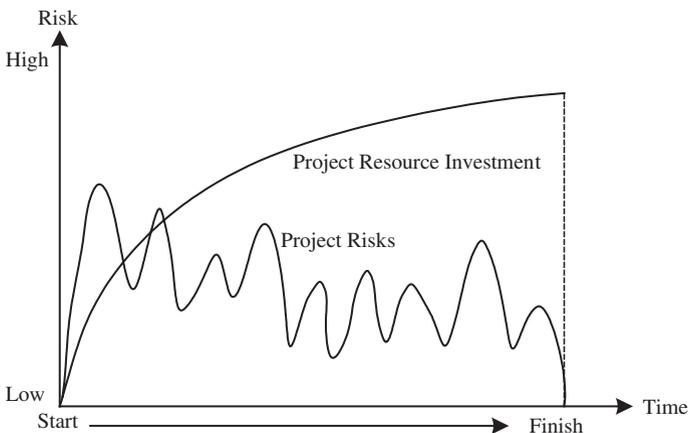
Fig. 3.4 Resourse investment and risks of projects

1. Control risks

Due to uniqueness nature of projects, it is not effective to manage them by relying on individual's experience. To a certain degree, project management is risk management. If we rush into the next project phase without a proper finish of the previous phase, potential issues will emerge and deteriorate. The improvement of efficiency in one project phase does not necessarily indicate the overall efficiency and reliability of the entire project. It is not unusual that projects rushed into the execution phase without a proper decision, initiating, and planning phase. This has led to a number of issues such as reworks, cost overruns, and delays.

We have to deal with common psychological misunderstanding of overall efficiency so that project risks can be managed according to the project life cycle. A project is a social system. Due to interactions between project activities, it is difficult to draw boundaries according to predefined functions. Project stakeholders are contingent to each other in terms of their demand and associated responsibilities. This is especially the case in innovation-oriented projects where project stakeholders rely on each other. The degree of cooperation between stakeholders largely determines the project success (or failure). In order to manage projects effectively, senior executives should have system thinking.

It is a common knowledge that the volume of a barrel is determined by the shortest piece rather than the longest piece. Similarly, extension to a few streets not necessarily improves the traffic conditions in the city. Urban road grid is a system and its efficiency is determined by bottlenecks. Some cities have invested in building overhead roads. However, traffic conditions are not improved significantly due to the bottleneck, i.e., the connection between overhead road and other roads. Without a proper understanding of system attributes, it is very common to pursue the individual efficiency. The improvement of efficiency within one specific field does not necessarily lead to the enhancement of the overall efficiency. Rather, the overall risk level increases. During the project decision-making process, over-emphasizing tax revenues is often responsible for serious issues (e.g., environmental damage and destroy of heritage). This loss cannot be remediated even if spending a large amount of time and money.

In the enterprise, everyone is busy to cover the truth. This is detrimental to the enterprise success. Focus of enterprise operation needs to be placed on effective outputs. In accounting reports, inventory is set as a kind of liquidity with an assumption of stable and adequate market demand. In reality, this is a false assumption so that inventory becomes sunk cost. Outputs of each individual department are not necessarily effective output of the enterprise. Effective output of the enterprise refers to those outputs involving selling goods (and/or services) with return of funds.

2. Assign responsibilities

Each project phase witnesses different personnel join or quit the project. As a result, project personnel will be assigned with authority at different project phases.

It is imperative to understand this otherwise the project manager will struggle. Cooperation between stakeholders plays a critical role in project success. However, this does not mean they share the same responsibility at the same time.

According to fundamental principles of management, every task should be assigned to one person, dedicatedly. With different focuses, project phases will be managed by different project personnel and units. It is not appropriate to expect a project manager to take the full responsibility of project management. For instance, it is mandatory to engage supervision engineer consultant in large-scale engineering projects. However, supervision engineers are not engaged until the executing phase. They can do nothing if something goes wrong at the decision-making stage.

Similarly, it is not appropriate to expect that all project activities are with the same level of difficulty. In fact, many projects ended up uncompleted in spite of good progress initially.

One solider went to toilet at night and suddenly discovered enemies. He was told to battle by himself. This soldier has three fates: be shot dead, surrender, or escape.

Limited Liability Company indicates that bankrupt protection can be applied when the company suffered from significant amount of debts. Similarly, the responsibility of each project stakeholder is limited. Senior executives should not expect their own responsibility to be bore by others. For instance, an insurance company will provide compensation if accidents occurs and causes death but not by means of cloning the insured person.

3. Effective incentives

Project life cycle is not according to the calendar. Rather, it is according to the beginning or end of significant events in a project, i.e., milestones. Milestones should be used for performance evaluation and promotion rather than relying on monthly plans or annual plans. This is a more effective approach to motive employees as well as early problem detection. Meanwhile, project personnel should join or quit project according to milestones rather than at the beginning or end of each month. They will receive income when quitting the project. Attention should be paid not to isolating employees during the performance evaluation. Otherwise, problems cannot be identified while inter-personal conflicts emerged. This is detrimental to project success.

> *Before an edict is issued, if people who have haphazardly done something in accordance with it out of chance are rewarded, it is nothing but rewarding people wrongly. If the sovereign rewards people wrongly, officials with outstanding achievements will become unsatisfied. When officials with outstanding achievements are unsatisfied with the sovereign, foolhardy people will do whatever they want. If foolhardy people do whatever they want, the order of the state will be severely disarranged. If people who have done something forbidden by the prohibition and has not openly announced yet are punished, it is nothing but punishing people wrongly. When people are punished wrongly, they will not attach much importance to their lives. If people do not attach importance to their lives, the ferocious will become active, cabals will be built up, and*

the wicked will conspire rebellions against the regime. After an edict is issued, if people with outstanding achievements are not rewarded correspondingly, it is nothing but making the common people discouraged, not comply with the military orders or devote their lives for the sake of integrity. When people are discouraged, do not comply with the military orders or devote their lives for the sake of integrity, then they cannot win any attack launched against other states or defend their own state. If they cannot win any attack launched against other states or defend their own state, the state will be in danger. After an edict is issued, if people acting against them are not punished, it is nothing but making people disobedient. When people are disobedient, the formidable and powerful will become very active. When the formidable and powerful are very active, the throne will be in danger. So, it is said that the constitution and all regulations should be in accordance with the right ways of governing the state, and all edicts are clarified, both awards and punishments are dispensed reasonably and honestly; these are the right rules for rectifying the people.

—Guanzi • *On Complying with the Law*

Rework leads to most significant waste in projects. Project efficiency is guaranteed without rework to any project activity. To achieve this goal, project has to be managed according to the project life cycle. Effective procedure management paves the necessary foundation for risk management. Despite the growing awareness of the importance of procedure management, it is not unusual that procedures are not followed properly in projects. This has led to not only significant financial losses but also negative impacts on the government's reputation and credibility. Indeed, system thinking is required for decision-making processes.

There is a famous case which demonstrated the importance of procedure.
On March 13, 1963, Ernesto Miranda was arrested, by the Phoenix Police Department, based on circumstantial evidence linking him to the kidnaping and rape of an 18-year-old girl ten days earlier. After two hours of interrogation by police officers, Miranda signed a confession to the rape charge on forms that included the typed statement: "I do hereby swear that I make this statement voluntarily and of my own free will, with no threats, coercion, or promises of immunity, and with full knowledge of my legal rights, understanding any statement I make may be used against me."
However, at no time was Miranda told of his right to counsel. Prior to being presented with the form on which he was asked to write out the confession he had already given orally, he was not advised of his right to remain silent, nor was he informed that his statements during the interrogation would be used against him. At trial, when prosecutors offered Miranda's written confession as evidence, his court-appointed lawyer, Alvin Moore objected that because these facts, the confession was not truly voluntary and should be excluded. Moore's objection was overruled and based on this confession and other evidence, Miranda was convicted of rape and kidnaping. He was sentenced to 20–30 years of imprisonment on each charge, with sentences to run concurrently. Moore filed Miranda's appeal to the Arizona Supreme Court, claiming that Miranda's confession was not fully voluntary and should not have been admitted into the court proceedings.

Chief Justice Earl Warren, a former prosecutor, delivered the opinion of the Court, ruling that due to the coercive nature of the custodial interrogation by police, no confession could be admissible under the Fifth Amendment self-incrimination clause and Sixth Amendment right to an attorney unless a suspect had been made aware of his rights and the suspect had then waived them: "The person in custody must, prior to interrogation, be clearly informed that he has the right to remain silent, and that anything he says will be used against him in court; he must be clearly informed that he has the right to consult with a lawyer and to have the lawyer with him during interrogation, and that, if he is indigent, a lawyer will be appointed to represent him."

Thus, Miranda's conviction was overturned. The Court also made clear what had to happen if the suspect chose to exercise his or her rights: "If the individual indicates in any manner, at any time prior to or during questioning, that he wishes to remain silent, the interrogation must cease… If the individual states that he wants an attorney, the interrogation must cease until an attorney is present. At that time, the individual must have an opportunity to confer with the attorney and to have him present during any subsequent questioning."

However, the dissenting justices accused the majority of overreacting to the problem of coercive interrogations, and anticipated a drastic effect. They believed that, once warned, suspects would always demand attorneys and deny the police's ability to gain confessions.

If one criminal made some water on ground dirty, the unfair justice system contaminates the water source.

There is a common question being asked: "should a general manager focus on critical issues or tiny issues?" The question itself is a wrong question. A senior executive have to manage those critical issues. However, those tiny issues will exaggerate without proper attention. Similarly, senior executives will not be able to manage all sorts of issues. Indeed, both general managers and project managers should adjust their focus when appropriate. Project managers should determine their priority according to the project life cycle.

3.4 Steps to Achieve Project Management Solutions

Two fundamental principles of successful project management are satisfying project stakeholders and managing project according to the project life cycle.

Step 1: determine the project life cycle

Same type of projects shares similar life cycle. In simple terms, a project life cycle consists of four phases, i.e., initiating, planning, executing, and closing. Each phase can be further divided into four sub-phases, i.e., initiating, planning, executing, and closing. This is an iterative process and the control actions go through the entire project life cycle.

In 2003, IBM spent US$ 2.1 billion to acquire Rational Software. Rational Software was established by Mike Devlin and Paul Levy in 1981 with an aim to develop a software development environment for business and to improve processes related to software development. Guided by this goal, a number of effective programming tools were developed such as Unified Modeling Language (UML) and Rational Unified Process (RUP).

IBM leads the industry in terms of the depth and coverage of application life-cycle management (ALM). IBM Rational Software provides the more comprehensive platform for the Collaborative Application Life-cycle Management (CALM). It brings together process modeling, requirements management, model driver development, quality management, change and configuration management, and project planning and tracking, as well as project and portfolio management on a common unified platform.

By the end of 2010, a number of enterprises had used the Rational Software. These included: 9 of the Fortune top 10 companies; 45 of the Fortune top 50 companies; 93 of the Fortune top 100 companies; all top 10 companies in the aerospace and defense sector, business banks, telecommunication sector, the chemicals sector, and electronics and electrical equipment sector.

In RUP, life cycle of various types of projects consisted of four iterative phases, i.e., inception, elaboration, construction, and transition (see Fig. 3.5).

Step 2: determine key activities in each life-cycle phase and their interrelations

Activities vary in each phase of project life cycle. During this step, it is imperative to clearly define tasks to be completed in each project phase, and the interrelations between project tasks. As a result, the project work flow can be achieved.

   Main tasks to be completed at each project phase provide grounds for project manages and senior executives to allocate human resources. For those senior
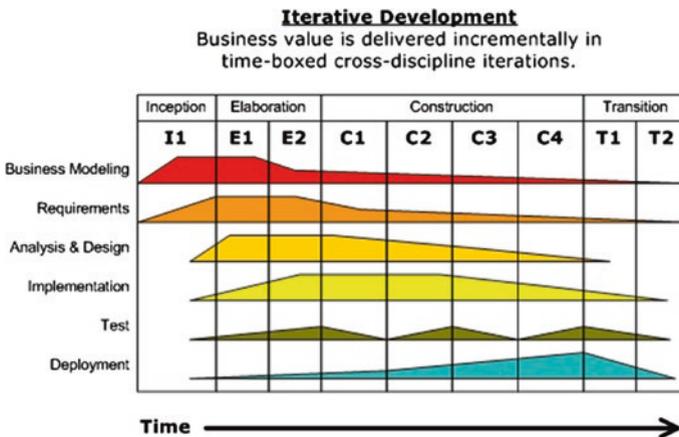
Fig. 3.5 Stages of RUP

executives managing multiple projects, it is crucial to understand the current project phase in order to determine outstanding tasks. Consequently, limited resources (time) can be allocated to each individual project. It is important to project managers as well. As a project is regarded as a temporary organization, project managers are facing similar issues as senior executives.

Step 3: determine the relationship between each activity and project stakeholders

Apart from efforts from project managers and project teams, projects cannot be completed without the cooperation of various stakeholders inside and outside of the enterprise. For instance, a project manager has to rely on functional departments (e.g., marketing, legal, and HR) to manage external customers and acquire necessary resources.

Henri Fayol proposed 14 principles of management in his seminal book "*Administration Industrielle et Générale*."[2] These principles are very useful when defining project tasks as well as roles and responsibilities of stakeholders.

1. *Division of Work—When employees are specialized, output can increase because they become increasingly skilled and efficient.*
2. *Authority and Responsibility—Managers must have the authority to give orders, but they must also keep in mind that with authority comes responsibility.*
3. *Discipline—Discipline must be upheld in organizations, but methods for doing so can vary.*
4. *Unity of Command—Employees should have only one direct supervisor.*
5. *Unity of Direction—Teams with the same objective should be working under the direction of one manager, using one plan. This will ensure that action is properly coordinated.*
6. *Subordination of Individual Interests to General Interest—The interests of one employee should not be allowed to become more important than those of the group. This includes managers.*
7. *Remuneration—Employee satisfaction depends on fair remuneration for everyone. This includes financial and non-financial compensation.*
8. *Centralization—This principle refers to how close employees are to the decision-making process. It is important to focus on an appropriate balance.*
9. *Scalar Chain—Employees should be aware of where they stand in the organization's hierarchy, or chain of command.*
10. *Order—The workplace facilities must be clean, tidy, and safe for employees. Everything should have its place.*
11. *Equity—Managers should be fair to staff at all times, both maintaining discipline as necessary and acting with kindness where appropriate.*
12. *Stability of Tenure of Personnel—Managers should strive to minimize employee turnover. Personnel planning should be a priority.*

---

[2]Henri Fayol. Zhou Anhua. Administration Industrielle et Generale. Beijing: China Social Sciences Press (1982)

13. *Initiative—Employees should be given the necessary level of freedom to cre-
    ate and carry out plans.*
14. *Esprit de Corps—Organizations should strive to promote team spirit and
    unity.*

Proposed a centenary ago, these principles are still effective. Those fancy manage-
ment methods and concepts that have been proposed recently fall into the scope of
these 14 principles.

Step 4: determine potential risks associated with each activity

Each project is full of risks. Both enterprises and project teams' area disciplined
organization. Some management professionals have advocated for delegation
with more consideration of personal rights. However, it is undoubtable that con-
trol is the core of management. It is worth noting that control is more effective
before problems occur. Under the fierce competitive environment, a mistake will
be costly and cannot be afforded. Therefore, management measures should be in
place prior to the occurrence of problems.

    In general, risk is an uncertain events or subjects that, if they occur, have a
negative impact, such as technical risks, financial risks, policy risks, and weather
risks. However, from management perspective, only those manageable uncertain
event or subjects are risks. Those unmanageable are environment rather than prob-
lems, e.g., sudden falling of asteroid. These uncontrollable events are called force
majeure which is not insurable.

    Manageable risks mainly refer to human being's behavior. Technical risks
mainly derived from lack of competent technical professionals or inappropriate
actions of technical professionals. Financial risks are due to incompetent financial
professionals or lack of proper investors. Human is always the top priority of man-
agement as human behavior is the most significant source of risks.

Step 5: determine risk management methods as well as roles and responsibility of
project stakeholders

Risk is human behavior that can be managed. However, it is not unusual that one
person's behavior cannot be controlled by means of just managing this person.
Therefore, we could try to change the system, i.e., the environment where people
are working. Project success will be achieved by matching people with their sys-
tem (i.e., organization, method, and tools).

    Edwards Deming, as a quality management guru, estimated that around 94 %
of the possible improvements belonged to the system which is beyond the control
of individuals.[3] Therefore, the focus of management should be placed on learning
and project system improvement rather than control and individual evaluation.
Frederick Winslow Taylor, the father of Scientific Management also pointed out
that:"In the past the man has been the first; in the future the system must be the

---

[3]Peter R. Schottes. Zhang Hanqing.: The Leader's Handbook. Beijing: Huaxia Publishing House
(2007)

first. This in no sense, however, implies that great men are not needed. On the contrary, the first object of any good system must be to employ the first-class men; and under systematic management the best man rises to the top more certainly and more rapidly than ever before".[4]

Talents are for solving a kind of issues. Excellent talents are for resolving critical issues. Only matching with the organizational management mechanism can talents capitalize their value. Talents constitute elements of the system. Despite their critical role, talents will never replace the entire system. When lacking an understanding of systems, we might have misunderstanding that human beings change the system. In fact, humans are changed by the system naturally. Desired project outcomes will not be achieved without the integration of talents and scientific project management methodology. Such integration helps to make efficient and stable decisions.

As a highly innovative discipline, project management always faces limitations. A good understanding of fundamental principles will help to achieve desired project outcomes at a minimum cost.

---

[4]Taylor, F.W.: The Principles of scientific Management. Beijing: China Social Sciences Press (1984)

Chapter 4
The Development of Project Governance Platforms

The prerequisites for establishing one of the most powerful states or unifying the world are as follows: be incomparable in virtue, be incomparable in wisdom, be incomparable in tactics, be incomparable in geographic conditions, and be incomparable in grasping opportunities to take action. Only when the above mentioned prerequisites are fulfilled can you put the world under your supervision.

—Guanzi • *The Ideas of Establishing One of the Most Powerful States*

Successful project management needs supports from valid project governance platforms. There is an increasingly level of recognition of the importance and the effectiveness of project management. However, most people still perceive that project management is only the business of project managers and the middle managers or on-task personnel in enterprises. What they did not realize is that project management is the business of the top management in the first instance. Project management is the most important thing for the top management, especially in those project-oriented enterprises. The top management plays a vital role in successful project management. They should bear the responsibility of developing project governance platforms and consequently using them to manage projects effectively.

4.1 The Responsibilities Assumed by Project Managers Are Very Limited

Speaking of project management, people usually would think about "project manager responsibility system." However, in fact, the authority and resources a project manager possesses are very limited, so as the responsibilities he/she could assume. Many or even a majority of the reasons that determine the success of a project cannot be resolved by project managers alone.

Based on an investigation conducted by Standish group[1] in 2013, 61 % of the successful projects are successful due to the effective supports from the top management and the organization. On the contrary, 70 % of the unsuccessful projects fail due to the capabilities of the top managers and their limited supports. The support from the top management is the No. 1 factor that makes a project successful.

Among the factors that determine employees' performances, more than 94 % cannot be decided by employees themselves.

—Edward Deming • *Quality management guru*

There is very limited scope of responsibility for a project manager.

First, he/she cannot decide which projects to proceed.

The reason project managers are called "project manager" is that they exist only because there are projects. Without projects, the position of "project manager" disappears naturally. Projects are temporary; therefore, project managers are temporary too. Although there are some personnel with a title of "project manager" in enterprises, this is an alternative vain title. Only when there are projects at hand, they become real project managers. It is a basic chronological order to have project first before having project managers. It is the top management in an enterprise who decides which projects should or should not be conducted. Project managers are simply responsible for finishing projects. They are not the decision-makers of the project. Of course, there are also "actor-director" scenarios where the top management personally assumes the roles of project managers.

*Enterprise's profits derive from value exchanges between enterprises and their external stakeholders (*e.g., *customers, suppliers, and sub-contractors). Other sources of profits are various types of contracts, which can be treated as projects. This is an important reason for enterprises to be project oriented. After acquiring these contracts, enterprises will hand them to specific project managers to complete. Then, if projects fail, who will take the responsibilities? Enterprises of course can punish project managers by deducting their bonuses or salaries or even sacking them. However, customers and suppliers usually ask enterprises to recover their losses. They will sue the legal representatives of the enterprises. This is the reason people often say that only the boss has no way to quit in an enterprise.*

Previous studies have showed that more than 40 presidents of the top 200 global enterprises were forced to quit or were fired in 2000, which accounts for 20 % of the total population! In our country, it is often reported senior executives are arrested when an enterprise runs into problems. At this moment, senior executives cannot blame others but have to tell themselves that "there are no other excuses at all", which they were used to telling their employees. There are a large number of risks during the project decision-making and execution

[1]Please refer to www.standishgroup.com.

processes, which will finally fall onto senior executives rather than onto the project managers.

The saddest thing in management is to "finish a thing that should not be done with a highest efficiency." It is more fundamental and more important to "do a right project" than to "do a project right." The responsibility to judge if a project is right or not should not be assumed by the project managers, and they cannot afford the responsibility either. If they are forced to take the responsibility, it might lead to a situation where local benefits are pursuit on the cost of the overall benefits of the enterprise.

Second, the authority and resources a project manager possesses are very limited.

There are conflicts in using resources between temporary project managers and stable functional managers. Project managers of course hope to have as many resources as possible, but the department managers hope to consume as fewer resources as possible. Therefore, project managers cannot make decisions, even cannot decide when making project plans. They have to negotiate with functional managers and seek support from the top management.

After successfully securing the business contracts, enterprises usually will not use the contract sum as the budget limits that project managers can use. In general, they will deduct gross profits as much as possible. The personnel and equipment allocated to projects are not sufficient due to its cost implications. Especially, in a multiproject environment, efforts will be made to improve the efficiency of dispatching resources dynamically. It becomes more and more difficult for a project to have a certain resource exclusively. As projects are temporary, project team members usually will give up on project managers when they face conflicts between project managers and their functional managers.

When dealing with project suppliers and sub-contractors, project managers can only ask them to execute contracts because project managers do not have rights to sign contracts with them on behalf of the company and consequently provide benefits to them. Therefore, project managers have very limited abilities to use enterprise's external resources.

In a changing environment, an enterprise must be able to develop capabilities to complete projects effectively, which will determine its profitability and success. However, the board of directors in an enterprise need to decide the profit model and cannot pass the responsibility of earning profits completely to the general manager. Similarly, the general manager cannot pass the responsibility of completing projects to the project managers.

For a project to be successful, it needs not only a capable project manager to complete the project management, but also a capable enterprise top management to govern the project effectively. To some extent, the result of project governance is to determine the profit models of projects. What project managers need to do is simply to realize these models efficiently and effectively.

4.2 Enterprises Need to Improve Their Project Governance Capabilities

A project is usually treated as a temporary task. Then, why does this task ever exist? Of course, we can say that it is to satisfy some needs. All products are manufactured in order to satisfy human being's needs. Then, whose needs should projects satisfy? Of course, stakeholders as well as customers should be taken into consideration. People work to satisfy their own needs, either physical needs such as foods, houses, and vehicles, or psychological needs such as emotion, reputation, conscience, or a sense of justice. Money is simply "the equivalence" of these needs. Even for slaves who have no personality and freedom at all, they work for satisfying their basic needs, which is to survive or to have the hope to survive.

"Exchange" is fundamental for human beings or all creatures to survive. Projects provide opportunities for these exchanges. Therefore, we can define projects as "a kind of opportunity for stakeholders to exchange their needs." However, it is not enough to just have opportunities. Stakeholders must have confidences in projects. They believe that the opportunities the projects provide are big enough so that it is worth making exchanges using their own stuff and the exchanges are beneficial to themselves.

To make everybody feel advantageous, we need to guarantee fairness to reach the overall balance. This means that projects need to have the characteristics of fairness. This characteristic cannot emerge spontaneously. It comes from the agreed regulation relationships among various stakeholders. Projects cannot exist without this relationship. Of course, fairness defined by any regulation relationships is relative, especially when people do not have options to choose from. Therefore, we can further treat projects as "transaction platforms based on some regulations, on which different stakeholders perform exchanges of paying and receiving to satisfy their own needs." These regulation relationships can be indicated by transaction role networks among stakeholders. This network is a kind of social network. In other words, projects can be defined as "social network platforms that are developed to complete temporary and unique tasks and to satisfy different stakeholders' needs." Correspondingly, project management can be defined as "the process of managing project stakeholders social network platforms to complete projects and satisfy stakeholders."

Common problems in management are dislocation, offside, and omission of roles. The ambiguous distinction of the boundaries between "project governance" and "project management" can also lead to such situations. If we cannot clearly clarify the differences between "project governance" and "project management," we cannot answer the question why we still need to propose a concept of "project governance" apart from the well-known concept of "project management." It is difficult to define the boundaries of governance and management as management covers governance in a broad sense while governance can be understood as "the management of management." An effective way to distinct "project governance" and "project management" is based on the authorities that project managers

possess. Authorities should be equal to responsibilities. However, in reality, people usually simply assign the responsibilities of project management completely or mainly to project managers.

An enterprise usually has multiple projects to proceed, which means that it is impossible for the enterprise to deliver all the resources to one project manager. Resources that are needed to complete projects are usually under the control of stable functional departments. These resources are controlled by those with stable positions such as department managers or general managers, rather than the temporary project managers. In particular, for those projects involving multiple enterprises, project managers have very limited power to control the resources. In other words, project managers only have the right to use resources. They do not have the right to possess them. To project managers, questions such as how many resources can be allocated and how to use them belong to "project governance." Under these rules, how to effectively use these resources is within the scope of "project management." As projects are temporary, project managers are temporary too. Enterprises cannot hand the responsibility of development completely to project managers, especially in interorganizational projects. Therefore, missions such as setting up project objectives and how to supervise project managers to fulfill their responsibilities are within the authorities of enterprises and related organizations rather than project managers.

The main task in project governance is to "set up project objectives, provide projects with needed resources, and determine methods to achieve project objectives and approaches to supervise performances." In a simple term, the responsibility of "project governance" is to provide objectives, resources, and regulation environments of project management, while the responsibility of "project management" is to effectively use resources to achieve project objectives within these regulation environments.

To enterprises, the best management approach in a changing era is based on the stable management infrastructure that can cope with changes. There are four components of enterprises' management infrastructure (see Fig. 4.1).

The highest level is corporate governance, which defines the responsibilities, rights, and the benefits among corporate owners and operators. In other words, it indicates "the power structure" of an enterprise. Nowadays, there are many terms used to describe the enterprise management such as chairman of the board and CEO. Many enterprises do not know the origin of the word "director," neither do they know the differences among the chairman of the board, CEO, and the general manager. Otherwise, there would not have weird situations such as the chairman of board also being the general manager or the CEO simultaneously. Similarly, it will not occur that members of the board of supervisors do not dare to "supervise". The most important responsibility of the board is to define the profit model of the company, and based on which to select appropriate operators and determine the principles of profit allocation.

An assumption that many operators (top management) can "threaten" the board for a decent salary is that an enterprise's operating efficiency depends on the performance of the managers. It looks right on the surface, but in reality in

Fig. 4.1 Enterprises' management structure

many cases, there is no significant relationship between the performance of the
enterprise management and the performance of the enterprise. Many failed com-
panies in fact do not have bad enterprise management, while many companies that
achieve huge bonus might have bad enterprise management. It is not a reasonable
way to use bonus as the criterion to evaluate the performance of enterprise man-
agement. Another misunderstanding is that the board is mainly responsible for
acquiring capitals and working on the stock market. However, the attention to the
stock market inevitably shifts the focus of the operators on the company, which in
turn reduces the driving forces to the company development.

Numerous people talk about innovation such as technology innovation, man-
agement innovation, and so on. However, the innovation of the board is underap-
preciated. The board's responsibilities are often transferred onto the operators,
which not only leads to the banality of short-term efficiency and profit models, but
also gives the operators more excuses to ask for higher salaries and gives the board
reasons to distrust the operators. Therefore, an inconsistent relationship between
company owners and operators is formed, which can be described as uncomfort-
able bedfellows inside, but great friends on the surface.

*The core question in governance is power relations. Power in corporate gov-
ernance is built on property relations. Power comes from the possessing degree
of corporate resources. The higher the degree of possessing, the greater the
power is, and* vice versa. *Big shareholders have greater power in corporate
governance than small ones. On the contrary, clients and suppliers do not
possess corporate resources. Therefore, they do not have power in corporate
governance. Taking a public listed company as an example, numerous small
shareholders just purchased some corporate stocks in stock markets, which
bring them right to receive bonus. However, they have little power in corporate*

governance. Therefore, they can only decide to hold or sell the corporate's stocks based on their own judgment. For the more familiar terms of "ownership" and "operational rights," "ownership" is possessed by the owners of the corporate capitals, while the "operational rights" belong to management personnel. In fact, because pure management personnel do not possess corporate's capitals other than their personal knowledge, they do not have power in corporate governance although they are given rights by the owners in the process of corporate management. It is not appropriate to use the term of "operational rights" in corporate governance. "Operational responsibilities" should be a better term.

There are two parts of project governance, which is within the corporate governance. The first is to identify, establish, and maintain the governance relationships between enterprises and their external stakeholders. The other is to identify, establish, and maintain the governance relationships between different internal departments and between different departments and projects. No matter which governance relationship is used, the purpose is to build a manageable, reliable, and effective environment to project management. People often wrongly think that grass-roots units or people at executive levels are responsible for project management. To make matters worse, the management models they adopt are "enthusiasm and stimulation", which in fact is that all matters are solved by project managers. However, in project governance, operators (which include functional departments) should be responsible for at least half of the questions. If we analyze the time allocation of the general managers, we can find that they spend a lot of time in interacting with external personnel and in coordinating different internal departments. If they can improve the efficiency of these jobs, they can build positive management environment for enterprises' projects.

Enterprise operations are full of risks. Power can be shared with others through authorization, and money can also be shared with others through distribution. However, no enterprises would like to share others' risks. Even if they would like to share, they might not be able to do so. The expectations of risk transfer are not always reliable and effective. The real valuable ideas from operators are to design and provide mechanisms to reduce the total amount of risks and to maintain the operation of these mechanisms. In other words, the important aspect of project governance is to design mechanisms to reduce risks, not to transfer risks.

Multiple project management falls into the category of internal project governance. We need to understand that project managers are only responsible for project objectives. They cannot take responsibilities for project aims. Their main responsibility is to do projects in a right way, not to do right projects. Then, who is responsible for doing right things? Who decide the preference order of projects using resources? It is the responsibility of governance.

In the environment of effective project governance, it becomes an inescapable responsibility of project managers to finish every project effectively and reliably.

The employment strategy of Juzheng Zhang, the Prime Minister in Waili time in Ming Dynasty, is to employ flexible people rather than frivolous ones. Flexible people know how to do things successfully in a flexible way within the boundary of laws. On the contrary, frivolous people have great dreams and fantasies, but they cannot do things successfully and always blame others for the failure. Project managers need to realize that they do not have time to establish a kind of project culture that can produce magical effects. Neither can they be sure that they could ask various people in the projects to share a same kind of culture. They cannot expect projects' different characteristics adapt to principles and policies of the enterprise, nor can they expect enterprises will change policies to adapt to their projects.

Project governance methods provided by operators are to establish principles for projects, which must be concrete and stable. What project managers can do is to flexibly deal with various projects and stakeholders, and to manage project team members with different characteristics within the framework of enterprise principles. The reason we emphasize that project managers need to have political minds is that owners and operators usually do not neglect the importance of politics. On the contrary, the personnel who are responsible for completing tasks might neglect this issue.

The boundary between project governance and project management is sometimes ambiguous, similar to enterprise governance and enterprise management. The ambiguous boundary between enterprise governance and enterprise management might cause the following few situations: The chairman of the board might exceed his authority and the general manager might become a puppet; or the chairman becomes a puppet and the general manager grasps all the authorities; or the boundary between the chairman and the general manager is so ambiguous that these two roles have to be assumed by one person. By contrast, the result from ambiguous boundary between project governance and project management is relatively simple but dangerous: Operators (including management sections) grasp all the authorities and project managers take all the responsibilities.

As for project governance, the relationship among stakeholders is collaborative partners, which must invest "work" in the process of completing project tasks to exchange for profits. Maybe someone might think that project investors should use their capitals in exchange for project profits. They do not need to use "work." That is right. Investors cannot just invest in vain. They can just invest and ignore the projects, but they can only receive profits after the projects are delivered successfully. If the projects cannot be delivered successfully, they have to assume the losses. There are various sources of an enterprise's profits. It is not a big deal to have local losses as long as profits from other areas can cover these losses. However, to a project, if it cannot be delivered successfully, it will bring losses even if the losses might not be assumed completely by investors. As risks are centralized, investors cannot simply authorize the projects to others without any efforts.

Similar to projects, project governance also has the characteristic of life cycles. The life cycle of project governance mainly refers to the period starting from project decision-making to project delivery and corresponding management closure. The operation after projects are delivered should not be included in the range of project governance. Instead, it should be included in corporate management. To improve the reliability of project delivery, different stakeholders will decide how many responsibilities they would assume based on the different authorities they own. Similarly, the profits project stakeholders receive during the project governance life cycle should be decided based on the amount of responsibilities they assume and the degree of completeness of the responsibilities. The authorities owned and profits received by project stakeholders are the compensation to the responsibilities they promise.

Apart from enterprise governance, project governance, and project management, there is another component in the structure of enterprise management that is most fundamental and widely used, namely daily operational management. Daily management sounds simple, but it is not easy to do properly. For this aspect, the opinion proposed by Mr. Taylor, the founder of Scientific Management, is worth learning most. Just like Mr. Taylor said, "Managers assume an important and great responsibility, which is to assemble all the traditional knowledge from the workers in the past and develop them into a science. Management is not only a science or an art. More importantly, it is a combination of science and art. Management is a technique, which has accurate and clear rules as those basic principles in engineering. These rules need long-term thorough thinking and studying." The definition of management technique is "to know exactly what need to be finished by others and direct them to use the best and most efficient way[2]." It is undoubtedly that the most important part of this technique is the relationship between the superiors and the subordinates.

> *The primary purpose of daily operational management is to combine high salary with low work cost, and believe that this purpose can be realized easily by using the following principles: (1) there should be lots of clarified tasks everyday; (2) standard work conditions; (3)receive high rewards after finishing tasks; and (4) unsuccessful person suffers loss. When the organizational structure of an enterprise reaches a certain advanced level, an additional principle should be added: the degrees of difficulties of tasks decide that only first-class employees can complete them.*
>
> —Taylor • *The Principles of Scientific Management*

In a changing era, enterprises need to satisfy individualized requirements using the industrialized efficiency. Enterprises should define an appropriate profit model to have a clear responsibility–authority relationship between owners and operators. When they establish a reliable project environment, and possess the right capability to complete projects, then they are able to maintain effective daily operations. As a result, they can deal with challenges posed by a changing era.

---

[2]Taylor, F.W.: The Principles of Scientific Management. China Social Science Press, Beijing (1984).

4.3 The Composition of Enterprise Project Governance Platforms

In complex competition environment, it is well recognized by enterprises that the value projects have that can effectively deal with changes. Project management becomes very popular in enterprises. Some enterprises even tend to act in a way of "treating every management activity as a project".

Project management is a management technique that enterprises and other organizations treat some work as projects in order to adapt to changing environments and requirements. It can have the following patterns: (1) set up milestones for a long-term job; (2) define the boundary of authority for a certain task for the long-term or general functions of some positions; (3) define collaborative ways in temporary organizations formed for some interorganizational work; and (4) establish temporary inflexible rules for some flexible or informal organizations. After the 18th Chinese Communist Party National Congress, project management is receiving a growing attention with the deepening reform such as the rapid adjustment of industrial structure and the advance of various collaboration and innovation.

Just as a coin having two sides, although project management has become more and more popular, it also brings some worrying situations. The enthusiasm of Chinese people is often impulsive and very clear in a way of "either this or that." Just like Chairman Mao said, "Either the east wind prevails over the west wind or the west wind prevails over the east wind."It is disadvantageous to the development of both enterprises and our country to treat "project management" as a movement. It is not reasonable either to just notice the changes of society while neglecting the relative stability behind changes or to overemphasize the importance of project and treat everything as a project.

During its process of development, an enterprise usually initiates or participates in multiple projects, which are in different business fields and have different objectives and conflicting requirements on human, financial, and material resources. It becomes a big challenge for enterprises to effectively manage multiple dynamic and temporary projects and use the regularity of management to deal with the uniqueness of projects. Under such context, stable and reusable project governance platforms become vitally important to enterprises.

Project governance platforms "provide reusable conditions for multiple functional projects, which can improve the efficiency and reusability of project management and strengthen the collaboration among multiple projects." The characteristics of project governance platform lie in their stability and reusability. Stability implies that project governance platforms are long term and reusability indicates that they are a collection of various processes, knowledge, techniques, and methods. An enterprise is a system, and its different projects are the sub-systems. Each project sub-system has different objectives and operating methods. Without effective planning, these sub-systems cannot be effectively integrated while projects are more likely to fail.

An enterprise project governance platform includes the following components.

1. Scenario-oriented project operation platforms based on processes

The roles played by project stakeholders are dynamic, which are controlled by some processes. These processes differ according to scenarios. Scenarios are related to project scopes and work processes, which are highly interdependent. Project scope can be described by work breakdown structure (WBS), and processes are the sequences of work packages in WBS, which includes logical sequences and the sequences formed by requirements on resources and management. It is worth noting that the decomposition process of WBS is usually based on activities related to project products. However, in fact, we should emphasize more on the decomposition based on management activities. From this perspective, WBS is a network structure rather than a tree structure. Since processes include activities and sequences, we can simply refer to scenario as "a collection of processes." Scenario-oriented project operation is a procedure that uses processes to control activities, which is used to control resources.

In The Legend of the Condor Heroes, why are there eighteen moves in Xianglong Kung Fu rather than twenty-one? Why are there seventy-two moves in Kongming Kung Fu rather than eighty-one? Why are there thirteen moves in Wudang Tai Chi? Moves are not made up randomly. They are the classification of attack-and-defense ways in different Martial arts. The biggest problem in fighting is that there is not enough time to think about how to defeat the enemy while facing his or her attack; therefore, there are trainings of moves. Air defense drill, island-taking drill, disaster-relief drill, and emergency preplan are all examples of this training. With this kind of training, there is no need to hold a meeting to discuss and even a scenario mentioned above occurs.

The purpose of scenario-oriented project operation is to reach the maximum efficiency and reliability of project operation, which contains the thought of dialectics and embodies the rule of unity of opposites. Projects are unique. The uniqueness of projects not only refers to the uniqueness of project outcomes, which is not very meaningful in management discipline. The focus of management is on outcomes-oriented rather than outcomes-based. The outcome-oriented management is process management, while outcome-based management means to evaluate and make contributions for the future. Therefore, from the perspective of value of management, the uniqueness of projects refers to the uniqueness during the process of realizing project objectives. Of course, we treat project resources as the associated parameters in using processes. The differences among processes indicate the differences in project scenarios. The classification of processes is the basis of classifying scenarios.

This method of simplified analysis is vitally important to the formulation of project team characteristics. Apart from this method, there are some other important ways of simplification. These include the following: simplify the focus of management to the management of human behavior; simplify technique and resources to the belongings of human and treat them as associated parameters of

human beings; and treat management activities as a function of information, that is, to simplify all management activities as well as human behaviors to their information characteristics. Without these simplifications, there are no scientific management research and scenarios of processes. In other words, scenario is a function of project processes. Processes use resources, that is, processes are functions of resources. In these resources, all other resources can be simplified as parameters of human, that is, human is a function of resources. The roles played by stakeholders in projects are functions of individual ones and their interrelationships, i.e., functions of human and information. Hence, a nesting complex functional relation is formed, which in turn results in that scenario-oriented project operation is a function of the roles of stakeholders and related information. This simplified functional relation can be described by the network of the stakeholders' roles, which provides a basis of methodology and techniques for using scientific research, which includes mathematical inductive and deductive analyses.

For an organization, scenario-oriented project operation is not a process set because organizations usually have multiple projects. Similarly, projects operated by multiple organizations are also based on process sets, which is the reason scenario-oriented project operation is a platform. The purpose of a platform is to provide an integrating environment and conditions for each individual function operating on the platform. As a result, each individual function can be effectively integrated, configurational conflicts can be reduced, and the whole effectiveness and efficiency can be improved. Although projects are complex, the types of process sets that used to finish projects are limited. Therefore, the efficiency problem caused by "specific analysis of specific issues" can be avoided. Instead, an approach of "classification and automatic analysis of specific issues" is applied. Project values usually are reflected in their expiration dates of values rather than in their uniqueness. Projects' time value is vitally important. Scenario-oriented project operation means that projects must be completed before their expiration dates.

Time limit is the biggest resource limit in managing projects. The reason IBM put forward a slogan of "deal with changes based on requirements" is that IBM has a scenario-oriented Worldwide Project Management Methodologies (WWPMM), which is depicted in Fig. 4.2.

2. Role-based human resource development platforms based on the degree of competency

A prerequisite of hiring somebody is that this person is capable of doing a job. However, in reality, it is not always the case. It is not the "hiring after competency is confirmed," but the "competency development after hiring," which appears to be the majority of cases. The consequences are to increase risks and decrease efficiency. To avoid using real job for training, it is imperative to have the awareness of competency, selection criteria, ways of improvement, and hiring methods.

Projects depend on human beings to complete, who are the stakeholders of projects and the human resources of projects in a broad sense. However, the characteristics of project human resources are different from those in

Work models in project management
A summary of procedures project managers
should adopt in more than 40 different work
scenarios
From the perspective of events

Work Models

Knowledge
Domains

Work Products

Knowledge domains in project
management
There are 13 fields and more than 150
project management processes. It also
defines how to deal with details in
project management
From the perspective of knowledge

Work products in project management
Project managers use various kinds of
documents in initiating and planning
projects
From the perspective of documents

Fig. 4.2 IBM's project management methodologies

stable organizations. Project human resources do not belong to projects. They are grouped together by their individual benefit agreement. This kind of human resources has the following characteristics compared to those in stable organizations: It has clearer and more detailed boundaries of responsibilities; it has more limitations in using these resources; its participating process tends towards fragmentation and timeliness. In other words, roles assumed by stakeholders play a more important role in project human resources than in those in enterprises or other stable organizations. Therefore, for projects, role-based stakeholder management conforms to the project characteristics and is necessary for managing projects.

"Role" not only refers to a specific person. More importantly, it indicates a specific responsibility in completing a project. Stakeholders in a project can play different roles in different phases, occasions, and tasks during the life cycle of project governance. Meanwhile, a same project task can be completed by different people with different roles. A responsibility might not be assumed by just one person. It needs other's collaboration. Hence, responsibility also covers the way of connecting different roles. Therefore, it is very difficult to use a rigid hierarchy or matrix in advance to describe the relations among the roles played by different stakeholders. Instead, these relations always depend on the characteristics of project governance and the dynamic role of network needed by tasks in the life cycle of project governance. From this point of view, it is not realistic or reasonable in project governance to seek for a "governance structure" that can define the relationships among stakeholders straightaway.

Roles appear to be dynamic or time-bounded with the progress of processes. For organizations, resource requirements are not static but dynamic. Role-based human resource management can reduce the total amount of human resources and

reduce the costs. Further, there will be more managing and social issues caused by managing one more person. To make sure that a person can be used in multiple positions, the following two conditions must be satisfied: The person needs to be active; and the person should have the ability to satisfy the needs of the several positions. In other words, dynamic managing mechanism needs to be used and a person should have the competency to take several roles.

The competency degree of project roles refers to the matching degree between someone's capabilities and the role's requirement on capabilities. Here we emphasize capabilities rather than other factors such as individual accomplishments, quality, and morality, which are based on our understanding of management. Capabilities are directly related to project activities, while morality and accomplishments might not be. They are more likely to relate to social values. Of course, to some certain jobs, accomplishments and morality are also kinds of capabilities. In summary, capabilities are connected with project activities.

Stakeholders' capabilities might not necessarily lead to effective behaviors. They are simply one of the conditions that produce effective behaviors. They are not even necessary. For example, with luck or social background, one might not need capabilities. From the perspective of reliability, every project activity has factors that lead to its success, although these factors might not be identical in terms of constitution or the degree of importance (essentiality). It is reasonable to have situations such as "create a job to accommodate a person" or "use a person to accommodate a job" in management. But no matter what, we need to have a basic judgment about what kind of person being capable of doing a certain project activity. This judgment is called capability baseline. We can see that capability baseline is not always objective. It is an ascending spiral process from practice to theory (standard knowledge) and from theory to practice. Capability baseline has a framework of standard knowledge, which provides basis for training personnel. In a rapid-changing and high-competitive era, it is impossible to accumulate experiences based on individual experiments, which is too ineffective and risky. Further, the mobility of employees does not allow organizations completely depend on experiences that belong to individual employees. Approaches to identify roles, competency standards, training mechanisms and evaluation mechanisms, and so on together form a sub-system of project governance, which is called "Role-based human resource development platforms based on the degree of competency."

3. **Human resources dynamic management platforms based on knowledge reuse**

Role-based dynamic management means various stakeholders can be managed effectively during the project life cycle. The management mechanisms based on role competency are realized through managing processes, which need to have a leading amount and to improve the forecasting abilities of the roles in play. All these are based upon the managing abilities an enterprise has toward processes. "It is easy to have a thousand soldiers, but hard to find a good general" is a traditional opinion toward talented people in China, but "it takes a hundred years to educate a person" is not appropriate for projects that have obvious or even rigorous time limits.

Although projects can facilitate people to be talented, projects usually do not aim at training human resources. Moreover, they are simply utilizing human resources. Talented people are important while they are difficult to employ. Because they are high-paid and bad-tempered. However, talented people actually are not such important as above said for project. Of course, if we treat the elements that are needed in completing project tasks such as techniques as attributes of a person, this person becomes necessary and irreplaceable. However, if we can decompose these elements and distribute them to different people, the necessity of a person is reduced. In other words, experiences that are ambiguous and belong to a certain person can be transferred to knowledge that is explicit, standard, reusable, and independent of a specific person. As a result, the dependence on this person is reduced.

The difference between science and art is that the former does not depend on a specific person while the later does. When we have the ability of decomposition and standardization, art becomes science. Of course, it is difficult to treat many problems in management with scientific perspective, but we can move to the middle of the spectrum between science and art. This is a paradigm shift from "art of leadership" to "techniques" in management. When we can transfer our opinion of "use people to work" to "use people to work based on their specific knowledge", the decomposition of people's attributes will be achieved. In other words, a person's attributes are decomposed to a set of attributes, which help to reduce the reliance on this person and improve the work efficiency and reliability. If we drop the standard on people's attributes a little bit, we will locate much more people who satisfy these attributes, which in turn reduces costs.

During the whole life cycle of a project, there are a lot of activities that are not directly related to products such as file management and communication management. Although these activities play important maintenance roles in closing projects successfully, they make people feel like doing housework: trivial, annoying, time-and-money consuming, and unimportant. In fact, many advanced management models become nasty in some enterprises starting from the nasty changes of those activities with indirect outputs. "Make up all the documents before evaluation" has become a public secret in the operation of the ISO9000 system.

The process of decomposing and standardizing experiences and converting them into reusable knowledge not only reduces the competency baseline of project roles, but also provides fundamental working style for roles. In other words, roles receive training based on knowledge and work based on knowledge standards. For organizations, roles and knowledge are separable. Those that cannot be detached are experiences. Otherwise, they are knowledge. Activities that are related to formulation and reuse of knowledge form another sub-system of project governance, which is also another sub-platform.

4. Informatization management and control platform based on key performance areas and performance indicators

It is irresponsible to call that "to delegate tasks to the right people, and then wait for them to submit the results." It is not a trend of socialized division of labor force

that "a person being used cannot be suspected while a suspected person cannot be used." Basic roles of project governance are as follows: "planning, maintenance, operation, and monitoring." Management becomes a discipline as it is critical to the project success, so as the personnel. It is a misunderstanding that having the power is equivalent to being a manager, which led to many problems in the society. Many of those in power do not think subconsciously that management is a major discipline, which is a challenge to researchers in the management discipline.

Effective management requires abandoning the fluke mind. In a manager's dictionary, there is no "surprise" but "control." The control on process risk forms an important part of project governance, or one of the two cornerstones to develop relationship regulations among projects stakeholders. The other cornerstone is the allocation of responsibilities and interests. Key performance areas (KPA) in fact are another expression of key risk areas and key performance indicators (KPI) are the specific feature of KPA. For management, risks may be related to technology, financing, weather, health, and other factors. However, for governance, it can be simplified into the risk of the responsibility to be assumed by the stakeholders, i.e., the risk of role behavior.

Manageable behaviors of the stakeholders or the behaviors that can be changed through management are the main targets of project risk management. Human behavior arises from two reasons. The first kind of behavior is caused by self-endogenous attributes, or it is the behavior that is decided by self-attributes. The risks produced by this kind of behavior (i.e., possible unplanned outcomes) are called "attribute risks," which are judged by the relation function of the common list of risks and specific persons. The other kind of behavior is produced based on relationships between people, i.e., the exogenous attributes. The risk caused by such behaviors can be called "structural risks," which can be further divided into two sub-categories: relationship risks, which describe the risks to a specific person; and network risks, which indicate risks to a group of people.

Projects are complex, and the difficulty to identify project risks lies not only in the judgment of uncertainty, which is based on ability. The difficulty to management lies in another factor, namely information. The fact that the information transmission might be untimely distorted and hidden is the focus of manageable risks. That is also the reason we simplify various management behaviors into information exchange. Further, with the help of information systems, we can reduce artificial ambiguity and flexibility in processing, which in turn help in reducing risks and improve the effectiveness of management.

5. Project cultural platforms based on sustainable collaboration

Projects bring not only opportunity but also risks to people. Projects deal with changes, which bring people concerns. Especially, the degree of these concerns will rise when people get older without effective social security system. If organizations do not address these concerns, employees will have to solve these problems by themselves.

To solve psychological problems existing in projectized processes, people need to develop abilities of cooperation, and improve their competences to play

their roles well. As a result, they could see the prospect of future professional and personal development, and increase the reliability of such prospect. These need a series of security systems that are built on the understanding of human nature. Culture is a kind of habits developed in the long term, and we cannot wait to manage until the habits are formed. Instead, we should break the formation of habits down into individual behavior-solidifying processes. Human behavior needs to be solidified and repeated. Constraints and guidance are required with carrot and stick approach.

Culture deals with the fear that people have when working on temporary projects. It is the logic of the project governance platform that people are willing to change into a role position from a routine position; knowledge can ensure roles to do the job competently; information management and control system provide roles the rules in work; and roles complete a project by means of process integration. It is the responsibility of organizations rather than project managers and project team members. Nor can it be assumed by any other functional departments independently.

Movement-style and speculative operation behaviors are detrimental to many enterprises in China, which have the symptom of most Chinese companies being struggling to respond to market changes. Unstable feelings such as overcautious are exactly caused by the fact that we only have project awareness, but lack of a stable project governance platform at the enterprise level.

A general lack of platform awareness exists in most of the Chinese enterprises. We have always emphasized experiences and experienced personnel. However, attention has not been paid to the importance of knowledge accumulation and reuse, and the interaction between educational systems and talented people. We emphasize problem-solving techniques rather than science with fundamental theories. We are excited about innovation or imitation, but do not respect the protection of intellectual property rights. If this continues, it would be difficult for companies and even countries to have a sustainable competitiveness.

We have various mobile phones and numerous applications, but we do not have such platforms as Android, iOS, and Windows. We have a large number of aircraft, radar, artillery, and missiles, but we lack a comprehensive platform to integrate these weapon systems, i.e., aircraft carriers. Platforms play important roles. This is why the aircraft carrier "Liaoning" in China attracts a global attention.

A company with only projects but no project governance platform can only carry out guerrilla-style tactical activities. It cannot carry out a large-scale campaign, and its future is full of risks. Zicheng Li is a project expert, but his ultimate failure is not only due to the internal pride and corruption, but also due to the absence of platforms strategically. The Chinese revolution led by Zedong Mao learned this lesson. He built individual base areas (platforms) rapidly, together with managing individual battles (projects). This strategy is worth our high attention.

Chapter 5
Successful Project Decision-Making

*Do not make friends with those who do not deserve being
consorted. Do not force others to do things beyond their limits.
Do not plan with insensible people. Otherwise it will be fruitless.*

—Guanzi • *The Situation*

Project management first implies that there are projects that can be managed. Fundamentals of project management are as follows: obtaining correct projects, valid projects, and/or projects that worth managing. Project decision-making plays a very important role in achieving the project success. In an enterprise, it is the top management's responsibility to make project-related decisions, which should not be shuffled onto the project managers.

"Would you tell me, please, which way I ought to go from here?"

"That depends a great deal on where you want to get to?" said the Cat.

"I don't much care where—", said Alice.

"Then it doesn't matter which way you go," said the Cat.

"So long as I get SOMEWHERE." Alice added as an explanation.

"Oh, you're sure to do that," said the Cat, "if you only walk long enough."

—Lewis Carroll • *Alice in Wonderland*

*For large-scale construction projects, 70–95 % of the project investment is
affected by preproject decision-making. About 60–70 % is affected by designing
and planning phase. Only less than 40 % is affected by project execution phase.
However, cost on preproject works only accounts for 1–2 % of the overall cost.
However, this 1–2 % of overall cost determines almost all the cost in the following
project phases.*

Successful project decision-making can be achieved from the following 5 steps: clarifying aims and objectives, identifying stakeholders, exploring stakeholders' expectation, searching ways to satisfy stakeholders' expectation, and determining if the objectives were met.

5.1 Clarifying Aims and Objectives

It is vital for managers to distinguish three important concepts: aim, objective, and means. An aim refers to a certain realm that people wishes to reach. It implies the degree of approval people have toward a certain status or value. It is directional to some extent. However, its judgment criteria are ambiguous and various. An objective is the concrete representation of an aim which has clear characteristics and judgment criteria. In other words, aim can be understood as a set and an objective is just a sample in that set. For example, pursuing happiness is the aim of life, but different people have different understandings of what happiness is. Therefore, they might have different objectives when pursuing happiness. For some people, having a car is happiness, while for some others, having food to eat is happiness. All these are the specific objectives of happiness that different people might pursue. The methods or ways to meet the objectives are called means. There might be various methods to meet a same objective, i.e., "all roads lead to Rome."

A long time ago, there were only two indicators to judge an official: moral characters and talents. Later, two more indicators were added: diligence and performance. Then, it was found that these four items were not perfect, and more were added gradually such as GDP, incorruptibility, environmental protection, birth control, mass incidents, and major security incidents. Because there were too many indicators, it became difficult to assign scores for each item. As a result, the full score reached more than 1000 points or even 2000 points. Each item was assigned a weight to indicate its relative importance. However, these methods in fact mistook objectives for aims. Meeting objectives does not equal to realizing aims.
There is a thief event occurred at a sprint champion's home. Because the thief just left, he ran after the thief to catch him. Shortly, he passed the thief. When he turned around and tried to mock the thief, he just realized that the thief had ducked into an alleyway and disappeared. You might think this story is absurd because the objective here is to catch the thief, not to race with him. These are two different things.

From the perspective of management, any things we do have aims. Many dilemmas are derived from unclear aims.

It is common to have such situations in the enterprise evaluation: Some departments are easy to evaluate, while some others are difficult to evaluate. When asked which departments are easy to evaluate and which ones are not, the answers usually are as follows: "the departments that earn money are easy to evaluate and those that spend money are difficult to evaluate." In fact, an important characteristic that distinguishes enterprise from other organizations is that enterprises aim at profitability. In simple terms, enterprise is a type of organization that pursues profit within the legal framework. With this aim clarified, we can argue that it is not appropriate to divide an enterprise into "earn-money" departments and "spend-money" ones. Instead, an enterprise should be divided

into "earn-money" departments and "help-earn-money" ones. The former ones do not have focused aims, while the latter ones have. If the second way of division is adopted in enterprises, it should be the "earn-money" departments evaluate the "help-earn-money" ones. However, currently most enterprises chose an opposite approach.

Another problem in enterprise evaluation is that people usually use comprehensive evaluation methods. That is, a group of indicators is developed and weightings are assigned to each individual indicator. The overall weighting is 100 %. The purpose of this method is simply rewarding or punishing departments. It is not very useful in finding and solving problems. For example, when seeing patients in hospitals, doctors never assign weighting to individual medical indicators. They would never say things such as "your blood pressure is high but you are short. So on average it is good and you are healthy."

The purpose of working on a project is not to produce a new product or finish an engineering work. Rather, we are pursuing a certain value. New products or new projects are simply some specific objectives to achieve this aim. Therefore, project managers need to keep "value" firmly in their mind when making decisions.

In order to obtain a valuable project, we need to answer the following questions to clarify our aims.

1. *What are our life expectations?*
2. *What are the visions of our enterprise?*
3. *What kinds of social and business environments do we live within? How are these environments changing?*
4. *What opportunities and threats do these environmental changes bring to our expectations and visions?*
5. *What kinds of values do we need to provide in order to seize these opportunities or to mitigate these threats?*
6. *When must these values be provided?*
7. *What specific outputs or indicators can help us to examine if these values have been achieved?*

Questions 1–5 can help us to clarify the aims of the project. Questions 6 and 7 are the specification of the project aim and serve as parts of the project objectives.

Specially, managers need to strengthen their systems thinking abilities in order to clarify the aims. They need to put the enterprise, the projects, and themselves in a dynamic value system and make evaluations through this system. Many projects fail as the decision-makers treat the projects in isolation, or they treat the projects in a static system.

   Only based on systems thinking, can we understand the various factors that are related to enterprise development and self-development. Only if we connect these factors into a system, can we understand our position in this system and the values we need to possess in order to survive and progress.

   Projects are the platforms of value exchange. If we do not consider ourselves' aim first when deciding the aim of the project, we cannot be really motivated by

Fig. 5.1 Basic units in
system flowchart
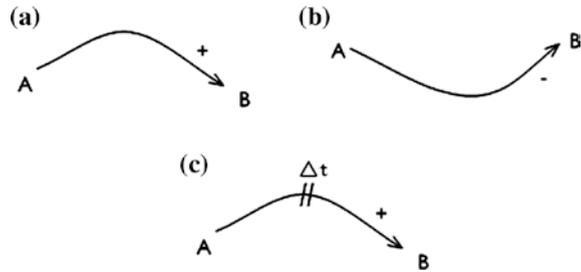
the project aim. In addition, the system we are surrounded is a dynamic social
system, which is constantly evolving. If we do not understand this point and only
focus on the current status, it is likely to reach a result that the undergoing project
loses its value before its completion because of the evolving system. The compo-
nents of our system include not only the stakeholders from the outside, but also
other internal projects and their stakeholders.

*One method that can help us discover values and aims is system flowchart, which
is a part of system analysis.*[1] *System flowchart is composed of three basic units:
reinforcing relationships which mean an increase in A will cause an increase in B*
(see Fig. 5.1a)*; balancing relationships which mean an increase in A will cause a
decrease in B* (see Fig. 5.1b)*; and delaying relationships which mean an increase
or a decrease in A does not cause an increase or a decrease in B immediately.
Instead, B will respond with a delay of Δt time* (see Fig. 5.1c)*. These three basic
units can be used to develop complex system flowchart. Consequently, it can be
used to identify project opportunities and to judge whether a project matches our
values and aims.*
Figure 5.2 *reflects systems evolution in car sales and service markets in a simple
way. An increase of private-owned cars leads to more parking difficulties, heavier
traffic congestions, and more requirements on car repair and maintenance. If traf-
fic jam is severe enough, government is expected to intervene by announcing poli-
cies such as developing public transportation, which in turn leads to a decrease
in private-owned car sales. However, as more and more private car owners have
gotten used to life with cars, they are more likely to still drive cars even public
transportation could be used as well. This situation leads to an expansion of car
rental business. No matter in which situations, the amount of cars that needs repair
and maintenance will increase, which leads to more problems derived from the car
repair and maintenance sector. As a result, government might need to announce
policies in car repair and maintenance to regulate the market. As shown in
Fig. 5.2, car rentals, repair, and maintenance bring more business opportunities.
Meanwhile, the time delay of these opportunities might bring some other projects
such as financing, constructing new workshops, and setting up standards.*

---

[1]For diagram drawing and analysis in systems thinking, please refer to:
    Sherwood, D. (2002). Seeing the Forest for the Trees: A Manager's Guide to Applying
Systems Thinking. Nicholas Brealey Publishing, 2002.
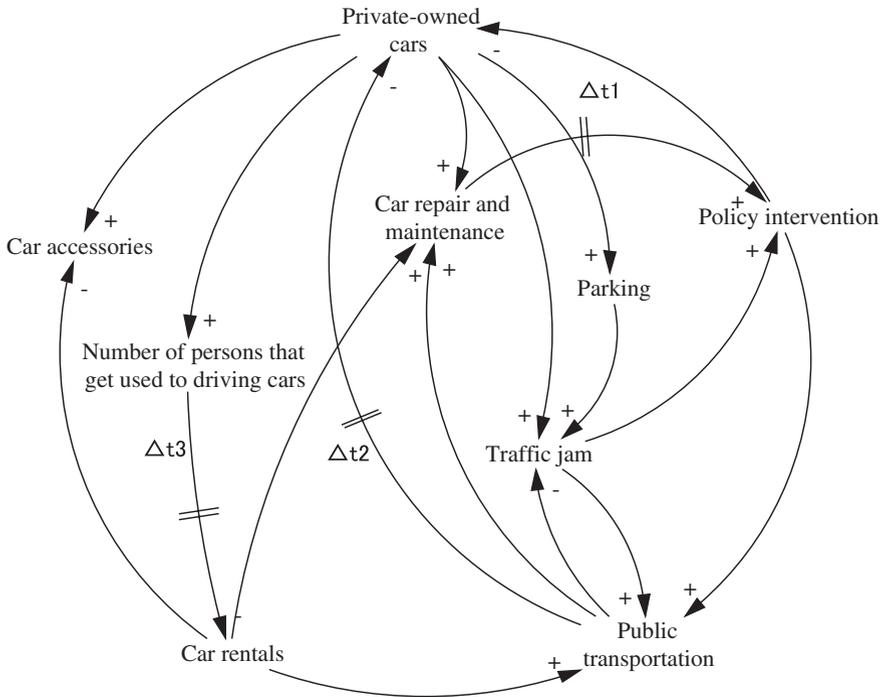
Fig. 5.2 The system evolution in the car sales and service markets

5.2 Identifying Project Stakeholders

During the process of project decision-making, it is unrealistic to just consider our own aims. Without the support from other project stakeholders, it is difficult to realize these aims by ourselves.

In general, project success means the project can deliver qualified project outcomes in limited time and with limited cost. Time, cost, and quality are regarded as the three fundamental elements of project success, which is called the triple constraint model (see Fig. 5.3). Changes from any element in this model would cause changes in the other one or two elements.

However, the criteria for project success are not constant in different eras. That is, they have been evolving over the time.

In the Age of Kings, project success meant that the project work was finished. There was no specific time and cost limits. Taj Mahal in India and Pyramid in Egypt are examples from this Age. The object of project management then was only the project scope, that is, the contents of tasks that a project should finish.

The construction of the Great Wall lasted for more than 2000 years. From Chu State which first built the Great Wall as "Fang Cheng" in 700BC to Ming Dynasty,

Fig. 5.3 The triple
constraints in project
management
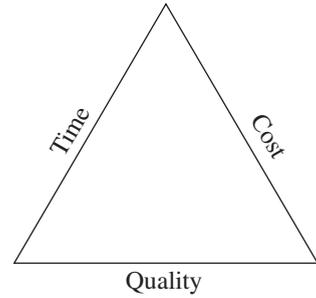
*more than 20 feudal lords' kingdoms and the feudal dynasties have constructed
the Great Wall. Qin Shi Huang, the first Emperor of Qin Dynasty, deployed
300,000 people to construct the Great Wall. In Han Dynasty, from Emperor Wen to
Emperor Xuan, all ordered constructions on the Great Wall, which accounted for
nearly 10,000 km. In Ming Dynasty, the Great Wall had been repaired and main-
tained continuously from Hong Wu to Wan Li times with 20 major constructions.
The Great Wall construction was like a relay race. Ancient emperors had worked
on it successively and created a project that lasted for the longest period of time in
the world.*

In the bureaucratic era, project success means a project can be done in a given
time. As long as a project can be finished on time, it does not matter if the cost
exceeds the budget. One can always apply for more if money is running out. This
still occurs nowadays. Some "image projects," "tribute projects," and "angling
engineering projects" are typical examples.

   In the market economy era, since enterprises became the main body of the mar-
ket, more and more projects are operated by enterprises. It is difficult for an enter-
prise to raise the fund. To produce goods which cost too much would be likely to
reduce the competitive advantage of an enterprise. Therefore, project success does
not merely mean to finish a project on time. Budget and quality are also taken into
consideration as the criteria for project success. In this era, the triple constraint
model of project success was formed.

   More recently, with the fierce competition and acceleration of change, projects
are required to be completed not only within a certain scope, time and cost, but
also are required to reduce the schedule and budget as much as possible. Further,
stakeholders should be satisfied with the project quality. In other words, there are
four objectives of modern project management: time, cost, quality of deliverables,
and stakeholders' satisfaction (see Fig. 5.4). In summary, a project is considered as
successful only when it meets the requirements on time, cost, and quality and sat-
isfies the project stakeholders. In fact, time, cost, and quality are also requirements
from some project stakeholders. Therefore, in simple terms, project success means
to satisfy the project stakeholders.

   To satisfy project stakeholders, we need to know who they are in the first
instance. Although we know that project stakeholders are vital to project success,
it is not easy to clearly identify all of them. The foreigners are used to sign, and

Fig. 5.4 The four factors of
modern project management

the Chinese are used to stamp. With signatures, it is easy to identify the respon-
sible persons, but it is not the case with stamps. It is not an easy job to discover
what and who are behind a stamp. You might waste all of the previous efforts with
a slight negligence.

Most of the Chinese ways of doing things are based on "interpersonal connec-
tions." Some people that might affect the project success are related to the pro-
ject, so it is imperative to identify them. However, there are some other people
who have no relationships with the projects, and they are treated as "idlers." They
might become project stakeholders when they feel self-esteem being hurt by being
treated as "idlers," or they do not want to be treated as "idlers." This kind of per-
son cannot do anything right and are very destructive. Moreover, they usually do
not need to take any responsibilities since they are "idlers."

*We can consider a simple example from life to illustrate this problem. Just think
about the following situation. Is an old man who collects waste in a residential
community a stakeholder of a real estate project? Intuitively, he is not. But, if
he wants, he can always be a stakeholder. Here is one possible way. One day, a
couple came to this community to buy a house. With the enthusiastic help from
an agent, this couple finally selected a house that meets their requirements on
the layout, location, and price. However, when they were on their way back to
home to collect money to make the deal, things happened. The old man was
quarreling with a security guard at the community gate. He was shouting loudly:
"you don't let me in as if I were going to steal. There have been four cars stolen
in your community in the first half of this year. Is it me who stole these cars? If
you are really good, manage these things first. What does that count to shout
at me?" This couple was immediately discouraged from making the deal. They
planned to get more information and compare more places before making the
decision.*

We can use a three-dimensional model to identify project stakeholders (see
Fig. 5.5).

In Fig. 5.5, the process dimension is used to describe what phases or processes
a project belongs to. Stakeholders of a project are not fixed. Some of them might
enter or exit the project at different phases or processes. It is not necessary or even
impossible to identify all of them at all the phases of project decision-making.
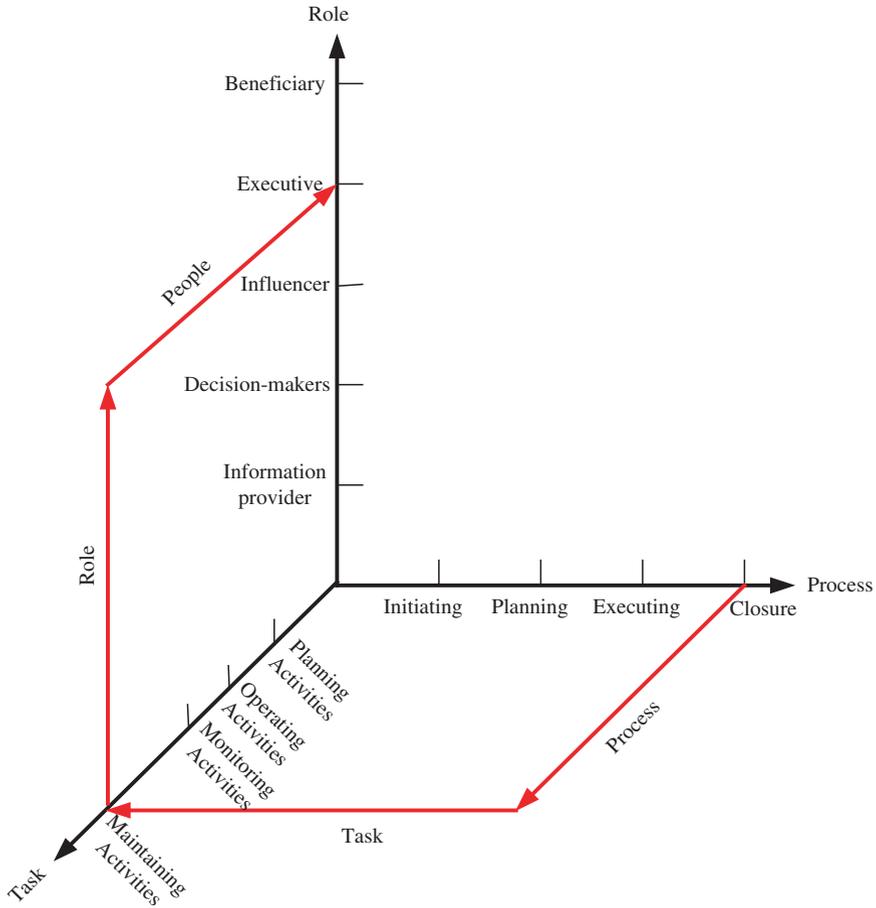
Fig. 5.5 The three-dimensional model of identifying project stakeholders

An important objective of having project life cycle is to clarify responsibilities. Stakeholders at different stages have different responsibilities. They also have different roles and different requirements. The task dimension in Fig. 5.5 is used to identify the activities that need to be performed at a certain phase or process of a project. These activities can be grouped into four categories: planning, which refers to make strategic decisions on what to do, how to do, and who are doing; operating, which refers to implement the plans developed by the managers; maintaining, which refers to provide necessary resources needed by the operating activities; and monitoring, which refers to monitor and evaluate the stakeholders' activities and provide feedbacks, so that they can carry out their work as promised.

As activities are identified, they need to be corresponded and assigned to organizational units (departments). Doing projects is not to deal with the whole organization. Instead, it is specific persons in the organization that they are dealing with.

Therefore, it is necessary to map from the organizational units onto specific individuals. In general, it is more difficult to map onto specific individuals than onto the organizational units.

There are generally three types of enterprise's clients: those that use the enterprise products (service can be seen as a type of product), those that buy the products, and those that decide to buy the products. Consider a simple example. In a three-member family, dad and mom bring the son to the KFC. Then who is the client? It is the son who eats the KFC burgers, so he is a client. It is the mom who makes decision on what to buy, so she is also a client. It is the dad who pays the bill, so he is a client too. They are all clients.

It brings more questions to an enterprise if there are too many clients. There is a Sino-German joint venture that produces vehicles for transporting city garbage. The vehicles manufactured by this company have advantages such as easy to drive, big capacity, and non-leakage. At an auto fair, this company made a live demonstration of this vehicle and attracted a lot of audiences. However, the vehicle was not sold well. So, what is the problem? Here is the reason. This company has a variety of clients including sanitation bureau, drivers, and finance bureau. However, this company only focused on drivers and garbage porters.

To deal with this question, we can group related project stakeholders within an organization into 6 types based on the dimension of role as indicated in Fig. 5.5.

1. *Stakeholders that make decisions,*
2. *Stakeholders that influence decision-making,*
3. *Stakeholders that carry out the decisions,*
4. *Stakeholders that get benefits,*
5. *Stakeholders that lose benefits, and*
6. *Stakeholders that share secret information with others.*

Among these 6 types, the second and the sixth types of stakeholders usually receive little attention.[2] *Stakeholders that share secret information with others refer to people that are able to get, disclose, and transfer information. This kind of people might not belong to decision-makers, but they are able to interact with them frequently. Gan Jiang in Gathering of Heroes is such a kind of person. In modern society, people such as leaders' secretaries and drivers, and directors of executive offices are all examples of the sixth type of stakeholders. They can often change to influencers, the second type mentioned above. This is why we often say that "people around a leader equals to a leader." Influencers are those that have major impacts on decision-making. They might be the person around a leader, such as his or her finance manager and his or her daughter-in-law. They might also be some people that have no obvious relationships with leaders, such as the old man we mentioned in the previous example.*

---

[2]Ding, Xingliang. (2006). Marketing Strategies and Project Management for Big Clients (in Chinese). China Machine Press, Beijing, China.

5.3 Exploring Stakeholders' Requirements and Expectations

With the identification of stakeholders, the next step is to explore their expectations and develop them into clear requirements. Further, we need to deal with the conflicts existed among stakeholders' different requirements and consider the changes that might emerge after requirements are clarified. We need to emphasize that expectations are not identical to requirements. Expectations are things people really want. They are the aims. On the other hand, requirements are the specific reflections of expectations and aims, which can be expressed and even written down in contracts.

Stakeholders usually cannot express their expectations clearly since they are not professional personnel. Further, their expectations might be self-contradictory. In many cases, it is difficult for stakeholders to clearly define and articulate their requirements.

Stakeholders usually illustrate their requirements through descriptive languages. These ambiguous requirement descriptions sometimes led to inconsistent understandings of the project requirements among different stakeholders. It is a common issue during the project initiating and executing phases that stakeholders do not pay enough attention to reach agreements among themselves on the project requirements and aims. Many managers underestimate the difficulties of solving this problem.

There are many aspects of stakeholders' expectations on the project. This includes not only the requirements on the characteristics of project outcomes but also the requirements on emotions.

Stakeholders' expectations can be simply classified into three types. The first is "Musts," which refers to the basic characteristics of the outcomes that cannot be lack of. The second type is "Wants," which refers to things that stakeholders want to acquire to enrich their needs. The last one is "Nice-to-haves," which means those "the-more-the-better" things stakeholders might want to have.

From the rational perspective, the importance of these three types of requirements to stakeholders is decreased in order. However, in project life cycle, the frequencies that stakeholders express these requirements are usually increased. This issue might cause project scope creep, project variations, and project conflicts. This eventually leads the project to be out of control, which is responsible for the project failure.

Quality function development (QFD) technique (see Fig. 5.6) is a useful tool to turn stakeholders' expectations to clear requirements. As shown in Fig. 5.6, "stakeholders' expectations" are usually too general or vague. "The physical characteristics of the expectations" are the concrete expressions of the stakeholders' expectations. They can be defined by professionals and be approved by the stakeholders. The "correlation matrix" refers to interrelationships among numerous physical characteristics, which are usually displayed in positive or negative correlations. The "relational matrix" defines the affiliating relationships between stakeholders' expectations and their physical characteristics and can be indicated by using "strong," "moderate," and "weak" or using scores. The "parameters of

Fig. 5.6 Revised QFD
to describe stakeholders'
expectations
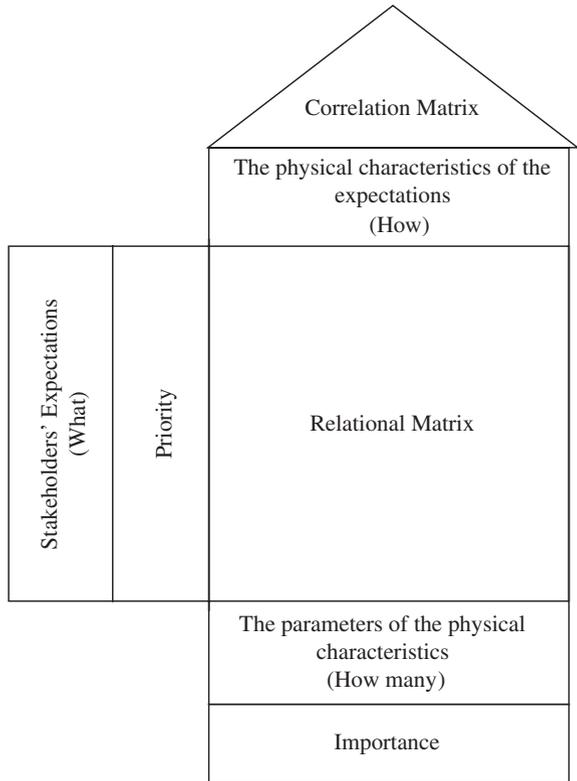
the physical characteristics" refer to using objective criteria to assess stakeholders'
requirements. "Priority" describes the order of precedence among different stake-
holders. It can be used to reduce expectation conflicts or requirement conflicts
among these stakeholders.

There are five steps of QFD:

First, confirm the expectations stakeholders have toward the project and decide
their priorities. That is, to decide "what."

Second, decide the physical characteristics of the stakeholders' expectations
(i.e., those things that can be explicitly expressed such as capital, satisfaction
questionnaire, etc.). That is, to convert "what" to "how."

Third, decide the relationships between "what" and "how" using the relational
matrix.

Fourth, decide the relationships among different physical characteristics using
the correlation matrix.

Fifth, based on the results from the relational matrix and the correlation matrix,
decide the parameters or the evaluation criteria for the physical characteristics
(i.e., what are the numbers), and the relative importance of these criteria. The pur-
pose is to transfer them into stakeholders' requirements and the priority order.

Enterprises have never been so dependent on stable clients like these days. It is not only because that the price of acquiring a new client is 5–10 times of maintaining an existing client, but also the ratio of profits brought by stable clients to the enterprise' overall profits reflects the risk resistance capability of an enterprise. In a business environment that almost every enterprise faces "terminator era," the ability to resist risk is really crucial.

It is not easy to identify real clients. It is even harder to transform them into an enterprise's stable clients. In order to stabilize the clients, an enterprise needs to know what the clients really want and what factors force the clients leaving.

A survey result suggests that there are mainly five reasons that make a client leave an enterprise (see Fig. 5.7).

The first reason is that the client "died." For examples, if a client of a personal consumer product company died, this client could not buy its products again; if a client of an office automation company went bankrupt, then this client certainly could not buy the upgrade version of this company's software. The "death" of a client is not a problem that can be solved by an enterprise. Therefore, it is not a problem that an enterprise should consider and can solve. Fortunately, this kind of reason only accounts for 1 % of the total cases.

The second reason is that a client moved to another place. As the client is now far away from the enterprise, it might become inconvenient for him/her to buy our products. For example, if a client moves from Beijing to Shanghai, he might still like the style of Wang Fu Jing Shopping Mall, but it is unlikely that he will buy commodities from there again. Besides, for a supplier of production materials, its clients might have a career change, which also belongs to this reason. This cannot be solved by enterprises either. Fortunately again, this reason only accounts for 3 % of the total cases.

The third reason is about price. Although we can say that a competitor takes away a client if this client begins to buy others' products instead of ours, this issue
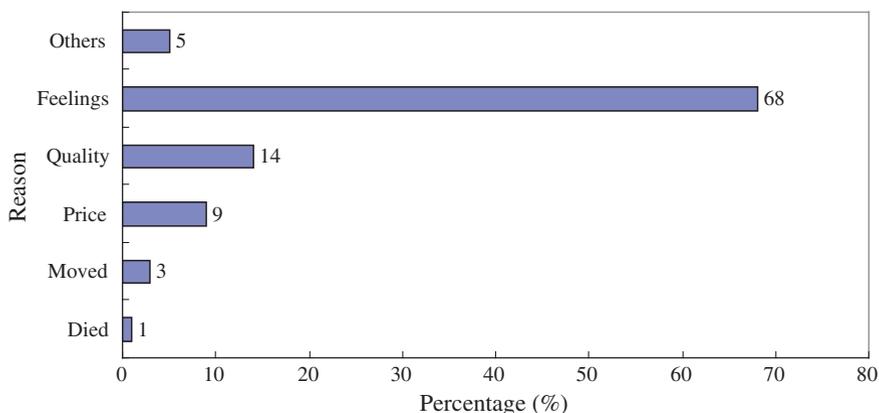
Fig. 5.7   Major reasons that a client left you

can be further analyzed. When we say a competitor takes away a client, we assume that there is no obvious difference in products. It is because our price is higher than the competitor's. The more competitive the market is, the more important role the price plays. This reason accounts for 9 % of the total cases.

The fourth reason is about the product, mainly referring to its quality and technology. Because we do not have qualified products, or our products cannot meet the clients' requirements, a client leaves us for a competitor as their products can satisfy this client. This reason accounts for 14 % of the total cases.

The fifth reason comes from the clients' feelings. The clients feel that we are not trustworthy, or they feel that we do not care them. This feeling of distrust or not being taken care of might come from some very subtle and unspeakable events, or some hearsay rumors. However, this reason accounts for 68 % of the total cases!

In the hot summer, if the air-conditioner in our bedroom was broken, we were anxious which could be exaggerated when the indoor temperature further increased. If we called the repair department of the manufacturer who produced this air-conditioner and learned that there are staffs answering clients' calls 24 h a day, we felt a little bit relieved, i.e., the service was not bad. The maintenance staff arrived shortly. If we saw that the maintenance staff wore shoe covers when he entered the door and he used dust cover to avoid making the bedroom dirty when disassembling the air-conditioner, we were satisfied: This enterprise was really considerate. When we saw the maintenance staff was sweating everything over, we wanted to provide a cup of water. However, he refused with thanks: "We have policies that we are not allowed to drink the clients' water because we cannot bring them trouble." We were more satisfied with this enterprise: "this enterprise is really good and lives up to its reputation." We were very touched by this enterprise during this incident. We might put in good words for this enterprise when we find that some others are intended to buy air-conditioners or other electrical appliances. However, what if our air-conditioner did not break? In that case, we could not have the opportunity to be touched by the enterprise. Furthermore, it costs a lot of money or even is impossible to keep a product in working condition all the time. Consumers are not fully rational in decision-making. Instead, they are with limited rationality.

Consider sales project as an example. We need to understand the following questions when analyzing clients' requirements: What are the clients' key questions and objectives? What are the clients' products and services? Where are their most important markets? Who are their key clients and competitors? What are the internal and external factors that drive the clients' business development? Why can clients be driven? Is there a deadline for making decisions for this particular event? What are the criteria for clients to make decisions? Which criterion is most important?

Our relationships with the clients are transaction-driven. Only when we can expand our attention to the clients of our clients, we can truly understand the clients' requirements and identify project opportunities.

5.4 Seeking Ways to Meet Stakeholders' Requirements

The ways to satisfy stakeholders' requirements need creativity and are the basis for the so-called feasibility research. Problems in project decision-making are similar to inherited diseases, which cannot be solved by hard working. These problems can lead to a massive waste and have very serious consequences. We cannot deny that there are some officials intentionally make wrong or bad decisions based on personal interests, which causes losses to state property. However, in more cases, wrong or bad decisions are due to the lack of scientific decision procedures and insufficient decision-making knowledge, and sometimes by behaviors with full of "good" intentions.

Usually, there are multiple projects operating simultaneously in an enterprise and these projects compete for limited resources. Under this circumstance, research on enterprise project management emerges. Program management and portfolio management have received an increasing level of attention. At the same time, future business forms require that innovations and efficiency can coexist in an enterprise. Every enterprise needs to form value networks with other enterprises, in which each enterprise only works on certain things they are good at. It is less likely that an enterprise works on a project (especially large-scale projects) independently. Instead, more and more projects are carried out and completed through collaborations among multiple enterprises.

When multiple projects are carried out by a single enterprise and project profits and losses are the enterprise's own responsibilities, the enterprise can make comparisons among multiple projects and make trade-offs in order to pursue the maximum overall efficiency. When a project is carried out by multiple enterprises, the decision to maximize one enterprise's efficiency might lead to a result that all the projects they participate cannot be completed on time.

Let us assume such a situation. There is a project A that needs the collaboration among enterprises X, Y, and Z. Moreover, enterprise X has two other projects, namely B and C, and enterprise Y has one other project, namely D. From the perspective of enterprise project management, enterprise X needs to compare the benefits and risks brought by projects A, B, and C, and enterprise Y needs to compare those brought by projects A and D. Suppose after consideration, enterprise X sets project A's priority as the second or the third. Then when resource shortage occurs (which is very likely), enterprise X might have to postpone or even give up on project A. Under this situation, project A cannot be completed on time no matter how hard enterprise Y and Z work. Even enterprise X can bear some losses, it cannot make up for the losses caused by the project failure. It is like that a man lost a leg in a car accident after he bought large amount insurance. Although he will be paid the financial compensation, no insurance company could compensate him with a leg. The pain of losing a leg is nothing an insurance company can make up for. This question cannot be solved by establishing a virtual enterprise by enterprises X, Y, and Z. Virtual enterprise needs relatively long-term stable and trustworthy relationships. However, in this case,

these three enterprises might only have collaborated once. To achieve individual benefits, it is impossible for them to have an accepted leader. Neither can they give up on their own benefits for the collective benefits. Therefore, virtual enterprise is very difficult to survive.

It is well known that every project decision needs a serious, scientific, and reliable feasibility analysis. Indeed, feasibility studies have been conducted in many projects with conclusions that the project is feasible. However, it is still infeasible when executing this project.

There are many reasons, which can be classified into the following three categories.

Firstly, as it is named "feasibility study," people might screen data or plans intentionally or unintentionally. This can be called "the belief in a thing makes it happen," which can be reflected in ways such as choosing consulting experts who have a certain attitude, guiding purposefully by the leaders, intentionally ignoring negative data, and so on. This is due to that the leaders in charge have preferences or personal aims. As the old saying goes, thief's remembering with concern is worse than the thief's stealing. If we are eager to do a thing, this thinking will get so amplified that we might ignore all the other information or plans.

Secondly, there are defects associated with the approach to conduct and organize feasibility study. The feasibility study of many government investment projects mainly adopts methods in technical economics, which is the product of the planned economy era. The problem of this approach is technical feasibility does not equal to economic feasibility, and both of them do not equal to managerial feasibility. Trust in certain personnel and some individuals' successful experiences cannot take the place of managerial feasibility. Some outstanding talents might bring organizations the long-term damage. Two common major issues associated with feasibility study are as follows: neglecting managerial feasibility research and replacing the judgments on organizations by judgments on individuals.

Project feasibility study usually emphasizes on technical economic analysis, while neglecting managerial feasibility analysis as well as the main source of project risks in terms of management. Managerial risk is the biggest source of project risks, especially to the management of an enterprise's external stakeholders.

Thirdly, the "experts" of feasibility study either purposefully cater for leaders' intentions, or they are fake experts. Usually, experts have no or little responsibility for the results. As a result, experts could make some fatuous, arrogant, or even impossible comments without any responsibilities. Experts are also human beings that have personal desires. They might lose their conscience and talk big to impress people. Nowadays, the emergence of many political and economic problems is related to the irresponsible talks from some experts such as economists, jurists, and sociologists.

The focus of project feasibility study is risk assessment. We can get more reasonable results if we could arrange two different groups of experts and let them conduct feasibility and risk analysis separately, and then compare their results at the end.

Feasibility study should include two parts: feasibility analysis on project approval and feasibility analysis on project implementation.

1. **Feasibility Analysis on Project Approval**

All the projects initiated by an enterprise must go through the project approval feasibility analysis, which cannot be outsourced to project contractors. Project approval feasibility analysis needs to answer the following questions:

1. What aims will the project try to reach? Why does the project want to reach these aims? To answer these questions, we must clearly define the project aims, develop their evaluation criteria and methods, and understand their relationships with the achievement of the enterprise's strategic aims.
2. How to reach these aims? This question is to clarify what kinds of projects can be developed to realize these strategic aims and the relationships and priority among different project alternatives. The answer of the questions is beneficial to the successful implementation of projects in future. The decision to execute a project is not the project contractor's responsibility. Rather, it is the project clients' or the initiator's responsibility. To answer this question, it also needs to provide methods for project screening. The purpose is to set the priority of the project alternatives and make preparations to solve conflicts such as project resources.
3. Who or what kind of organizations can undertake the project? The purpose of this question is to provide a basis for selecting capable project contractors. Three factors need to be taken into consideration when selecting capable project contractors. The first is the maturity level of the project contractor's project management ability, which analyses whether the project contractor has the ability to manage the project. A project is hard to be accomplished if it only depends on the resources (mainly costs) provided by the client, or the temporary project managers. The second is the project execution feasibility report conducted by the project contractor, which tells us how the project contractor will assure the execution of the project, which includes the reliability analysis on the execution plans. The third is the project leader (project manager)'s abilities as project manager plays a vital role in the project management.

In general, the following criteria can be used to judge the capability of a project manager: the abilities to use project management-related methods and tools, the abilities to maintain interpersonal relations and lead teams, the basic technical and management skills, the experiences in project management, the respect and recognition from peers in project management, and so on. Of course, it is not enough to select project managers only based on the above criteria. More factors need to be considered such as the project scale, personal experiences, the availability of the candidates, and the candidates' interests and health status.
Project managers for small-scale projects should receive trainings in project management methods and tools, have interests in the product/process created by the projects, and possess a wide range of knowledge. The best situation is that they

have experiences of working in similar projects. Project managers for medium-scale projects need to have experiences for being engaged in several small-scale projects. Large-scale projects refer to the projects that involve or even beyond the whole range of an enterprise jurisdiction. In this situation, the candidates of the project manager must have experiences of conducting many similar medium-scale projects before and their performances were widely recognized by others. Project managers at this level must understand the techniques used in the project (although they do not need to be experts). They must spend a majority of their time in project plan writing and project controlling. At the same time, they know how to deal with interpersonal relations and rights. Authorization, time management, and proficient skills in interpersonal relations are the key issues for large-scale project managers to achieve success.

If permitted, the potential project managers should be encouraged to participate in the feasibility study of project approval.

2. **The Feasibility Analysis on Project Implementation**

Project contractors and in-house project managers of the enterprise must submit feasibility study reports on project implementation. This analysis needs to answer the following questions:

1. What is the implementation plan? In the report of implementation feasibility analysis, the contractor of a project needs to describe the project implementation plan, which includes project duration plan, main technical methods, and cost estimate.
2. What are the assurance measures? Illustrate how the contractor of a project would do to guarantee the normal execution of the project. What are the supporting mechanisms and what prerequisites can be provided? What are the controlling points and what control methods can be used?
3. Are the project manager and the project team capable of their jobs? It is not easy to select a project manager. Therefore, high attention needs to be paid to the selection process. The project manager's abilities on overall management and project development directly reflect the project management abilities of the organization that undertakes the project. The knowledge and abilities of the project manager and the core members in a project team need to be demonstrated in this part. In addition, project managers cannot be overburdened if we want them to work effectively. Therefore, the workload capacities of the project manager and other project team members must be illustrated in this part as well.
4. What are the project's constraint conditions and assumptions? Implementation of any project has preconditions. All projects have constraint conditions, which need to be defined clearly at the beginning. For a project, it is easy to define the required resources as a constraint condition, but the fundamentals and environment for the project implementation can be easily overlooked as constraint conditions. Project assumptions refer to the assumed conditions in project planning. Any project is based on certain assumptions. The hidden project assumptions are the main sources of project risks. To avoid these risks, all the assumptions in project implementation feasibility study must be described clearly.

Assumptions and constraint conditions exist in many aspects of a project such as human resources, material and financial resources, project progress, facilities, and environment . Although these conditions can be justified when needed, they will bring risks to the project execution if a project manager treats them as fixed resources or takes the environment as granted.

For internal small-scale projects of the enterprises, feasibility analysis of project approval and project implementation can be combined.

There are many ways to satisfy stakeholders' expectations and requirements. We need to select the one that is best for us and is easiest for the stakeholders to accept. In addition, to analyze these different ways, we need to pay attention to the assumptions that we take for granted, which usually are sources of risks. Specially, we need to be careful about those plans that seem to be perfect. No plan can be perfect. If there is such one, it is very likely a plan that is full of risks.

Here, we still use the sales project as an example. We need to answer the following questions in order to identify an effective way to satisfy the client's requirements.[3]
Solution plan: How good (desirable) is our solution plan to the client's requirements? What the client would think? What else do we need to do to revise and strengthen the plan? What external resources are needed to satisfy the client's requirements?
Resources/ability requirements: How much time does our sales unit need to spend on this project? What other internal and external resources and abilities do we still need in order to win the contract? What are the sales expenses/costs on this project? What are the opportunity costs and can we afford them?
Unique business values: What verifiable specialties and business values can the project bring? How does the client define value? How to test? How to summarize values using the client's language? How can these values help us to surpass our competitors?
Relationship with the clients: How to describe our relationships with the clients? How to describe competitors' relationships with the clients? Who has great contacts that can give us more advantages on this project compared to our competitors? Comparing with our competitors, who has the better relationship with the clients from the clients' perspective?
Leaders in contact: Which clients want us to win? What have they done to express their support? Are they willing and can they do something for you? Do these people have power? Can they influence or change the decision criteria? Can they create a sense of urgency?
Informal decision processes: Do the clients really want to make decisions? Are there any intangible or personal factors that can influence the decision? What are the unstable factors? Can we know who have personal opinions and what the opinions are about? Which opinions really mean something?

---

[3]These questions on sales project are adapted from IBM marketing plans.

Cultural abilities: What is the company culture of the client? How is it compared to ours? What is the client's philosophy toward suppliers and manufacturers? Can we persuade the client to change or can we have to adapt to them? Are we willing to do so?
Risk mitigation: What can make a solution plan invalid? What are the most dangerous factors that impede to realize the client's values? What could the client do to make a project failed? If a project fails, how could it influence our business?

5.5   Evaluate if a Project Can Achieve Its Aims

All alternative plans can achieve our aims in varying degree. However, only the clearest, the most economic and the most reliable plan is what we should select. The outcomes of this plan are our specific objectives, and the synthesis of the outcomes of this plan to all of the stakeholders is the project's objectives (see Fig. 5.8).

SMART principle is an effective standard used to establish effective measures on whether an objective is good or not. It requires that an objective must be specific and targeted; measurable, which means there are ways to examine the degree of realization of objectives; attainable, which means the objective can be realized although there might be huge challenges on the way of objective realization; relevant, i.e., the objective needs to be related to the enterprise's business aim and be related to the people who realize the objective; and time-bound, i.e., we must set up the objective's start date, measurement date, and finish date.

We still use the sale project as an example. The seller's objective can be clarified using the following questions.
Short-term performance reward: Total orders? Is it beyond our extremes? When to sign the bill? Is it within our tolerate time range?

Fig. 5.8 The sources of project objectives
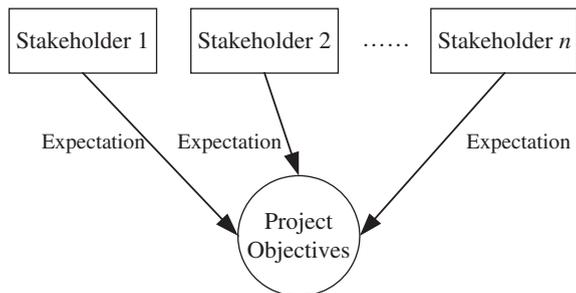
Long-term performance reward: What is the impact on our next year's perfor-mance, and on the next three years' performances? Is it beyond our extremes? How does this project influence our future? How to make sure that the clients will keep their promises?

Profit status: What is the project profit? Is it beyond our extremes? What are the potential impacts on our profitability? How to improve our profitability on this project?

Strategic value: In addition to the sales income, what is the biggest value we can obtain? Does this opportunity match our business plan? How can this opportunity help us reach other clients and markets to improve sales income? Can this oppor-tunity help us to improve product and service quality?

A project is not successful if it cannot satisfy both our own and the other stake-holders' expectations and requirements. In addition, during the project decision-making, the project acceptance standards should be proposed based on project objectives. Objectives will not be acceptable unless measurement criteria and acceptance standards are clearly defined. Similarly, the corresponding plan is not acceptable and the corresponding decisions will not be effective.

Chapter 6
Defect-Free Project Initiation

> *Those who forget their tasks in the morning will have no achievement in the evening.*
>
> —Guanzi • *The Situation*

Once decisions are made, a project should be officially initiated. All projects have risks. Within all the processes in a project life cycle, initiating process brings most risks to the project. Many projects fail because there are failure threats from the beginning of the projects. When these threats break out at the late period of the projects, there is nothing project managers can do.

6.1 Initiated with Fanaticism and Ended with Failure

Projects are how enterprises survive and are sources of individual performances. Therefore, it is natural that projects make people excited. However, it is regretful that this excitement usually will not last long.

An enterprise's president, Mr. Wang, was traveling to Europe for a two-week business trip. His executive vice president, Mr. Zhang, saw him off at the Beijing Airport. While waiting for the plane taking off, Mr. Wang occasionally read from a magazine that many enterprises were implementing ERP systems. Then, Mr. Wang said to Mr. Zhang: "Mr. Zhang, it seems that an ERP system is good. Can our enterprise have one too?" Mr. Zhang replied "as long as it is advanced and useful to our enterprise, we should and can have it. Mr. Wang, I'll carry out this project when I'm back. You are going to Europe for two weeks, right? I think when you are back, we might be able to finish it." Mr. Wang replied with excitement "that's great! You are in charge now." Mr. Wang then left to Europe.

Once Mr. Zhang returned to the company, he immediately organized a meeting with other managers to deploy this project: "Mr. Wang required us to implement ERP before he left to Europe. Our company should enter the information era…".

When Mr. Zhang was keeping on talking about the importance of informationization, Mr. Ma, the sales manager, asked "Mr. Zhang, what on earth is this ERP about and what can it do?" Mr. Zhang replied "Actually I'm not quite sure about what ERP is in details. But it is very useful to enterprises and many enterprises are implementing it now. Furthermore, Mr. Wang asked for it before he left…"

Had been discussing for one week and referring to some reading materials, most managers still felt ambiguous about ERP. Because they had wasted so much time, some managers including Mr. Ma began to complain about it. Mr. Zhang became anxious too when he thought about the promise he made to Mr. Wang at the airport.

Two weeks passed quickly. Of course, there was still no sign of progress on the ERP project. It was time for Mr. Zhang to pick up Mr. Wang from the airport.

After exchanging greetings, Mr. Wang asked about the ERP project. Mr. Zhang answered "Don't mention it. I made arrangements for this immediately after I went back to the company. But many people didn't support it and they even made some cynical remarks. It seems that ERP is a "top management project" and only you can control it." Mr. Zhang also talked about the complaints made by Mr. Ma and some other staffs. Mr. Wang was very annoyed by it and believed it should be stopped. He called Mr. Ma immediately and criticized him. He also indicated the human resource department to deduct Mr. Ma's salary by one level.

After calming down, Mr. Wang said to Mr. Zhang "since many people don't know about ERP, I think our company should organize some experts to have a feasibility study before we consider whether we should implement it or not." "How about other things in the company?" Mr. Wang asked Mr. Zhang. Mr. Zhang answered "don't worry and everything is fine." In addition, Mr. Zhang listed a few names that had great performance. Of course, these people did not participate in this so-called ERP project.

The above case describes a common project life cycle: A project is initiated with fanaticism and entered into terrified phases quickly. Then, the next step is to find scapegoats and to punish innocents. After going through the aforementioned phases, the project usually is also accompanied with another phase: praising those who do not participate in the project!

6.2 Project Management Is an Iterative Process

Project life cycle is composed of various phases or processes that are needed to complete a project. Usually, we can divide a project life cycle into initiating, planning, executing, and closing phases. In each phase, there are sub-phases of initiating, planning, executing, and closing. A project life cycle can be viewed as an iterative process from the perspective of management. There are two reasons for this view.

First, there are different stakeholders at different stages of a project life cycle.

For new product R&D projects, the personnel and management methods in the planning phase are different from those in the processing phase. Similarly, for construction projects, there are different organizations responsible for the construction, decoration, and greening. There are very few people that are involved in a project from the beginning to the end. Similar to projects, the relationships between stakeholders and their projects also have life cycles, which include phases such as interacting with the projects, signing contracts, finishing tasks, and exiting the projects.

From the management perspective, a project life cycle mainly refers to the life cycle that manages the relationships between stakeholders and their responsibilities, powers, and benefits. Of course, this cycle can also be expressed in terms of initiating, planning, executing, and closing phases. However, the emphasis should be placed on the management of stakeholders. This is due to the fact that we cannot manage technologies and capital. All we can manage are human behaviors, and all the others are simply the aims or the means of management.

Even for a same project, different stakeholders have different understandings of the "project." For example, building construction is a project. For the design firm, the building design is its project. However, for the construction firm, the construction of the building is its project. Therefore, it is reasonable to believe that a project, especially a large-scale project, is composed of various sub-projects.

From the perspective of management discipline, the size and complexity of a project depend on the degree of complexity in stakeholder management, rather than on the investment amount and the project duration.

There are different stakeholders in different phases of a project life cycle. As a result, stakeholder management must also go through a complete life cycle. In other words, from management perspective, every phase in a project life cycle is also a life cycle.

Second, projects are full of risks and uncertainties.

Although we are against projects that conduct exploration, design, and execution at the same time, we understand that such projects are unavoidable. Because projects deal with new things, at least to certain stakeholders, it is difficult to finish these projects purely based on their prior experiences.

Because there are new things in a project, it becomes inevitable that people have to "wade across the stream by feeling the way" during the process of project execution, especially for projects with long durations and large number of stakeholders. It is even more suitable for projects with significant technological innovation.

To mitigate the uncertainties or risks existed in these projects, a rolling approach is usually adopted by moving steadily at every step to finish a project. The rolling approach means that the work needs to be done is gradually clarified as the project progresses. It is also an important reason project management must adopt iterative process in project life cycles.

Suppose you replaced others to take on a project that was just initiated. To finish the project, you decided to make a plan first and then waited for your boss's approval to execute it. Twenty work items were listed as below that must be

conducted in order to finish the project. Although the items might not be exhaustive, they are essential.[1] Can you decide the order of the sequences of the items?

A: find proper candidates for each position
B: evaluate the progress status toward or against project aims
C: decide and analyze the essential tasks for project execution
D: decide the sequence and schedule of conducting major steps
E: make possible action plans
F: adjust project team members' work
G: give team members responsibilities/power
H: set up project objectives
I: train and develop personnel for new tasks/positions
J: collect and analyze facts regarding current project status
K: decide requirements for new positions
L: adopt corrective action plans for the project (rehandle project plans)
M: coordinate ongoing activities
N: make decisions on resource appropriation (including budget and infrastructure)
O: assess individual performances based on performance objectives
P: clarify the negative results for each action plan
Q: make individual development objectives that are approved by individuals and their managers
R: clarify the ranges of the relations, responsibilities, and power for new positions
S: decide basic action plans
T: decide measurable checkpoints for expected project objectives and their changes

Can you figure out how these tasks are conducted in order? In a dozens of exercises done by different people, I found that most people would go directly toward the jobs they think would rank the first, the second, and so on.
Psychology research reveals that people can only identify no more than 9 items at the same time when they try to sort a number of items according to the order of sequences or importance. Therefore, we will experience difficulties when we try to sort out the above 20 items together. We might attend to one item and lose another. However, it would be easier if we could first divide them into different work processes, then classify these work items into their corresponding work processes, and sort out the jobs in each process.
In fact, not only this exercise but other works we are handling can be done in this way. We need to think first before making actions. It is not appropriate to dive into details at the very beginning.

The classification of projects into different life cycles can make project managers, especially those top managers to avoid taking a part for the whole. They can

---

[1]The items are adapted from course materials of Project Management at China Europe International Business School.
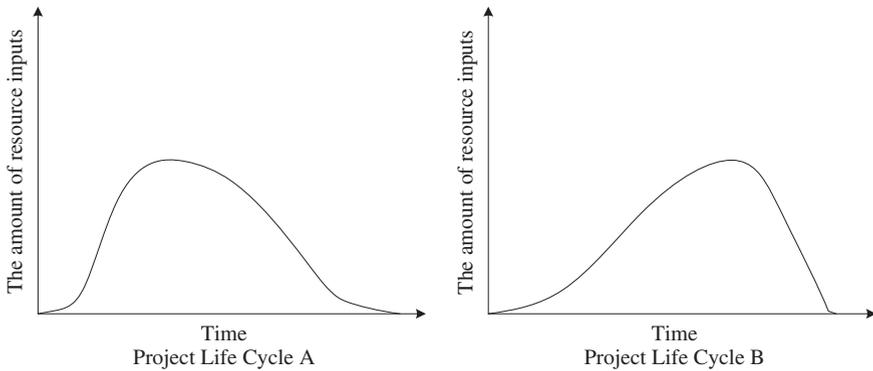
Fig. 6.1   A same project with different division of life cycles

clarify their positions based on the different phases in a project life cycle. Only in this way, they can focus on the key areas in project management and avoid working on every detail.

It is very important to classify a project into different life cycles. It is not only convenient to manage a project, but also effective in controlling project risks and be supportive to project business.

The contract price is a focus in business negotiations. Even under the circumstance that project costs are same, we can form different negotiating advantages based on different life cycles a project can adopt, and therefore obtain different contract prices.

Figure 6.1 *depicts a project that can adopt two different ways of dividing life cycles: A and B. Life cycle A needs more resources in the early period of the project and therefore needs to have a higher amount of early payment from the clients. By contrast, life cycle B needs more resources at the late period of the project and therefore needs less early payment. It is not hard to predict that more price negotiating power can be obtained by using method B than method A. In other words, using method B could result in a higher contract price than method A.*

Sometimes, we can adopt different divisions of life cycles to finish the same project. For projects in different industries, there would be even more differences in ways of dividing project life cycles.

It should be based on the characteristics of the project and the ways of managing the project when selecting a specific way of dividing a project life cycle. For example, there are many ways to divide the life cycle of a software development project. As shown in Table 6.1*, each way of dividing has its own characteristics. We should tailor them in practice based on the specific context in project management such as the status of human resources, capital, and time lines.*

Table 6.1 Software project life cycles and their characteristics

Various ways of dividing the project life cycle					
Characteristics		Waterfall model	Incremental model	Rapid prototype model	Spiral model
Project characteristics	Work load	Small to large	Medium to large	Small to large	Medium to large
	Code size	Small to large	Medium to large	Small to large	Medium to large
	Team size	Small to large	Medium to large	Small to large	Medium to large
	Duration	Small to large	Medium to large	Medium to large	Medium to large
	Complexity	High	Medium to high	Low to high	Medium to high
	Reliability	High	Medium to high	High	Medium to high
	Requirement legibility	High	High	Low to high	Low
	Requirement stability	High	Low to medium	Low	High
	Proficiency for technical/system structures	High	High	Low	Low
	Requirements for creating reusable codes	High	High	Medium	High
	Use existing software	High	High	Medium	Medium
Advantages		• Medium level of management visibility • Medium level of progress stability	• Medium level for transition time • High level for client and manager visibility • Easy for risk management • Easy for prompt correction • Medium level for progress stability • Can develop extendable and reliable systems	• Provide high visibility for both clients and managers • Easy for risk management	• Easy for risk management

Table 6.1   (continued)

Various ways of dividing the project life cycle				
Characteristics	Waterfall model	Incremental model	Rapid prototype model	Spiral model
Disadvantages (common risks)	• Low level of client visibility • Long duration • High cost • Uneasy for prompt correction • Uneasy for risk management	• Needs experienced and mature managers	• Needs experienced and mature managers	• Needs high-risk management skills

6.3 Project Initiation Is the Responsibility of the Top Managers in an Enterprise

The core task of project initiation is to let the project stakeholders to clarify their responsibilities, power, and benefits related to a project. The core member during project initiation process is not the project manager, but the project initiator, especially for those projects that include many functional departments of the enterprise and have various external stakeholders.

Wuwei Company recently appointed a new assistant general manager, whose name was Jie Li, a MBA graduate.[2] Since his arrival, General Manager Kewei Ma just let him get familiar with the company business and did not assign him any formal responsibilities. After spending a period of time to understand the business operation, Jie Li felt he should do something to display his talents. He suggested to Kewei Ma that all the computers in the company should be connected to form an intranet to improve the company's operating efficiency. General Manager Ma was very glad with his idea and asked him to take full responsibility for research and investigation. He asked Jie to submit a research report in ten days. Jie was very excited and felt he finally got a chance.

Due to the heavy workload in research, Jie asked General Manager Ma what company resources he could use. The answer from Kewei was "you are the assistant general manager and you have the rights to decide what resources are needed. The most important thing is that you must have the research report ready in 10 days. All I want is the result. You need to figure out how to do it. We are going to listen to your report at the next company's management meeting."

---

[2]This case was adapted from the following book: Managing Projects in Organizations, authored by Frame, J.D. and translated by Baozhu Guo, World Book Inc., Beijing, 2004.

Jie ran into problems immediately when he tried to organize team members. Some staffs he tried to use said they did not have time to participate in this project. Because he just joined the company, Jie was familiar with almost nobody. Although he was the assistant general manager, he found it difficult to ask others to stop working on what they were doing and attend to this project. Therefore, Jie had to work overtime by himself.

During the research and investigation process, Jie found staffs had quite different attitudes toward this project. Some managers were positive and provided many detailed suggestions regarding what needed to be done. However, some others were negative about this project. They thought informatization sounds good but would encounter many problems in practice. Of course, they all wanted to get more computers and related devices for their own departments. Fortunately, the manager of the data analysis department, Dafu Shi, was very enthusiastic about this project. Once the company decided to build the intranet, his department would get the chance to display their skills fully and they would achieve the considerable performance. Dafu provided Jie with many methods used by other enterprises, even with detailed prices for related software and hardware products.

With persistent efforts, Jie finally finished a 26-page investigation report in ten days, which illustrated in detail the opinions held by each department toward building the intranet. To make this report more professional, Dafu enthusiastically helped Jie to finish the writing on the technical plan part. Although Jie was not familiar with some professional terms in the report, he believed that Dafu was absolutely an expert and knew more about the company than himself. Therefore, his suggestions should be appropriate.

However, against his expectation, many managers objected to the suggestions proposed in the report at the company's management meeting. They even overthrew their own suggestions they provided to Jie. Kewei also believed that there were issues associated with the methods adopted in the investigation. He even hinted that Jie was not really integrated into the company in the past month and was not familiar with the company situation. There was only one suggestion Kewei adopted, which was to add some new desktop computers in the data analysis department and two other departments.

Jie felt he might not be going to have a bright future in Wuwei Company.

In this case, there are many problems Jie did not handle well. A very critical issue is that Jie did not identify the real stakeholders. He wrongly considered the project as a technical project and treated all the investigated people in each department as the stakeholders. He especially treated Dafu Shi as a major stakeholder, while Kewei Ma and other top managers were ignored.

Practices suggest that it is not easy to identify and clarify project stakeholders and ask them to take responsibilities for the projects. Sometimes, a project has been undergoing for a long period of time, but the project team still does not understand who the real clients are. A common mistake is to take the direct users of the project products as the clients.

*The real clients of an e-government system are the decision-makers of certain gov-
ernment agencies, rather than the specific technical departments that cooperate on
the project implementation. If the project's needs are only from technical depart-
ments, the project might not reach its real aims even if the system is completed.
However, due to various reasons, decision-makers might not have sufficient time to
pay close attention to this project. Therefore, if the project team does not try to solve
this problem, the project might fall into troubles from the beginning.*

The real reasons for Jie's failure are that the company did not have an official pro-
cedure for project initiation, and Kewei did not take the responsibility to initiate
the project. That is, he did not clarify the responsibilities each stakeholder needs to
take and benefits they can have! Without establishing and following proper initiat-
ing procedures, similar failures would occur again in this company even this pro-
ject succeeded with support from the top management.

"Top Leadership Project" emphasizes the importance of the top managers
and their responsibilities. However, due to the lack of process management, it
will become very common that the top managers are needed everywhere for eve-
rything. If a top manager is responsible for too many things, his responsibilities
become symbolic. Under such circumstance, you can find the responsible person,
but you cannot prevent the occurrence of problems. Top managers are under enor-
mous pressure, and top management becomes a high-risk position. Therefore, they
might mitigate risks and pressures and pass on responsibilities. The person who
is responsible for executing the project initiation process should be enterprise top
managers, i.e., the project initiators.

6.4 The Responsibilities of the Typical Project Stakeholders

A very important task in project management is to let project stakeholders to fulfill
their responsibilities while making them satisfied. Project success depends on the
efforts of not only project teams but also other stakeholders.

There are five typical stakeholders in a project: project initiators, project cli-
ents, project manager, project team, and managers of project-related functional
departments. They should assume the following responsibilities to the project.[3]

1. Project Initiators

Usually, project initiators are the top managers in an enterprise, who are the final
decision-makers of whether to close a project or not. They are also the leaders of
a project portfolio. In other words, they are not the employees who do the daily
work. They provide enterprise business aim-related basis for the existence of the

---

[3]A reference was made to The Methods of Project Management, issued by Project Management
Office in Michigan State, U.S.A, May 2001.

project. Generally speaking, project initiators control the entire project financing. Project managers cannot take responsibilities for the enterprise's external clients. The enterprise's legal representatives should do that. Therefore, a project manager is directly responsible for the project initiator.

It is vitally important to have a powerful project initiator. Previous studies showed that top managers rank first in a variety of factors that influence the project success. However, in reality, many projects are initiated without clear project initiators. It often occurs in government projects and nonprofit organization projects. These projects use official stamps to replace the project initiators, which often leads to the project failure. Feasibility study might become the work that really uses "feasible results" as the assumed result of the analysis. The project undertakers are responsible for the consequences of project failure, while personnel who participate in the feasibility study take no responsibilities at all. There are no clear project initiators, not to mention letting the project initiators to take the responsibilities.
Project initiators should be clarified at the individual level. Projects without project initiators are flawed.

The general responsibilities of project initiators include the following: explaining the enterprise's requirement on the project in details; guaranteeing the project outcomes satisfy these requirements; providing the project with necessary capital and resources; seeking support from other staffs in the enterprise by showing them with the project; and communicating with other project stakeholders in regard to the project progress and project success factors.

1. *Roles and responsibilities during the project initiating process*

    (a) *Provide illustration on the project's current and future business values to the enterprise;*
    (b) *Define their requirements on the project;*
    (c) *Acquire capital support for the project; and*
    (d) *Appoint contact persons for the project initiator.*

2. *Roles and responsibilities during the project planning process*

    (a) *Examine and approve the project plan and*
    (b) *Participate in the process of project plan development.*

3. *Roles and responsibilities during the project executing process*

    (a) *Participate in the inspection of project execution requirements;*
    (b) *Help to solve problems in project needs; and*
    (c) *Approve all kinds of project requirements and qualification criteria in a written format.*

4. *Roles and responsibilities during the project controlling process*
   Attend meetings on project status examination when necessary.

5. *Roles and responsibilities during the project closing process*

  (a) *Attend or send others to attend the meetings on communicating project experiences/lessons and*
  (b) *Sign and approve the project closure.*

2. Clients

Any project has clients, who propose requirements on project outcomes, and buy or use the project products. They might come from the external or internal of the enterprise. Sometimes, project initiators are the project clients.

Project clients need to make sure their project requirements are clearly expressed, and the project product satisfies their requirements. They need to be trained to use the project product.

Clients' responsibilities include the following: clearly expressing their requirements; ensuring the project product satisfies these requirements; ensuring that end users receive training to inspect and accept the product; and supporting the application of the project outcomes to other business fields.

In practice, some projects might not have defined clients or might have clients in a broad sense. Especially for some government-initiated projects (e.g., public investment projects and government-sponsored R&D projects), there are no clearly defined clients' responsibilities during the processes of project requirement development, project acceptance, and project management. Under this circumstance, project initiators should assume these responsibilities.

Many projects cannot finish on schedule as the clients do not get ready for accepting the project outcomes, which might bring changes to the clients. Although the clients develop the project requirements, they might not be ready for accepting these changes.

It is very common that the clients' rights in project management are overemphasized, whereas their responsibilities are neglected.

1. *Roles and responsibilities during the project initiating process*

   Clearly define their requirements and their requirements to the project team and the project manager.

2. *Roles and responsibilities during the project planning process*

  (a) *Examine and approve the project plan;*
  (b) *Examine the project progress report;*
  (c) *Appoint the contact person for the project team;*
  (d) *Approve all kinds of project requirements and qualification criteria in a written format; and*
  (e) *Identify those people that need training.*

3. *Roles and responsibilities during the project executing process*

  (a) *Attend necessary trainings;*
  (b) *Help examine the project product when necessary;*
  (c) *Approve delivery and installation procedure;*

(d) *Examine the current business practices and analyze the impact of the project product on these practices; and*

(e) *Develop procedures, policies, and systems to support the use of the new product;*

4. *Roles and responsibilities during the project controlling process*

(a) *Attend the examination on requirement changes;*
(b) *Examine the design when necessary; and*
(c) *Help to solve problems in requirement changes;*

5. *Roles and responsibilities during the project closing process*

Attend or send others to attend the meetings on communicating project experiences/lessons.

3. Project Manager

Project managers take full management responsibilities for the successful closure of the whole project. To best fulfill these responsibilities, project managers should work closely with project initiators to make sure that all the needed resources are in place. Meanwhile, project managers should be responsible for the development of the project plans, to make sure that the projects are successfully finished within the expected schedule, budgets, and quality. Project managers must be appointed during the project initiating process to guarantee that there is someone being responsible for the project execution.

The roles and responsibilities of project managers include the following: implementing enterprise project policies and procedures; acquiring needed project resources; maintaining the project team members' technical proficiency and productivity, and providing training when needed; developing and maintaining the quality criteria of project work, and identifying and acquiring needed tools.

1. *Roles and responsibilities during the project initiating process*

Compile files on feasibility study on project implementation.

2. *Roles and responsibilities during the project planning process*

(a) *Compile detailed project plans with the assistance from the project team members;*
(b) *Develop the organizational breakdown structure and work breakdown structure with the help from the project team members;*
(c) *Compile or help to compile project scope statement, project schedule arrangement, communication plan, risk management plan (including risk contingency plan), procurement plan, configuration management plan, and project budget;*
(d) *Ensure stakeholders such as management, clients, related agencies, and contractors and keep their promises;*
(e) *Ensure project plans get examined and approved and act as the project execution baseline;*

(f) *Allocate resources to the project; and*

(g) *Approve project quality plan and configuration management plan.*

3. *Roles and responsibilities during the project executing process*

(a) *Manage project work and provide work instructions for the project team members;*

(b) *Examine project progress status regularly and compare the actual cost with the budget;*

(c) *Examine project schedule network diagram regularly and compare the actual completed work with the schedule baseline; and*

(d) *Ensure that project plans are updated frequently and are signed by all stakeholders if necessary.*

4. *Roles and responsibilities during the project controlling process*

(a) *Change project budgets and project schedule and provide change suggestions when needed;*

(b) *Check and guarantee the quality of examination results;*

(c) *Inspect and approve product/project changes as a member of change control committee; and*

(d) *Examine project risks and develop risk response strategies and procedures.*

5. *Roles and responsibilities during the project closing process*

(a) *Redevelop action plans for products that do not pass the final check;*

(b) *Get approvals from the clients and top project managers regarding the completed products;*

(c) *Finish the unsolved items;*

(d) *Compile project summary report;*

(e) *Develop communication activities to exchange project experiences/lessons;*

(f) *Finish finance-related work;*

(g) *File all the project-related files and data;*

(h) *Attend and help project audit when necessary; and*

(i) *Celebrate the project success with the project team and other stakeholders.*

4. Project Team

Project teams are responsible for various activities in project execution. When necessary, project team members should assist project managers to compile project plans and to complete the projects within the constraints of budget and schedule. Project teams can invite related experts to implement project plans. They also need to maintain interactions with the clients and other project stakeholders to make sure that the requirements are understood and executed properly.

Project teams' roles and responsibilities include the following: identifying alternative plans for solving problems; implementing plans within budgets and

schedule; coordinating with quality assurance personnel; supporting the development of project plans, and monitoring the project progress.

1. *Roles and responsibilities during the project initiating process*

   (a) *Provide evaluation opinions for the project product development;*
   (b) *Make sure the project requirements are practical and are consistent with current resource status; and*
   (c) *Analyze requirements from the perspectives of completeness, interdependency, and clarity.*

2. *Roles and responsibilities during the project planning process*

   (a) *Develop technical methods;*
   (b) *Assign and participate project tasks;*
   (c) *Provide supports for compiling cost estimates and schedule plans;*
   (d) *Help compile quality assurance plans and configuration management plans;*
   (e) *Make all the team members understand the project plans;*
   (f) *Identify project members' training needs; and*
   (g) *Make sure project team members fully understand various requirements.*

3. *Roles and responsibilities during the project executing process*

   (a) *Develop product or process plans;*
   (b) *Follow project execution status and submit project progress reports;*
   (c) *Conduct project internal inspection and help conduct project external inspection;*
   (d) *Compile configuration control files and their baseline files;*
   (e) *Compile test plans and coordinate various testing activities; and*
   (f) *Execute assigned project tasks;*

4. *Roles and responsibilities during the project controlling process*

   (a) *Identify problems and submit applications for schedule changes;*
   (b) *Coordinate quality assurance activities, examine quality assurance results, and rectify various bias in a timely manner;*
   (c) *Identify risks and adopt corresponding response strategies; and*
   (d) *Participate in the change inspection.*

5. *Roles and responsibilities during the project closing process*

   (a) *Attend meetings on experiences/lessons exchange;*
   (b) *Identify ways that can improve project processes; and*
   (c) *Submit various project-related documents to project managers using a proper filing system.*

5. Managers of project-related functional departments

Projects are temporary. Most of the resources that are needed to complete a project are within the hands of the managers of project-related functional departments.

Without their support, it is very difficult or even impossible to successfully finish a project.

The roles and responsibilities of these people generally include the following: ranking enterprise requirements and including them in the departmental plans; ensuring the needed resources for various project activities; guaranteeing that related personnel receive corresponding trainings; and evaluating and recommending available project management tools.

1. *Roles and responsibilities during the project initiating process*

    (a) *Recommend or select project managers and provide support for personnel appointments;*
    (b) *Inspect and approve project risk analysis; and*
    (c) *Guarantee the supply of project funds.*

2. *Roles and responsibilities during the project planning process*

    (a) *Inspect and approve project plans and budgets and establish management reserve;*
    (b) *Provide professional support for cost estimating; and*
    (c) *Guarantee the availability of project personnel.*

3. *Roles and responsibilities during the project executing process*
    Perform regular managerial inspection to project execution

4. *Roles and responsibilities during the project controlling process*

    (a) *Inspect and approve project plan change;*
    (b) *Inspect project risk management plans; and*
    (c) *Inspect and approve changes in contract implementation.*

5. *Roles and responsibilities during the project closing process*

    (a) *Attend meetings on experiences/lessons exchange;*
    (b) *Attend and guarantee the acceptance tests from the clients and project initiators; and*
    (c) *Guarantee the closing of the accounting/financing.*

6.5 The Roles of the Stakeholders in "General Projects"

In practice, only a small number of projects can have clear and ideal definitions of duration, costs, and quality objectives prior to the project initiation, which is essential for the execution of the business contracts. Most projects are what we called "general projects," which are not able to clearly define project objectives and scopes in advance. Rather, only a general aim is clarified in these projects. Iraq War is such a "general project." The starting time could not be decided before it was launched. The finish time could not be decided either, so as the cost, and other data and techniques required in formal project management such as WBS

and Gantt. Similarly, new product research and development projects (such as the development of anti-SARS medicine) are also "general projects." We cannot predict what kind of technical difficulties this type of projects would encounter and how much time is needed to solve them. A majority of various organizational projects are "general projects." Only a few projects have formal and clear definitions. Usually, "general projects" are not as noticeable as large-scale and formal business projects. However, there is a huge number of this type of projects. If we do not pay sufficient attention, these projects could deplete the organizational resources as Ren Woxing's magic power in The Smiling Proud Wanderer.

The process of getting scripture from the Western Heaven in Journey to the West is a "general project." It did not have a good start: Although the project had a clear definition of the product (i.e., the Tripitaka scriptures), the quality criteria were ambiguous (After the four masters arrived at West, Buddha just asked Atan and Jiaye to select a few from the 35 columns of the Tripitaka scriptures, which were given to Tang Monk to bring to the East and distribute them). It neither had set up a time limit nor a set of cost indicators (Even Avalokitesvara said that the time needed is undefined, which might be two or three years. Tang Monk even thought it might need two to three or five to seven years.). It did not define the project scope. Besides, this project neither had a detailed plan, nor considered risks. However, this project was absolutely successful: All of its stakeholders expressed satisfaction to the project results.

As the project initiator, Buddha fulfilled his responsibilities. First, he clearly proposed the aim of the project (to get the Tripitaka scriptures from the West and distribute them in the East to teach people be good). Second, he provided the characteristics of the project manager (i.e., project manager needed to be a good person from the East and had perseverance toward going West) and provided him required resources (i.e., the kasaya and the staff that could protect Tang Monk from falling into Samsara, the lock ring that helps Tang Monk control disciples). Third, he helped coordinate the managers of the functional departments to make them better support the project (e.g., asked other gods such as Taishanglaojun to support wipe demons out). Fourth, he provided project management principles (i.e., must went through 81 disasters). Fifth, he paid attention to the whole process of the project without too much intervention, that is, he only helped at critical moments (e.g., he intervened at the scene of distinguishing real Wukong from the fake one). Sixth, he signed the project closure and made performance evaluations (i.e., he assessed and rewarded the project team).

In Journey to the West, the gods in the Heaven were managers of functional departments, which was represented by Avalokitesvara (her position was similar to the manager of human resource department or the dean of project management office). These managers provided project resources, regulated project operations, and documented the whole project process. When the project team encountered difficulties, they always provided their supports timely or even confronted the enemy personally when necessary. In this project, the functional managers never fight resources with the project manager.

In general, it is difficult to clearly define the required project support in advance. As a consequence, "general projects" need more attentions, understandings, and support from their stakeholders. Their strong support helps project managers and the team members to gain more confidence, which is crucial to the success of "general projects."

Interestingly, many disasters encountered in the project of going West were created by the functional managers and Buddha. Although there were other demons and ghosts, the ones that could cause real troubles to the project were the disciples and mounts of the functional managers. And their appearances were exactly arranged intentionally by the project initiator Buddha to test the piety of the project team. How similar is that to projects in reality!

As the project manager, Tang Monk is not outstanding but competent. First, he knew business (he knew how to chant scriptures and how to tell real scriptures from fake ones). Second, he was familiar with and stuck to Buddhism principles, and he clearly understood the project mission with firm belief. Third, he had good relationships with the project initiator, the client, and the functional managers (he was a disciple of Buddha and he was a sworn brother of the client, Emperor Tang. These two relationships kept him good in both Heaven and mortal worlds: In heaven, gods took good care of him from being harmed by the demons because he was Buddha's disciple (this project was a top leadership project"); in mortal world, the authority of Emperor Tang made him the "eminent monk" in small countries along the journey and got convenience in things such as room and board and visa). Fourth, he was quite artistic in managing the project.

The objectives of "general projects" are difficult to define at once. They need to be revised and clarified continuously during the project execution. Some management methods such as monitoring and central authority are usually not targeted. This is not useful for the project development, which might be detrimental to project teams' enthusiasm.

Some people might say, Tang Monk was too incompetent. In fact, governing by doing nothing was Tang Monk's biggest magic weapon. A direct objective for going West was to arrive at Leiyin Temple. However, even a senior monk like Tang Monk might treat a false Leiyin Temple as the real one. If the project manager were somebody else such as Wukong, the project most probably would be ended with failure.

For project management, it is definitely appropriate that "laymen lead experts." It is where their values lie that subordinates know more than their superiors in some areas.

It was just because Tang Monk did not have even the weakest strength that he had to not only motivate the project team members' enthusiasm, but also regulate their behaviors so that they could use their abilities in the activities that led to project success. Tang Monk did great in both aspects: On the one hand, he enabled his disciples to work hard by satisfying their vanity; on the other hand, he managed

to use "release and be at ease" method successfully in project management by applying different controlling strategies such as using the inhibiting magic phrase to control Wukong and using Wukong to control Bajie.

In the project team, Wukong stood for the technical person with no question, or we can say he was a "technical cowboy." He liked his occupation (get rid of demons) and he had very high professional skills. But also because of this, he had the common problem existing in technical people: He liked to conduct things from professional perspective and neglected or even did not see the project objectives; he was fond of being special when doing things and did not like to follow social norms; he had bad temper and would quit if he felt unsatisfied (he could easily find a new job because of his technical abilities). Sha Monk was a best project secretary. He was diligent and serious in doing things, but his abilities were just on average. The White Dragon Horse was a project assistant, who helped allocate and transfer project required devices. Bajie is worth mentioning here. He did not have good technical skills. He was selfish as well as coward. Although he had many shortcomings, he was the cohesion of the project: He provided the "technical cowboy" with a place to express emotions. So when Wukong wanted to "quit the job," he became the best ideological worker!

It is worth mentioning that all the project team members including Tang Monk, Wukong, and Bajie were all convicted people. However, it was these convicted people that made an excellent team and achieved immortal feats. Management personnel in real projects need to think more about this. The harmony among people, technology, and process is the key point in "general projects." Projects that only pay attention to heroes could destroy project team development.

As the client who would use the product of the "going West" project, Emperor Tang showed up only a few times in Journey to the West. He was not a Buddhist scholar, and he did not understand quality criteria of the project product, which is quite similar to "general projects" in reality: Clients are not always experts, and they cannot define their requirements using standard terms. However, Emperor Tang played an important role in the project: Because of the reverence of his kingdom, the project team obtained many conveniences along the road. For example, they could easily get visas. In other words, they could easily get approved to enter the next phase in the project…

6.6   The Challenge of Defining Project Requirements

Each enterprise project is developed for achieving some business aims. If these business aims cannot be clearly defined and documented, projects could have a higher failure rate or even lose the value of project existence.

Further, project objectives, project requirements, and the characteristics of project products vary significantly. Project requirements are the expectations from

project initiators or clients to the projects. Project objectives include not only the expectations from the project initiators or clients, but also the expectations from other stakeholders to the projects. The characteristics of the project products are quality standards of the products projects deliver to the clients.

Business experts should be engaged in defining project business values. Even for pure technical projects, the engagement of business experts is valuable.

Technical personnel usually make the following two types of mistakes in defining project requirements: "gilded requirements" and "filtered requirements." The so-called gilded requirements mean that technical personnel do not care about the clients' real requirements and they overemphasize and exaggerate the technical superiority. The corresponding products are called "gilded products." "Filtered requirements" mean that technical personnel might filter the project requirements subjectively based on their own technical preferences.

Most technical personnel love their own technical skills, especially for those technical masters (we would rather call them "technical cowboys"). However, professional technical skills are not their biggest advantage to the project. Rather, it might become their biggest shortcoming. Technical personnel are doers. As long as they are working on the jobs they like, they feel happy. Their interests in a project are not on the business outcomes of the project, but on the excitement of the project processes and on their pursuit of the technical superiority of the project products. Of course, money is also what they like, but they would think it is totally a different topic that "the objective of using technical skills is to reach the project's business aims." If a project manager is extreme technocratic, he might become a killer to the project. This is because understanding what skills are needed in a project is different from understanding a project that needs these skills.

For a software engineer, there is never a perfect project. If time permitted, he/she can always find places to revise further.

Practice reveals that products from projects that lack business experts' involvement are usually overcapacity designed, inapplicable, or even unusable.

However, both clients that use the project products (they most likely are not the related technical experts) and business experts experience difficulties to clearly define project requirements. They might use some data to define requirements in a clearer manner. However, in more cases, they use descriptive languages to illustrate the requirements. These ambiguous descriptions sometimes lead to different understandings of project stakeholders to have on project requirements (see Fig. 6.2).

Even the project objectives follow the SMART principles, and it is not necessary that we have finished the setup for the objectives.

A young man feels tired during his journey and wants to take rest. He finds a bench along the road and wants to sit on it. But the bench only has two seats that were taken by an old man and a dog. Obviously, he has to drive away the dog to get a seat. But he is afraid of being bitten by the dog, so he asks the old man "Sir, does your dog
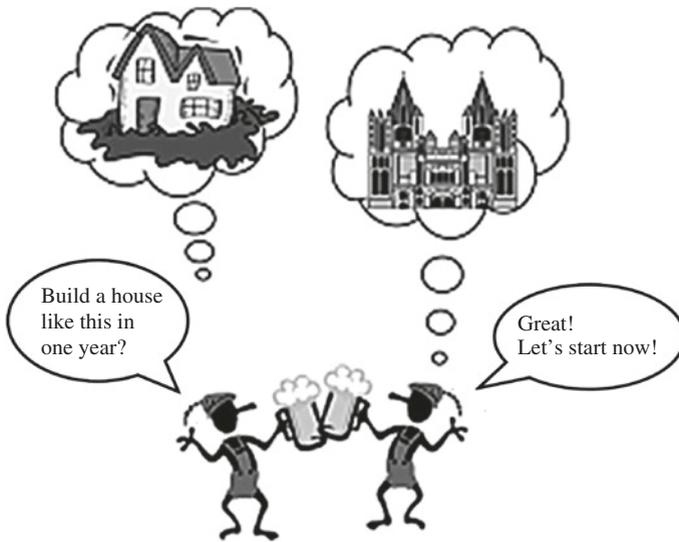
Fig. 6.2 Misunderstandings to project requirements from different stakeholders

bite?" The old man answers "no." So the young man pats the dog to show hospitality as well as trying to drive him away. However, he was still bited. He asked the old man angrily "you said he didn't bite, right? Why did he still bite me?" The old man replied "Yes, my dog doesn't bite, but this one is not my dog."

During the process of setting up objectives, there is nothing more important than reaching agreements on the objectives between supervisors and subordinates and among any objective-related people. Clarified objectives do not necessarily mean having reached consistent understandings. Many enterprises have hung slogans such as "innovation" and "solidarity," but few enterprises can make their employees agree on the real meanings of these terms. All of the objectives become empty words if there is lack of consistent understanding of these objectives.

It is a common problem during the project initiation process that no emphasis is placed on arriving at agreement among stakeholders on project requirements and objectives. Many project managers underestimate the difficulty on this matter. In fact, many projects are initiated without clear definition of their objectives and requirements.

6.7 Project Charter that Is Distributed to All Stakeholders

How does an enterprise work? We asked managers in many enterprises at various occasions, some of whom were even CEO of large-scale enterprises. Unfortunately, vast majority of them forgot that enterprise regulations are the

principles of performing all the activities in an enterprise. Enterprise-level activities are based on enterprise regulations, while department-level activities are based on department responsibilities and individual-level activities are based on job descriptions. Then, what is a temporary project based on?

Culture, especially national culture, has a significant impact on the way of thinking, behavioral norms, and life styles. Chinese people are widely influenced by the Confusian culture. According to Confusian culture, besides the relationship between self and enemy, interpersonal relationships are based on the following five types: liege, father–son, sibling, husband–wife, and friendship. From these five relationships, we can see that there are no business relationships between individuals. In business behavior, we usually use these relationships to define each other's roles. The relationship with competitors is self-enemy type and is irreconcilable; the relationship with superiors is liege type (the original government–enterprise relationship is this type too), which means the superiors not only have absolute power in work, but sometimes, this power might be extended to the subordinates' daily life. The more common relationship is friend type. Therefore, we need to pay attention to personal relationship when doing business. Sometimes, we can start working without signing the contract in the first instance, and sometimes, we can treat the signed contract as nothing.

A document is needed to clarify the formal existence of a project to make sure that the project secures necessary resources as a temporary task, to guarantee that the project manager has enough power to take responsibility for the project success, and to clarify the responsibilities each stakeholder assumes to the project and honor their promises. This document is called project charter.

The purpose of compiling a project charter is to express that the project and the project manager have got supports from the top management. It is a simple but powerful document. As an announcement document, project charter has various formats such as memos, letters, and e-mails, through which the project-related individuals and organizations can learn information about the project and the project manager.

Another purpose of creating a project charter is to communicate with the stakeholders about the project and clarify their responsibilities, power, and rights. The signing and distribution of the project charter indicate that the project officially exists.

A project charter usually includes the following contents.

1. Project aims

"Why do we want to do this project" is a question that needs to be explained to all the stakeholders in the project charter. It is very important to have a clear explanation of project aims especially for those projects that need a large investment of capital and time from their stakeholders. Knowing the answers of this question can enhance stakeholders' confidences in investing the resources they are in charge of.

Although there are various "why" in project aims, a project charter is not trying to answer all of them since it is not a substitute for project feasibility study report.

2. Project objectives

Project objectives mainly refer to project performance objectives. Project performance can be directly traced back to the enterprise's strategic objectives, missions, business aims, etc.

Project objectives not only include the expectations from party A, but also those from party B and other stakeholders. This is also why enterprises cannot directly hand the contracts to the project managers as the foundation of project implementation.

I have a friend who is a general manager of an enterprise and have had a successful career. One day, I had a chat with him and asked what was the happiest thing to him. He told me an interesting story:
"One night I was taking a rest. At about 1 a.m. I suddenly heard somebody was knocking at my door, which awaked me. I thought there must be something bad happening since the door was knocked at such a late time. I asked: "who is it?" and somebody answered with "I'm with procuratorate." I was broken into a cold sweat and was wondering if anything had happened to my company. I opened the door and only found that they reached the wrong person. After sending them out, I was bursting with happiness."
It is the enterprise's legal representatives who take full responsibilities for business contracts, so the contract should not be used to replace the project charter.

3. Project scope

Project scope refers to the scope of tasks that a project needs to accomplish. The description of project scope should be able to clearly point out if additional work in future exceeds the planned project scope.

The description of project scope should particularly point out the things that a project cannot provide, especially those that might be wrongly taken as being included in the project scope. Meanwhile, it needs to differentiate a product scope from a project scope, as a product scope can keep unchanged when a project scope is extended.

4. Project power

Due to the project complexity, stakeholders need to make various decisions to keep projects on the right track. Therefore, project charter must clearly define the power and mechanisms that are used to solve potential problems.

Questions from at least three areas need to be answered.

First, top management in enterprises (project initiators) needs to sign the project charter. The purpose is to demonstrate that top management will provide and organize resources for the projects, and has the power to control any factors that are going to influence the projects.

Second, a project charter must appoint a project manager and provide him authority to plan, execute, and control the project.

Third, project charter must establish connections between the project and top management and other stakeholders. The purpose is to guarantee that a support mechanism exists which can be used to deal with problems that cannot be solved within the project manager's power.

Thus, the project charter becomes a contract between top management and project managers. Both sides have responsibilities and rights to the project. A single page is needed in the project charter for the signature purpose. All related parties should sign on it to demonstrate their understanding, approval, and commitment to the contents in the project charter.

5. Project roles and responsibilities

Roles and responsibilities during the project initiating, planning, executing, and closing processes must be assigned to project team members and other stakeholders. To achieve this purpose, it is very important to clearly identify tasks that need to be carried out and the interrelationships among the tasks; accurately estimate duration; clearly define tasks and product quality criteria; and establish evaluation criteria for the task performance.

Responsibility assignment matrix is a tool to extensively describe roles and responsibilities in project activities. Responsibility assignment matrix can clearly indicate who is responsible for a certain activity. Therefore, using responsibility assignment matrix can avoid communication disruptions among individuals, departments, and organizations.

6. Management checkpoints

To ensure that project can achieve satisfactory progress, it is necessary to clearly define management checkpoints and decide the dates to evaluate project progress.

Checkpoints belong to major milestones of the top management. Top management uses them to approve the closure of a project process or milestone and make decisions on whether to continue with the next process.

7. Project product specification

Project product specification provides a description of the outcomes a project is going to provide to its clients.

A detailed product description must be developed prior to the project initiation. Without it, project team members cannot clearly understand what their jobs are. Under such circumstance, all the other major indicators might be useless.

Project charter is an evolving documentation along with the project progress. Therefore, if there are significant changes to a project so that the existing project charter is no longer feasible, a new project charter should be developed and signed by all stakeholders. In addition, sometimes it is not easy to immediately define all the responsibilities of the external stakeholders. Therefore, these contents should be updated in the project charter as the project progresses.

6.8 Don't Forget to Hold a Project Initiation Meeting

Before projects are officially initiated, it is very necessary to gather all the project stakeholders together to have a project initiation meeting. The meeting can help to clarify the meanings of some project-related concepts on site, publicly implement project stakeholders' roles and responsibilities, and ensure their fulfillment to project commitment. In addition, project initiation meetings can serve as social events for people to know and communicate with each other. After all, sometimes nothing is more important than having good interpersonal relationships.

The agenda of a project initiation meeting usually includes the following 13 items.[4]

1. Welcome and introduction

Make sure that the key stakeholders or their delegates are present or can use remote video devices to communicate. Provide all the attendants with a directory including names, titles, and contact information of all the attendants. Introduce the main project team members face-to-face to the stakeholders.

2. Introduce the meeting purpose

Introduce what project the initiation meeting is held for. Through the meeting, guarantee main stakeholders such as the project clients and the suppliers and approve the project management methods, roles and responsibilities, change management method, and so on.

3. Introduce the project background

Explain why initiate this project and use numbers as many as possible to illustrate problems.

4. Illustrate the project scope

Illustrate what the project includes and does not include in a simple but comprehensive manner and describe the main project products and critical milestones.

5. Illustrate project stakeholders' roles and responsibilities

Use responsibility assignment matrix to illustrate.

6. Introduce the management method the project manager is going to adopt

It needs to be emphasized that the project management method must be approved by the enterprise and the project stakeholders. In particular, it must include project communication methods.

7. Illustrate project change control methods

Change control diagrams can be used to assist the illustration. Clarify the responsible person for change management. Clarify when the clients are needed to participate. Clarify who has the authority to sign.

---

[4]This part is referred to management regulations in American Nortel Networks.

8.   Illustrate the main points and risk points in project activities

Simply introduce the work methods adopted in the project such as some major evaluation and control methods.

9.   Describe the acceptance criteria the client has for the project product

Illustrate what kind of product is going to be provided to the client, what their quality evaluation criteria are, and how the client is going to examine and accept this product. Try to secure the client's approval on the project plan, management method, client's roles and responsibilities, change management method, and other project work methods.

10.   Illustrate the project communication methods

Illustrate what, when, and how to communicate among the project stakeholders and decide who is/are responsible for the communication and what kinds of communication feedback mechanisms are going to be used.

11.   Answer questions from the attendants

Provide the stakeholders with the contact information so that they can contact the project team at any time and consult timely if they have any questions.

12.   Summarize the meeting

Summarize the achievements and results from the meeting. Thank everyone for his/her attendance. Illustrate how and when to distribute the meeting minutes.

13.   Close the meeting

Start well and end well. Try to leave a best impression to the stakeholders of the project team, especially of the project manager.

Many problems during the project initiating process are hidden threats to the project in later processes. Generally speaking, it is most difficult to obtain commitment from the key project stakeholders (i.e., top management) and the client.

Before projects achieve obvious economic benefits, generally they would not get supports from the top management. When obvious economic benefits are achieved, the top management will show its support. The way of showing support is to form a committee. You need to report to this committee regularly. However, when you need it, you usually cannot find its members.

There are many possible reasons not to support a project. If this occurs in the late period of a project, the problem is much more serious. Projects need capitals and other resources. A project is easy to fail if the individuals who are in charge of capitals or other resources do not have a strong consciousness of supporting the project or are not interested in the project. Top leaders should provide necessary support in a timely manner during the early period of a project and maintain this support throughout the whole project life cycle.

We should try to initiate a project as flawless as possible.

Chapter 7
Effective Project Organization Management

> *Once the men have been consolidated as one body,*
> *the courageous will not have to advance alone, and the*
> *cowardly will not get to retreat alone. This is the art of*
> *employing large numbers of troops.*
>
> —Sun-Tzu • *The Art of War Armed Contest*

Projects cannot be completed without resources which need to be properly organized. Previous studies show that it is very rare that projects fail because of "hard" reasons such as technical skills and methods. Rather, projects often fail due to reasons related to "soft" abilities such as organization, personnel, and management. Problems derived from inappropriate organization and management account for 48 % of project failures. This clearly demonstrates the importance of effective resource organization (See Fig. 7.1).

It is of very limited use to discuss the effectiveness of project management within a project team because there are three sources of the problems associated with the project organization management: (1) the relationships among temporary project teams, stable functional departments, and other project teams; (2) the relationships between an enterprise and its external stakeholders; and (3) the relationships among project team members. The project management issues derived from the first two types of relationships are more serious than those from the third type of relationship. It is beyond the project managers' authority to solve these problems. Of course, strictly speaking, the relationship between an enterprise and its external stakeholders is not a problem of project organization. They are problems of managing project partners.

7.1 The Characteristics of Project Organization

Project organization is a type of organization, but is different from general organizations. Influenced by projects and the characteristics of project management, project organization has distinct characteristics, which present significant challenges to project managers.
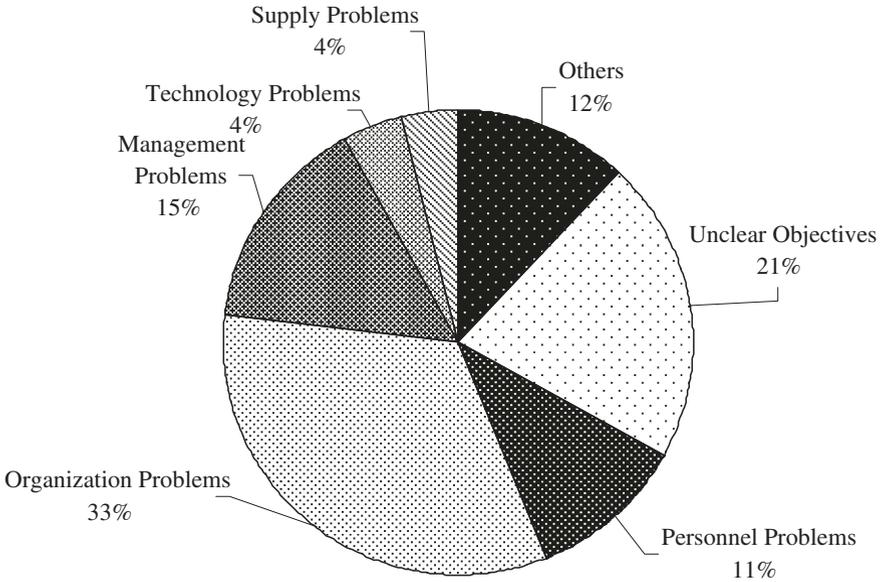
Fig. 7.1   Reasons of project failure

1. Project organization is formed for project tasks

Projects are temporary. Therefore, project organizations are temporary too. Project organizations are developed because of projects. Project organizations are dismissed when projects are finished.

Project manager is a temporary position. Since the power of temporary positions has limited influences on people, project managers do not speak powerfully as those people who have stable positions such as functional managers.

Mr. Zhang is an employee from technical department and was recently assigned to a new product development project team. One day, Mr. Zhang received a call from his department manager Mr. Li: "Mr. Zhang, can you come back to our department now?" Mr. Zhang was discussing some project technical details with the clients at that moment and was difficult to leave away. He tried to explain to his department manager. But his manager interrupted him: "you are busy, right? Ok, it's up to you." And what was next? Mr. Zhang immediately put his work aside and went back to his department in a hurry. He asked his manger what the matter was. His manager answered carelessly: "actually it's not a big deal. I cannot find a document and hope you can come back and find it for me." Was Mr. Zhang angry with his manager? No, because he knew that his department manager was much more important than his project manager.

2. Project team members have various skills

There are common steps to set up functional departments in an enterprise: clarifying the enterprise aims, decomposing the aims, classifying project activities based

on types, assigning similar activities to corresponding functional departments, and assigning powers and responsibilities to each department and so on. Therefore, there are similar professional skills possessed by personnel in each functional department in an enterprise. Each department has its specific skills set.

However, project teams aim to develop final products, which is different from functional departments that face certain types of activities. Therefore, a project team must possess all the skills needed from the beginning to the end of the project. A functional manager can get familiar with all the business within the department. However, it is difficult for a project manager to do so. Project managers cannot be familiar with all the knowledge, skills, methods, and tools used to finish the projects. There are always some members who have the knowledge and abilities that the project managers are not good at.

"Laymen lead expert" has been criticized for a long time, but it is a fact in project management. As a consequence, there are significant challenges to the authority of project managers. They must have stronger leadership abilities and stronger abilities to manage experts.

3. Project teams do not have redundant personnel

The personnel (and other resources) needed by a project are changing dynamically. Different people in terms of skills and quantity are needed to finish project tasks at different periods of time. When the tasks are finished, these people might leave the project team. In other words, project teams do not have redundant personnel. Project teams can have people coming when they need hands and can have people leaving when they are needed anymore.

Then, where are these people coming from and where are they going? Obviously, they come from the related functional departments and will go back to these departments. Therefore, department managers might think: "we are not hospices. We cannot do our jobs with the high mobility of employees." As a consequence, project managers need valuable staffs and departments provide with idle ones. Department managers and project managers often have conflicts on fighting for project resources.

4. Projects might be misunderstood as criticisms on functional departments' work

Enterprises are divided into various departments based on functions, and certain responsibilities are assigned to each department. To finish assigned tasks, each department simply needs to finish its own jobs. This is feasible if the business environment is changing slowly and responsibilities can be divided clearly. It is necessary to considering project-oriented structure when the business environment is changing rapidly and responsibilities cannot be clearly defined.

Both function-oriented approach and project-oriented approach are useful to an enterprise. They can complement each other to fulfill an enterprise's aims. However, in practice, many department managers might misunderstand that adopting project-oriented approach is a sign that their functional work is not trusted which in turn reduces their values. Therefore, it is very common that project

managers and department managers fight for credits and department managers do not show strong supports for the projects.

5. Project team members have different objectives and do not have enough loyalty to the project

Any organization must have common objectives. However, project team members come from different functional departments. They clearly know that once the project is finished, they will go back to their functional departments. They are only temporarily assigned to a project, and the departments are where they belong to.

In many cases, project managers have very weak influences on rewards and punishments to project team members. The real power is within the department managers' hands. Therefore, it is difficult to eliminate the phenomenon of "stand on one's side apparently but actually on another's side."

Effective project organization is the prerequisite of making good use of project resources. To establish the effective project organization, the characteristics of the aforementioned types of project organizations should be taken into consideration fully.

7.2 General Ways of Project Organization Structures

Usually, people might simply think that project organization deals with sources of human resources. However, a variety of resources are required in projects. Apart from human resources, projects also need capitals, materials, devices, facilities, information, tools, standards, methods, and so on. Project organization must describe the sources of all these resources needed by a project.

In general, there are common ways to organize internal resources of an enterprise.

1. Functional Organization Approach

The approach of functional organizations means that project resources are distributed in various functional departments, and department managers are responsible for arranging and using them when these resources are needed in projects (See Fig. 7.2).

Obviously, the advantage of functional organization is that it can take full use of enterprise resources. When some personnel or other resources are needed in a project, functional managers are going to assign them temporarily to the project to finish the tasks. If there are difficult and emergent project tasks, department managers can pool all the efforts from the whole departments to finish the tasks. When the tasks are finished, all personnel go back to continue their original functional work naturally. In the whole project life cycle, the project team members do not leave their departments. They only take orders from their functional managers.

The disadvantage of this approach is that there are no project managers. Each functional department is only responsible for the assigned project tasks, not the
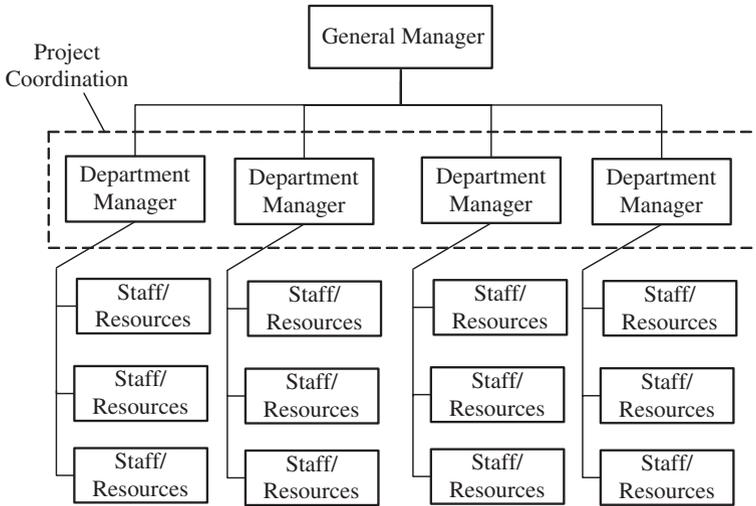
Fig. 7.2 Functional project organization approach (It is worth noting that the project organization discussed in this chapter includes not only personnel, but also resources, which are more important. Readers can compare the differences when they read project structure diagrams in other project management books.)

project final products. In other words, this approach can hardly acquire the commitment of project resources to achieving project final products.

This approach is feasible when project tasks can be clearly and stably divided. However, in some projects, there are a number of uncertainties, and it is difficult to define responsibilities in advance. Under such circumstance, functional departments tend to pass on responsibilities to other departments where those departments/personnel at the downstream often suffer losses. Therefore, functional organization approach works best for projects that have independent project interfaces and techniques.

Further, this approach only works if there is only one project during a certain period of time. If there are multiple projects, functional managers might have different understandings on the priority of the projects, which might lead to delay on all projects.

When multiple functional departments are responsible for finishing a project A, the project is divided into pieces, which are assigned to these departments (see Fig. 7.3). However, these departments also have other projects that need to be finished. Their decisions to pursuit the maximization of individual local benefits (resource utility efficiency) will lead to different preferences of project A, which in turn leads to an increased possibility of delay or failure of project A (see Fig. 7.4). For project-oriented enterprises, there are multiple projects at the same time. As a result, this functional organization approach can hardly satisfy their needs.
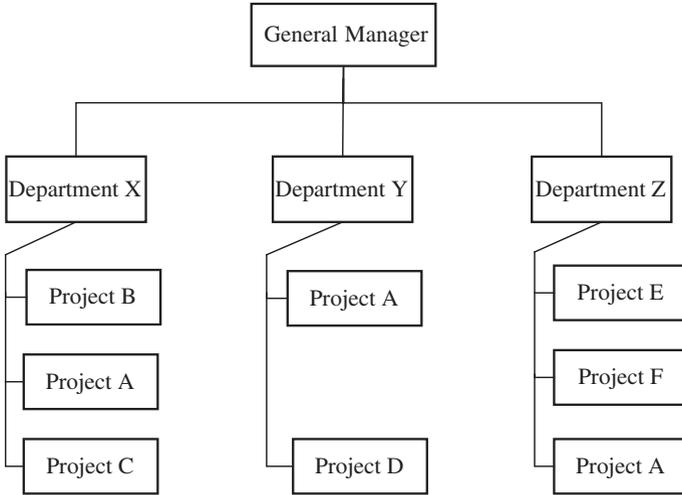
Fig. 7.3 Project A is assumed by multiple departments, and these departments are assuming multiple projects at the same time
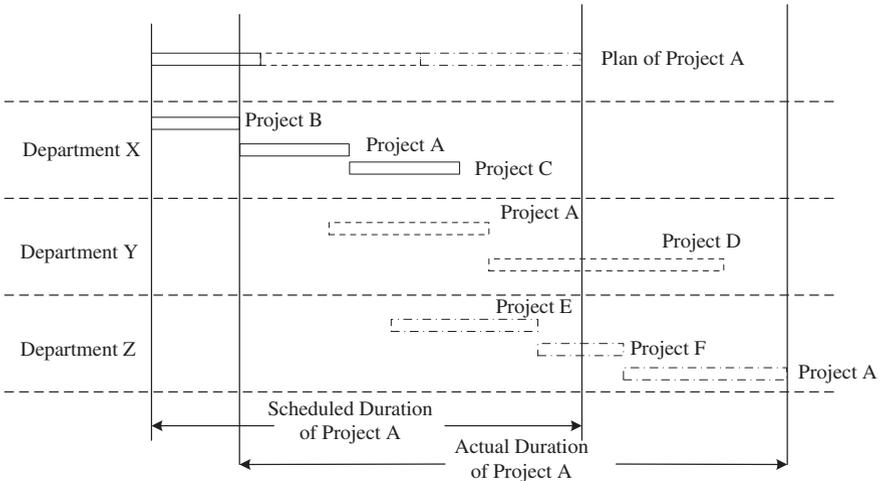
Fig. 7.4 Delay of project A caused by different preferences of project A of various departments

2. Project Organization Approach

An opposite approach to functional organization is project organization, which treats project teams as independent operating units. These project teams have their own project resources (see Fig. 7.5).

The advantages of this approach are that project managers take responsibilities for the achievement of project results and project teams can take full use of their own resources.
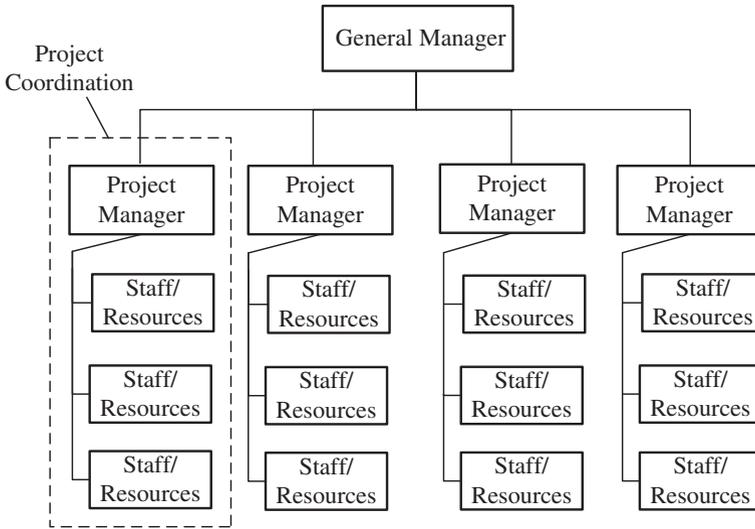
Fig. 7.5 Project organization approach

However, the disadvantage of this approach is obvious too: It has low usage of enterprise resources. Project resources are solely occupied by the project teams. Although projects can obtain these resources timely when needed, these resources are not easily released from the project teams when not needed by the projects. This approach is not convenient either when projects need to use more resources from the enterprise to solve technical problems.

Project organization approach is a good option for those projects that emphasize on project schedule and product characteristics, demanding on skills and quality, less attention to the project development cost, and with sufficient enterprise resources.

3. Matrix Organization Approach

Matrix organization is a project organization approach that not only allows somebody being responsible for project objectives, but also can utilize enterprise's resources more effectively.

According to the degree of project resource possession, there are three types of matrix organizations.

1. Weak matrix structure. This structure is very similar to functional organization approach where functional departments provide resources and finish project tasks (see Fig. 7.6). There are no formally appointed project managers. Even if there is a project manager, he or she assumes a role of project coordinator. In most cases, functional managers have authority to control resources.
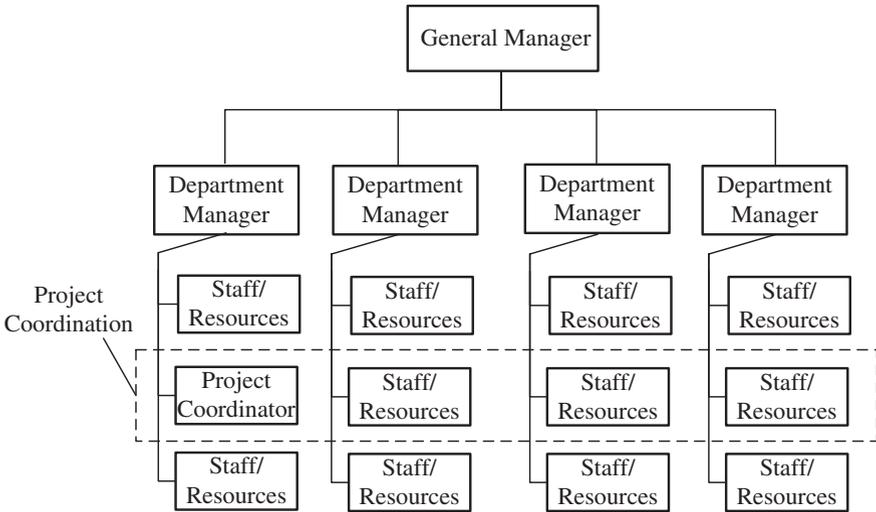
Fig. 7.6 Weak matrix project organization approach

As there is no formal and powerful project manager, it is difficult to ask some-body to take responsibility for the final project results. The degree of the support from the functional managers plays a vital role in project success. In this structure, project team members spend most of their time on their departmental work. They are just "amateur" project team members.

Mr. Ma was an "airborne" person. Company Y poached him from company X at all costs because of his excellent performance at company X. Mr. Ma's first task in company Y was to transfer elites from various departments to form a project team to perform marketing analysis of company products. Mr. Ma knew the importance of this project in terms of his own future and the company's future. He found related people and asked them if they could attend the project. But they all responded that they were very busy and could not make it.

In a weak matrix structure, the project coordinator lacks in power and effective control on project resources. Further, the abilities of coordinating, influencing, and interacting with people are very important characteristics that a project coordinator should have. All of these could have important impacts on project results.

2. Balanced matrix structure. Balanced matrix structure is displayed in Fig. 7.7. In this structure, there is a clear project manager, and he or she takes responsibilities for the project outcomes. However, this type of project managers is not independent of functional departments. S/he still needs to attend or assume functional work while in charge of the projects. There are only project coordinators but no project managers in weak matrix structures. By contrary, there are project managers in balanced matrix structures, but this type of project managers is "amateur" too.
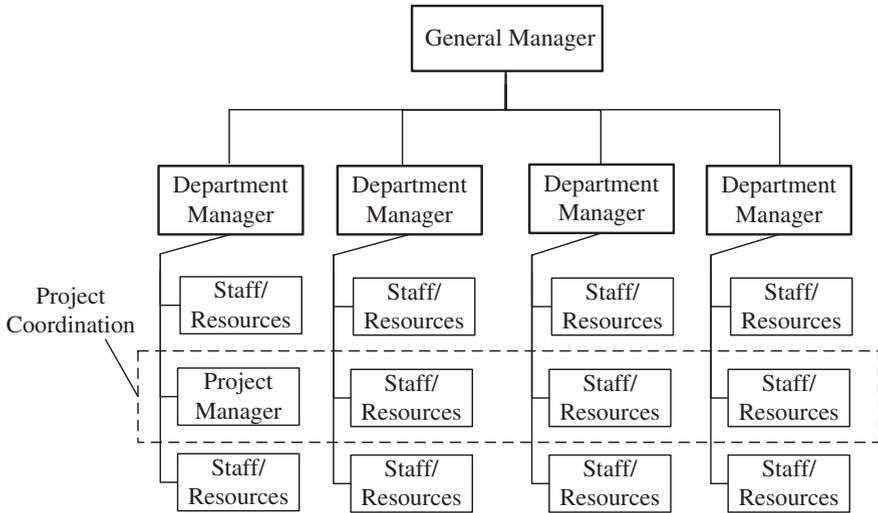
Fig. 7.7   Balanced matrix structure

Mr. Li is the vice manager of Information Department at Company Z. He recently undertook a project, which was to complete a design plan for the company Intranet within a month. He made a project execution plan, which needed personnel sent from human resource department, marketing department, and enterprise management department. Since Mr. Li is one of the technical authorities in the company and he has good personal relationships with the managers of these departments, these managers are all willing to help him. But the problem is, Mr. Li's department is very busy and he had to stop the project work at hand frequently to deal with those departmental businesses.

One month passed. Although Mr. Li finished the design plan for the company Intranet and submitted it, the plan did not get approved by the company. Instead, some company leaders began to doubt his technique skills. Mr. Li knew that it was due to insufficient efforts he put on this project. However, he could not explain it to the company leaders. In early period of project initiation, the company had taken a formal project initiation meeting and announced his existence as the project manager and assigned him with full power and responsibilities. In addition, each department had good collaboration with him. Even his department manager, Mr. Liu, was very supportive. Mr. Liu tried his best to take him away from daily ordinary work in the department and used his time only on occasions such as department regular meetings and dealing with work that was Mr. Li's responsibility.

In balanced matrix structures, project managers have two kinds of jobs and they have to find the balance between projects and their departmental work. However, it is regretful that this kind of balance is often very difficult to achieve.
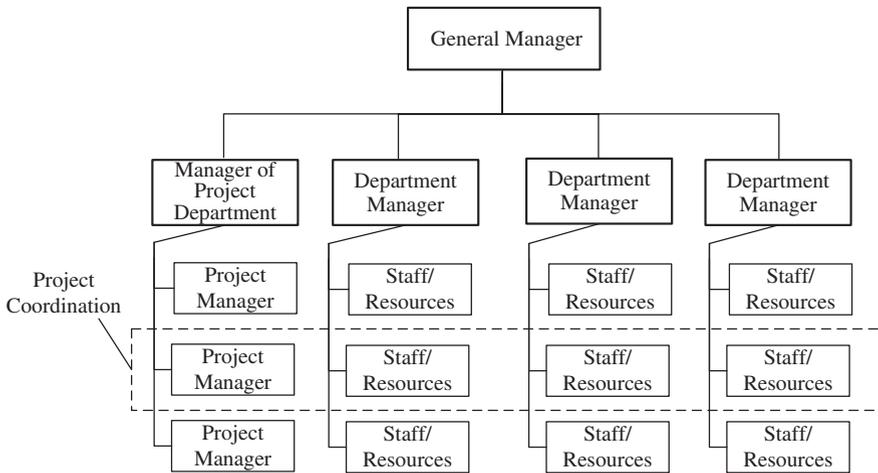
Fig. 7.8 Strong matrix structure

3. Strong matrix structure. Strong matrix structures are similar to functional struc-
   tures (see Fig. 7.8). In this type of structure, project managers are full time.
   They do not belong to any functional department during the project period, and
   they do not need to work on functional departments' jobs. Similarly, project
   team members spend most of their time on the project. Project managers have
   more commanding power to them than their functional managers do.

   *Mr. Zhang is an engineer who has excellent performance. He had been
   assigned to a project team for one year. He did well in that team and was
   praised by the company. He got bonus and returned to his department. His
   department manager Mr. Liu asked him what his feeling for attending such a
   successful project was. Mr. Zhang replied: "I feel great, but please don't send
   me again if there are such projects in future."*
   *In a strong matrix structure, although the project manager has enough power
   to use the project team members, the members who have been away from his
   or her department for a long time might feel a whereabouts problem when the
   project is over. Similarly, the functional managers do not like their subordi-
   nates leaving the departments for a long period of time. This is because the
   managers cannot count for them when they are needed and they might be back
   when they are not needed.*

Weak matrix, balanced matrix, and strong matrix structures reflect the degree of
impact project managers and functional managers exert on the projects. With the
changes from weak to strong matrixes, project managers' impacts on the projects
become bigger and bigger, while the functional managers' influences become
smaller and smaller.

However, a problem exists in all of the matrix structures, i.e., there are two or
more superiors for an employee.

Who should feel worried by having two or more superiors in a project? Logically speaking, the subordinates should because they have to satisfy the requirements from two or more people. However in fact, the superiors feel troubled too. If this person cannot satisfy their needs or s/he has to do two jobs at the same time, both job s/he is responsible for are affected. The worse thing for the superiors is: This person might use the conflicts between the two superiors to benefit him or herself. This is very common in reality.

When selecting matrix structures, consideration should be taken whether a project manager has rights to manage capitals and has business relationships with functional managers. This includes acquiring their official commitments to the project and their participation in making project plans. If the answer is yes, matrix structures will play a significant role in the project performance. However, if the project manager is only regarded as a project coordinator while department managers are counted for executing the project, matrix structures will no longer be effective.

7.3   The Assignment of Project Tasks

Functional organization, project organization, and the three types of matrix organizations only describe the sources of human resources and other resources that projects need. The section illustrates how project utilizes these resources and how to assign project tasks.

1.   Assignment Method Based on Same Shape

The assignment method based on same shape means that project tasks are divided into various parts based on WBS, and each part is assigned to a sub-team within the project team.

For example, we are going to develop a bidding document for a project. The WBS of the project is illustrated in Fig. 7.9. *We can form four project sub-teams from the project team and assign these four tasks to them separately, as depicted in* Fig. 7.10. *The advantage of this project task assignment method is that the project tasks might be conducted in parallel. The disadvantage is that it might cause difficulties*
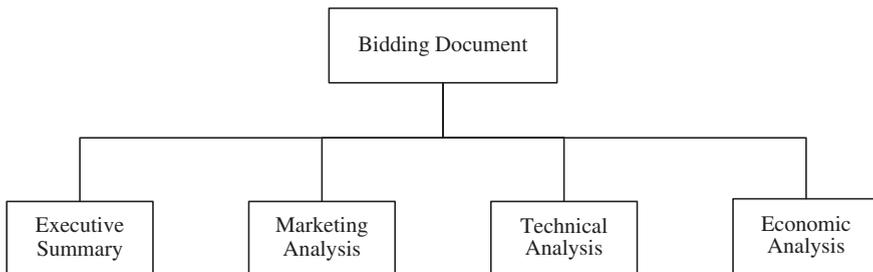
Fig. 7.9   The WBS of a project for developing bidding documents
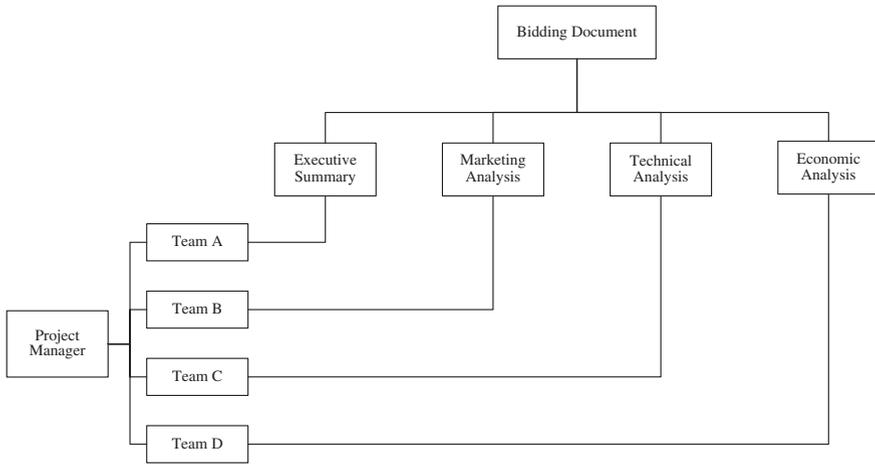
Fig. 7.10   Project task assignment method based on the same shape

in assembling the final project tasks. By having each sub-team to finish a chapter in the bidding document individually, it helps to ensure clear task division and to accelerate the completion of the document. However, it might cause the disorganization or even discrepancy between the contents and opinions of each sub-team and the inconsistency of the format of each chapter.

This method only applies to projects that have relatively independent parts. Further, project managers should take full responsibilities for coordinating and commanding each sub-team.

2. Assignment Method Based on Professional Competency

To guarantee the quality of each task completed, we can assign project tasks based on the professional competency of each project team members.

We still use the project of writing bidding document as an example. Suppose project sub-teams A and B are both familiar with the overall situation of the project. Therefore, these two sub-teams are responsible for writing the "executive summary" section of the document. Sub-teams B and D are both familiar with the marketing situation of the project, so they are responsible for writing the "marketing analysis" section. As only sub-team C is familiar with project technical skills, it is assigned the "technical analysis" section. Sub-teams A and D are skilled at economic analysis, so these two sub-teams are responsible for writing the "economic analysis" section (see Fig. 7.11).

The advantage of adopting this method is that each part of the project can be finished by the most competent members in that professional discipline. Therefore, each part can achieve a relatively high performance. However, there are issues. First, this method might cause problems of unclear division of responsibilities. When two or more people are responsible for same tasks, the results might be that
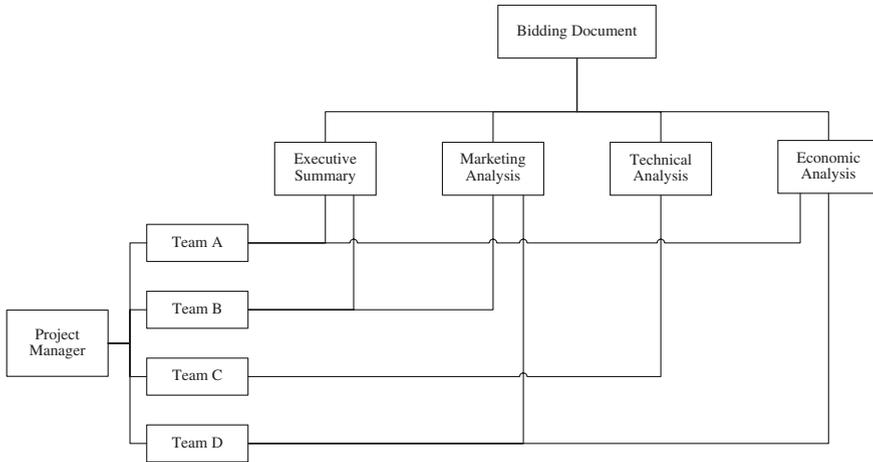
Fig. 7.11 Project task assignment method based on professional competency

nobody are actually taking responsibilities. Second, this method might cause the unbalance workload among team members. Lastly, relative independence among project tasks is required.

3. Assignment Method based on Collective Negotiation

Collective negotiation method means that project team members make negotiations on various issues in the first instance such as the contents and characteristics of project tasks, working methods, and task assignment. Consequently, they begin to work based on the negotiation outcomes.

Let us still use the project of writing bidding document as an example. Team members make communications and negotiations on various issues prior to assigning project tasks such as to ensure the document quality and the consistency of styles and contents among different tasks; and to guarantee the clarity of responsibilities and balance workload among team members (see Fig. 7.12).

Although this assignment method does not have high efficiency at the beginning of a project, the efficiency increases rapidly after team members begin to work based on the negotiation outcomes. This is due to the fact that at that time, the project can be executed in parallel, while there are few problems during the final project integration. This is what called "sharpening your axe will not delay your job of cutting wood".

Two problems exist when adopting this method. First, project size cannot be too large. If a project's size is very large, many issues need to be negotiated. Therefore, workload is massive, and it is difficult to reach the agreement. Second, project team members need to be relatively stable. If project team members are very mobile during the project execution, latecomers must renegotiate the outcomes of the original negotiation with other members. This might lead to lower project efficiency and more project conflicts.
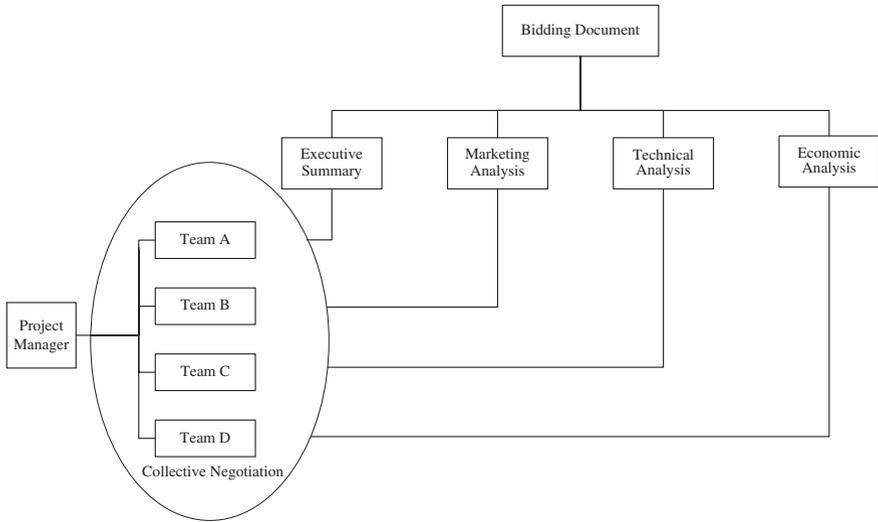
Fig. 7.12 Project task assignment method based on collective negotiation
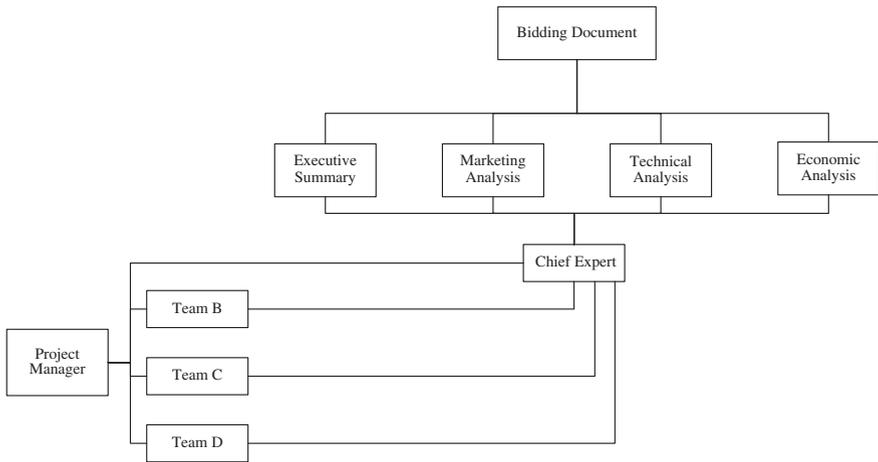
Fig. 7.13 Project task assignment method based on "chief expert"

4. Assignment Method based on "Chief Expert"

In some projects especially those related to software, research and development, and surgery, an assignment method based on "chief expert" is adopted. That is, although there are many members in a project team, they most likely work as assistants to an expert, assisting him/her on things such as providing materials, collecting information, and providing supplementary support and so on.

In writing bidding documents especially small-scale ones, it is possible to ask one member who has comprehensive business capabilities (might be the project

manager) to draft the bidding document, and other members provide him or her with assistance such as materials and word processing (see Fig. 7.13).

This method enables projects to move forward quickly, and it does not require the final integration. However, the project output quality is highly correlated with the individual performance of the chief expert.

7.4 Clarify Stakeholders' Responsibilities Using Responsibility Matrix

In order to guarantee project stakeholders assume their corresponding responsibilities to the project, the following three issues must be paid attention to.

1. Task clarification, that is, each task that is used to finish the project must be assigned to a clear responsible person. To avoid situations such as buck-passing and unclear division of responsibilities, each task must have one and only one person taking corresponding responsibilities. If two persons are responsible for a same task, it is very common that nobody takes responsibilities.
2. Personnel clarification, that is, each stakeholder needs to take certain responsibilities for the project. The reason why project stakeholders are stakeholders is that they have influences on the project. Therefore, it is necessary to clarify stakeholders at individual levels, rather than at organization, department, or team levels. It is not allowed that a project stakeholder only has rights but no responsibilities for a project.
3. Organization clarification, that is, provide organizational security for the successful fulfillment of each task. For examples, we should guarantee the coordination among personnel, processes, and management platforms/techniques/tools used in project organization and execution, as well as establishing corresponding motivation mechanisms and so on.

To deal with these three issues, it is imperative to establish a responsibility matrix among project stakeholders.

Usually a responsibility matrix is a two-dimensional table (see Table 7.1)*, which includes the stakeholders' names, the activities or tasks needed to finish the project, and the corresponding relationships between each activity or task and each stakeholder. The tracking and management processes of a software project are depicted in* Fig. 7.14*. To guarantee the expected effect of the processes, the company defines the project stakeholders and establishes a responsibility matrix as illustrated in* Table 7.2.

Project stakeholders need to fulfill their responsibilities to the project. However, many of them are not the project manager's or the project initiator's subordinates. They are even not the employees of the enterprise that undertakes the project. Therefore, it presents a challenge to the project management to make these people dutifully fulfill their responsibilities to the project.

Table 7.1 Project responsibility matrix table (a general format)

Role and responsibility					
Project task/ activity	Project stakeholder				
	Project stakeholder 1	Project stakeholder 2	Project stakeholder 3	...	Project stakeholder N
Activity 1					
Activity 1					
Activity 1					
⋮					
Activity M					
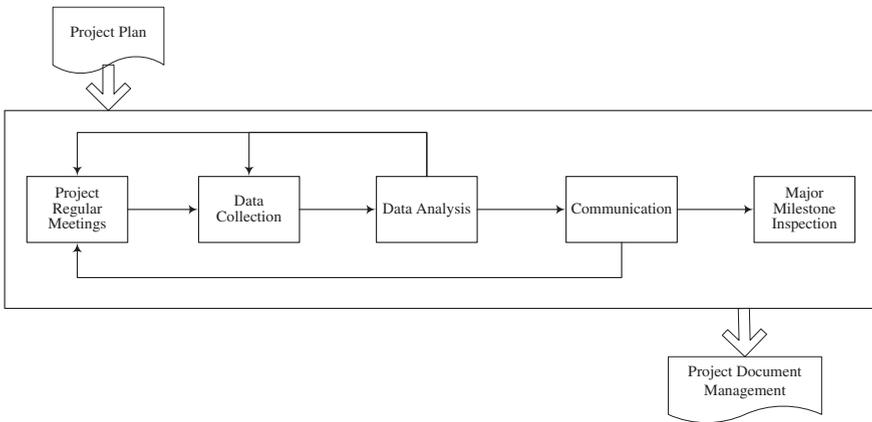
Fig. 7.14 The tracking and management process of a software project

Table 7.2 The responsibility matrix of the tracking and management processes of a software project

	Project manager	Project members	QA personnel	Clients	Enterprise management managers	Deputy vice general manager
Project regular meetings	F	P	C		R	
Data collection	F	P				
Data analysis	F				C	
Communication	F	P		C		
Major milestone inspection	F		C	C	C	F

F Take responsibilities; *P* Support; *C* Participate; *R* Report

7.5 Functions and Authority-Based Organizations Are Hard to Fulfill the Needs of Project Management

There are both advantages and disadvantages associated with functional structure, project structure, and matrix structure. Functional structures can take full use of enterprise resources, but these departments hardly make commitments to the project results. In project structure, although project managers can take responsibilities for project results, the efficiency of using project resources is low. Matrix structures take the advantages of both functional structures and project structures, but have a problem of authority conflict derived from multiple superiors for one person. What cause these problems? This is because that functional departments or static position authority-based management cannot fulfill the needs of dynamic projects and business environments.

Matrix organization structure has a problem of multiple superiors for an individual person. Essentially, it is a conflict between temporary authority and stable authority on fighting for resources. Projects are temporary tasks. In the process of project execution, project managers only control the resources and have authorities in project life cycles. Therefore, this kind of authorities is obvious temporary. Compared to project managers, functional managers have stable authorities. Under the circumstance of limited resources, the intersection of these two authorities falls at fighting for resources with no doubts, as depicted in Fig. 7.15. *Enterprise objectives are broken down to two parts: the objectives for individual departments and the objectives for projects. The breakdown of objectives means*
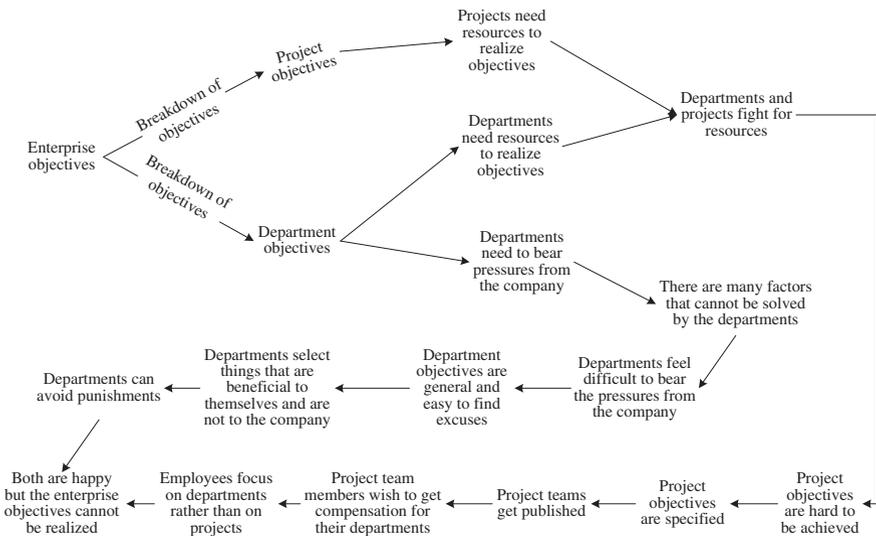
Fig. 7.15 The analysis of the driving factors to the conflict between projects and departments

the breakdown of responsibilities and pressures. Resources are required to real-ize objectives. Based on common understanding, resources mainly refer to the exclusive resources such as human resources, capitals, and materials. Therefore, there are resource competition between projects and functional departments. These resources are more likely to be used by departments because of the follow-ing reasons: (1) Projects are temporary, while departments are relatively stable; (2) assessment objectives for projects are rigid, while those for departments are flexible; and (3) the authorities of departments are real, while those of projects are virtual. The consequence is that it is difficult to finish projects smoothly. An enterprise might appear to be project-oriented organization, but in fact, it still depends on the division of stable departments to finish a project. However, func-tional departments often cannot bear the pressures assigned by the enterprise, because there are also many external factors that they cannot control. For exam-ple, profit rate per capita is commonly used as an assessment indicator for human resource department. However, due to various issues associated with sales and enterprise structure, the human resource department cannot bear such pressures. This kind of indicators is not very meaningful even if they are easily assessed. This management approach seems to encourage individual departments and projects to assume their responsibilities for the enterprise objectives. However, in fact, it causes divergent objectives and buck-passing between individual departments and between departments and projects. This leads to the situation of "everybody is busy, and busy with cover the truth" in the enterprise.

Currently, vast majority of researches on project organizations has focused on issues such as organizational structures and the relationship between departments in organizations. There is lack of studies on driving forces that facilitate project organization's operation. However, although organizational structures are influ-ential to the effectiveness of project operation, if there are same driving forces, it is difficult to assess the effectiveness even if the organizational structures are obviously different. In other words, it is the driving forces of project organizations rather than the different organizational structures that determine the effectiveness of project organizations.

Magritte, a nineteenth-century Belgian painter, once drew a painting, which had a tobacco pipe on it. However, the title of the painting was "this is not a tobacco pipe." What he wanted to express is that this is only a painting about a tobacco pipe, not a real pipe. Similarly, if we draw a diagram of a project's organizational structure, it can also be called "this is not an organization." This is because a dia-gram of organizational structure is only a part of an organization.

Authority is the power specified by the positional functions. It is a power that commands people for their obedience. If a project uses authority as the driving force for its organizational constitution, it will have the following characteristics.

1. Exclusivity. Authority comes from official positions, which are embodied in the well-known superior–subordinate relationships. The superiors who have authorities have the rights to assign subordinates with tasks, decide the

sequence of tasks, make decisions, set up deadlines for subordinates' work, hire or fire subordinates, and so on. Subordinates are a kind of resources that belong to superiors, and superiors can occupy this kind of resource, or at least have rights to control the subordinates during work time. This kind of occupation is exclusive and hierarchical. A subordinate cannot be occupied by two or more superiors. Since subordinates are a kind of resources of the superiors, the purpose of subordinates' work is to achieve the superiors' objectives. From this perspective, subordinates are not different from working machines.

It is because of the exclusivity of the authority that the problem of having multiple superiors for one people emerges in a matrix structure. Both functional managers and project managers want to enjoy the exclusiveness on using the project team members (or other resources), which leads to the authority conflict and makes project team members in a dilemma.

2. Closeness. In an enterprise that uses authorities as driving forces, each department operates around the predefined functions. The range it focuses on is the range of the functions. A task is transferred to another department after it is finished by a department. The aim of each functional department is to achieve its performance objectives. Except the general manager, others only need to see and care for a small part of the enterprise.

   There is an assumption for using this approach to finish a project. That is, the project tasks can be finished by clear and static task divisions. When the divided tasks can be finished in best ways, the project is finished in a best way. If each department achieves the best performance, the project achieves the best performance. This authority closeness is the source for the advantage of the project functional structure.

3. Responsiveness. In an organization that uses authorities as driving forces, information transfer is responsive. Superiors give orders, and subordinates perform activities; Superiors make plans, and subordinates perform activities. In this kind of organization, the people who create project values directly are those that at the lowest level in a hierarchy and are most insignificant. There is information transfer between superiors and subordinates, but the relationship is not equal. Direct information transfer among different functional departments only takes place in exceptional cases or with informal channels.

   In this kind of hierarchical systems, there are no real collaborations among project team members.

4. Regulations are the basis for management. The medium to authority is regulation. In a project organization that uses authorities as driving forces, management is based on various regulations. Because of the uniqueness and the innovativeness of the tasks and the constantly changing environments faced by project teams, regulations are updated frequently so that project team members get lost.

   "Changes always go beyond plans" is a characteristic of project. To some extent, the management of project teams emphasizes on the management of changes. The regulations and inherited bureaucracy are difficult to adapt to rapid changes. If a project team is surrounded by layers of regulations, it often results in sacrificing opportunities for maintaining regulations.

7.6 The Development of Effective Project Organization Management Systems

It is imperative to avoid the shortcomings of project organization management based on functions and authorities and to form effective project organization management system at the enterprise level. The following issues need to be addressed.

1. Reposition the roles of functional departments and project teams in enterprises

In a changing era, the core task of an enterprise is to complete various types of projects. Enterprise values come from the fulfillment of project objectives. Therefore, departments in an enterprise should be classified as the following: dynamic departments that are used to finish projects, i.e., project teams, and they are the users of project resources; and static departments that are used to support the completion of projects, i.e., the suppliers of project resources. To solve the problems existed in matrix organizations, functional departments need to change their way of thinking when setting up functions. The functions of functional departments in a project-oriented enterprise should be transformed from "management," "production," and "procurement" to "resource security." They must be transformed into supply and maintenance departments for various professional resources (see Fig. 7.16). Functional managers need to be changed to "resource managers." In this context, "resources" are a general term, which not only include the human, capitals, and materials in a traditional way, but also information, regulations, methods, and so on.

2. The driving forces to achieve role transformation among departments

The driving forces for achieving role transformation among departments are to develop corresponding relationships in performance evaluation. This is because it is a common sense that people think "you tell me what you are going to use to evaluate me, then I tell you what I am going to do." Changing evaluation methods changes everything. Otherwise, nothing will be changed. Many enterprises use the following approach to develop criteria for performance evaluation, which is to ask each department to report their own evaluation indicators independently and simultaneously. This approach only works when departments can work independently. For project-oriented organizations, various departments need to collaborate where projects are used as a platform. Therefore, this method is not feasible.

The evaluation method for enterprise performance should be guided by the objectives of effective projects, based on which to deductively define the responsibilities of the static and dynamic departments. Many enterprises face such a situation that the performances of functional departments are difficult to evaluate. However, it will not be difficult any more if the role of the functional departments is positioned as supporters. The fundamental principle is that the users of resources evaluate the suppliers of resources. However, in practice, it is often the opposite. No wonder why this kind of problems is difficult to solve.
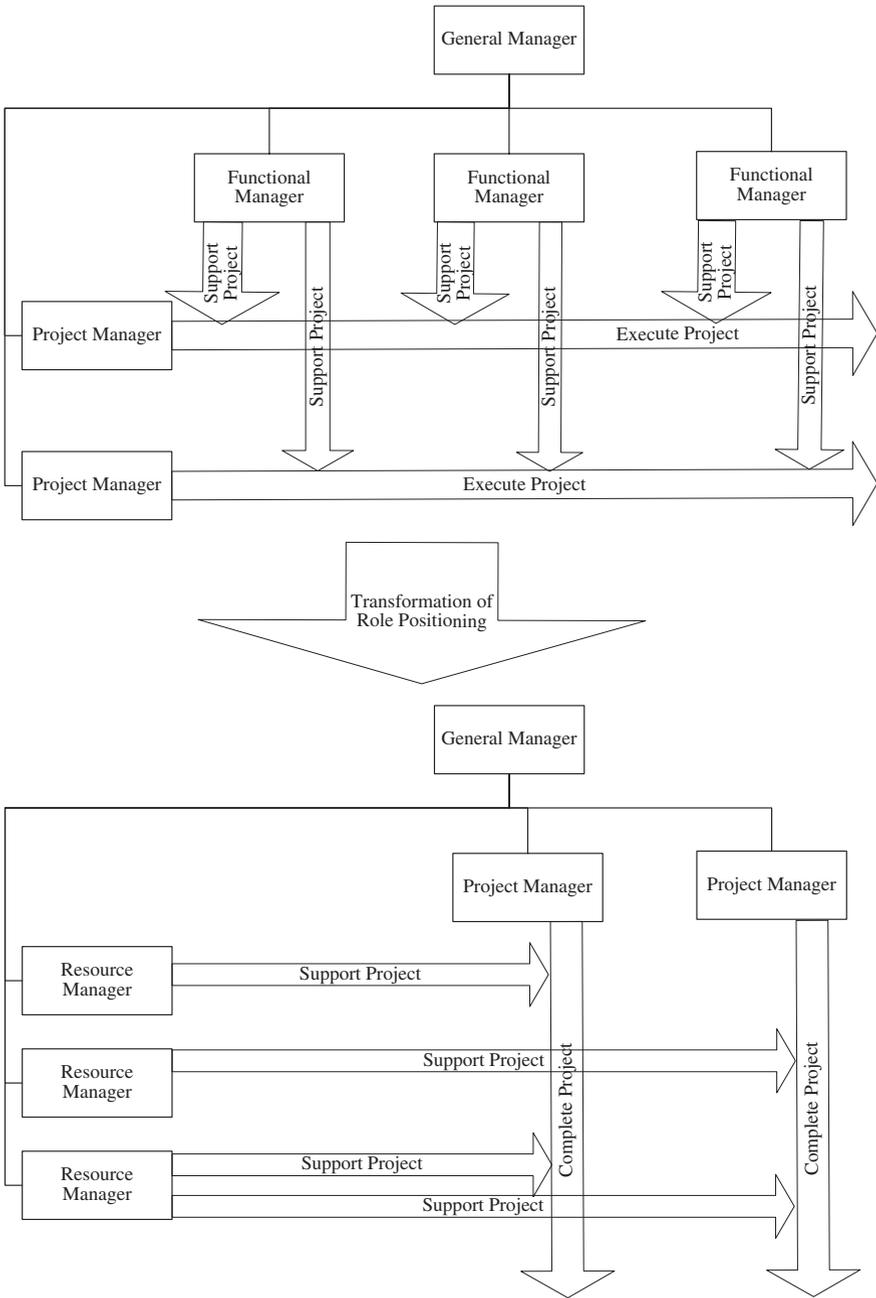
Fig. 7.16 Role transformation for functional departments

In Fig. 7.17, *A, B, and C stand for three departments in an enterprise. Department A (project team) is responsible for executing the project, and departments B and C are the suppliers of the project resources. The effective evaluation method for the enterprise performance should start from department A. First develop the objectives for A's performance, and A proposes corresponding requirements based on its performance objectives, such as requiring a certain resource support from C and so on. Based on A's requirements, C proposes corresponding requirements to B. To satisfy the requirements, B proposes requirements to A and C…… Once these requirements between each other are indexed, they are summarized according to departments, and then, it is easy to form the performance evaluation indicators for each department. In* Fig. 7.17, *the diagonal sections are the internal evaluations in departments and the non-diagonal sections are the evaluation relationships between demanders and suppliers, thus forming an internal marketing mechanism.*

3. The accumulation and reuse of enterprise knowledge

In changing environments, enterprises must have the capabilities to undertake multiple projects simultaneously and finish them effectively and efficiently. In all enterprise resources, human resources and knowledge resources are most influential to the project efficiency. The importance of human resources to projects is obvious. There are common challenges for enterprises such as letting project team members to be familiar with their roles quickly, finding problems and proposing solutions rapidly, delivering project outcomes quickly, and appropriate and timely project roles. Change is the enemy of speed, while knowledge is the opponent of
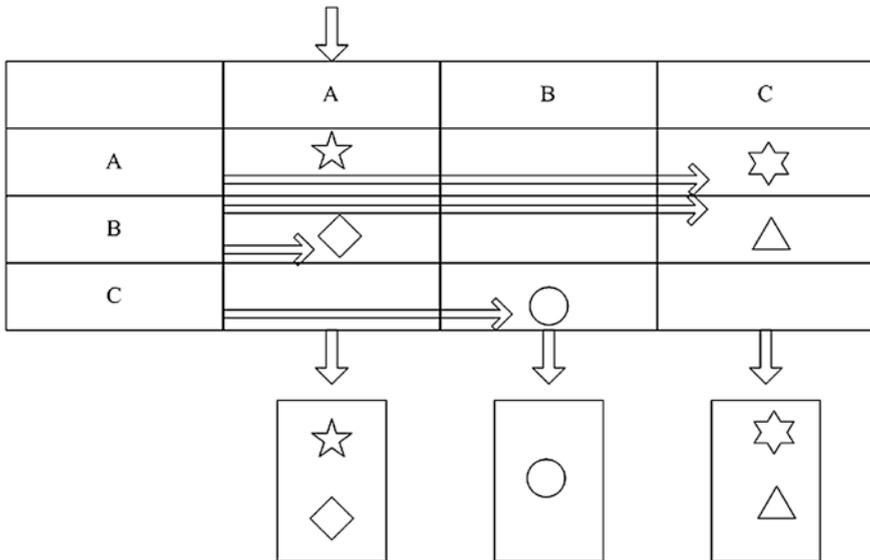
Fig. 7.17 The evaluation relationships among departments in a project-oriented organization

change. Of these intangible assets, the most important component that is related to efficiency is the enterprise-owned knowledge that can be reused. Enterprises must be good at finding commonalities from different projects, refining the experiences and methods of dealing with these commonalities, consolidating them to enterprise knowledge, and establishing corresponding mechanisms to improve the reuse rate of the knowledge. This mission needs to be completed by the "resource managers."

Issues such as the transformation of departmental roles, the formation of driving forces, and the extraction and reuse of knowledge are the main components of enterprise organizational mechanisms, which can be simply depicted in Fig. 7.18. *In* Fig. 7.18, *the general manager proposes evaluation requirements (project objectives) to project managers based on project aims. Based on these clarified project objectives, project managers propose resource requirements to resource managers. Resource managers provide resources (using project team members as resource examples) to project managers based on the requirements. Project*
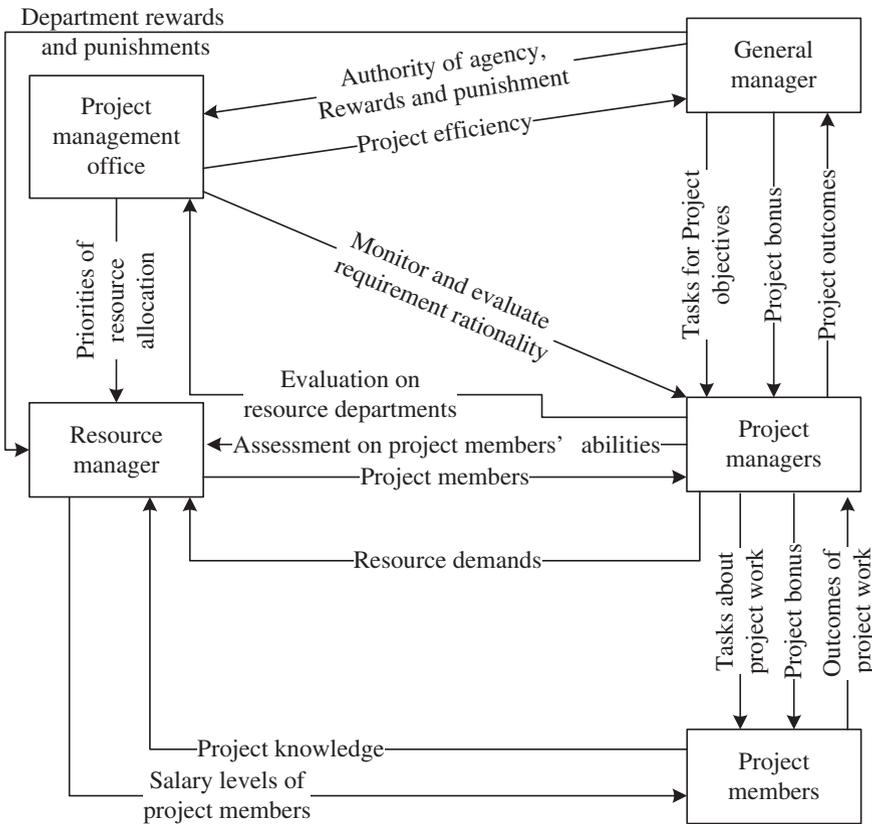
Fig. 7.18 The development process of organizational mechanism in project-oriented organizations

managers assign tasks to project team members. When project team members finish their tasks, project managers can submit project outcomes to the general manager (enterprise) and acquire project benefits (such as bonus). Project managers decide the benefits of each team members (e.g., project bonus) based on their performance in finishing project tasks and provide feedbacks on their abilities and attitudes exhibited during project execution to their resource departments. After team members return to their departments, they need to extract the knowledge they get from the projects and leave it with the departments. Resource managers adjust the team members' salary levels (i.e., hourly pay in an enterprise) based on the project managers' assessments on project team members' abilities and the effectiveness of the knowledge team members extract. Project managers evaluate resource managers based on the quantity and quality of the resources they provide. The general manager makes rewards and punishments to resource departments based on the results of the above assessments. The most effective authority project managers possess in this whole process is the evaluation they make to departments and project team members.

No matter the type of enterprises and projects, three steps should be followed in order to achieve the effective organizational management mechanism, i.e., procedure optimization, structure classification, and evaluation. This order cannot be changed.

To achieve the transformation illustrated in Fig. 7.18, there are three questions need to be solved. First, who can judge the rationality of the resource requirements proposed by project managers? Second, how resource-supply departments decide the priorities when multiple projects have conflicts on resource demands? Last, since project managers are only responsible for finishing a project correctly, who is responsible for providing right projects? The solutions of these three questions lie in the establishment of project management offices (PMO) in enterprises. PMO uses the authority of agency assigned by enterprises and monitors various projects and is responsible for benefits from the project execution. Once project managers propose resource demands to resource managers based on project objectives, PMO evaluates these resource demands based on the contribution levels of the values and efficiencies that projects make to enterprises, to decide the rationality of the resource demands and assign priorities. To some extents, PMO is the real management agency in enterprises. PMO can be either a department or a combination of several departments. When functional departments are changed to resource providers, the question of fighting for resources between functional departments and projects, which are treated as resource-use departments, is transformed into fights among projects. The difficulty of "multiple superiors for one person" will change fundamentally and can be solved by the priority of resource investment decided by PMO.

The functional structure of PMO is illustrated in Fig. 7.19.
The main functions of a PMO are described as follows:

1. *Manage enterprises' project documents, and use it as basis to develop and maintain enterprise's project management standards, methods, and procedures, and to produce enterprise project management knowledge;*
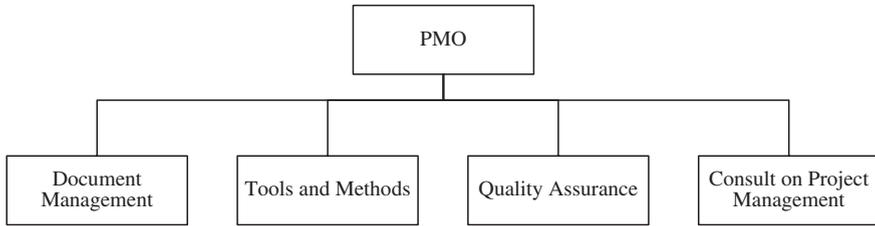
Fig. 7.19   The structure of project management office

2. *Provide project managers with project management consulting and directing;*
3. *Provide enterprises with qualified project managers;*
4. *Provide enterprises with project management training;*
5. *Manage the quality of project deliverables;*
6. *Provide enterprises with other supports related to project management.*

"Multiple management" is a common phenomenon in reality, which means a job has multiple departments to manage. This phenomenon contradicts the basic management principle of "everything must have and only have one person to take responsibilities." A solution to "multiple management" is "big department" method, which means to combine these multiple departments into one big department so that there are no multiple departments taking responsibilities anymore. However, "big department" method can only solve the problem of who bears responsibilities after things happen. It cannot reduce problems. Furthermore, a department is responsible for multiple jobs, and enterprise departments are closely related. It is impossible to combine an enterprise into one department to manage. On the surface "big department" method indicates there are people taking responsibilities, but in more situations, it leads to either low efficiency or corruption due to too-centered authorities. Although the responsibilities are clarified but the resources and methods of mitigating risks are limited, therefore it is easy to let everyone feel insecure. People tend to seek scapegoats such as "temporary workers" or reap some profits first to achieve the effect of "high risks and high profits." In fact, multiple management is a kind of illusion.
Figure 7.20 *illustrates a phenomenon of multiple management, in which four departments A, B, C, and D collaborate to finish a job. In* Fig. 7.20, *the job is treated as a "black box." If we decompose the job we can see that (see Fig. 7.21) each department is responsible for a subtask. Therefore, multiple management is a kind of illusion to a certain extent, which is caused by undivided jobs and unclear processes. To solve this problem, we need to subdivide jobs and clarify responsibility processes rather than to simply combine all the departments.*

Because of the uniqueness and innovativeness of project tasks and the ever-changing environment, "positions" are not good enough to deal with flexible tasks. Therefore, it needs to be replaced by the "roles" that are for tasks. At present, the salary of workers is expected to increase in the human resource markets. The price which enterprises pay to acquire workers (especially knowledge workers)
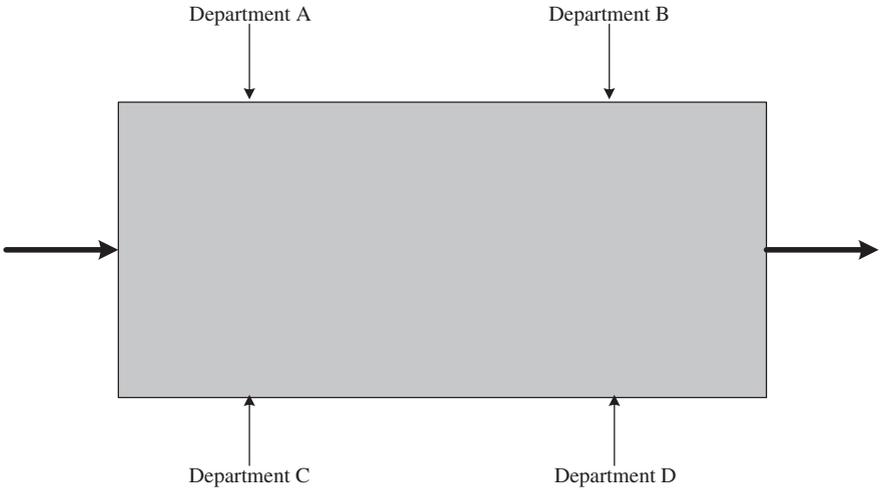
Fig. 7.20 "Multiple management": A job is multiple departments' responsibilities
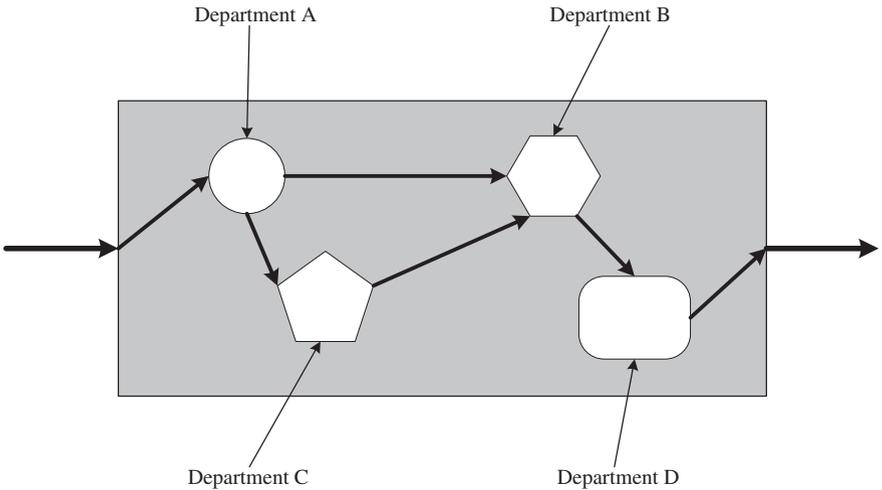
Fig. 7.21 Job responsibilities after getting rid of the "black box"

is growing, and the output-to-input ratio is declining. These changes motivate enterprises to use employees dynamically through applying projects as carriers. The core of enterprise human resource management is to improve the abilities to use dynamic resources to deal with dynamic tasks. In order to do this, we need to transform the policy that resources belong to departments to the policy of role allocation in projects and to change static positions to dynamic roles. Only in this way, we can truly understand the project organizational management.

Chapter 8
Establish "Win-Win" Partnership Relationships in the Project

The most valuable policy is bestowing (people with what they really want and need) instead of demanding (things from your people to fulfill your own wishes).

—Guanzi • *On Governing the People*

It is common that multiple enterprises participate in the same project. These enterprises come together for their own objectives. They might collaborate or betray each other at any time. The strategies they adopt depend on the benefits the strategies can bring. Further, each individual enterprise that participates in the same project has other projects undergoing at the same time. There are limited resources in enterprises. Therefore, enterprises must consider how to assign the limited resources to different projects. It will be disappointing if enterprises simply treat project boundaries as the management scope and ideally think project resources are provided indefinitely where projects can be managed by project managers through authorities and contracts.

8.1 "Competitors" Is a Narrow Concept

Ever since Michael E. Porter, an American management guru, published *Competitive Strategy* in 1980, many enterprises have their development attributed to whether they can win in competition. Figure 8.1 can be used to simply indicate the competitive situation among today's enterprises. Markets are swallowed up by those "big predators", and various similar enterprises are fiercely competing for the remaining markets that appear less and less. They either merge with each other or are involved in price wars.

Let us look at merger first. Maybe you have felt that the merger is not popular anymore, neither the concept of "building aircraft carriers". The merger failure is not unusual either in China or in abroad. The original purpose for merger is to expand the scale of enterprise rapidly, so that their strengths can be enhanced. However, the results are beyond all expectations. It is similar to the situation that

Fig. 8.1 The competitive
situation among enterprises

one person wants nutritional supplements, but gets rabies by eating dog meat
and gets bird flu by eating chickens. Very few enterprises enhance their strength
through mergers. Rather they have met a major setback because of the cultural
conflict and scatter resources.

Now let us turn to the price wars. Price wars are undergoing in China like a
raging fire, and they are involved in every industry. For example, the modern IT
industry is involved in price wars, which has very low profit rate.

*Software enterprises that have certain sizes are not afraid of having price competi-
tion with famous giant enterprises. Rather, the thing they fear most is the price wars
with various "guerrillas". A large number of small software companies offer very
low contract prices in bidding processes. Although they might not get the contracts
because of their low capabilities, other enterprises that secure the contract have to
offer a low price too. The consequence is you are out if you do not get the contract,
and you lost money if you get it. Think about Changhong. How powerful it was
when it started the TV price war. However, Changhong has lost its glory today. In
these years, there is intensive price war among online retailers. It can be predicted
that the low-end price war cannot facilitate the development of the industry. Rather,
it might lead to the ruin of the enterprises and the decline of the industry.*

Price wars are very harmful to domestic enterprises; however, enterprises are
addicted to it as opium. Enterprises have to keep going this hopeless approach to
survive under the intense business competition. The old saying of "the business
world is like a battlefield" is still well recognized. In fact, price wars exist based
on the following assumptions:

1. The market space is fixed. Under this assumption, the bigger the market share
   we take, the smaller the market share the competitors take. Market share is the
   most common indicator that reflects this assumption. A higher market share
   provides people impression that the enterprise is bigger. This assumption is
   also built upon the homogeneity of clients' requirements. That is, requirements
   from different clients are all same, and the products enterprises provide to sat-
   isfy clients' requirements are all same too. Obviously, these assumptions are

not appropriate. The market share is not static, and clients' requirements are changing every day. New requirements emerge everyday too. Having higher market shares by enterprises does not necessary mean they can hold their market advantages in future. Instead, it might make the enterprises negligent and lead them to "the limit of growth" eventually, i.e., leading in positions causes development in size, which brings profits. Profits bring satisfaction, which brings stagnation. Many enterprises decline rapidly after they develop into a certain size because they cannot avoid this "limit of growth." The old saying of "apprentice learns and master dies" is also based on a similar inappropriate assumption, i.e., fixed career opportunities. Therefore, nobody wants to pass on his or her own experiences to others. It is difficult to innovate and develop enterprises, industries, and individuals with such assumption.

The explanation of "crossing the sea under camouflage" in Thirty-Six Stratagems is that people are more easily to get mentally relaxed when well prepared and people do not doubt when they see often. Similarly, the turning point for an enterprise's decline appears when clients' satisfaction and its market share arise to certain levels. Tao Te Ching says "it is the way of Heaven to diminish superabundance and to supplement deficiency", which also reflects this principle. Although the Matthew effect that matches the above sentence from Tao Te Ching allows enterprises prosper for a short moment, it accelerates the decline of enterprises.
Su Xun from Song Dynasty once said in one of his books that "I observed those people that are good at using military forces and found that there are three strategies that can be used in a battle: having direct frontal attack, having surprising attack, and using ambush to attack…. Therefore, it is difficult to predict the results when using direct frontal attacks. However, it is five of ten that we might win in a battle when using surprising attacks and ten out of ten that we will win when using ambush to attack." Even when we use battlefield to describe business world, price wars are just the direct frontal attacks and outcomes are unknown.

2. Defeating opponents mean customers can be taken over. This assumes that customers can only choose partners from limited competing opponents. However, Internet and advanced logistics (Internet of Things) have already broken the time and space limits people usually face. Trade agreements such as WTO agreements have allowed people to break various trade barriers. Under this trend, customers' choices are increased a lot, so as the amount of the corresponding enterprise opponents. For small- and medium-scale enterprises, defeating opponents never means wining the customers. By contrary, it might mean a third party gets the benefits. Enterprises should place more focuses on caring about clients' requirements rather than caring about opponents. Opponents are simply peers that we should learn from. They are not our life-or-death enemies, because their death does not mean you can live. It is also the reason most of the enterprises that started price wars decline rapidly.

Two young men fell in love with the same girl, and they decided to arrange a duel. The outcome was one dead while the other wounded. Unexpectedly, the girl got

married with a third young man. So the important thing to get married to the girl was to please the girl instead of engaging a duel with others.
In track and field competitions, few sprinters can watch others while running like Bolt does. Normally sprinters run wildly toward the finish line. Talents like Bolt are rare. Most sprinters can only stare at the finish line while running. Actually, the real charm of playing golf is that you are always comparing with your own objectives (i.e., whether you can have less pars), not with your opponents. Many top managers like playing golf while not understanding the real fun from it.

8.2 You Can Hire the Person You Doubt

In his book *The Wealth of Nation* published in 1776, Adam Smith, a Scotland Economist, clearly proposed the concept of grand collaboration of socialization, which is the basis for the development of western industrial society. 200 years later, many management personnel in our enterprises still have not learned how to survive and develop in the environment of grand collaboration of socialization.

With the acceleration of social changes, enterprises do not have enough time to learn new stuff, and they cannot always possess advanced talents. Similarly, talents will be more and more loyal to their own professions rather than to enterprises. It is an important part of human resource management in future to learn how to collaborate with the talents that do not belong to your enterprise. It is also a fundamental technique an enterprise must have to learn how to collaborate with various business partners. More than two thousand years ago, Guan Zhong, a politician in Qi Kingdom, once stated "A sovereign good at his state can also use things not belonging to him and control people not under his supervision."

"Hand professional things over to professional people" sounds simple, but many enterprises are not able to do it because they are worried about their partners.

The old saying of "never doubt the people you hire and never hire the person you doubt" actually is not appropriate when applied to the business world. It is more appropriate to say "doubt the person you hire and hire the people you doubt."

There was a famous doctor named Ye Tianshi in ancient times. One day, his mother got a strange disease. Ye Tianshi was not sure about a medicine ingredient when he treated his mother. If he used it right, he could cure the disease. However, if he was wrong, his mother could die. To be on the safe side, he asked another doctor whether he should add the ingredient. That doctor responded that he should add it without any hesitation. The doctor thought it in a simple rationale: If it was right to add the ingredient, he would gain much higher reputation; if it was wrong, it did not matter to him since the person died was not his mother.

This legend is very appropriate to describe the relationship between enterprise owners and enterprise operators. Owners authorize operators to create values for them, but they are not at ease with the operators. Indeed, operators have done many things that do not rest the owners' hearts. No matter whether enterprises

have achieved the so-called "modern enterprise system", problems with consciousness emerge such as those happened in Enron Corporation and Andersen Accounting Firm, not to mention those numerous problems that are not wrong in subjectivity. Therefore, owners need to intervene and exert controls on operators. This is how corporate governance comes and where owners feel pains about hiring operators with a "doubt the person you hire and hire the people you doubt" approach. It also brings some profound and helpless concepts such as "transaction cost" and "motivation and control mechanism". Are there any radical solutions? There seems not, and this is why we say "management is a kind of flawed beauty".

People also praise the old saying of "to be a good man first before you do anything". In fact, the principles of being a good man and of doing things well are different. For instance, Xiang Yu might be better at being a man. Xiang Yu was very clear about who his friends were and who his foes were. He was a man of high integrity and paid attention to love. On contrary, Liu Bang was ambiguous in doing things. He was a blackguard and a notorious womanizer. Xiang Yu killed himself because he thought he had no face to see his elders; Liu Bang was defeated in almost all of the battles and he even pushed his son out of his carriage during run-away because he believed his son stand in his way. Xiang Yu kindly released Liu Bang's father. By contrast, Liu Bang talked to Xiang Yu with a smile that Xiang Yu could share with him the soup that boiled his father. Because of being a good man, Xiang Yu possessed a lot of talents such as Fan Zeng, Zhong Limei, Long Qie and Zhou Yin. How about Liu Bang's associates? They were useless people who were greedy and lack of integrity, just like Cheng Ping said. However, Liu Bang ruled the world in the end!

Similar to Liu Bang himself, few of Liu Bang's associates were with high integrity. Xiao He was associated with gangsters when he was a government official in Qing Dynasty. Han Xin betrayed Xiang Yu. There are other numerous examples. Chen Ping is the person who is mostly worth mentioning. Chen Ping was very poor when he was a kid. His elder brother took very good care of him and did not let him do even a little farm work. However, he raped his sister-in-law. To improve his social status, he even married to the granddaughter of a local rich man, who was ugly and had divorced five times. He was capricious. He took bribes and returned kindness with ingratitude. He was such a man with low integrity and corrupted morals, and Liu Bang still used him and put him in an important position. Even Liu Bang's cronies such as Zhou Bo and Guan Yin believed that using Chen Ping was like using a poison. However, Liu Bang put Chen Ping in an important position. Further, Chen Ping became the prime minister of Han Dynasty. Why? And what were his roles?

A talk from Wei Wuzhi, Chen Ping's referee, helped Liu Bang to make his decision: "Will you use them if Weisheng and Xiaoji if they were still alive?" Weisheng died for fulfilling his promise and Xiaoji was a famous filial son. The two men are models of being a good man. However, Liu Bang thought that "at the critical moments that decide success or failure, the things Weisheng and Xiaoji did are good to nothing". Since then, Chen Ping recommended several crucial suggestions to Liu Bang, which were very effective. But they were all devilish while gentlemen would not adopt them. Fortunately Liu Bang was not a gentleman and here came the following history. Chen Ping made a suggestion when Xiang Yu trapped Yingyang City, which was to let loyal Ji Xin pretend to be Liu Bang, Let Zhou Ke pretend to be the general to defend the city, and let two thousand women pretend to be the soldiers who defended the city. The results were, these innocent people who were good to Liu Bang but had not enjoyed Liu Bang's benefits all died. Ji Xin was burned to death. Zhou Ke was boiled to death whereas Liu Bang run away from the back door.

—Shiba Ryōtarō • *Xiang Yu and Liu Bang*

We emphasize again that ordinary people are the objects of management. In other words, they are ordinary people, not supermen. Whether they can be trusted does not depend on the self-regulation, which is brought by education and moral cultivation. It depends on where our management methods can reduce the degree of their unreliability.

8.3 Understand Partners' States and Status

Projects, especially relatively large-scale projects, usually have multiple enterprises involved. To manage these partners effectively, it is imperative to understand their states and status.

1. Fully consider the economic value added of the project

The completion of a project through participation of multiple enterprises does not simply mean using methods of contracting and subcontracting, which generally only increases project costs and does not add projects' actual values. They are not "completing a project collaboratively" in a real sense. They might lead to the increase of project costs for some unreasonable and illegal profits. In other words, the results of these methods are to increase project costs rather than to increase project values.

Projects that are really completed by multiple enterprises should be completed in a way that each enterprise works based on how to increase project values. Each enterprise contributes to the addition of project values and shares the corresponding profits. The relationships between multiple enterprises and projects are a kind of value networks.

Because of capital costs, an increasingly number of enterprises in the western society uses the concept of Economic Value Added (EVA). EVA describes the net profit earned by an enterprise, which equals to the operating profit after tax minus the required return of the enterprise's investors (being shareholders and debt holders). EVA is not only an indicator to measure the company performance, but also a structure to describe the comprehensive financial management, which can be used as an income distribution mechanism of managers' and general employees' salaries. People must pay for using capitals as paying interests. EVA takes the costs of all capitals taking equity capitals into consideration. Therefore, it reflects the wealth values that enterprises create or lose in certain periods, and the profits defined by the shareholders. If shareholders want the investment return rate to be 20 %, they "make money" only when their operating profits after tax excess 20 % of their capitals. Anything done before this is only an effort to reach the minimum return that is acceptable for the enterprise investment. Effective use of EVA can align the interests of managers with those of shareholders, and therefore, avoid the usually unavoidable interest conflicts between them.

Similarly, in order to complete a project through the collaboration among multiple enterprises, the measurement method of EVA can be employed as well in

order to develop project value networks and to determine the allocation method among these enterprises. That is, we use Project Economic Value Added (PEVA) as the indicator to measure the effectiveness of multiple enterprises working on the same project.

The PEVA analysis needs to start from the project investors and project clients. There are two ways to understand cost, price, and profit. The first is "price = cost + profit", and the second is "cost = price – profit". These two approaches are similar in terms of mathematical expression. However, the first approach is from the enterprise's perspective, i.e., an enterprise decides the price based on its spending cost and expected profit. The second approach is from the marketing perspective, i.e., an enterprise determines the allowable cost based on the marketing price and expected profit. These two approaches are entirely different. Similarly, the calculation of PEVA can only be conducted reversely from the project outcomes. Although we often say people create wealth, wealth cannot come from nowhere. Its total amount is constant, and the acquirement of a fortune is always transferred from one or more other things (material or non-material). The EVA acquired by each enterprise that assumes the project comes from the PEVA of the project outcomes. In other words, PEVA can be defined as "the sum of EVAs that project outcomes bring to project investors, project clients and all the other related parties." When there are not sufficient PEVA and higher EVA is expected from the project contractors and subcontractors, negative outcomes will emerge such as cheating, jerry building, and passing costs on others.

In project management, the difficulty is not how to manage projects in an enterprise. Rather, it lies in how to let multiple enterprises to understand and be willing to accept their roles when they participate in the same project. It is difficult for us to have enough self-discipline to help project investors to complete a project. We neither have reliability nor responsibility to do it. The reason we collaborate is that collaboration can bring us what we want. From the perspective of economic rationality, the reason we collaborate is that we can get the expected EVA from collaboration. Although human beings are not completely economic, we cannot deny the promoting role of economic profits. Effective methods of project management must build on the fact that each project participant can accept the EVA which is brought by the project.

> *Some ancient kings had high reputation and great achievements. They were remembered by successors. The reason is that they are supported by citizens. I haven't heard a case that is not because of this reason. On the contrary, some bad kings lost their power and made their countries perished. The reason is that they lost supports from citizens. Similarly, I haven't heard a case that is not because of this reason…. The way to get or to get people's supports is to give them benefits first.*
>
> *—Guanzi • The Five Supporting Principles*

2. Understand that our project is not the only project our partners are working on

Enterprises usually have multiple projects going on, which are fighting for limited resources. At the same time, future business forms require enterprises to achieve

innovation and efficiency at the same time. Every enterprise needs to form a value network with other enterprises. In this network, each enterprise only does what they are good at. It will become less and less common that a single enterprise assumes a project (especially large-scale projects) independently. It will be more common that multiple enterprises collaborate on a single project.

In the situation that an enterprise independently assumes multiple projects and the profits and losses brought by these projects, the enterprise can have a trade-off among the multiple projects in order to achieve maximum of the overall efficiency. When a project is assumed by multiple enterprises, the decision of pursuing the maximum of self-efficiency by each single enterprise might be detrimental to project outcomes, e.g., all the projects they participate cannot be finished on time.

Suppose there is such a situation, as described in Fig. 8.2. *Project A needs collaboration among three enterprises to complete: Enterprises X, Y, and Z. Further, Enterprise X has two other projects: B and C. Enterprise Y assumes another project called D. Considering from the perspective of enterprise project management, we can see that Enterprise X needs to consider the benefits and risks brought by projects A, B, and C, and Enterprise Y needs to consider those brought by projects*
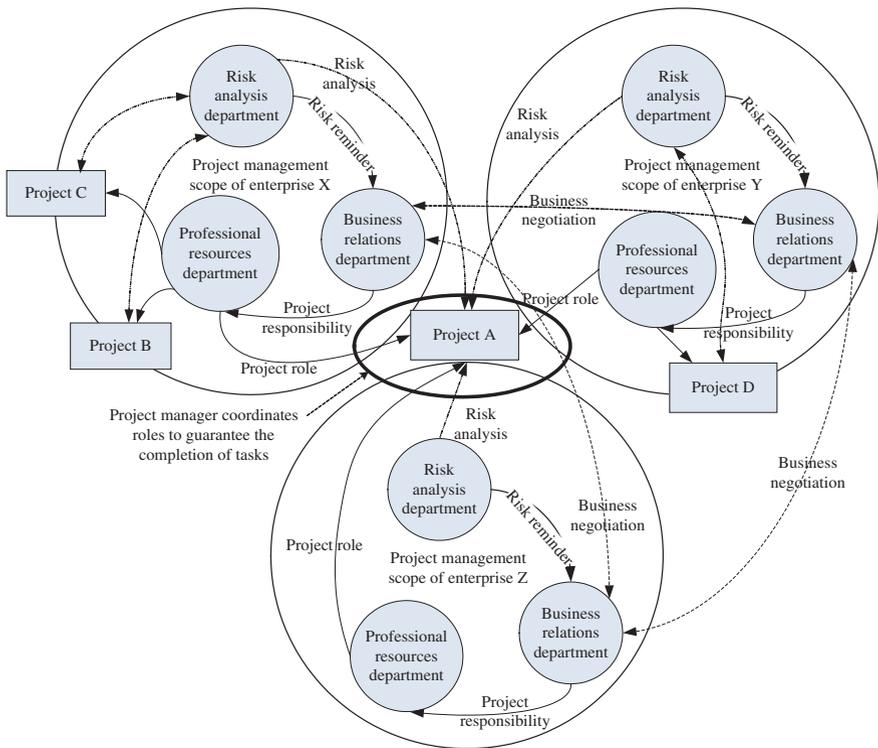
Fig. 8.2 The relationships among multiple enterprises attending multiple projects

A and D. Suppose after consideration, Enterprise X puts the priority of project A at the second or the third place. Then, when there is a resource shortage (which is very common), enterprise might postpone or give up on project A. Under this circumstance, project A cannot be completed on time no matter how hard enterprises Y and Z work on it. Even when enterprise X will bear some losses, it still cannot make up for the losses caused by the project failure. This problem cannot be solved by establishing a virtual enterprise by enterprises X, Y, and Z. Virtual enterprises need relatively long-term stable and trustful relationships. However, in this case, these three enterprises might only collaborate on this project. They neither can have an accepted leader because of considering their own interests, nor can they give up on their own interests for the common interests. Therefore, it is difficult for virtual enterprises to survive, and virtual enterprises only exist in name.

There are various methods of modern project management such as program management, project portfolio management, BOT, BT, and EPC. The abbreviations are rather confusing. Most of these methods put projects under a general structure of functional organization. It does not fully consider the real situation of multiple enterprises that participate in the same project. Similarly, simple or disguised complex project management methods using "social division" might not be able to achieve the expected results.

8.4 Risks Should Be Emphasized in Contract Management

Many people over-believe the role of contracts. However, in China, contracts are like adding a simple padlock outside a vault. That is, contracts only guard against gentlemen rather than bad people. The process of establishing contracts is a process of negotiation and bargaining. In more academic terms, it is a process of gaming. Of course, there are various techniques used in this process such as cheating and hiding information. In other words, there are games under situations of information symmetry and information asymmetry. The parties in a negotiation might have different intentions such as one-shot deals and establishing long-term relationships. Therefore, there are various games such as one-shot games, multiple games, competitive games, and collaborative games.

   According to Nash's law, there are equilibriums for all games, which are the best results for all game participants based on rational thinking. In other words, only the contracts that are built on Nash's equilibrium are beneficial to all parties; otherwise, there must be a party whose benefit will be damaged. Thus, the contracts are not stable. In Nash's equilibrium, if we can find a special equilibrium (which is called Pareto optimality in academic research), any party in a game will damage him or herself if he or she breaks the contract first. The contractual relationship established under this condition is relatively reliable.

All games must be based on the expectations that enterprises hold for participating in projects. There are various expectations and investments for projects from enterprises. We can reflect them onto capitals to make them as "efficiency". In this way, we can treat the actions of enterprises attending projects as investment behaviors. Once enterprises invest their capitals, they expect to receive benefits during and after project processes. This kind of benefits is risk benefit. Therefore, the process of enterprises attending projects is a process of venture investment. Project governance is also an activity of managing various venture capitals to some extent, and projects become financial engineering.

It is appropriate that businessmen should be honest. Most enterprises want to be honest. However, whether you want to be honest is entirely different from whether you can be honest. The western logic is different from ours. Their logic foundation is formal, which includes 3 laws, i.e., law of identity, law of contradiction and law of excluded middle. There is a relatively clear boundary between right and wrong. By contrary, our logic is beyond this. No matter what you do, we often say they are all right in one moment, and then they are all wrong in the next second. We often mention "situation, reason and law", i.e., we want things to be done under a fair situation and in a reasonable and legal way, where legitimacy is put last. The criteria for "fair situation" are different based on various factors such as people, matters, time, and locations. Laws are important. However, it is not enough to rely on laws only for Chinese. Chinese do not like to be engaged in lawsuits unless they have to. Their losses might outweigh their gains even if they win the legal cases.

We always hope others to obey laws and keep their promises. On the other hand, we hope ourselves could enjoy the illegal benefits. We neither feel there are contradictions in this thought, nor is there anything wrong with it. We even admire those who can do this. This thought is not new, as like Yutang Lin once said, "this thought have been obvious since around 136 B.C.: government officials worship Confucius, and writers and poets worship Zhuangzi. However, once a writer becomes a government official, he or she begins to publicly worship Confucius and secretly study Zhuangzi."

As projects are full of risks, project contracts can only be implemented reliably on conditions that the confidences of participating projects are kept same or enhanced during the contract terms. To achieve this goal, it is imperative to have communication mechanisms and proper elasticity in contracts. During a project life cycle, changes are inevitable. Too rigid contracts not only damage your opponents, but also put yourself in a passive position. Elasticity can be convenient for others as well as yourself. It can also make the contracts that are full of commercial atmosphere more human, more reasonable, and more suitable for Chinese. There is an old saying in the business world of China: There is no business that cannot reach agreement; the only thing that cannot be agreed successfully is the price. The basic principle of negotiation is "never give up unless making exchanges". Then what to exchange? It is the contract elasticity. The participating enterprises of a project can ask for elasticity in the contract. However, they need to provide conditions that

are used for exchanging elasticity, which are able to make up for the other parities' losses derived from the elasticity.

Of course, the most fundamental principle is that the values produced by the project outcomes can be shared by the participating enterprises. Only contracts built on this principle can be implemented. Project managers consider the project delivery, but the participating enterprises consider other issues such as the values the project adds to their enterprises, output–input ratio, and opportunity costs. Project value alliance is reliable only when it is built upon conditions that each participating enterprise can obtain its reasonable expected values. In this way, project success is reliable too. For projects that have multiple enterprises, we need to understand whether there is a feasible solution between the project value and expected values from each project participant. If there is no feasible solution, we need to consider new value-added methods. Otherwise, unreliable contracts lead to unreliable projects.

That partners provide specified amounts of qualified resources does not mean they fulfill the requirements to achieve project objectives. Do partners care about how to make the project succeed? No. Will partners treat themselves as a part of the project team? No. When the project encounters difficulties and needs to adjust its supply mechanism, will partners response to it voluntarily? No. In the process of supply and demand, it is very likely that partners do not know their inputs to complete the project, the project success criteria, and values of project success. Having so many "no" answers, how can we still expect partners can make specific efforts with us to complete the project? Partners seldom consider what effects the project success will bring to us. Similarly, we seldom consider how much we should return to our partners from what we earned because of project success as a compensation for their contributions.

There are a huge amount of risks in projects. To some extent, project management is risk management. Although business contracts have considered risks derived from uncertainties, both parties still want to reduce risks through objective assessment, i.e., the party who does not finish the objectives is going to be penalized at different levels. However, this effort cannot solve the following two types of risks.

One type of risks is that partners cannot provide required project resources in time. A partner might have to provide material resources to a few or even dozens of projects. These resources might have different types and different delivery dates. Due to price pressures, partners have to consider scale effect and gather all resources that belong to a same type of demand to produce. This production method might cause delays on providing supplies to some projects and have to assume losses because of breaking contracts. However, project partners have reasons to do so as long as they perceive it is appropriate by considering the overall scale effect. Of course, partners might also have to postpone the supply delivery due to their own resource limits.

Another type of risks is the losses due to the timely supply from our partners. Because of our own or other reasons, there might be changes on project issues such as project scope and project duration. At this time, we need partners to make

corresponding adjustments. If partners still supply timely according to contracts, we might suffer losses. For examples, in a building construction project, project duration is delayed because of heavy rain. However, the partner still delivers expensive furniture from aboard to the site according to the schedule agreed in the contract. There is no place to store the furniture, and we cannot assemble them in time. Thus, we have to suffer all the losses. It also has major impacts on the project if they are damped and damaged by the heavy rain.

If we cannot treat our partners as long-term working partners, at least we need to treat them as our temporary project team members. We cannot simply hand our requirements to them through business contracts.

It is a common understanding that "price is what partners care most and the most important factor which affect the decision of signing a contract." However, many problems are derived from these common understandings. Partners care about prices, so do we. In the negotiation process with partners, we fight against each other with wisdom and courage. We make a deal at a price that we both think we can take advantages. Excessive care on prices makes us to ignore the project values. We do not fully consider how to add project values through collaboration with our partners.

There are a number of losses caused by the postponed delivery of our partners which are as follows: We cannot get project outcomes on time, the inability to withdraw our personnel and other resources from the project in time, the loss of marketing opportunity, and other opportunity costs. These losses usually are far beyond the amounts that are displayed in the accounts. Of course, our cash flow might be decreased or even we get bankrupted because of the losses we suffer. Then, we have no abilities to pay our partners in time or even we can never pay them, which results in decreased cash flow of our partners or even leads to their bankruptcies.

For most projects, it is crucial to complete them with guaranteed quality. Under some circumstances, it is also very important to have a tight delivery with decreased quality. As the supply cycle is shortened, partners should get rewards for the values they add to the project. They have rights to request contract prices based on their contributions to the project, which is not decided by the way of "cost plus profits."

8.5 Develop a Unified Process of Effective Collaboration Relationships

Currently, many enterprises go through two steps to sign a contract: clarifying each other's requirements and clarifying each other's responsibilities. As contracts are full of risks, effective business contracts need to go through the following four steps from the perspective of management.[1]

---

[1]This process works not only for the management among project partners, but also for relationship management among general partners. Therefore, the "partner" can be replaced with "stakeholders."

1. The Acquirement of Project Partners' Requirements

Project success cannot be achieved without project partners' support. The reason partners are willing to help to achieve project objectives is that they expect to get what they want from the project. Any partners' participation in a project can be regarded as a process of risk investment. They need to spend things such as time, human resources, money, devices, and intelligence to participate in a project. Therefore, to get their supports, we must first clearly identify and define what the real project partners are, and understand what their expectations are. Their expectations cannot always be clearly defined, nor can they be always written in contracts.

2. The Definition of the Governance Roles of Project Stakeholders

The relationship among project partners is a network of benefits, which requires requirements and responsibilities from each other. It might need one or more other stakeholders to assume different responsibilities to satisfy a stakeholder's requirement. In other words, it needs other stakeholders to play different roles to satisfy a project partner's requirement. In a project life cycle, a project partner might play different roles based on needs in different periods of time and different project tasks.

Interrelated project governance activities form a system. Miller and Rice once classified types of system activity and identified three types of basic activities.[2] We can refer to this classification and group roles into three basic types. The first type is operation roles, which are responsible for finishing concrete project tasks. People assuming these roles can be project suppliers or project subcontractors. More importantly, they are assumed by project managers and their project teams. This type of roles can also be classified as project management activities. The second type is maintenance roles, which have different responsibilities from operation roles. They are responsible for acquiring and supplementing resources that are used by operation roles, which include people, money, materials, devices, tools, information, and so on. There are a wide range of maintenance roles that differ from one project to another. The third type is planning roles. These roles have the following responsibilities: interlinking operation roles; interlinking maintenance roles and operation roles; and interlinking operation roles, maintenance roles, and planning roles.

3. The Identification of Risks in Assuming Project Governance Roles

A lot of uncertainties exist when partners assume corresponding governance roles, which consist of the risk resources of project governance. Generally speaking, these uncertainties exist in the following areas. (1) Project partners find new business opportunities. The process of each partner participating in a project can be simply regarded as investment process. Since it is an investment process, we must

---

[2]David Moore. Optimal Structure. Beijing: Chinese Industry and Business Association Press, 2004: 41–42.

consider opportunity costs. When partners find new and more profitable investment opportunities during the execution of a project, they might postpone, withdraw, or reduce their investment in this project. Every project partner might examine the project value from a multiple-project perspective. (2) Project partners will pursue the benefits brought by information asymmetry. Trust is like a crystal bottle, which is difficult to repair once been broken. The trust relationship among partners appears to be fragile in front of business benefits. (3) Flaws in project plans lead to chain changes. It is difficult to define project plans accurately due to various reasons such as technical difficulties, natural disasters, and policy changes. Temporary changes are very common. Project partners' overall arrangements might be disturbed because of the occurrence of these changes. Of these three types of role risks, the first is caused by partners' active activities, the second is caused by their intentional activities, and the third is caused by their passive activities.

4. The Establishment of Regulation Relationships Among Project Partners

Generally speaking, the regulation relationship among project partners is established by business contracts. Business contracts define relationships between discrete points as well as the constraint and incentive relationships between local responsibilities and local benefits. They cannot answer the characteristics of project internal changes in a timely manner. Further, they cannot effectively face project's internal technical and environmental risks, nor can they effectively control the role risks intentionally produced by project stakeholders. In other words, to reduce role risks in project governance and to establish reliable relationships among project partners, it is far from enough to rely on signing business contracts only. To truly establish a reliable value alliance among project partners, one needs to do the following things: (1) understand each other's value expectations and contributions before establishing the relationship; (2) develop performance contracts, psychological contracts as well as business contracts based on negotiations on issues such as responsibilities, rights, benefits, processes, and methods during the process of establishing the relationship; and (3) maintain and facilitate this relationship so that this value-based dependence can be further developed once the project is completed.

With the entrances and exit of project partners during a project life cycle, there is reparative iteration between requirements, roles, risks, and relationships. The management process of the relationships among project partners is to deal with the iterative process of these four Rs in the entire project life cycle.

8.6 Prevent Unhealthy Competitions Among Internal Business Units of an Enterprise

To motivate its employees, an enterprise often promotes competition strategies among its different business departments (e.g., business units and sub-companies). Let's set aside the question of whether an enterprise's development really needs

"competition" or not first. "Competition" cannot be leaped directly to "internal competition", not to mention to treat it as "internal competition of benefit allocation". The assumption of this internal competition is not appropriate. An enterprise cannot make any achievement from inside. All of its achievements are from outside of its departments. Similarly, a department cannot make any achievement from its inside. All of its achievements are from the outside of the department. The effect of internal competition usually is that a business department pays its attention to other business departments rather than on the external stakeholders. They force prices down internally or even think that they would rather give the opportunities to the outsiders than to fellow departments. Under this circumstance, it is necessary to "stabilize the internal first before resisting the foreign aggression".

Do internal units ever need competition? The answer is yes since human beings have shortcomings such as laziness, selfishness, and greediness. However, managers need to consider and clarify what to compete. There are two areas for enterprise competition: effectiveness and efficiency. Effectiveness focuses on external performance and efficiency focuses on internal one. That is, internal competition is mainly on efficiency, and external competition focuses on effectiveness. To put it in a simple way, it means to "increase incomes from outside and reduce expenditures from inside".

For project management, efficiency competition means competition for stakeholders' satisfaction based on quality, cost, and schedule. If we treat quality as a constant variable (although it often changes due to demand mining), the competition for project management efficiency mainly refers to competition for cost and schedule. In practice, it becomes worse for both the two aspects. The reason is that these enterprises do not encourage internal competition for efficiency. Instead, they encourage competition for internal benefits. These enterprises do not "increase incomes from outside and reduce expenditures from inside", rather they "compromise towards outside and sabotage towards inside". The sabotage might not be subjective, but the result leads to decentralization of strengths and resources, which turns a competitive enterprise into a mix of small workshops under the name of enterprise. This is not unusual.

Although some enterprises adopt the concepts of "project" and "project management", they do not use the dynamic view of resources to deal with dynamic tasks. Rather, they use a static view of resources to deal with dynamic tasks. This leads to increased human resource costs, which is most important in enterprise costs. Further, because of resource isolation, various undergoing projects might be delayed, which negatively impact the enterprise's reputation.

Let's use an architecture design institute as an example. Figure 8.3 *describes part of its organization structure. In* Fig. 8.3, *design units I, II, and III are the three main business departments. Each unit consists of several design teams, which have no fundamental differences except the characteristics of the tasks such as location and the sector. To motivate these business departments to secure more contracts, this institute adopted an "internal competition mechanism", which is essentially similar to a business commission mechanism. Currently, the internal competition of the institution is somewhat out of control: They do not trust each*
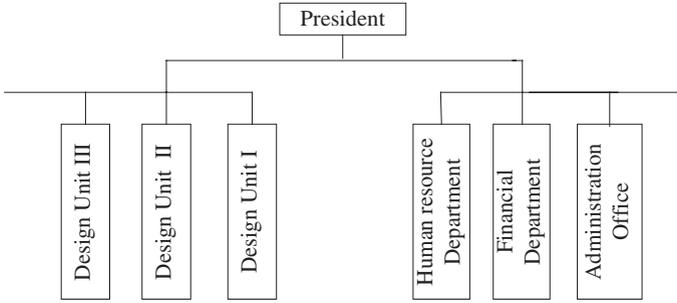
Fig. 8.3 Partial organizational structure of an architecture design institute

other and they bid internally for the same contract or even sabotage each other. Although the number of signed contracts was increased obviously once, the phenomenon of contract delays that come with it becomes more and more serious. The contract profit rate is dropped. People are tired as they often work overtime. Complaints and resignations from employees are not unusual, and the institution finds it hard to maintain its cash flow.

Why do such undesirable situations still occur when everyone faces the competition and lives under the competition pressures? Why is the efficiency of the institution still dropped even with overtime working of employees, higher work intensity, and increasing number of contracts?

The profit of the institution is decided by two major factors: the contract price given by the clients and the internal costs. The higher the contract price is, the lower the internal costs are and the higher the profit the institution gets. On the contrary, it will be decreased. The contract price given by the client will be impacted by the competition among bidders. The stronger the competition is, the lower the price the client offers. On the contrary, it will be higher. Bidders' competition comes from two aspects: competition among different design institutions and the competition among different units within the institution. We can use Fig. 8.4 *to describe the chain reaction caused by the internal incentive policy within the institution.*

In Fig. 8.4, *the arrow lines indicate the relationships between the influential factors (the end of an arrow) and the influenced factors (the head of an arrow). The "+" and "−" on the arrow lines indicate positive and negative relationships separately. For examples, the higher the client price is, the higher the profits the institution gets; and the lower the client price is, the lower the profits the institution gets. The shorter the delivery period is, the higher the client profit is; and the longer the delivery period is, the lower the client profit is. As a result, we can easily develop different cause–effect diagrams to analyze the reasons to form a factor and its effects.*[3]

---

[3]Interested readers can refer to related materials on System Dynamics. Using methods in System Dynamics, you not only can develop structural cause–effect relationships among different factors, but also can build functions on these relationships to simulate the numerical degree of dynamic changes among these factors. This book only illustrates the structural relationships among the factors. All relation diagrams are drawn with Vensim software.
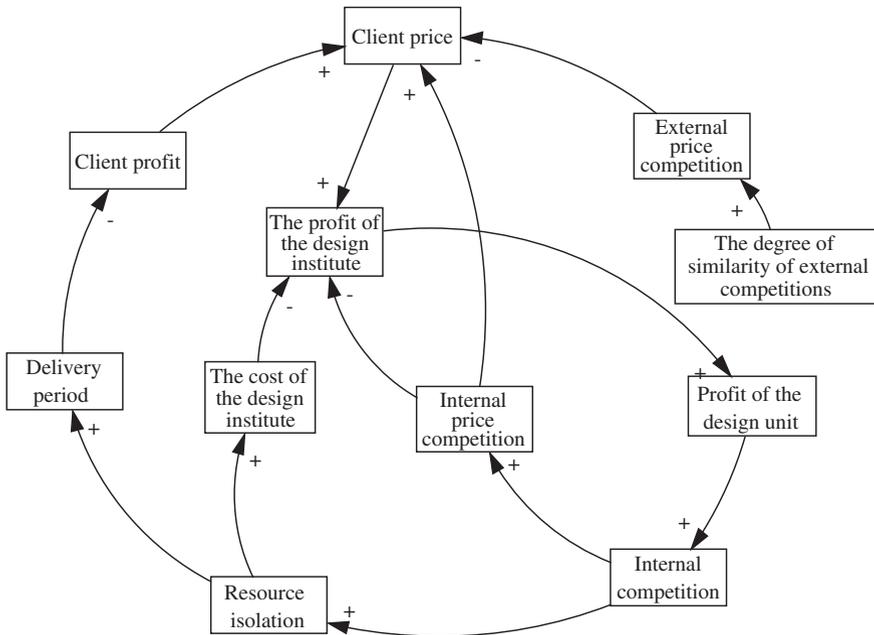
Fig. 8.4   The chain reaction caused by the internal competition in the institution

Let us look at the solution plan from the perspective of the institute that makes policies. The factors that influence the profit of the institution are depicted in Fig. 8.5. *In* Fig. 8.5, *those factors that can be controlled by the institution include the following: "internal competition" and "resource isolation". As shown in* Fig. 8.4, *the fiercer the "internal competition" is, the more obvious the "resource isolation" is, which is caused by the uninterchangeable use of resources in different design units. The effect of "internal competition" and "resource isolation" is illustrated in* Figs. 8.6 *and* 8.7 *respectively.*

We keep emphasizing that only the projects that satisfy all stakeholders are real successful projects. In this case, only the project management methods that satisfy the clients, the design institute, and the design units are real good ones. The loop indicated in Fig. 8.4 *that includes client profits, design institute's profits, and design units' profits is depicted in* Fig. 8.8. *In* Fig. 8.8, *the number of arrow lines that have "−" is the basic number (one in this case). Therefore, it is a moderated loop that includes two controllable factors, i.e., "resource isolation" and "internal competition". These two factors can be used to search for a solution for the design institute.*

The circular relationship among different factors in Fig. 8.8 *can be either positive or negative. The key for transition lies in the location of internal competition*
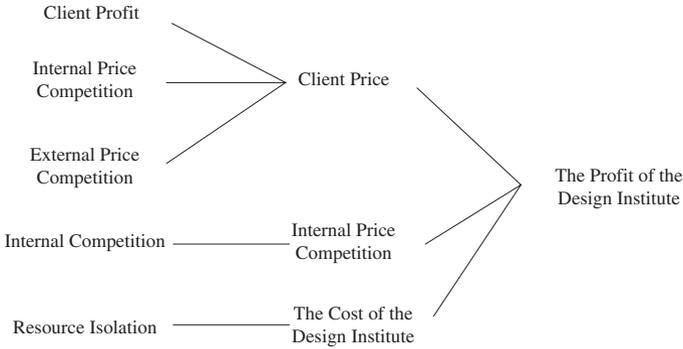
Fig. 8.5 The factors that influence the profit of the design institute
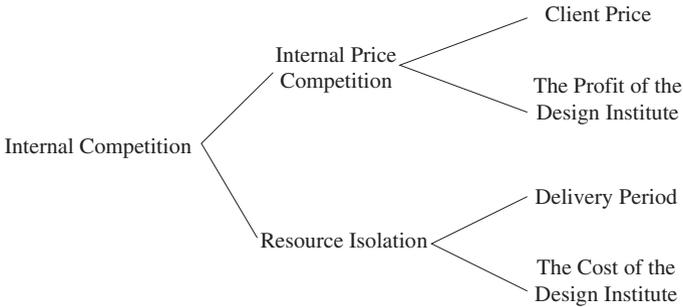
Fig. 8.6 The effect of the "Internal Competition"
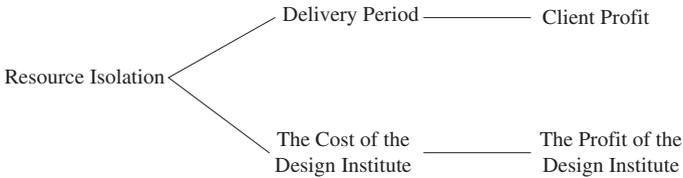
Fig. 8.7 The effect of the "Resource Isolation"

and the degree of severity of resource isolation. In enterprise management, there is an argument regarding whether enterprise development should be professional or diversified. Most assessment criteria take consideration of various aspects such as markets, capitals, and core skills. However, an enterprise will have multiple options as long as it can pool its resources rapidly, which means it does not matter whether to adopt professional development or diversified development. In other words, no matter if it is professional development or diversified development, an

Fig. 8.8 Positive relationship diagram among the following three factors: clients, the design institute, and the design units

Client price

+

Client profit

+

Profit of the design institute

−

+

Delivery period

Profit of the design unit

+

+

Resource isolation

+

Internal competition

+
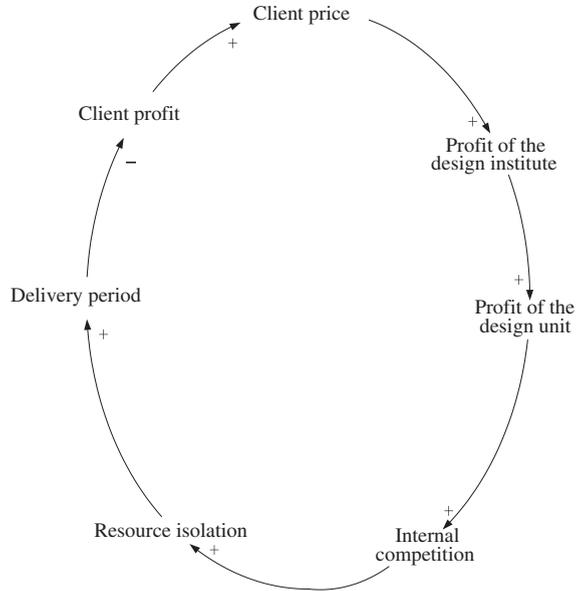
enterprise needs to deal with it with its whole strengths and entire attentions. It cannot use a method of "breaking up the whole into parts" to conduct the enterprise management.

It is a common sense that project management needs a systematic thinking. However, it is not unusual that people often attend to one thing and lose sight on another; or they focus on local benefits and damage the overall benefits; or their solution of one problem leads to one or more worse problems. This design institute should convert the ownership of resources from departments to projects, convert the postresponsibility system to role responsibility system, and transform the internal effectiveness competition to external efficiency competition and internal efficiency competition. Only in this way, the enterprise can apply the real project management.

For enterprises that need wide dynamic collaboration, the design of organizational structure is largely different from the current approach. Three departments must be strengthened. The first is the risk analysis department, which will develop the overall enterprise risk management system. Consequently, this department will analyze risks and benefits associated with each potential project. The second is the business relation department, which will be fully devoted to achieve enterprise's value through negotiation. The third (or the third type) is the supply department of professional resources, which provides resources and acts as its defined role which is decided in negotiation, assumes project responsibilities, and eliminates or reduces project risks and enterprise risks.

Project managers are often confused by the use of "project human resource management" only which cannot highlight the characteristics of projects that the collaboration is required from various enterprises. A better concept is "project partner management." It is relatively easier for an enterprise to manage its human resources. However, it is much more difficult to manage its external partners. Enterprises need to strengthen its development of analysis systems to scientifically and systematically identify project partners, their degrees of impacts on the project, and how they are impacted by the project. Further, this system should be included in the system of enterprise risk management.

Nowadays, it is more and more popular to have dynamic project resources and to require resources from multiple enterprises. To guarantee the success of future projects under this circumstance, it is imperative to strengthen the enterprise risk management and project risk management, and to build the project responsibility mechanism based on the risk management.

Chapter 9
Control the Project Scope

All difficult things in the world are sure to arise from a previous state in which they were easy, and all great things are from one in which they were small.

—Lao Tze • *Tao Te Ching*

Project scope refers to the work to be completed for achieving the project objectives. This is an era that demands are changing constantly and customers perceive that it is their rights to change their demands. As a result, it is more challenging to control the project scope where more creativity is required.

9.1 Determine What Are Beyond the Project Scope

As the saying goes, you should not do everything so that you can do something. Practical experience has shown that it is more important to know what not to do than to know what to do when defining or dividing the project scope.

There is a consulting firm with extensive experience, primarily engaged in the design of executive stock options (ESO). The ESO is a shareholding system designed for senior managers and major technical personnel, in order to stimulate them to work hard and eventually improve the market value of the stock. This system can put the "golden handcuffs" on the key personnel of enterprises. This is perceived as a useful approach to encourage these key personnel to strive for the overall and long-term interests of the company.

The consulting firm signed a commercial contract with a young IT company for designing their ESO. In the contract, it is specified that the consulting firm should submit the final program to the IT company within two months. Otherwise, 1 % of the contract sum will be deducted as a penalty for every one day of delay.

The followed work was completed on the basis of active consultations between two parties. However, the program was completed three months after the date specified in the contract. In other words, it took five months to complete the project.

What went wrong? When the project had been delayed for one and a half months, the boss of the consulting firm asked me how to control the project duration. I tried to understand the project status and have a thorough look at the contract. I found that the real problem was not about the control of the project duration, but the control of the project scope. There is a clause in the contract that the contractor should assist the client to improve its human resource management system in the course of the project. What is more, there is another clause at the end of the contract that more negotiation is needed when necessary.

The improvement of the human resource management system is an endless project. In the ESO project, if the improvement of the human resource management system was taken as one of tasks or was included within the project scope, the ESO project would certainly be endless.

The duration, the costs, or other important indicators of the project are closely related to the project scope. Therefore, the work covered in the scope must be both necessary and sufficient. The same project goals can be achieved in different ways. That is to say, project scopes vary significantly even for the project outcome with the same features and characteristics. However, we often make mistakes such as confusing project objectives with project scopes, or perceiving one of the ways to achieve the objectives as the only way.

The survey from Standish Group shows that minimized project scope is crucial for project success. This factor is ranked the 5th in terms of relative importance for project success, with the degree of influence of 10 %. Top 4 factors are "senior management support", "customer participation", "an experienced project manager", and "clear business purpose".[1]

The common problems of project scope management are as follows:

1. The problems of project design

Project scope is largely affected by the rationality of the overall strategy and methods to achieve the project objectives. This rationality is generally not about the feasibility of the project, but about the efficiency of project execution. Therefore, it is the key to the rationality of project scope by means of a project design which aims to achieve project goals.

It is a straightforward process that the soft drink products are rolled over to the market since been manufactured. The concentrated juice, which is the raw material of the drink, is produced by the original manufacturer.[2] *Once the concentrated juice is produced, it is delivered to packing plants. The final products are manufactured by adding some other ingredients. Later, the final beverage will be shipped to the distribution centers after been bottled or canned and finally be merchandised through a retail network. The supply chain is ended when the customers get the drink, which covers*

---

[1]Refer to https://www.standishgroup.com

[2]This case is adapted from the "Project Management" course notes of China Europe International Business School.

relationships with a large number of customers and suppliers. In the whole process, we have to meet the demand of the customers, such as on-time delivery, adequate supply, low price, as well as excellent quality. Nowadays, many companies are trying to strengthen the customer relationship management (CRM) in order to gain a better understanding about the operations of the supply chain and to gather a common experience on customer service which can be applied to geographically diverse areas.

FDC is a company engaged in the beverage packaging and distribution. It packs up and warehouses the concentrated juice from other companies and then distributes them to the next level of distribution companies and retailers. The company is divided into six regions according to the geographical location, each with its own packing plant and central storage warehouse. The general manager of each region leads a small team of managers, with various functions such as the company's business (packaging and storage), logistics (materials management and distribution), finance, IT, and sales. In every department, there are not many employees, but they are all dedicated to their department. In the past, the company did not have a centralized customer service department. As a consequence, the business manager had to deal with the problems of customer management, while the company headquarter provides finance, information technology, operation, marketing, public relations, law, management, human resources, and other services.

Solutions to deal with customer complaints vary in different regions and departments. The newly appointed general manager was not satisfied with this approach. There are so many complaints from customers, such as the delivery and the foreign affairs. The general manager hopes that FDC can be perceived by the customers as an organization which provides the same quality services to customers in different regions.

All regional companies did not have dedicated customer service department. Rather, they provided service to customers in their own way. As a result, much information of the customer service is lost. If such information can be documented properly, it will be beneficial to the customer service and potential business performance. The general manager and six regional managers have reached an agreement to establish a centralized customer service department in the distribution center of the southern region. Although some regional managers prefer to establish their own customer service centers, finally they agree that it is more effective to spend six months and 5 million yuan to establish a centralized organization under the existing technical conditions.

What is the project scope? There are two scenarios. One is that the team completes the project personally, to work out the office layout, the procurement of furniture, the personnel recruitment, the development of information systems, and management policy on their own. Another one is to outsource the development of information systems, the personnel recruitment, and so on, to other company. These have significant impacts on the workload, durance, and expenses of the project. However, the project objectives can be achieved in both scenarios.

It is a very popular phase "to gain profit from the management". However, the real goal of management is efficiency. For an enterprise, profit is largely dependent on the profit model, while the management mainly concerns the level of

efficiency to achieve this profit model. If the identification of profit model is classified as part of management, the scope of management will be expanded as well.

2.   The scope creep in projects

In the process of the project implementation, the stakeholders will create some tiny but unplanned works for various reasons, making the results in scope creep. Project managers are not certainly aware of its fatal damage to the project, until the creep develops from quantitative change to qualitative change and the project is completely destroyed.

There was an old experiment that a live frog is dropped into a pot with boiled water, and it will immediately jump out of the water pot. When the frog is put in a pot with cold water, which is heated slowly, it will float comfortably in water. Gradually, it was unable to escape when it felt the hot water.
The project scope management also needs to face similar situations, which is called "Scope Creep".

There are two main reasons for the scope creep: the client and the project team itself.
   In the process of the project implementation, the customers will normally propose some tiny works that are easy to complete with a little workload. This work has nothing to do with the features and characteristics of the project outcomes. Rather, it can make customers more satisfied. However, the accumulations of the tiny works will lead to the time and cost overruns, resulting in the dissatisfaction of both project sponsor and the customers. The customer's satisfaction with the additional work will not be able to offset the dissatisfaction with the delay of the project. Furthermore, the delay derived from the creep of the project scope due to the customers may bring some legal disputes if there is lack of recording and confirmation.

In order to avoid the scope creep caused by customers, it is useful to remember this principle: "never give in, unless exchange". It is the customers' rights to change. However, any changes in the project scope must be completed through commercial negotiations (though it may be irregular). Similarly, the appropriate formal change should be made on duration, cost, or quality standard accordingly.

However, we should also pay attention to the scope creep caused by the project team itself as the project team or the enterprises are responsible for the losses. The "fishing project" aiming to increase the contract amount by changing the scope is only useful for new customers.
   The scope creep caused by the project team is relatively subtle, which is generally due to the mentality of the technical personnel. Being eager to get a sense of accomplishment from the technology, the technical personnel consciously or unconsciously push for manufacturing some products that are unnecessary and unreasonable, but to meet their emotional needs in accordance with their own interests.
   Therefore, it is imperative not only to clearly understand the needs and goals of the project, but also to clearly establish the project scope. In other words, it is equally important to understand what are beyond the project scope.

For the project of developing the customer service center of the FDC Company, its scope statement must include two aspects: what to do and what not to do.
For example, the project scope includes the following:

1. *To complete the software design, development, installation, and debugging of the CRM information system;*
2. *To complete the design of the office environment and the purchasing of the equipment and facilities, as well as the layout of the customer service center;*
3. *To complete the personnel training of the information systems.*

The following works are very important to the successful implementation of the project however are not within the project scope.

1. *To purchase and inspect the hardware which is associated with the CRM information systems;*
2. *To survey and analyze the related customers of the FDC company;*
3. *To process the company's existing data;*
4. *To recruit the staffs of information systems;*
5. *To build the office management system.*

9.2 Devil Is Hidden in Details

The extent of grasping details can reflect the maturity of management of an enterprise or a project manager. "Devil is hidden in details". If the vague, uncertain, and irrational components hidden in the project details cannot be identified, we will never feel the pleasure of management or get rid of the anxiety from inappropriate assumptions.

The Work Breakdown Structure (WBS) is an effective tool to reveal the project details, to define the project scope, to estimate the cost and to communicate with each other.

WBS presents all levels of work required to complete the project products. It is a genealogy hierarchy chart of the project products, which contains all works that must be completed to achieve the overall objective. However, different from other genealogies, the products at the lower branch of WBS are produced earlier than that at the higher branch. The products may be hardware (e.g., tools and equipment), service (e.g., equipment operation, testing and evaluation, and management), and even data (e.g., technical reports, engineering data, and management data).

A WBS contains multiple layers (see Fig. 9.1). The first level only includes the quantitative objective or the final product; the second level includes the main components of the project, namely sub-projects; the third level includes major product segments in the sub-projects or summary task, which is actually not to perform the task, but is the sum of the underlying work; and the last level is the procedure or work packages which is a collection of specific activities to accomplish a particular job, such as shop drawings, acquisition of devices, and data collection.
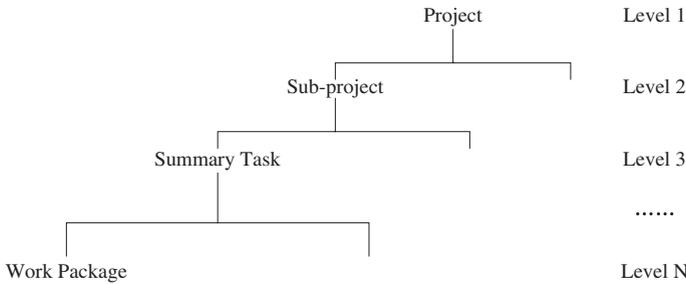
Fig. 9.1   The general form of the project WBS
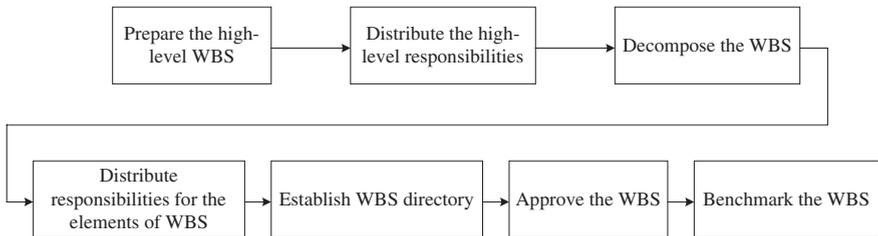
Fig. 9.2   The general procedure to establish the WBS of projects

The preparation of the project WBS programs is shown in the Fig. 9.2.

The first step is to develop the high-level WBS. In general, the project charter provides the scope of overall works, which can be used as the basis for the preparation of the high-level WBS.

The second step is to distribute the high-level responsibilities. The high-level WBS elements are defined, and the project organization (commonly referred to as the project team or department) is established. Since then, it is necessary to distribute the responsibilities of the high-level WBS to the relevant senior managers. This helps to ensure that the senior managers pay close attention to the decomposition of the high-level elements into more detailed products or services in order to define the specific scope of the project work.

The third step is to further decompose the WBS. The high-level WBS is broken down into lower level products or services. Lower level of hierarchy indicates a more specific and detailed definition for the scope of work.

The fourth step is to assign responsibility for the decomposed elements. WBS should be used to assign responsibility for all work packages once been decomposed to the lowest level. Allocation of responsibilities at a higher level can ensure that the management committees are responsible for the entire project, while the lower level personnel are responsible for planning, completing, and delivering of products.

The fifth step is to create a statement of the work. Once been defined, the work packages should be described. This is called "Statement of Work (SOW)," which includes the job title, methods to complete the work, resources, related responsibilities, and acceptance criteria. The purpose SOW is to define the scope of activities and responsibilities of each work package. The SOW can clearly define the boundary of different organizations or personnel in delivery. It is an independent document which serves as a reference when creating WBS.

The sixth step is to approve the WBS. The senior managers are responsible for reviewing and approving the WBS and associated documents. This step is very important to ensure managers' commitments.

The seventh step is to benchmark the WBS. Once approval of the WBS is obtained from stakeholders, it is necessary to benchmark the WBS and place it under the change control.

Many projects are so complex that automated tools are required to assist managing and reporting the project information. As the WBS is a "hierarchical" structure, a "Parent and Children" (hierarchical) relationship should be established in order to prepare the report automatically in the organization. To do this, we can set up "coding tables" and assign the number for each WBS elements with the form of coding as simple as possible. We should revise the WBS as less as possible once the WBS is coded, and we cannot code the WBS if it is unstable to a certain degree. By using this method, we can prevent the use of overly complex coding system as well as the negative phenomena of recoding for the changes to the WBS.

If the project is complex, the WBS will contain more contents. Then, catalogs can be used for the illustration method.

A rapidly growing company plans to install a small piece of commercial computer equipment to handle accounting works, manage the stock, and other related daily affairs. The managers hope that this equipment can be put into use before the end of this fiscal year, i.e., within 26 weeks. If the target cannot be reached, the company is bound to recruit additional employees to cope with the increasing workload, which would lead to a substantial amount of the labor costs.

Prior to the entire work, five weeks are required to conduct the feasibility study. Assuming that the conclusion of the feasibility study is positive, employees must participate in the project and start to purchase computers.

The whole set of computer equipment takes ten weeks from the order date to the delivery. One week is required for formulating rules of orders and sending orders to the selected vendors. After ordering, it will take four weeks to prepare the site to install the equipment and one more week to install computers.

Some staffs are required for the equipment, including systems analysts, programmers, operators, and data collectors. It takes four weeks to recruit the data collectors and another three weeks to train them. These staffs must be ready during the operational phase which is the final phase of the project. The operation phase takes two weeks. Once the system is tested, one week of training is provided for users. All these must be completed prior to the operational phase of the system.

Moreover, it takes six weeks to recruit the computer operators and another three weeks for the training. Once the computer program is installed, these operators must carry out the program test for two weeks. In addition, the offices must be ready for them. It takes eight weeks to recruit experienced system analysts. After the feasibility study, they must analyze and design the systems for seven weeks, which must be completed before the programmers start working. It takes eight weeks to recruit the programmers, and another four weeks for training. After the system analysis and design, four weeks are required for coding by programmers. The directory WBS of the project with four code as follows:

> *1.0.0.0   Install computer systems*
> *1.1.0.0   Feasibility Study*
> *1.2.0.0   Install computers*
>   *1.2.1.0   Draft and issue orders*
>   *1.2.2.0   Computer arrival*
>   *1.2.3.0   Prepare the installation site*
>   *1.2.4.0   Install computers*
> *1.3.0.0   Recruit and train staffs*
>   *1.3.1.0   Recruitment System Analysis*
>   *1.3.2.0   Recruit and train programmers*
>   *1.3.2.1   Recruit programmers*
>   *1.3.2.2   Train Programmers*
>   *1.3.3.0   Recruit and train operators*
>   *1.3.3.1   Recruit operators*
>   *1.3.3.2   Train operators*
>   *1.3.4.0   Recruit and train data collectors*
>   *1.3.4.1   Recruit data collectors*
>   *1.3.4.2   Train data collectors*
> *1.4.0.0   Design and develop system*
>   *1.4.1.0   System analysis and design*
>   *1.4.2.0   Program*
>   *1.4.3.0   Test procedure*
> *1.5.0.0   Train staffs and implement system*
>   *1.5.1.0   Train the staffs who are responsible for users*
>   *1.5.2.0   Implement the system*

A WBS defines the necessary details of project management activities. First, the purpose for creating a project WBS is to define the scope of the project. Although the feasibility study and project charter have already defined the scope of the project at the conceptual level, the comprehensive description of the scope is based on the WBS.

Secondly, creation of the project WBS helps to monitor the project management process. The activities for each working procedure, the resources required, and time required should be measurable. As a result, every work package can become the basis for monitoring the project process and communicating between stakeholders.

Thirdly, the creation of WBS helps to estimate the cost and schedule of the project accurately. In SOW, the costs of the necessary equipment, labors, and materials for each task are listed in detail.

Finally, the WBS helps to establish the project team. Each team member wants to have a clear assignment in order to gain a better understanding of how to carry out their work. The breakdown of work structure can meet this requirement.

The WBS plays a key role in controlling the project scope. The more detailed breakdown of work structure, the easier controlling the project is. There is no simple formula to define how detailed the work structure should be. However, the following issues need to be taken into consideration when preparing the WBS.

1. *Break the project down to an extent that we are able to accurately estimate the required resources and the cost of the performed tasks.*
2. *Ensure that the start dates and finish dates of each task are clearly defined. Lowest level of the WBS tasks (work packages) should be carried out within a reasonable duration, preferably within two weeks.*
3. *Ensure that personnel of the project are assigned to each individual task, and each work package should be specifically assigned to a person in charge.*
4. *Ensure that each work package is relatively independent and complete, i.e., having a traceable and verifiable product.*
5. *Ensure that all work packages constitutes all the work required to complete the project. Strictly speaking, we cannot perform tasks that are not covered in the WBS.*
6. *Try to express it with "verb + noun".*

9.3 The WBS Is the Intangible Assets of Companies

In the same enterprise, although all projects are different, many projects are similar at the higher level. If these companies can make efforts to prepare a standard WBS which covers these same types of project contents, WBS will become the intangible assets of companies. The standard WBS should be tailored for each individual project (see Fig. 9.3). Moreover, in these WBS, the SOW is the intangible assets (the summary of SOW is also known as "Work Package Dictionary"). Similarly, the members of the team groups with new members or external human resources can quickly understand the contents and standards of their work based on the statement. There is a large amount of work if this approach is adopted. However, once this kind of company knowledge is formed, project managers can quickly define the project scope and reliably estimate the project cost. This not only improves the speed and the reliability of the project, but also reduces the project risk.

1.0.0.0.0   Staff training project for the × × Corporate
  1.1.0.0.0   Complete the training plan
    1.1.1.0.0   Analysis of corporate strategy and annual plan
    1.1.2.0.0   Form a training course plan
      1.1.2.1.0   Determine the course contents
        1.1.2.1.1   Conduct a survey of course contents
        1.1.2.1.2   Develop the courses outline
        1.1.2.1.3   Obtain employees' feedback on the courses outline
        1.1.2.1.4   Revise the course Outline
        1.1.2.1.5   Obtain the top management's approval for the course outline
      1.1.2.2.0   Determine who will attend the training program
        1.1.2.1.1   Verify the employees' work plan
        1.1.2.1.2   Choose the staff members to attend the training program
        *1.1.2.1.3   Obtain the supervisor's approval for the staff members to attend the
                        training program*
      1.1.2.3.0   Select trainers
        1.1.2.3.1   Collect information of the relevant trainers
        1.1.2.3.2   Communicate with trainers on the curriculum
        1.1.2.3.3   Select and determine trainers
        1.1.2.3.4   Signed training contracts
        1.1.2.3.5   Obtain training materials
      1.1.2.4.0   Develop the training budget
      1.1.2.5.0   Determine how to assess the training outcomes
        1.1.2.5.1   Develop a questionnaire survey for training programs
        1.1.2.5.2   Develop inputs / outputs analysis procedure for the training program
  1.2.0.0.0 Organize the implementation of the training program
    1.2.1.0.0 Reception and arrangement for trainers
      1.2.1.1.0 Meet at the station
      1.2.1.2.0 Arrange accommodation / dining / activities
      1.2.1.3.0 Prepare training support materials
    1.2.2.0.0   Prepare training venues
      1.2.2.1.0   Contact training venues
      1.2.2.2.0   Prepare training equipment and facilities
      1.2.2.3.0   Prepare food and accommodation of trainees
    1.2.3.0.0   Management of attendees to the training program
      1.2.3.1.0   Arrangement of sign-in
      1.2.3.2.0   Release the training information
      1.2.3.3.0   Release the training survey
      1.2.3.4.0   Arrange the transport
      1.2.3.5.0   Arrange the accommodation of trainees
    1.2.4.0.0   Record courses
      1.2.4.1.0   Arrange recording / recorder
  1.3.0.0.0 Summarize training outcomes
    1.3.1.0.0 Review of training results
    1.3.2.0.0 Write the summary report for the training program
    1.3.3.0.0 Update the information system on employees' skills

Fig. 9.3   Tailor the standard
WBS
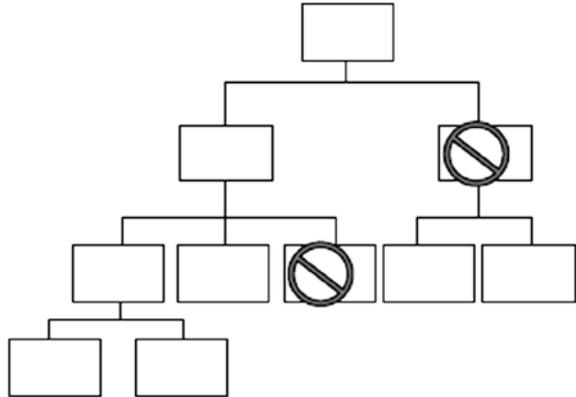
If it is an in-house training, the training is conducted within the enterprise. Then, this training can be achieved by removing the following contents in the standard WBS:

1.1.2.3.1	*Collect information of the relevant trainers;*
1.1.2.3.4	*Sign training contracts;*
1.1.1.4.0	*Develop the training budget;*
1.2.1.0.0	*Reception and arrangement of trainers;*
1.2.2.1.0	*Contact training venues;*
1.2.2.3.0	*Prepare food and accommodation of trainees;*
1.2.3.4.0	*Arrange the transport;*
1.2.3.5.0	*Arrange the accommodation of trainees.*

If 1.2.1.0.0 is deleted, all tasks covered in this summary will be deleted as well.

The responsibility to establish such standard WBS belongs to functional departments, rather than the specific project groups. Of course, if support can be gained from the project team, that will be the functional departments' good fortune.

It should be noted that it is not easy to define the project scope of work even in small projects.

As an important project management tool, it is of great importance to control the scale of WBS. If WBS is overly complex, it will become the administrative burden of the management. Under the normal circumstances, WBS should be compiled and consequently broken down to each individual element according to the risk level of each element within the scope of work.

9.4 WBS-Based Project Knowledge Management and the Role Management

The value of project is largely determined by the efficiency of its executing efficiency which is the core of project management. In order to improve the execution efficiency, efforts are required to improve the component degree of projects, and the reusability of these components.

The so-called component-based project management is a management system. It standardizes the WBS, which helps to complete the project, and improves its reusability. It transforms individual's project experience, both internal and external of the enterprise, into the reusable knowledge and tools for the enterprise. Thus, it reduces the dependence on the individual knowledge and ability of project team members, which consequently improves the efficiency of their individual work as well as the overall project.

Unique nature of the project can be understood from two perspectives. On the one hand, for the undertaking enterprise, project itself is unique. However, if the project is decomposed and consequently broken down, it is not hard to find that many of these subdivisions have been undertaken before, or seem to be. On the other hand, the project is unique for each individual. However, within the enterprise, some staffs had completed the project or a part of this project. The main issue is the lack of understanding of how to decompose project tasks rather than the unique nature of projects. In other words, there is lack of understanding of how project tasks have been successfully completed.

There is growing attention on knowledge management. The efficiency of the project can be improved by means of transforming the knowledge into technology. In turn, we will not know how to extract, accumulate, and use knowledge until we understand what kind of technology can improve the efficiency of the project. It is a common case that we contingent our hope on those "composite" personnel with sufficient experience that they can improve the project efficiency. Less attention was paid to explore components of their work that can be standardized and reusable. If there are not adequate capable personnel, more staffs will participate in the project, which results in more complex projects. The number of project participants will grow exponentially, and the complexity of management grows rapidly. In many enterprises, the project knowledge is far less than the number of employees, which is well known to many managers. As a result, we consciously or unconsciously give up management responsibilities. Rather, we simply hope the project efficiency can be improved by means of motivating employees. Unfortunately, we are often disappointed as a result.

> *Which the wise know while the fool does not, that cannot be educated to the public. Which the clever person can do, while the humble cannot, that cannot be educated to the public.*
>
> —Guanzi·*The Most Important Economic and Political Affairs*

In order to achieve the component-based project management, the following steps should be adopted by enterprises:

1. Decompose project into components according to the WBS. These components are standardized and packaged in order to improve their reusability. Project consists of the following components: ① activities derived from the decomposition of WBS (work packages or processes), i.e., works to be conducted in order to deliver results in line with the requirements. ② Roles, i.e., each project activity is assigned to specific roles. The role represents the project tasks undertaken

by individuals and defines the approach to complete its work. ③ work piece, i.e., the products of process. The work piece provides the activities with inputs and outputs, as well as communication mechanisms between activities. Work piece contains documentation (e.g., user manual, standard vocabulary, mold plate, and cases), model (e.g., analysis model, design model, and implementation model), and tools (e.g., developing tools, testing tools, and configuration management tools). Roles use work piece to execute activities. In turn, work piece is produced in the process of executing activities.

The relationship between project components is shown in Fig. 9.4:

Sometimes it is difficult to decompose a project into components, followed by standardization and packaging. This is because there is something we do not know. Even if we have been very familiar to lots of work, it is not an easy task to define those "very familiar" works. An enterprise-wide knowledge management is required, so as the creativity and persistence.

Assistance from project manager and project team members should be sought for the component-based project management. However, these people do not take the main responsibility as they do not have time to do these works. Similarly, they generally do not have a comprehensive understanding of what components are needed in order to complete the project. Indeed, it is the responsibility of the project management office. If there is no project management office within the enterprise, such task should be conducted by the functional department.
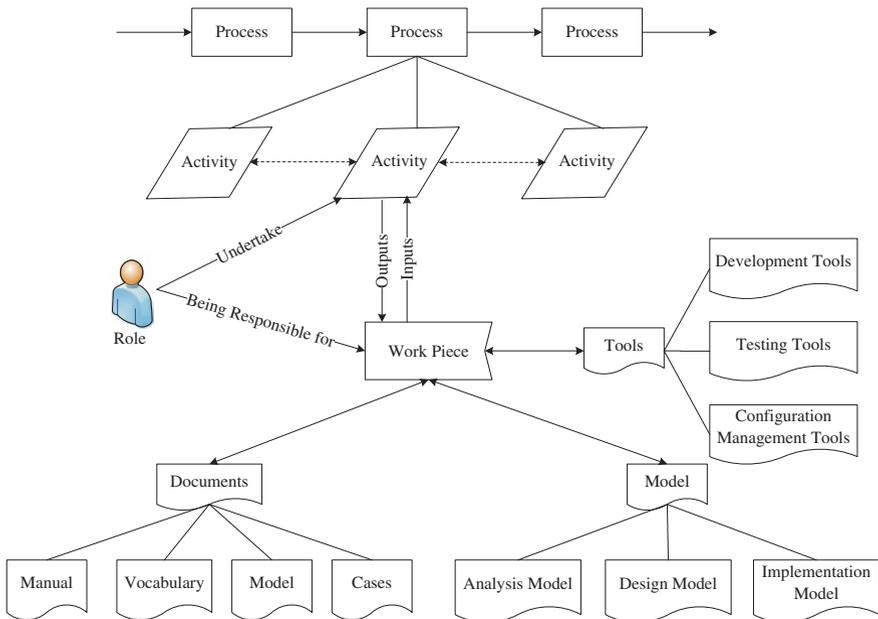
Fig. 9.4 Components of project management and their relationships

It should be noted that components will not be effective until they can be packaged. Packaging refers that the outputs of components will remain constant provided the inputs are the same. Similar to an integrated circuit, various and complex products can be achieved as long as we can properly handle the external interface, without the need to know the details of its internal functions. Component, packaging, and reuse are the three keywords of the project to simplify the complexity and improve the project performance on cost, quality, reliability, and schedule.

2. Provide trainings to project team members according to their roles. Improving staff's substitutability provides enterprises with competitive advantage within the business environment which is featured with the fierce competition on talents. There is no doubt that essential personnel exist in every enterprise. However, these people should only account to a very small proportion of the total number of employees. In fact, no one is completely irreplaceable. If a person has weak substitutability, it simply means that it takes longer to find a replacement which is always associated with a higher cost. Therefore, efforts are required to identify an approach which is efficient on both cost and time. This approach is the professional division of labor. Nowadays, interdisciplinary talents receive a growing attention. However, it is the professional talent that is efficient with a reasonable cost. To complete the project efficiently, efforts are required to effectively integrate various professionals according to their different roles. Staffs should be assigned to tasks that they are most capable of with the highest efficiency. It is very common that there is lack of an effective mechanism for the integration of human resources in enterprises. Rather, responsibilities were assigned to those staffs with interdisciplinary skills. This often results in weak substitutability of personnel as well as the low efficiency of works.

Only when we are able to define and subdivide the roles of the project, can we carry out the training with project team members effectively. As a result, they can quickly qualify project roles and eliminate the common issue of inconsistency between job settings and the actual work.

3. Establish mechanisms so that the project team members can carry out the work in accordance with component-based approach. This is the most difficult step. To achieve this, efforts are required to change staff's attitudes and adjust the corporate management system.

It is difficult for efficiency and personalization to coexist. It is unrealistic to improve the execution efficiency as well as meeting the personality and unique style of project team members within the project. As the project activities are closely related, the elasticity of activities will lead to a chain reaction, ultimately resulting in a severe impact on the project plan. In order to achieve the component-based project management, we have to first establish the concept of "efficient work, happy life." After all, only a small number of people are able to get pleasure

from the work process. If you expect people to work happily, the result is likely to confuse work with life, affecting both the work and life. Our corporate management personnel, particularly senior executives, generally find it is difficult to enjoy the holidays.

Of course, employees cannot be regarded as machines. It is inappropriate to perceive all employees are only driven by economic interests. However, economic benefits are mainly reflected on incentives, secondment, and professional development beyond the project. Therefore, enterprises must establish the corresponding management system in order to ensure the realization of "efficient work, happy life." At the same time, efforts are required to allow the project team members to understand the relationship between the roles and project tasks, influence of local changes on the entire project on a timely basis. As a result, the project team can handle the interface between packaged components and standardize communication mechanisms. This is essential for achieving the component-based project management.

Developed by the Rational Corporate, Rational Unified Process (referred to RUP) is a kind of representative component-based product. It is an object-oriented Universal Service Management method, which describes a series of related software engineering processes with the same architecture. The core processes of RUP are as follows: business modeling, demands, analysis and design, implementation, testing, deployment, configuration and change management, project management, and environment. Each core processes is associated with a particular model set, supported by the workflow chart to depict the roles involved in the process (e.g., analysts, architecture designers, architecture reviewer, package designers, code reviewer, database designers, and operators), input and output artifacts (case models, design models, design type, cases, document templates, source code, executable programs, etc.) as well as the activities to be carried out (seeking the protagonist, finding cases, establishing the interaction mechanisms between protagonist and the cases, generating case models, and assessing results). RUP allows the standardized definition and refinement of all these contents and provides a tool set related to demand management, visual modeling, automated testing, and change management, and so on. These include Rational Rose, Requisite Pro, Clear Case, Clear Quest, and Test Studio. RUP brings together a wide range of best experience in the modern software development.
There are growing demands from various projects and organizations for a flexible form of management. RUP provides a standardized approach to assign tasks and responsibilities in the R&D organizations. Its goal is to ensure that high-quality software is developed to meet the end-users' requirements with a predictable schedule and budget. There are a number of benefits of RUP such as increasing the reusability of software development, reducing the knowledge and experience requirements for a variety of roles, and improving the efficiency and reliability of software development process. IBM spent US$2.1 billion to acquire this corporation to showcase the value of component-based project management.

9.5 WBS-Based Approach to Determine the Project Budget and Contract Value

The reasonable project budget is a basis for the effective use of project resources. WBS provides not only an effective tool for the control of project scope, but also a reliable foundation to determine the project budget.

As we have repeatedly emphasized, each project is unique. The more special project is, the more difficult it is to make an accurate project budget. Under such context, the project budget can only be established on the basis of speculation to a certain degree. Past experience provides a useful reference to develop the project budget. However, they are often not reliable. Moreover, for some new projects, almost no previous experience can be followed.

In addition, the difficulty associated with the project budget is reflected in the following aspects.

1. Budget analysts can develop the project budget according to the changes in the project on the basis of historical or empirical data. However, it is difficult for them to precisely predict what changes will occur in the project, the intensity of these changes, and the processes in which these changes will occur. There are a number of scientific methods on forecasting changes and building these changes in the project plan. However, in the end, budget analysts' experience and intuition are still required.
2. Budget analysts do not have adequate understanding of project team members. The special skills and knowledge that project group members have will affect their own productivity, so do the project budget. However, there is an "information asymmetry" between budget analysts and project team members. In other words, the budget analyst found it difficult to thoroughly understand the productivity of team members, while the project team knows exactly how to declare the costs and other resources that are the most favorable to them.
3. The budgetary problems caused by new technologies. It is not unusual that the application of new technologies is required in the project. The reliability and efficiency of new technology affect the accuracy of the project budget.
4. The challenges associated with the project budget also exist during the feasibility study of the project. For enterprises, project is a kind of investment. Inaccurate budget will lead to the wrong investment decisions.

Due to the growing intensity of the market competition, in the bidding, war is more popular. Under such circumstance, many companies are confronted with a dilemma. To bid, the price has to be cut down, which means that the project is bound to be a loss even before it is started. Without cutting the prices down, it is hard to win the contract, which means the enterprise is hard to survive. This is so-called "winning to die, and no bid is to wait for death." This has significant impacts on the market regulation, which is also responsible for corruption issues and quality issues.

5. The accuracy of the project budget is affected by the forecast accuracy of other projects. The project budget is largely affected by the inaccurate forecast of the project duration, and the predictions of the reliability of project subcontractors and suppliers.

Although there are many uncertain factors in the project that affect the accuracy of the budget, the following common mistakes will make it even worse:

1. Conclusion was made in rush. Decision on the project budget might be rushed due to the pressure from superiors, market, time; or excessive self-confidence and heroic mentality from project managers and project team members.

The boss or client meet us in the elevator or the hallway and ask the budget situation. We might answer these questions with an optimistic guess which is fully intuitive. To avoid such optimistic guess, some suggestions are provided as below.
Recommendation I: Do not give your answer quickly. You can reply after thorough consideration: "There are many uncertain factors that will affect the completion of the project. I think we should find another time to report to you in detail."
Recommendation II: Take out a pen and a piece of paper to write down the matters that your boss asks, and began to list the questions that must be answered in order to obtain the budge. If your boss is eager to get a reply, you can help your boss to understand that the project budget is not a simple answer only by asking some relative questions.
Recommendation III: If you have to provide a budget immediately, you can provide a figure which is 2–4 times of the optimistic guess. It is the answer that even your boss feels unrealistic. Alternatively, you can politely decline to answer this question due to lack of any preparation.

2. Start the budget estimates without a clear scope of the project. Normally, these low-level errors rarely occur in the construction industry and often occur in software development projects. Someone had the idea, which has been approved, and then, there is a budget for resources, time, and costs. Everyone works in full swing, but in fact nobody knows what to do next.
3. Exaggerate the project budget. There are a number of reasons to increase the money or other resources in the project. These include the following: to enhance the ability to resist risks and to prevent the project delay due to the illness or vacation of the project team members. Surely budget should be set aside for risk prevention. However, a worthy project will be profitless if risk prevention is used as an excuse to increase the capital investment. Similarly, this behavior will result in the case of competing resources with other projects in the enterprise. As a result, other worthy projects fail ultimately. Therefore, it is the best solution to provide an objective project budget, and the honest attitude is easy to win the trust of the project stakeholders.

By means of WBS, it is more easy to obtain the budget estimates for the project. This budget breakdown becomes a Cost breakdown structure (CBS). There are two kinds of approaches for budget estimate.

1. Top-down approach

Top-down approach is to assign the overall budget of the project (usually derived from the business negotiations, historical experience, or total financial capacity of enterprises) to each of the underlying elements of the project WBS in accordance with a certain proportion until work packages are identified (see Fig. 9.5).

The advantage of this approach is that the project budget will not be exceeded. However, this approach is based on the historical data from previous projects. Historical projects must be very similar to this project for a more accurate estimate. Meanwhile, since the budget is top-down, every component of the budget will not be accurate unless the overall project budget is precisely accurate.

The top-down approach is vulnerable to bias in terms of accuracy. However, it provides a convenient choice during the project approval process.

2. Bottom-up approach

The bottom-up approach firstly estimates the budget needed for work package at the bottom of each WBS. Consequently, merge will take place layer by layer, resulting in a total budget of the project (see Fig. 9.6). Bottom-up approach has the highest level of requirements in terms of time and techniques. However, the result is the most accurate.

Despite being more accurate, bottom-up approach is not always used for budget estimation. It is not due to the large amount of time required. It is very reasonable to spend more time to develop accurate budgets. The main reason lies in this estimation method itself. During the initiating phase, there is lack of adequate information for the entire project life cycle which is necessary for detailed estimates.

Bottom-up approach can only be used for the budget estimate during the detailed planning stage.
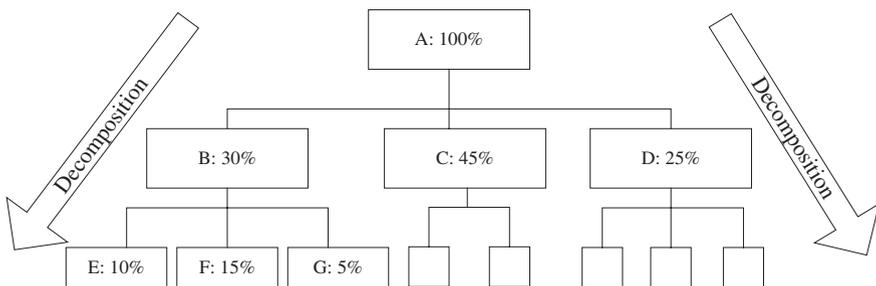
Fig. 9.5 WBS-based top-down estimation method
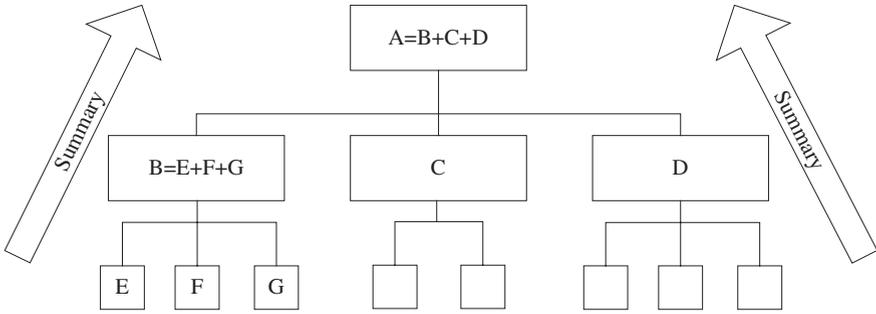
Fig. 9.6   WBS-based bottom-up approach

It is very common to combine these two approaches during the formation of the project budget. Even so, the project budget can never be 100 % accurate. To achieve the 100 % accuracy, it is necessary to accurately predict the changes in all projects in the future and to control all of these changes. These two requirements will never be satisfied. Of course, it is good to have a more accurate estimate, but sometimes it goes too far.

Even if we make a completely accurate project budget, it is not necessary that project will be completed successfully. This is due to the assumption we made during the budget estimate that there are sufficient resources for the project or enterprise. In reality, it is the opposite. Each project actually has limited resources, which cannot be directly controlled by the project team in most cases. It presents a significant challenge to the project manager to make most of these resources so that the needs of the project can be met.

The estimate results could be entirely different if it is performed by different people for the same work under the same environment. Even performed by the same person, the results could vary at different times.

The important reason the contractor often relies on low bid in business negotiations is that it did not make good use of WBS and CBS. The client often uses the top-down approach so that it can control the total budget. Therefore, in order to achieve a higher price, the contractor needs to adopt a bottom-up approach. Results are what clients want. In the case of achieving the same outcome, the cheaper price the better. The contractor must provide evidence to convince the client the cost is necessary to achieve the desired results of the project. If the contractor is not able to provide CBS, it will take the same perspective as the client, which is the top-down approach. As a result, the client is in full control. The top-down approach often leads a low bid. However, this may lead to "fishing project" and "jerry-built project" during the project execution process. Therefore, both parties need to repeatedly use top-down and bottom-up approaches when the business negotiation.

Scope of the project must be strictly controlled, and the WBS is an effective tool. The formulation of WBS is the task in project management which is most challenging and needs a lot of creativity. Therefore, we must do it very well and turn it into the corporate knowledge assets.

9.6 The Change of Management Scope

We can more clearly define the project scope by using the WBS. However, in the execution process of the project, the scope is very likely to change. It is very rare that project scope does not change at all. Therefore, we must be prepared to manage these changes.

In order to standardize the project change management, a clear change management process needs to be formulated. The main content of the change management process is to identify and manage all internal and external factors that caused changes to the project scope. It consists of three main processes: identifying the factors that cause changes in project scope; determining the real need for change and asserting influence to ensure that the change is beneficial; and managing the changes that actually occurred. The general process is shown in Fig. 9.7.

Scope change is not the problem. However, a lot of changes are in the "non-administrative state". There are diverse forms of variation request are diverse: oral or written; clear or subtle; internal or external; operational; management demand; or technical constraints.

Fig. 9.7 The general flow of project scope change management
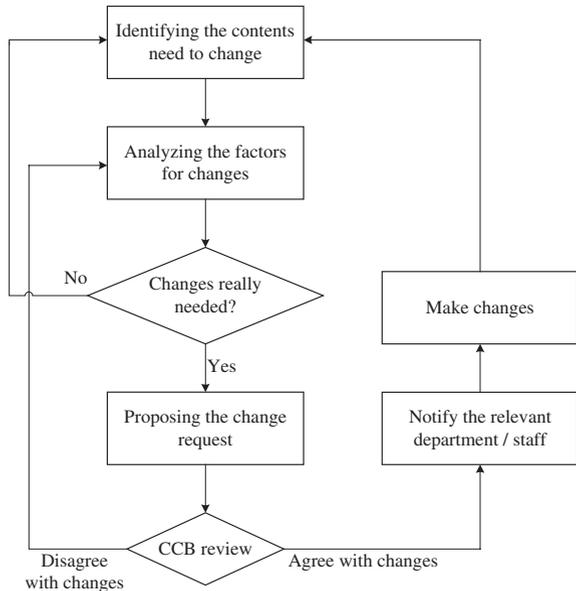
In Fig. 9.7, CCB is the abbreviation for the Change Control Board. The change of project scope is likely to require additional project funding, resources, and time. Therefore, the Change Control Board should be established. Its members are project stakeholders from different disciplines in order to assess the impact of scope changes to the project or the organization. This committee should consist of representative staffs and have the capacity to make a commitment in the management.

CCB needs to classify the following issues: When the scope is changed, it should determine what can be done and what cannot be done by the project manager; provide a way which we all agree on to make changes and to assess their impacts on the project baseline; and explain why approve or not approve the time, the workload, and the funding required for the change. It is particularly important that CCB needs to strengthen the following areas: configuration item derived from the change of assessment applications, namely a chain of changes caused by this change, as well as how to manage these changes; whether or not to change the corporate governance standards after the change effect is achieved, etc.

In addition, the scope change will affect the various documents throughout the project planning stage. We need to re-evaluate and update these documents related to the WBS and the project progress, considering the impact of the scope change. Project manager should clearly communicate with the project team or project stakeholders about the contents of scope changes in a timely manner. Similarly, project team members need to understand the impact of scope changes to their roles in the project and to ensure that all project participants obtained the latest project information since the scope changes.

Chapter 10
Grasp the Pulse of Project Schedule Management

In war prize the quick victory, not the protracted engagement.
—Sun-Tzu • *The Art of War On Waging Battle*

In this changing era, business opportunities go away quickly without notice. This presents significant challenges to every single project manager to accomplish the expected objectives within limited period of time.

According to statistics, software programmers are optimistic in terms of time required to accomplish their works. Vast majority of these projects suffered from 25 to 100 % of time overruns. Only a small proportion of them had an accuracy of 10 % in terms of schedule estimates. It is very rare that the accuracy of schedule estimates was controlled within 5 %.

Due to the time overruns, variations to client's requirements and project scope creeping are not unusual due to changes in technologies and environment. This consequently led to further time overruns, i.e., a vicious circle.

We often hear this kind of dialogue about project schedule between superiors (Boss) and subordinates.

Boss (B): "Xiao Zhang, how long do you need to finish the project?"
Subordinates(S): "About 80 days, Mr. Wang."
B: "don't be vague, how many days exactly?"
S: "80 days."
B: "80 days is too long. I give you 50 days time."
S: "50 days is too short, Mr. Wang."
B: "ok. I give you 65 days. Don't bargain. That's deal done."
S: "All right."

As a result, the compromise from subordinate and the tolerance from the boss lead to an "exact" project time limit. This time limit will be transformed into a complex graph (such as network chart, Gantt chart, and so on) to be hung in the meeting room. However, such graph is often ignored during the process of plan implementation. Project duration depends on some external factors, or just as

Dilbert said, "all successful projects mainly depend on two things: luck or a very nice name."[1]

10.1 Make Good Use of Project Milestones

Practice shows that it is vital to control the project progress by setting up project milestones. The project milestone is a significant point or event in a project.

Following factors should be taken into consideration when setting up project milestones.

1. Meet the needs of customer and contract. In order to gain the confidence or control the investment in the project, the customer generally will set up project milestones in the business contract so in order to receive intermediate achievements as soon as possible or make timely adjustment of project demand, scope, expenditure, and so on.
2. Meet the needs of project characteristics and life cycle. Even though it is for the same project, milestones could vary significantly if different methods were used to classify project millstones. Stakeholders take different responsibilities in each stage of life cycle. Therefore, milestones should be specified according to the change of the life cycle where project stakeholders' responsibility interface should be clarified.

Figure 10.1 *shows the evolutionary prototyping method employed in software development projects. The milestones of this kind of development method are as follows.*

① *Software requirements are determined preliminarily.*
② *Software prototype structure is completed.*
③ *Prototype is tested and improved.*
④ *Delivery of system is completed.*

If the spiral model is adopted in the software development project, an anchor point method will be employed for defining the project milestones (see Fig. 10.2). *In other words, LCO (life circle objective), LCA (life circle architecture), and IOC (Initial Operational Capability) were used to facilitate the achievement of objectives and to monitor the project progress. Meanwhile, these three milestones identify the commitment point for various stakeholders in different stages of the project life cycle. LCO, LCA, and IOC are the commitment to support the system structure, the entire project life cycle, and the ongoing operation, respectively.*

3. Meet the needs of inspiring project team members' morale. Carrying out a project is often a tough process, involving a lot of tedious works. Under such context, it is critical for project managers to maintain the morale of the project team members and their productivity. Milestones not only enable project

---

[1]Scott, Adams: The Dilbert Principle. HarperCollins, New York (1996)
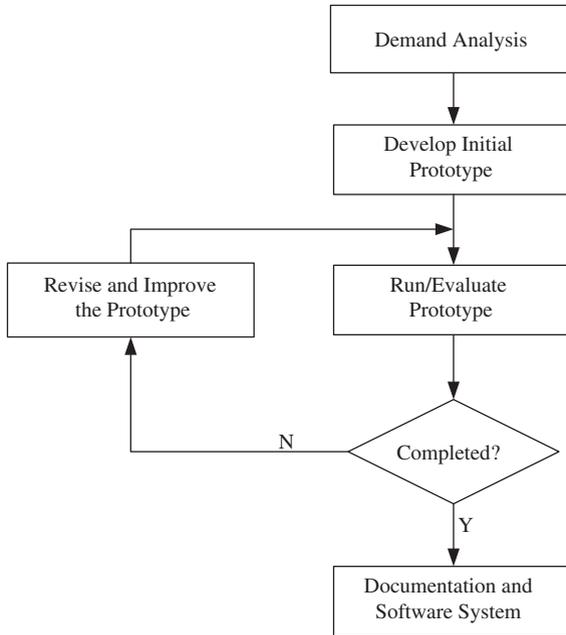
Fig. 10.1 Evolutionary prototyping
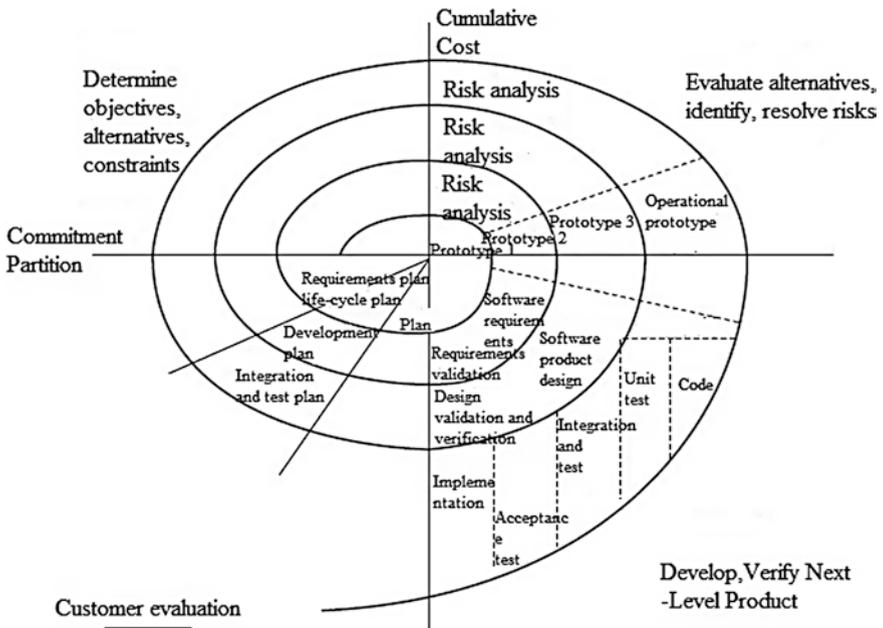
Fig. 10.2 Spiral model of the software project process

members to continue to have a sense of accomplishment, but also enable them to generate pressure to ensure that the project is going on as scheduled.

In the 1984 Tokyo International Marathon, the Japanese athlete Yamada surprisingly won the championship. A reporter interviewed him for his experiences and feelings of winning the championship. Yamada's answer was, "Wisdom is the key." The reporter perceived that Yamada was trying to be mysterious, as he believed that endurance was the key to win the marathon.
Two years later, in the Milan International Marathon, Yamada won the championship again. Once again the same reporter went to interview him and asked the same question. Yamada's answer was also similar to the previous time. However, the reporter followed up to ask him to explain further. Yamada commented, "When I first took part in the marathon, I can barely finish half of it. Later on, every time before running the marathon, I first drove down a circle of the racing track, and remembered obvious landmark of trees, houses and so on along the way. During the race, I will take those things as goals, thus enabling me to maintain a good competitive state and perseverance, until the end, to win the championship."

4. Meet the needs of risk management. Projects are full of risks. Even though we have made full preparations to deal with project risks, risks remain like a ghost haunting the project. We cannot afford to review project status and draw the lessons learnt until the project went wrong. We must set milestones to continuously review and adjust the project direction.

Corporate executives need to manage multiple projects simultaneously. Therefore, they must understand which milestone each project is at. During project regular meetings, those projects without milestones falling between two meetings do not have to attend so that cost can be reduced. Only those projects with milestones at this stage or the next stage of the life cycle are worthwhile for executives to spend time on.

Planning project schedule is an iterative process. During the formulation of the project schedule, the very first step is to develop major milestone plans. Based on this, frame-based network plans can be established. Consequently, a detailed plan of the first milestone can be developed, and so on (see Fig. 10.3).

In general, there are two kinds of project schedule network plan. One is double code network diagram, called AOA (Activity on Arrow), which uses the code of arrowhead and nock to represent the activities of the project. Figure 10.4 *shows a precedence network diagram, where (2, 4) stands for activity A. Activity B is a virtual process which indicates the logic among the project activities without the cost of resource and time. Another is arrow network diagram called AON (Activity on Node), in which the joints of the framework show the activities of the project.*
The double code network diagram shown in Fig. 10.4 *can be expressed as single code network diagram shown in* Fig. 10.5. *The single code network diagram is adopted more frequently because it contains more information and it is more convenient without virtual process compared to the double code network diagram. If there are no special instructions in this book, the network diagram refers to the single code network diagram.*
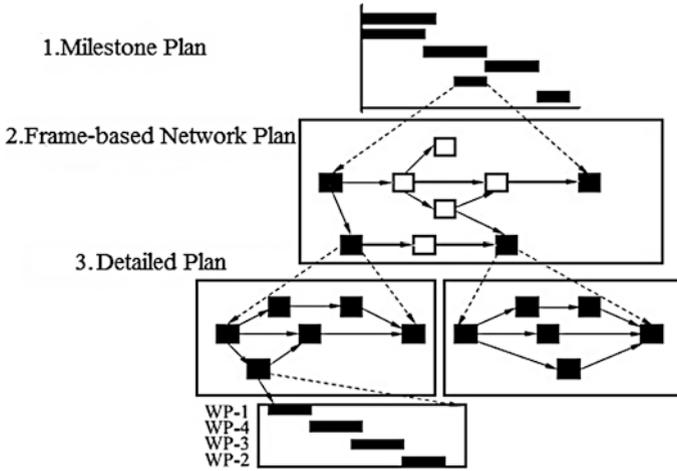
Fig. 10.3   Detailed process of project schedule plan
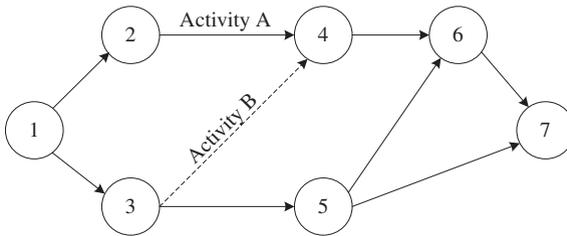
Fig. 10.4   The double code network diagram
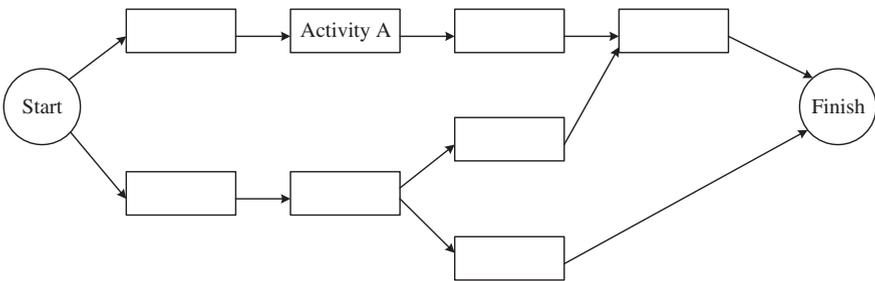
Fig. 10.5   The single code network diagram

The rules of the single code network diagram are as follows:

1. *The process is from left to right;*
2. *Arrow refers to sequence and flow. The activities which the heads of arrows point at are the successor of those which the tails of arrows link, and vice versa;*

3. *Each task is uniquely identified;*
4. *No circulation; and*
5. *Only one start node and one finish node.*

In the single code network diagram, each project activity has the following 9 kinds of parameters.

1. *Name;*
2. *Code;*
3. *Duration time (t);*
4. *Earliest start time (ES);*
5. *Earliest finish time (EF, EF = ES + t);*
6. *Latest finish time (LF);*
7. *Latest start time (LS = LF − t);*
8. *Total float (TF);*
9. *Free float (FF).*

In the network diagram, the ES of one activity is the maximum of the earliest finished time of all its predecessor activities. LF is the minimum of the latest start time of all its successor activities. The total float of this activity is its LS-ES. The free float of this activity is the minimum difference between the earliest finished time of all its predecessor activities and the latest start time of all its successor activities.[2]

In the network diagram, the route with the longest duration (or the route connecting activities with the minimum total float) is called the critical path. The activities on the critical path are called critical activities. If any activity on the critical path takes one more day to complete, duration of the project will also be delayed for one day. Therefore, project managers should pay more attention to activities on the critical path.

The network diagram helps to correctly analyze the logical relationship between project activities and to identify the critical path. However, it is not intuitive.

In practice, it is more common to use the Gant diagram (also called bar chart (see Fig. 10.6)).

It should be noted that the project milestones must have deliverables rather than some activities or processes. There are only two outcomes for the review of the milestone status, i.e., completed or uncompleted. Descriptions such as "in progress" or "as planned" are not acceptable.

As for evolutionary prototyping, which is adopted in a software development project, there are specific deliverables for each milestone.

1. *Software requirements preliminarily identified. At this time, users only have vague idea and cannot clearly express their comprehensive requirements of system. In addition, software developers do not have a clear and explicit*

---

[2]HaroldKerzner, Project Management, 8th, John Wiley & Sons, Inc, 2003.
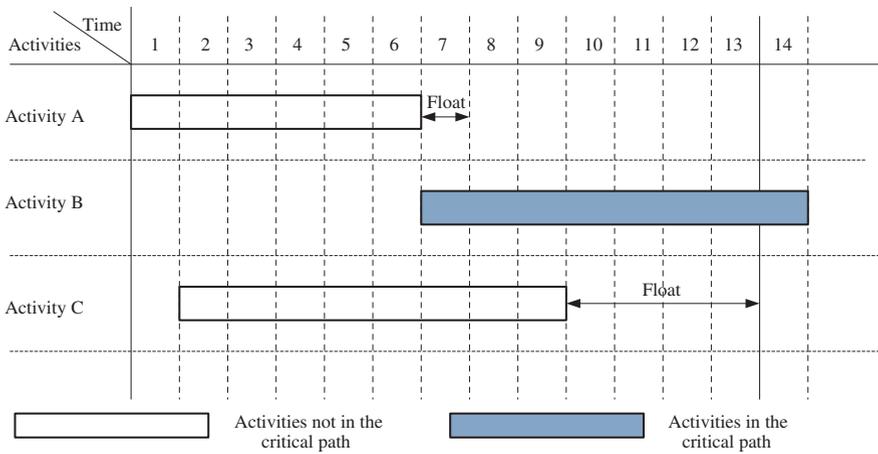
Fig. 10.6 The Gant diagram

understanding of application problems to be solved. Both parties draw up the preliminary Software Requirements Analysis Specifications based on a discussion on the system functions. The milestone deliverables include the preliminary Software Requirements Analysis Specifications, meeting minutes and requirement traceability matrix. The standard for submission is that Software Requirements Analysis Specifications should be signed by users.

2. *Software prototype completed.* On the basis of rapid analysis, according to preliminary Software Requirements Analysis Specifications, effective development tools are used to implement an executable software version as soon as possible. The milestone deliverables include the Software Requirements Design Specifications, initial software prototype, and requirement traceability matrix. The standard for submission is that the Software Requirements Design Specifications are approved and the initial software prototype fulfills the requirements set in the preliminary Software Requirements Analysis Specifications.

3. *Assessment test of the prototype passed.* This contains a continuous iteration process. Users experience the submitted prototype system and provide feedbacks. Software developers consequently improve the prototype accordingly and then submit it for further testing, evaluation, and modification. Gradually, software developers become more and more aware of the details of user's requirements so that misunderstandings during analysis and communication can be minimized. As a result, software developers can adapt to changes in requirements and ultimately fully meet users' requirements. The milestone deliverables include user test records, module and comprehensive test records, test confirmation records, changes in software requirements and design, operational manual and changes in the manual's content, requirement traceability matrix, and new version of the software prototype. The standards

for submission are user test records, and changes in software requirements are signed by users. Besides, changes in software design and operational manual should be approved. The control strategy is conducting the project with configuration management methods and based on users' assessment test of the prototype in each cycle.

4. *System delivered. Milestone deliverables include the final version of the software prototype and all supporting documents. The standard for submission is that users are satisfied with the final version of the software prototype and sign the acceptance report.*

The process of setting project milestones should engage all on-task project team members and other necessary stakeholders.

Setting the project milestones needs the support of functional managers. With functional managers' approval, adequate resources can be accessed during the project when required. When functional managers know every specific milestone, they can prepare resources required in advance.

Despite a large number of advantages, there are a variety of traps when setting project milestones.

Firstly, after project milestones are set, it is not unusual that goal management methods were used. People think that "Final outcome are far more important than process". As a result, the process of monitoring the project was overlooked which is detrimental to the achievement of project milestones. Most practitioners of knowledge-based enterprises are knowledge workers. They are very keen to authorization. Under such context, misunderstandings are more likely to take place.

Secondly, there is lack of control of project milestones. Due to the fact that vast majority of milestones are simply intermediate achievements of projects, milestone changes are not paid adequate attention during the project process. As a result, although most milestones are met, the project is not completed on schedule. Project activities are related to each other. A milestone's delay will cause a chain reaction and may even lead to loss of control of the project schedule.

Thirdly, milestones are set by the project team only based on the project characteristics without proper communication with and commitments of project stakeholders.

To avoid falling into these traps, attention should be paid to gain the commitments from stakeholders such as clients and suppliers to these milestones. These commitments can be formalized by means of the responsibility matrix signed by all parties.

10.2 Risky Time Is Often Ineffective

We are often disturbed at work, which affects our productivity. Similarly, we have to do other jobs simultaneously. These are either our daily work or related to other projects. However, during the estimation of the project duration, we often

unconsciously assume that this project is the only project we are engaged in and estimate the project duration accordingly.

Assume that it costs a marketing manager 30 h to develop a corporate marketing program. He works 8 h a day. Then, the duration of the work is as follows.

$$30/8 = 3.75 \text{ days or almost 4 days}$$

But in reality, how is the manager's productivity? One of his typical working days is as below.

08:30   *Arrival to office, everyone greets each other. He then makes a cup of tea, switches on the computer, and logs on the e-mail system.*
08:45   *He begins to browse and reply e-mails which must reply immediately.*
09:15   *After replying the e-mails, he begins to consult relevant market materials of his company from file clerks. 20 min later, he finally gets the information.*
09:30   *Think and draft a scheme.*
10:30   *One of his subordinates asks him some questions which are very important to the department. Therefore, he spends half an hour on discussing with the subordinate.*
11:00   *Continue to work.*
12:00   *Lunch.*
13:00   *Back to the office. He lost a bit of concentration after lunch. So he browses the files collected in the morning in order to bring back his concentration.*
13:30   *Continue to work.*
14:00   *The phone rings. It is a call from an important client. The client tells him that his daughter is finally admitted to the university. So, he spends 35 min listening to the client's talk about her daughter.*
14:35   *He goes on with his work. Since the work was interrupted, he had to spend 5 min to sort out ideas. It works well in the next 1 h.*
16:00   *He attends the department manager meeting in a short notice.*
17:30   *The meeting ends, It's time to get off work.*

As can be seen from the above process, the manager only works for 3 h 50 min within 8 h of work time. Work efficiency is only 3.83/8 = 48 %. On the basis of this, the expected time to complete the task is

$$30/(8 \times 0.48) = 7.8 \text{ days or 8 days}$$

Previous studies have shown that the time required to complete a project activity cannot be determined. It complies with the β distribution. There are three estimates of the completion time of each activity, i.e., optimistic time estimate in which everything goes smoothly, pessimistic time estimate in which almost all of the risks occur, and most likely time estimate, that is, the time required under normal circumstances. The more complex an activity of the project is, the longer its pessimistic time is.
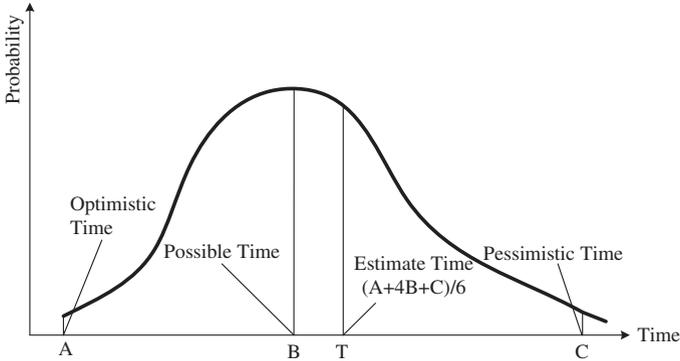
Fig. 10.7 Distribution curve of possible time to complete the project

The late 1950s, the US Navy developed a method called PERT to calculate the project duration where time required for each project activity is (optimistic time estimate + fourfold most likely time estimate + pessimistic time estimate)/6 as shown in Fig. 10.7.

The PERT is as follows.

Step 1: *Calculate σ_{ti} 和 t_{ei} in each activity within the project network diagram*

$$\sigma_{ti} = \frac{t_{pi} - t_{oi}}{6}, \quad t_{ei} = \frac{t_{oi} + 4t_{mi} + t_{pi}}{6}$$

t_{oi}, t_{mi}, t_{pi} are the optimistic time estimate, most likely time estimate, and pessimistic time estimate, respectively.

Step 2: *Determine P_c (the critical path) in the network diagram, and P_c is the path with the longest duration within the network diagram when duration of each activity is set according to t_{ei}.*

Step 3: *Calculate the expected project completion time t_e and standard deviation σ_t^2*

$$t_e = \sum_{i \in P_c} t_{ei} \quad \text{and} \quad \sigma_t^2 = \sum_{i \in P_c} \sigma_{ti}^2$$

Step 4: *Assumed that P_c contains sufficient activities so that the project completion time t complies with the normal distribution with a mean value of t_e and standard deviation of σ^2. As a result, the probability to complete the project within the required time t_S can be calculated:*

$$p\{t \leq t_S\} = p\left\{ Z \leq \frac{t_s - t_e}{\sigma_t} \right\}$$

$p\{t \leq t_e\} = \frac{1}{2}$, that is, the probability to complete the project within t_e is 0.5.

In practice, due to risk existed in projects, the *T* value shown in Fig. 10.7 is generally not complied when signing a contract or requesting for the project duration

from the boss. As the probability of completing the event within the *T* of time is only 50 %, there are substantial risks. In general, the duration is more acceptable when there is a probability of 80 % to complete the project on schedule. Therefore, it is not unusual that two times of the most likely time estimate is requested (Fig. 10.8).

However, what is worth pondering is less than 40 % of projects were completed on time even though risks were fully taken into consideration by increasing the probability of completing each activity to 80 %.

On Friday morning, Mr. Zhang who is a manager of marketing department was called by the general manager as soon as he arrived at company: "Mr. Zhang, a senior management meeting will be held on next Thursday, on which we will discuss about marketing plan in next quarter. I need your preliminary proposal in advance." There are other issues to be dealt with today, coupled with through thinking required for the preparation. Therefore, Mr. Zhang said to general manager that he will summit the proposal on Wednesday morning even though he was capable of working it out in half day. General Manager replied: "Wednesday? Oh it is too late. I need to have a look at it beforehand. Well, can you try your best giving it to me on early Monday morning"? Mr. Zhang laughed up in his sleeves for winning over 3 days to prepare. He was determined to do his best to prepare the marketing plan.

So, when will Mr. Zhang start to make the proposal? Generally, there are three scenarios:

The first one is to delay it to Sunday afternoon. It is the most common because he could finish it in a half day. However, it is a pity that he is always busy with something to do on Sunday afternoon. Therefore, the only choice is to work overtime at night. Under such circumstance, he could hardly present his fancy idea in the proposal. Finally, it turns out he cannot summit the proposal on time on Sunday morning or summit a proposal which hardly satisfies himself.

The second is to finish it on Friday morning. Here comes the question. Would Mr. Zhang summit the proposal to the general manager? The answer is absolutely not as he has won for the extra time. If it is submitted too early, he might
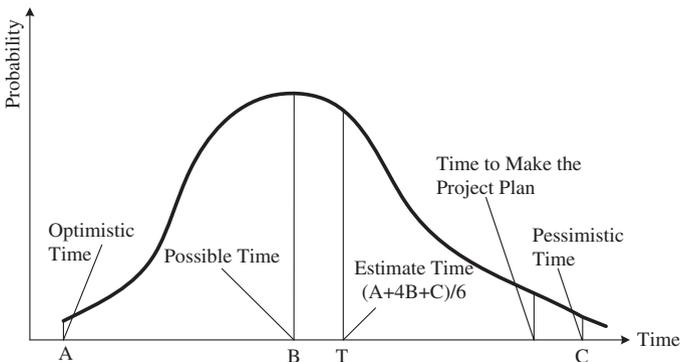
Fig. 10.8 Project completion time in the actual project plan

be criticized by the general manager rather than praising with such doubt thoughts as, "Why did you finish it so quickly. Do not do shoddy work, I am supposed to receive it on Monday morning. Polish it up over the weekend and make it better."

The third is that Mr. Zhang have finished it on Friday morning and submitted it to the general manager. Even though Mr. Zhang was praised, will the senior management meeting be held ahead of schedule? No, because the attendees have had their calendar full.

This case often occurs in real life. When we are planning project schedule, project risks are taken into consideration so that contingency is set aside for the perfection. However, during the execution phase, these plans were either wasted or what we do won't make the project ahead of schedule. In other words, even time was set aside, the impacts of project risks still present a significant challenge to the project team.

10.3 The Impacts of Local Deviations on the Entire Project

During the implementation process, any precise estimate time of project activities may be associated with deviations. This deviation may not be substantial for each individual activity. However, with a lot of activities in the project, these local variations would lead to a substantial delay.

As shown in Fig. 10.9a, even if the activity A and activity B were completed 5 days and 10 days ahead of schedule, respectively, as long as the activity C is completed on schedule, activity D has to start on schedule. As shown in Fig. 10.9b, even if activity A and activity B were completed 5 days and 10 days ahead of schedule, respectively, as long as the activity C is delayed by one day to complete, activity D will be delayed for one day to start.

So, if some project activities experienced delays, can we strive to recover so that the delay to the entire project is avoided? Yes, but unlikely.

Israeli physicist and business management consultant Goldratt (Eliyahu M. Goldratt) set an example in his famous work called "The Goal: A Process of Ongoing Improvement" which can explain the problem.[3]
Assume there are two activities within a project. The first one is part processing for worker manually. The other one is for machines to reprocess the parts processed by workers manually previously. The start time of the project is 12 noon where both machines and workers can process 25 parts per hour. It is required to manufacture 100 parts by 5 p.m. The project plan is shown as Fig. 10.10.
During the project implementation process, time is required for workers to get familiar with the work and prepare for the materials. As a result, only 19 parts were manufactured within the first hour and 21 parts in the second hour. Since, as getting more familiar with the work, workers produced 28 and 32 parts in the third

[3]Eliyahu M Goldratt.: The Goal. North River Pr (2004)
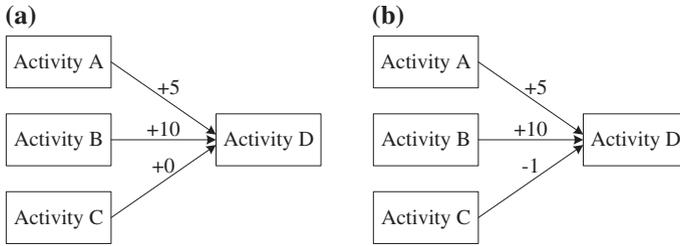
Fig. 10.9   The relevance of project activities on the influence of the time limit for a project
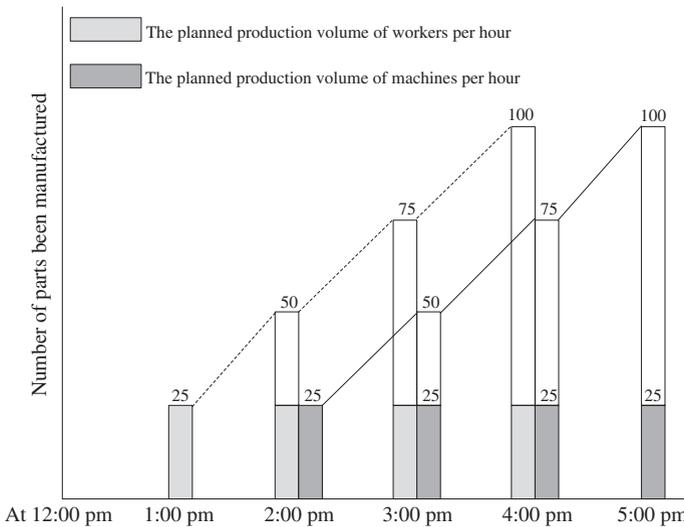
Fig. 10.10   Projects plan of manufacturing parts

and fourth hours, respectively. At 4:00 p.m., workers completed the project plan (production of 100 parts), with an average production of 25 per hour. In other words, workers caught up with the plan (as shown in Fig. 10.11).

So, what about machines? As shown in Fig. 10.12*, although workers tried to catch up with the project plan, the machine experienced difficulties to complete on schedule. At 5 p.m., the machine only produced 90 parts.*

In this case, who is responsible for the project not achieving the expected result? Mankind finishes 25 parts per hour despite some deviations during the process, which is reasonable. It is not fair to blame machine either. This case demonstrated that some local deviations are inevitable during the project implementation. However, it is worth noting these inevitable and reasonable deviations may lead to project delays.
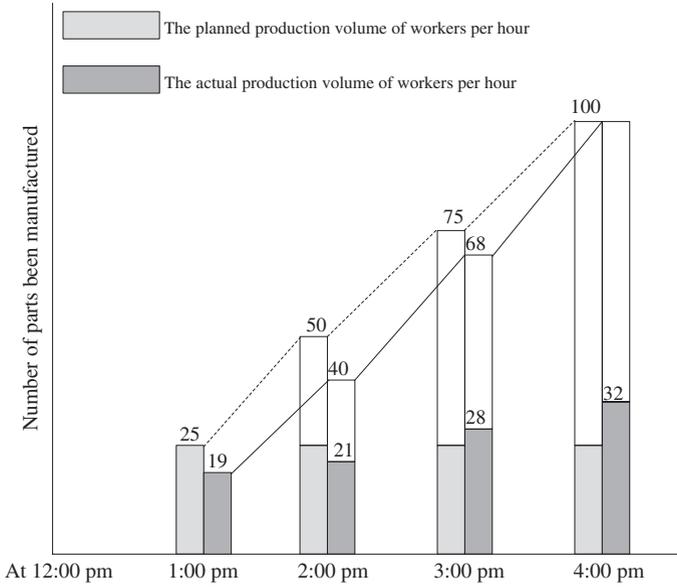
Fig. 10.11 The planned and the actual parts processed by workers
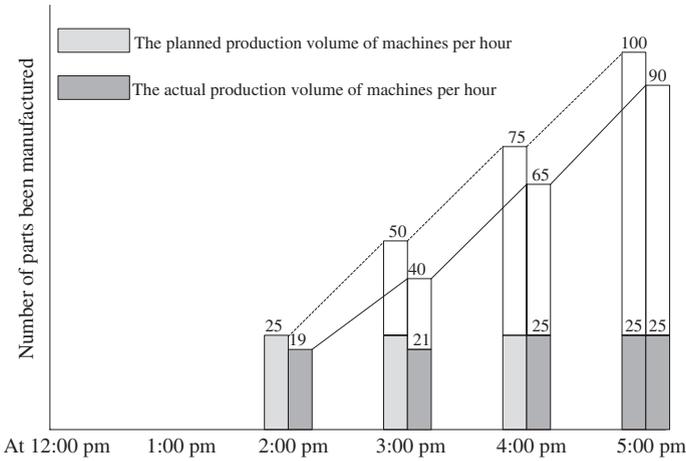
Fig. 10.12 The planned and the actual parts processed by machines

10.4 A Block Period of Time for Key Personnel

Project managers always hope the project team members are "capable", as these capable members can indeed play an important role on the project efficiency. However, in each enterprise, there are limited numbers of these employees and it

Fig. 10.13 Schematic diagrams of the key resources of use on the duration of the project
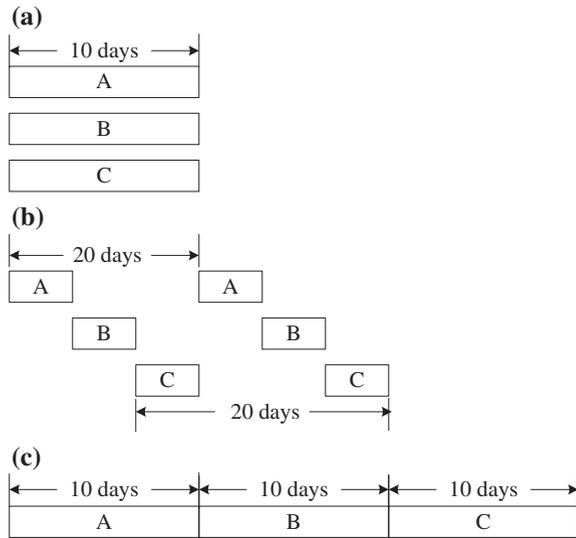
is impossible to allocate them to a project exclusively. They are often forced to act as a firefighter or cleaners in multiple projects.

If these personnel are not given a block of time, they have to bear excessive workload, which often led to delays of multiple projects.

Assume an enterprise has three projects (A, B, C) with the duration of 10 days each. All three projects cannot be completed without the key personnel X (see Fig. 10.13a). As the saying goes: "Those children cry will have milk to drink", project manager of each of these three projects strongly appeal to the human resources department for the priority to allocate the key personnel X. Human Resources Manager has to arrange key personnel X to all these three projects in turn. Assume key personnel X has to rush to project B for "firefighting" after working 5 days in project A. Five days' time, the key personnel X has to rush to project C for "firefighting." Another five days' time, the key personnel X then came back to project Z. Even if the key personnel X works hard every day, the duration of all three projects (A, B, C) had to be extended twice (see Fig. 10.13b). If a block of time can be given to the key personnel X, although the start date of project B and project C will be delayed, their finish dates will be much earlier than those shown in Fig. 10.13b, and they will be completed within 10 days (see Fig. 10.13c).

10.5 Set Buffer Time

Network diagrams and bar chart (also known as the Gantt chart) are typical and the most well-known (often also be considered to be the most effective) tool to develop project schedule plans. In fact, this tool has been closely linked with the project management.

According to Gantt chart, start and finish dates of the project activities are visualized, which allows to compare the actual and planned progress of project activities. Through a network diagram, critical path method (CPM) can be used to identify the key activities of the project and to analyze the logical relationship between activities. Consequently, the ripple effects can be identified if an activity is delayed or completed ahead of schedule. It is a pity these methods have not produced values as expected since the 1940s. Many companies either do not have a network diagram, or draw some simple Gantt chart based on personal experience. These graphs are often ignored during the project execution phase.

Many people perceive that the success of the American Polaris missile program is largely due to network planning and PERT techniques. However, research on this program has discovered that these tools simply served as aided tools as they cannot solve various issues existed in project schedule management such as unnecessary contingency, reasonable deviation of activities, and decentralized use of critical resources.

In addition, CPM/PERT methods generally cannot play a role in early warning of schedule deviations. For instance, the CPM method can inform the delay of the entire project is subject to the time performance of certain project activities. However, the CPM method cannot help managers to identify the early signs of schedule risks in advance and to take preventive measures accordingly.

Assume there are some people hiking and they are arranged in a queue where the order between them remains unchanged. Along with the travel progress, the distance between the first person and the last person will be increasing as some people might want to stop in the middle to tie their shoes, or for sightseeing.

There are a variety of approaches to keep the length of the travel team unchanged. For example, everyone in the team can be asked to maintain the absolute consistent speed. This approach is easy said than done. Another approach is to use a rope tie everyone up. This means that everyone needs to be paid attention equally. However, pay attention to everyone simply indicates no attention at all. Another approach is to tie the first person and the last person up with a rope. This approach can control the length of the team with a focal point of control. However, the problem is to the last person in the team who is not necessarily responsible for the stretching length of the team, i.e., the wrong "criminals" was caught. The effective and reasonable approach is to fasten the rope between the first person and those walking slowly. Meanwhile, in order to ensure that the team traveling speed is not affected, efforts are required to ensure that people on the front are traveling with the planned speed. In short, there are three steps to ensure the team travels at the planned speed and control the queue length. First, those with slowest speed are identified. Second, the first person and those with slowest speed are tied up with a rope. Finally, the speed of the first person should be controlled.

Projects share commonalities with such travel team. There is a certain order among the project activities. Project delays are more likely with more project activities, longer project duration, and more project participants. In order to avoid project delays, it is critical to identify "the person with the slowest speed", "rope", and methods to control "the speed of the first person".

The critical chain method proposed by Goldratt (Eliyahu M. Goldratt) raised is an effective method to control the project schedule. It helps to solve a number of issues such as unnecessary contingency, reasonable deviation of activities, and decentralized use of critical resources.[4] The steps of the critical chain are as below.

First step: to estimate the duration of each activity and draw the network diagram of the project.

The network diagram of project CC is shown in Fig. 10.14. *The time unit of project activities is in days.*

Second step: to analyze each activity carefully and to eliminate the time contingency for risks. In addition, activities with key personnel (resource) required should be listed.

Project manager carefully analyzed and discussed the network diagrams with project team members. The final results are shown in Fig. 10.15*, where activity G requires the key personnel X.*
Apparently, there is a high level of risk according to the project schedule plan shown as in Fig. 10.15*.*

Third step: to determine the location of the buffer time. Buffer time can be set in three positions: behind the end of the project activity, the interface between activities that are critical path, and those not within the project network diagram, in front of the project activities which can only be finished with critical resources (see Fig. 10.16).

As a risk prevention method, the buffer time does not serve to protect each individual project activity. The buffer time located behind the end of the last project activity is to ensure the overall duration of the project. The buffer time set in the interface of the project network diagram between project activities on and not on the critical path is to ensure all activities on the critical path can start on time. The buffer time set in front of those project activities requiring critical resources is to ensure critical resources can be used straightaway.

Activities on the critical path and activities which require critical resources can be regarded as the person with the slowest speed in the travel team. The scheduled project completion date can be regarded as the person with the fastest speed, while the buffer time is the "rope" to solve the issue of prolonging queue length.

Buffer time within the network diagram of project CC is set as shown in Fig. 10.16.

The fourth step: to determine the size of first buffer time. Buffer time is achieved by compressing the estimated time of each project activity. The so-called first buffer refers to the buffer time which took place in the first time within the network diagram.

---

[4]Goldratt E M.: Critical Chain. North River Press, Great Barrington, MA (1997)

Fig. 10.14 — The initial network diagram of project CC for duration estimation

Start →

ES	D	EF
Task Name		
LS	TF	LF

ES: The earliest start time
D: Duration
EF: The earliest finish time
LS: The latest start time
TF: The total time difference
LF: The latest finish time

Activities:

A: 0 | 16 | 16 / A / 22 | 22 | 32
B: 16 | 19 | 35 / B / 32 | 22 | 47
C: 35 | 13 | 48 / C / 104 | 69 | 117
D: 0 | 40 | 40 / D / 0 | 0 | 40
E: 40 | 65 | 105 / E / 40 | 0 | 105
F: 105 | 12 | 117 / F / 105 | 0 | 117
I: 117 | 20 | 137 / I / 117 | 0 | 137
G: 40 | 40 | 80 / G / 57 | 17 | 97
H: 80 | 20 | 100 / H / 97 | 17 | 117

Fig. 10.14 The initial network diagram of project CC for duration estimation

Fig. 10.15

Start →

A: 0 | 10 | 10 / A / 17 | 17 | 23
B: 10 | 15 | 25 / B / 30 | 20 | 45
C: 25 | 10 | 35 / C / 45 | 10 | 55
D: 0 | 15 | 15 / D / 0 | 0 | 10
E: 15 | 30 | 45 / E / 15 | 0 | 45
F: 45 | 10 | 55 / F / 45 | 0 | 55
I: 55 | 10 | 65 / I / 55 | 0 | 65
G: 15 | 25 | 40 / G / 20 | 10 | 45
H: 40 | 10 | 50 / H / 45 | 10 | 55

Fig. 10.15 The network diagram of project CC for duration compression

As shown in Fig. 10.16*, the first buffer is buffer 3. Assume around 50 % of time compressed from each activity of project CC is set aside as buffer time. By comparing* Fig. 10.14 *with* Fig. 10.15*, it can be seen that the earliest finish time of activity D is compressed into* 40 − 15 = 25 *(days). Therefore, the buffer 3 can be set as 12 days.*

The fifth step: to monitor each buffer time. Project managers should regularly monitor the consumption of each buffer time. If a buffer time is not consumed, it indicates that all predecessor activities are on schedule. On contrary, if the buffer time has been consumed, although this has not yet produce a real impact on the project schedule, the control of predecessor activities should be strengthened.

In the CC project, the project manager checks whether or not the buffer 3 is consumed every day. If the buffer 3 is regarded as a project activity, its earliest start time is 15, and the earliest finish time is 15 + 12 = 27 *(days).*
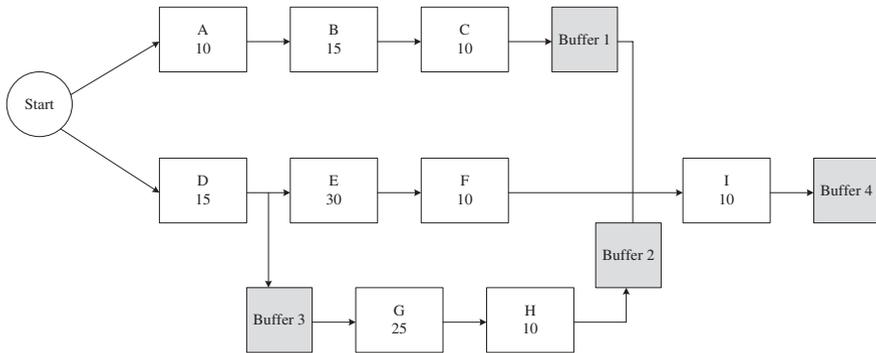
Fig. 10.16   Setting of buffer time in CC project

If the earliest start time for buffer 3 is still 15, the predecessor activities are not delayed. If the earliest start time is changed into 18, it indicates that the predecessor activities have been delayed by 18 − 15 = 3 (days).
Then, we need to monitor and strengthen the management of predecessor activities. As 18 is less than 27, this indicates that the delays to the predecessor activities of the buffer 3 did not have impacts on the overall project schedule.

The project network diagram should be updated when a buffer time is exhausted, or the buffer time was not consumed while all predecessor activities have been completed. Similarly, the first buffer time should be identified within the updated network diagram, i.e., turning to step 4. This is an iterative process until the project completion.

In order to control the project schedule, the following two factors should be paid special attention.
First, the project team members are not allowed to work in the absence of system planning. "Blind initiative due to the lack of systems thinking" is one of the most common issues within project management practices. Many technicians are good at specific actions but not good at commercial thinking. Many managers consciously or unconsciously perceive that "action is the only job." These factors will lead to a lack of project planning, which led to more project reworks.
Second, project variations are not allowed until its associated impacts have been formally assessed and approved. Any local variations may lead to chain reactions to other project activities and resources. The lack of control of project variations will result in chaos in project management. This applied to both negative and positive project variations. Local positive variations could be detrimental to the entire project if proper attention is not paid to.

To some extent, project duration determines the value of the project. Project manager must grasp the pulse of the project duration which is the only way to really control it.

10.6 The Criteria of an Effective Project Plan

Project management methods, reckoned by some, boil down to a six-clap movement, which I deeply understand. With the hope that we can all avoid this kind of movement, I conclude it as follows.

The first clap is to clap a hand to the forehead. Some leaders often take action as soon as they consider their ideas feasible instead of demonstrating its feasibility thoroughly with relevant personnel.

The second clap is to clap team members upon their shoulders. After making a decision, leaders may adopt some measures to enhance morale. For example, they may clap their members upon the shoulder by saying "Work hard and you will have a promising future."

The third clap is to clap the chest. After receiving the encouragement from leaders, project team members may clap their chest to relieve their leaders by saying, "Don't worry. Leave it all to me."

The fourth clap is to bang the table. All of a sudden, leaders may find that the progress of the project is faraway from his expectation and thus blows a fuse, banging the table and rebuking his group members by saying, "what on earth are you doing? After all the money and time we have spent, this is where you can get this project? There are so many problems unsolved. Make self-criticism when you are off work. If you can not finish the project on time, you shall lose your salary and bonus."

The fifth clap is to slap the buttocks. If project team members receive harsh criticism, a majority of them may slap their buttocks by saying, "You did not plan the project clearly at the beginning. Now that things go wrong, all you can do is to rebuke me. I won't stay here and bear it. I quit!" Some may loose their passion about work. Keeping such people at the project team is not good for the project, which will discourage other team members.

The last clap is to clap the thigh. The result of the above five clap is definitely disappointing to everyone. At the moment, everyone including executives, project managers, and project team members may clap their thigh painfully and hopelessly, sighing, "Alas, I should have known better."

There are many factors contributing to the six-clap movement, among which the most important one is lacking of an effective plan. Since projects are a kind of temporary and unique assignments, their management is not different from risk management to some extent. One of the important purposes for a project plan is to reduce risk efficiently. Then what kind of project plan is considered as efficient?

There are many changes during the project life cycle. Without changes, the project plan will just be empty talk. However, if changes are allowed, project team may be confused about how to avoid the situation that plans cannot catch up with changes. As a senior manager of a company, from which aspects can you judge the effectiveness for a project plan?

An effective project plan must include the following 5 "cans".

1. The objectives can be expected.

An effective project plan must be able to illustrate when and what achievement can project stakeholders get definitely and reliably.

Firstly, a project plan includes the expectation for project achievement from project stakeholders. Stakeholders will not support the project without any reason. They need to get what they want from the project. Many people just consider the expectation of clients or other few stakeholders for the project. This is far from enough.

Secondly, all project stakeholders should reach a consensus on project objectives. People's opinions on the same thing vary with their stances. In other words, what we can see is never the objective world. Instead, it is the world affected by our minds. Therefore, project objectives should take stances of different stakeholders, potential ambiguity, and conflicts into account. Only if you remove ambiguity and conflicts, can the objective be effective.

Finally, the feasibility of the project objective needs to be demonstrated. Critical demonstration is very common, in which conclusion comes first and then reasoning, just as we first shoot the arrow and then draw the target. Certainly, "to clap a hand to your forehead" is a worse method, in which there are no demonstrations at all. The latter one is also common in China since it is related to personal worship culture formed over time. Superiors "spoiled" by their subordinates tend to over-trust their intuition. However, the resources of all projects cannot work without effective management. Lacking of management feasibility research, a project is by no means acceptable.

2. Resources can be scheduled.

We cannot assert that it is the mainstream by angling engineering projects which contrive to get the project first. But this phenomenon does exist. When applying for or initiating a project, companies will put all the resources of good quality they have into use. But when they get the project, the resources they use are far different from those they use during initiating of the project. When it comes to the situation that many projects are going on simultaneously, low efficiency and lacking of resource scheduling are common problems. If we cannot solve the problems, the project plan is simply a castle in the air.

There are several connotations of the schedulability of project resources.

First of all, the resources used in a project plan must be safeguarded by organizations.

The organizations we mention here is not the organizations of the project, but those which bear the sources, transfer, rights, or responsibility of the project resources, at the corporate level or external project stakeholders. In simple terms, it is about

"Determination of tasks, human resources and organization." Determination of tasks means there should be a head on each project. Determination of human resources means each project stakeholder should be aware of and willing to undertake their responsibility. Determination of the organization means making the decision on the mechanism and method of cooperation and coordination.

Secondly, a clear understanding of the required quantity, quality, time, and release time of the resources is required. In this case, the problem you need to solve is to make sure the resources are available, suitable, and portable. It is a commonsense that to make sure the resources come in handy, you are required to accurately estimate the quantity and quality of the resources. But most people tend to neglect the fact that there are not enough details in the project plan about the access to the resources. It seems to be the business of some functional departments, but they actually play an important part in a project plan. To make the project resources especially human resources quickly fit into the role, adequate preparations are required for their tasks, their task interface relations, and useful tools. These must also be covered in the project plan. It is also pivotal to smoothly withdraw the resources you have used in order to use them in other projects. To do this, you are required to illustrate how the project knowledge is presented and shared.

Finally, stakeholders will incorporate project resources into its management plan. A lot of resources needed in the project are in control of functional departments. Others are held by stakeholders outside the company. All of these departments or institutions provide services for more than one project. Therefore, it is unrealistic to consciously or unconsciously assume that all the resources they own are available for the project. An effective project plan should match the resources usage plans of these departments or institutions. If you can fail to do it, the effectiveness of the project plan will drop significantly.

3. Changes can be controlled.

Changes are the enemy of plans. Unfortunately, plans and changes are both indispensable just like the two sides of a coin. It is imperative to coordinate these two controversial factors.

In this aspect, several facts should be taken into consideration in the project plan.

Firstly, a stable project framework is required. If the framework is stable enough, the loss caused by changes will be significantly reduced. Most of the changes are due to the changes of clients' demands on the project. Unfortunately, clients cannot be expected to define their demands clearly immediately. It is more rational to recognize that it is our clients' right to change their demands and our obligation to form a stable project framework and baseline to fulfill the project.

The fundamental principle to control changes to the project demand is to allow limited flexibility on the basis of strictly stable framework. To do this, negotiations with clients are required. You are supposed to involve clients and other necessary stakeholders into the process of making the project plan. At least they should take part in the project review. Every promise we make to our clients is conditional. However, clients always remember our promises but forget the conditions. In this point, the result of project is not yielded by our work but our negotiations with stakeholders. Secondly, a project plan should take the combination of stiffness and flexibility into account. The plan should be as flexible as possible by reducing its stiffness. With so many uncertainties in the project, an inflexible plan is ineffective.

A slight move in one part may affect the situation as a whole. This is the true theory of project changes. The flexible schedule commended by some people is usually not applicable to projects. This is because one person's schedule flexibility will trigger a chain reaction to other resources. Different from the work of departments, all project resources are temporary and scheduled at different time periods for different projects. A change in one project plan can affect one or multiple projects. The way to combine the stiffness and flexibility of project plan falls into the following types. The time of getting resources is flexible, but the period of occupying resources is stiff; the time of getting non-critical resources is flexible, but the period of obtaining critical resources is stiff; the control over changes to ordinary activities is flexible but is stiff over critical activities.

Lastly, configuration management can be used to improve the performance of controlling project changes. It is well known that project changes can be assessed with the help of change control board (CCB). However, configuration management has not been applied widely except in fields such as software development. The main purpose of configuration management is to transfer local changes to related parties as soon as possible. Since the changes are inevitable, configuration management plan should be included in the project plan. It is not enough to simply rely on ways such as evaluation and review to control project changes.

4. Problems can be foreseen and traced.

Many problems will occur during the execution phase of the project. "Once there is a potential of making mistakes, you will make mistakes." "A problem always occurs the exact moment you feel everything goes well." "A problem is solved. Another harder problem ensues." These are all sort of theories based on experience. Although problems do not emerge until the implementation of the project, its root cause can be identified in the project plan. A project plan which cannot foresee problems is ineffective as well as harmful, for it will waste a great amount of resources and time during the implementation. Some of the loss may even be irretrievable. Firstly, you need to recognize the project risk systematically. "Defeating enemies without fighting is the cleverest strategy." Likely, to prevent problems from happening is the cleverest way to solve problems. However, there is not way for us to foresee everything. What we can do is try to stay calm when risks occur. Systematical recognition, analysis, disposition, and monitoring methods are required in the project plan. It is also required to have a clear description of whom in charge of what tasks. Necessary resources should be reserved in case of risks. There should also be a clear understanding about the trigger mechanism of risks.

Secondly, the causes of the problems should be traceable. Even if we conduct risk analysis, there is no guarantee that no problems will occur. Therefore, the procedure and methods applied to investigate the problems once they occur should be included in the project plan so as to prevent the same problems from occurring.

Lastly, the method to improve should be included. The essence of the method is to attach equal importance to the system and personnel. Methods should incorporate PDCA (plan-do-check cycle). Communication mechanism and conference plans are also important.

5. Performance can be evaluated.

Projects are outcome-oriented. Whether the project is a success, whether stakeholders undertake their responsibility for the project and realize their promises, and whether the management methods are effective, all of them need to be evaluated. Nearly all projects will be evaluated when it is over. But only a small proportion of them specify how will the evaluation be conducted in their plan. Generally, project evaluation is provided as a stand-alone file. The evaluation methods are like a baton for most people hold the attitude that they should be instructed to evaluate the project.

The forensic-like, postevent critical method is a dead end. What they yield are only excuses. Just as Scott Adams describes, in reality, performance evaluation is the same as finding a dead squirrel in the backyard. The best way to deal with it is to lift it with a stick and cast it to other people's roof. Your neighbors will follow your example. At the end, no one will be unhappy except the dead squirrel.[5] Effective project plan needs to inform stakeholders when, who, and how their contributions to the project will be evaluated. How to evaluate project performance and stakeholders' contributions should form part of the project plan rather than a stand-alone management file.

Firstly, the project plan should include how to evaluate the performance of project team. Here, the object mentioned is project team. As for project team, it seems that everyone knows it well. But all teams are confronted with the same problems that how to encourage team members to share responsibility. Actually, it is not realistic to assume everyone will undertake their responsibility consciously. But we can drive the team members to realize that they should put their personal interests behind them for the time being to achieve the project objectives, which in turn will bring interests to them through evaluation, moderate pressure, and other suitable methods.

At last, methods of distributing interests to teams, team members, functional departments, and stakeholders outside the company should be covered in the project plan. The rights to evaluate, propose, and recommend are also interests. The specified rights to evaluate, propose, and recommend to project managers, functional managers, and stakeholders outside the company can also serve as an effective incentive for them.

Certainly, project plans should cover a lot of other aspects. However, the above 5 aspects are most likely to be neglected. The common state of project plans can be described as a project timeline based on the bargaining between supervisors and subordinates, "clapping a hand to the forehead" and "clapping team members upon the shoulder". Project timeline later will be transformed into a complex graph hung in the conference room, which most people tend to ignore it until the actual deadline is determined by some external factors. This kind of project plans covers various factors such as objective, project duration, cost, quality, and procurement. However, most of them initiate the six-clap movement and thus cannot achieve their objectives.

---

[5]Adam S.: The Dilbert Principle. HarperCollins, New York (1996)

Chapter 11
Develop Real Project Teams

The way ancient sage kings governed their people was that they did not value polymaths, however they would attach much importance to the obedience of their people to make sure that orders issued by them were followed by these people.
—Guanzi • *On Things Forbidden by the Law*

"Team" is one of the most popular words in today's corporate operations. Two decades ago, since there were very few companies ever applying the concept of team and its mode into operation, it became a hot topic when some industry giants such as Volvo, Toyota, and General Food pioneered to do so. Since then, team has been becoming a focus among industry sectors and nonprofit organizations. Even Bill Clinton had set up team development trainings for his major administrators when he was the President of the USA. In academia, research on team building has been drawing an increasing attention.

It is a prerequisite for the success of every single project to build a real project team, which is a major challenge for the project management. It is striking and worthy of consideration to all project managers on what Peter M. Senge questioned in his book *The Fifth Discipline*, "In many teams, all individual members have an IQ of above 120. But why the collective IQ is only 62?"

11.1 Barriers in Project Team Building

What does a real project team mean? What are the barriers in building a project team? The following experiment could help us to understand teams and barriers in team building.

Select any 10 volunteers with about the same heights. Let them carry a long wooden pole that is light and thin. All of the volunteers are required to hold the pole horizontally using their index fingers. Their task is to move the pole from the position of their heads down to the position of their waists. During the whole

process, nobody is allowed to move his or her index fingers away from the pole. Once someone does it, his or her team is judged as fail and has to do it all over again.

Please imagine what kinds of situations would happen to the pole? You might think that the pole could tilt, drop, or spin, etc. However, based on my observations from dozens of experiments, I found that in almost every experiment, the pole was raised up quickly rather than being dropped down.

Barriers in project team building are described in the following aspects.

1. Collaboration leads to nothing but punishment

All of the ten people participating in the experiment had a clear objective, which was to move the pole down. Further, all these ten people hoped to move the pole down. That is, all participating people had a same objective and they were working hard to achieve it. Nobody wanted to damage it. However, the pole was still moved up. There must be a person who gave the pole an upward force. Who did it? Nobody knew because the behavior was subconscious. An act somebody did unintentionally destroyed the collective efforts. The reason we say it is subconscious is that this person still thought what he or she did was good to the whole team. He or she might think, "If I don't exert myself, the pole would leave my fingers and we would have to restart the game." However, when this person put forth his or her strength on holding the pole, others would feel immediately that the pole was moving up. They did not want the pole leave their fingers either, so they had to hold the pole with strengths too, which eventually led to pole moving up.

In a project team, everyone (or most of the team members) would like to finish the project successfully. However, the success is somehow not the first priority to individuals. What is more important to them is to avoid criticisms and punishments. Everybody assigns their own benefits higher priority than the project.

It is natural that people choose to "protect themselves and then obtain achievements." For example, if we want a person run faster, a way to achieve it is to put a dog behind him. When he runs slower, the dog would bite him. Then, would this person run faster because of the dog? No, he wouldn't. He would climb up onto a tree in case the dog bites him. Strategies such as "establishing internal competition mechanism" and "the elimination system to the person graded last in the performance evaluation" force people to always think about how to protect them first, which facilitates the development of such habit.

For an enterprise's departments, it is difficult to keep their production capacities completely consistent with their efficiencies. Suppose there is a company which has two departments: department A and B. The monthly maximum production capacity of department A is 20. Then, we can suppose its monthly production objective is going to be 20 too. This is because if it exceeds 20, apparently the task cannot be completed. If it is set to be only 10, it means that this department can obtain the standard salaries from low-efficiency work. Similarly, if the monthly maximum production capacity of department B is 10, the evaluation criterion is
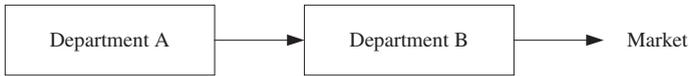
Fig. 11.1   The relationship diagram between department A and B

set to be 10 too. However, departments within an enterprise are interrelated. If the relationship between department A and B is like the one indicated in Fig. 11.1, *then what is the production objective for department A? If it is set to be 20, overstock of interim products would emerge, which causes losses to the enterprise. If it is set to be 10, it means that this department can use half of its work efficiency to obtain the whole salaries. If it is set to be 15, the situation becomes worse because it indicates that on the one hand, department A can obtain high salaries from its low efficiency, and on the other hand, interim products are overstocked.*

Under this situation, many people may suggest a layoff in department A. However, this indicates that a threat of layoff exists in departments that have high efficiencies. Therefore for its own safety, department A would most likely take an action that it looks like it works hard but actually it only produce 10 products per month. We might call this action "active slack in work", which happens in every enterprise. It can bring much more harm than passive slack.

Project success needs close collaboration among project team members, which requires that somebody can make sacrifice locally. However, if sacrifice means suffering losses, the collaboration cannot be formed, and the team cannot be formed either.

2.   Project goals are not challengeable

In the experiment of wooden pole, another reason that the pole is difficult to lower down is that the pole is too light. If we use heavier things made of materials such as metal, it would be much easier to lower it down.

When we develop project goals, it is necessary to make them challengeable. In other words, project teams need pressure. When project pressure matches the capabilities of the team members, such motivation produces positive results. When pressure exceeds the capabilities, project team members will complain or even give up. When the capabilities exceed the pressure they feel, team members might feel bored and arrogant (see Fig. 11.2).

3.   There is a lack of ways to cooperate in sync

If everyone in the wooden pole experiment can keep a same speed, the pole can be easily lowered down. However, it is not easy to keep a same speed. Cooperation in sync is not as easy as you think.

Actually, it can be very easy to lower the pole down, as long as everyone folds his or her hands. Therefore, we need to develop a system or mechanism to control each one's weaknesses, rather than to wish to change everyone's weaknesses. People are capricious but they do not like to be changed. The price to change individual's weaknesses and the low effectiveness of the change might beyond our imagination.

Fig. 11.2 The relationship
between team pressure and
capability
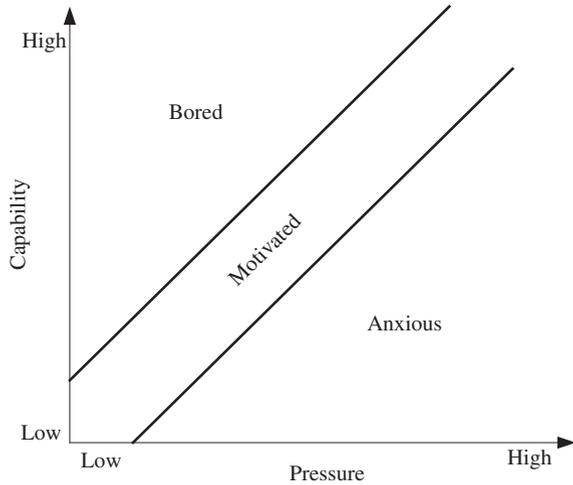
4. **There are too many people**

Another reason that the pole cannot be lowered down smoothly is that there are
too many people participating into the experiment.

More participants do not mean they can finish more jobs. Rather it means they
produce more jobs. People might do some unnecessary jobs in order to prove their
values. Further, more people lead to the rapid increase of the communication dif-
ficulties. When there is only one person, there is no need for communication. One
communication channel is needed for two people to communicate. Three com-
munication channels are needed for three people, and $n(n − 1)/2$ communication
channels are needed for n people. Generally speaking, it is difficult to form a real
team when there are more than 20 people.

*There exists a "people–month fantasy" in project management. That is, when pro-
ject workloads (people and month) are constant, people often think wrongly that
the time needed for completing a project will be shorter when more people are
involved. There is a hidden assumption within this thought: people and time are
exchangeable. It might be true for tasks that can be completely decomposed and
independent. But for tasks that are complex and need close collaboration, it might
lead to the situation that more people lead to longer duration.*

It is not difficult for us to summarize from the above discussion that what a real
project team is.

*Project team refers to a small group of people that have complementary skills
and are willing to assume responsibilities for collective and challengeable project
goals as well as methods.*

11.2 Select Appropriate Team Members

It is not necessary that a real project team will be formed once appropriate members are in place. However, it is definitely a case that a real team will not be formed once inappropriate members are on board. Therefore, it is vital for a team to select appropriate members. Finding appropriate members means half success for a project.

In general the personnel in an enterprise can be classified into four types: those that agree with the enterprise values and have the capabilities the enterprise requires; those that do not agree with the enterprise values and do not have the capabilities the enterprise requires; those that agree with the enterprise values but do not have the capabilities the enterprise requires; and those that do not agree with the enterprise values but have the capabilities the enterprise requires. It is easy to deal with the first and the second types of people, which are putting them in important positions and firing them, respectively. However, it is not easy to deal with the third and the fourth types of people. The typical people of the third type are those experienced employees. They are very loyal to the enterprise and they are very responsible. But their knowledge and abilities are getting outdated with the increase of their ages. If we simply fire them, we might disappoint them deeply. The typical people of the fourth type are "airborne people". Enterprises dig this kind of people from somewhere else in order to put them in important positions. However, they might not have the same mind with the enterprises. Further, introducing such kind of people might force their own talented employees quit. Therefore, project managers should only choose the first type of people, that is, those people that agree with the enterprise values and have the abilities the enterprise requires.

There are many criteria for selecting appropriate members, which can be described mainly in the following four aspects.

1. The member should possess task-related knowledge and skills, which is the most fundamental requirement. To have such members, project managers need to decompose project tasks and define the knowledge and skills required for each task. Generally speaking, an effective team needs three types of members who possess different skills, i.e., people who have technical skills; people who have capabilities to define problems and make decisions; and people who are good at solving conflicts and establishing human relations. These people's skills, abilities, and knowledge structure should be supplemental to each other.
2. The member should be interested in the project tasks and can keep his or her promises. Interests are the best incentives for motivating people. When a person can devote himself completely to a job, his potentials can better motivated which allows him do the job in a better way. If a person does not like the job he is doing, he might have emotional resistance toward the job, which makes it difficult to guarantee the quality and schedule of the job.

3. The member should have time to attend the project. All teams want to find talents or experts to join. However, as talents or experts are expected and chased up by all project teams, they are busy with various projects or their jobs. Many project failures are not due to lack of professional skills of their team members. Rather, these members do not put adequate time into these projects.
4. The member should enjoy team collaboration. It is common to see "technical cowboys" in projects. These people have excellent technical skills, but they are not willing to collaborate with others. The participation of these people usually can do a lot of harm to the development of project teams.

Every enterprise has its own human resource management information system. Generally speaking, this kind of system includes the following information: employee name, age, place of origin, the records of awards or punishments and so on. However, these types of basic information are not sufficient. To establish an effective project team rapidly, an enterprise needs to develop a database for human resource information as illustrated in Fig. 11.3, which includes the following contents.

1. Successful project experience. It is a common sense of management that "try best to make full use of one's advantages instead of focusing on changing someone's disadvantages." An enterprise might have many projects. These projects might be all new, but in general they are somehow same or similar to previous projects that were undertaken by the enterprise. Therefore, it is very necessary to find those people who have similar project experiences. The "successful project experiences" in the human resource information system document such information as what projects an employee has successfully worked on, what responsibilities he or she assumed and related information about the projects.
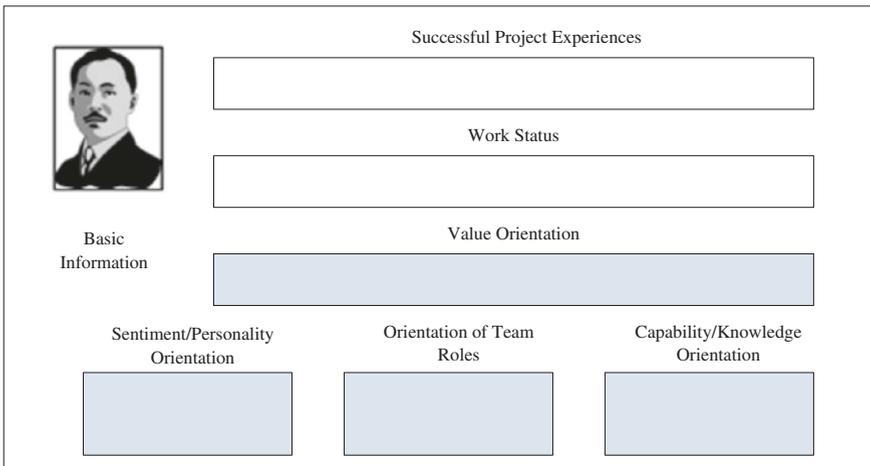
Fig. 11.3   The structure of the database for human resource information

2. Employee's work status. It is not enough to just find people with similar project experiences. The enterprise also needs to understand the work status of the employee, what kind of projects (tasks) he or she is assuming currently, the degree of work saturation, and the overall workload of the employees in the enterprise. Based on this kind of information, an enterprise is able to decide which employees have time to devote to the projects.

3. Employee's value orientation. Value orientation refers to the things employees emphasize and their preferences on these things. Generally speaking, there are three reasons why an employee works for an enterprise: the enterprise image (which can motivate the employees' sense of pride and add to their resumes), salaries, and the opportunities of improving their professional capabilities. Understanding this information can help enterprises to prepare for attracting and motivating human resources.

4. Sentiment/personality orientation. Psychologists and management scientists have developed a series of methods to evaluate people's psychology and personality. Myers–Briggs's classification is one of the most famous methods, which classifies people using four characteristics, i.e., extraversion–introversion, sensing–intuition, thinking–feeling, and judging–perceiving. These four pairs of characteristics can classify people into 16 types.[1] Each personality type is related to some behavioral characteristics. If we know the personality types of project team members, we can quickly predict their behaviors in different environments. This is paramount not only to project managers, but also for the harmony among project team members.

5. The orientation of team roles. Based on the results of research on organizational behavior, people intend to play 9 different team roles.

   (a) Creators. This kind of people is imaginative. They are good at proposing new ideas or concepts. They would like to work according to their own habits and ways. They do not like to be constrained by teams.

   (b) Explorers. This kind of people is willing to accept and support new ideas and they are good at utilizing new ideas.

   (c) Organizers. This kind of people likes to make operational procedures to turn new ideas to outcomes. They are good at making plans and organizing human resources.

   (d) Producers. This kind of people assumes concrete production tasks in teams. It is them who turn ideas into outcomes personally. What makes them pride is that their products meet the quality criteria or they themselves have super professional technical skills.

   (e) Inspectors. This kind of people cares most about whether regulations and policies are complied with. They are good at inspecting details to avoid mistakes in work.

---

[1]For detailed information about Myers–Briggs, please refer to Managing Projects in Organizations, authored by Frame, J.D. and translated by BaozhuGuo, World Book Inc., Beijing, 2000: 66–76.

(f) Maintainers. This kind of people has strong sense of principle. They can actively support other team members and enhance the stability of the team.

(g) Listeners. This kind of people is good audience. They are good at collecting information for the team.

(h) Assessors. This kind of people has strong analytical abilities. They are good at analyzing and assessing project plans.

(i) Coordinators. This kind of people works hard to establish cooperation relationships among team members.

If we decide the roles of the team members using responsibility matrix that is only based on professional skills and qualifications, we will face a number of difficulties when building a real project team. Usually, there are only two or three roles that people would be happy to play.

Management personnel must understand individual advantages each team member can contribute to the team. Based on this information, they can select team members and assign them team roles.[2]

6. Capability/knowledge orientation. The information system also needs to document the hierarchical levels of technical skills an employee possesses, such as the levels of Delphi and the Java programming language. Only when we are in charge of the above information, we can dynamically transfer employees and then achieve employee management at different levels. Contract system of project organization can be realized with this information too. Further, if some employees quit, we can quickly make judgment on issues such as the number of people that can substitute these employees, and the types of training required for them to reach at the same level as those employees who left.

11.3 Quickly Identify the Characteristics of the Project Team Members

One of the major challenges in project management is that project managers must be able to quickly identify the personality characteristics of project team members and can adopt corresponding strategies to deal with them so that they can work for the projects.

Although Myer–Briggs test can help us to analyze different types of personality, it is not direct and not easy to use. There are many other investigation methods that can help us to make judgments on human beings' personality. However, people prefer to choose "good" answers than "real" answers when they fill out surveys.

It is commonly seen in business activities that someone introduces him or herself with such words "Mr. Zhang, this is our first time to meet. You might not

---

[2]Please refer to the following book for the method to decide what kind of roles each member is suitable for Robins, S.P. Organizational Behavior. Beijing, China Renmin University Press, 1997.

know me well, but I am….." But it does not work for project managers. It is a crucial weakness of project managers if they cannot quickly identify a person and cannot carry out targeted business activities based on the person's characteristics. In other words, project managers must be able to quickly identify the types of the people they meet. Examples of these people can be the members of a project that is just temporarily organized or the clients they first meet. Further, project managers should adopt interaction methods that match these people's characteristics. Only in this way can the projects have good foundations. Of course, project managers cannot require these people to fill out personality questionnaires; neither can project managers ask them to provide information such as their birth dates, blood types, and constellation types. They can only identify the personality characteristics of the people they interact with based on their own observations.

There are two ways to treat people. The first is "treat others as you would like they treat you." This method is only effective in certain situations. You do not necessarily share the same view with others. Therefore, there is an alternative, which is "treat others as what they would like to be treated." This approach might work better in the business context. Therefore, the first approach can be called as "the golden rule", and the second approach can be called as "the platinum rule".[3]

Human being's personality can usually be reflected in their talks and behaviors. At the same time, there is no personality that is absolutely good or bad. Human being's personality is classified into four types (see Fig. 11.4).

In Fig. 11.4, straightness, flexibility, openness, and over-cautiousness indicate four types of personality characteristics, respectively. Each personality characteristic has its own advantages and disadvantages. The dimension of straightness–flexibility refers to the degree one can influence others and control the situation. Flexibility means one wants to avoid risks and is indecisive, which sounds not good. On the other hand, flexibility also means one would like to follow good advices, and one is patient and good at asking and listening. All these are good characteristics. People who are flexible do not like taking risks and they are indecisive in doing things; however, this kind of people likes to listen to others and they are indirect in expressing their own opinions. On the contrary, people with straightness are willing to take risks. They are good at making decisions, but they are lack of patience.

The dimension of openness–over-cautiousness refers to people's internal thoughts, emotions, and intentions. People with openness are easygoing, warmhearted, and value interpersonal interaction. But they usually have no sense of time, and they do not like to do concrete things. They are flexible and good at adapting themselves to circumstances. They usually do not have strong principles. Over-cautiousness is in contrast with openness. People with over-cautiousness are conscientious but mechanical. They are introversive in emotional aspects and prefer detailed plans. They value work and neglect human emotions.

---

[3]The platinum rule proposed by Dr. Tony Alessandra and Dr. Michael O'Connor is a simple and effective method provided to project managers to observe personality. Please refer to the following book for its details Alessandra, T. and O'Connor, M. The Platinum Rule. Beijing: Economic Daily Press, 1998.

Openness

Avoid risks, indecisive, good at following dvices, patient, good at asking and listening

Relaxed, warm-hearted, like discussing principles, value interpersonal relationships, emotional, weak sense of time

Flexibility ——————————————————— Straightness

Conscientious but mechanical, follow rules, pragmatic, value work, conceal their emotions, strong sense of time

Willing to take risks, good at making decisions, face up to reality, good at expression, lack of patience

Overcautiousness

Fig. 11.4 The coordinate classification of human being's personality characteristics

The combination of these two dimensions results in four types of people, as illustrated in Fig. 11.5.

1. Instructional type

The instructional type of people refers to those that are mainly characterized by straightness and over-cautiousness. This kind of people dares to say and dares to do. They are willing to take risks and make decisions. This kind of people considers more about jobs than emotional problems. They are conscientious in doing things, and they value more about outcomes than the details in work.

Openness

Collaborative Type   Social Activity Type

Flexibility ——————————————————— Straightness

Rational Type   Instructional Type

Overcautiousness
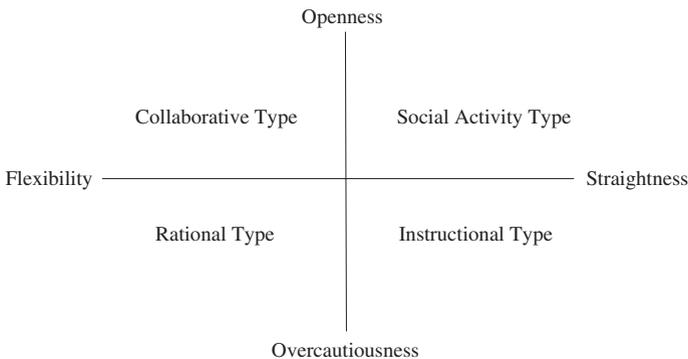
Fig. 11.5 The coordinate classification of the types of human being's personalities

The instructional type of people is usually ambitious. Their main objective is to do a good job. They speak fast and sonorously. Usually, they speak with some waving gestures. They talk much and listen little. They usually talks about some powerful statements and judgments, rather than proposing some questions. They are good at instructing others to achieve outcomes.

Superiors with instructional characteristics appreciate people that can complete tasks and are willing to face challenges and assume responsibilities. They cherish those subordinates that can fulfill performance objectives, or even are partial to their shortcomings. To interact with such superiors, you need to express your opinions directly and report your progress concisely. You need to provide potential solutions for the superiors to choose, rather than just proposing questions.

Subordinates with instructional characteristics usually are good at managing on their own. They do not like to report or ask for instructions for everything to their superiors. They can take full use of their authorities. Such subordinates also value work and outcomes. They do not care about the work details. They are capable persons and usually do not make mistakes. However, once they do make mistakes, these mistakes are quite troublesome. Therefore, we should strengthen our supervision and instruction to this kind of subordinates.

2. Social activity type

The social activity type of people refers to those that are mainly characterized by straightness and openness. This kind of people is open-minded, warmhearted, and easygoing. They value more on human emotions than on work principles. They have a lot of new thoughts. They are good at expressing and talking. But they are lack of patience and perseverance.

Similarly to people with instructional characteristics, social activity type of people is extroversive. But this kind of people is better at communication, making jokes, and is full of fun. Their interests are more on people. They do not like instructional type of people, who puts more emphasis on jobs. They talk more about people and ideas. They like to use emotional words. Similar to instructional type of people, they lack in patience.

Superiors with social activity characteristics like their subordinates to show appreciations to their charisma. They like to propose ideas to their subordinates rather than to make decisions from their suggestions. They usually can propose some great ideas to their subordinates. But their changeable thinking often confuses the subordinates.

Subordinates with social activity characteristics wish to get respects and appreciation from their superiors and other colleagues on their personality, ways of thinking, and new opinions. But they might not be enthusiastic to their work as to other people. Therefore, it is necessary to remind them that it is not enough to just have great thoughts. They must also achieve job outcomes.

3. Collaborative type

The collaborative type of people refers to those that are mainly characterized by openness and flexibility. This kind of people is easygoing. They value interpersonal

relationships and are sensitive to people's emotions. However, they do not like taking risks. They are not good at expression. They are more willing to listen.

Collaborative type of people has a measured sense in talking. When they want to talk, it is usually because they have questions to ask, rather than that they want to disclose their thoughts or feelings. They are good with people and are sensitive. They like asking others what their opinions are. It is very rare for them to impose their opinions on others.

Superiors with collaborative characteristics usually do not criticize their subordinates harshly, not to mention sarcasm. This kind of superiors is good at solving interpersonal conflicts, but they do not like risks. Their attitudes toward innovation are "it is good to lead a step in advance, but it is much worse to lead two steps further." Therefore, you need to look for advices widely before proposing suggestions to this kind of superiors. "Jointly sign" usually is an effective way to deal with this kind of superiors.

Showing care is needed when we deal with subordinates with collaborative characteristics. We need to praise for their goodness, humbleness, and good relationships with colleagues. Moreover, we need to encourage them to take responsibilities.

4. Rational type

The rational type of people refers to those that are mainly characterized by flexibility and over-cautiousness. This kind of people avoids risks and is indecisive. They value work rather than interpersonal relationships. They are very conscientious in doing things. They have a strong sense of time, which might lead to the loss of flexibility in some cases.

If we can say the laughs from the instructional type of people are ungoverned, those from the social activity type of people are exaggerated and performing, and those from collaborative type of people are humble, then the laughs from rational type of people are no laugh at all. The rational type of people is serious. They always give others a feeling that they are reserved and unhurried. They have clear minds and are mavericks. They are conscientious in doing things and do not like to talk. Different from the collaborative type, the rational type of people hides their edges under the surface of peacefulness. They hope to solve problems and do things right.

Superiors with rational characteristics usually have great memories. Their strict requirements on job details and their deep understanding of professional knowledge usually make subordinates feel a lot of pressure. Therefore, they need to be more tolerant with their subordinates, and know how to authorize and how to motivate the subordinates' enthusiasm. Of course, subordinates need to particularly make full preparation on logic and details when they interact with such superiors. This kind of superiors appreciates people with strong professional skills.

Subordinates with rational characteristics are the ones that need least supervision and encouragement on their jobs. They work very hard on the jobs they are interested. Sometimes they might work too hard. But they often get into a situation that they only focus on some details while forget the whole. That is, they are often intoxicated by their business while forget what the purpose is to work. Further,

they might feel wandering and helpless when they face jobs that they are not good at or not interested in.

Let us imagine a scene that describes the first management meeting in a company after the Spring Festival. The boss walked in when the managers were chatting on interesting things they found during the Spring Festival.

If the boss were a social activity type of person, what would he do? He would make jokes with these managers, or even have some gestures such as backslapping and arm-punching. His arrival would make the meeting atmosphere more living. Then he would say "Ok. Let's stop making nonsense and have the meeting." Who was making nonsense? It was the boss himself.

If the boss were an instructional type of person, what would he do next? He would sit on his chair after he walked into the meeting room and then clear his throat: "Everybody is here, right? Let's have the meeting." The meeting room was quiet down immediately.

If the boss were a collaborative type of person, he would chat first with his colleague after he walked into the meeting room: "Did everybody have a wonderful Spring Festival? The Spring Festival had passed and I'm afraid you still have to work hard this year." The whole meeting was carrying on in a relaxed atmosphere.

If the boss were a rational type of person, he would talk about the annual plan in a slow manner after he walked into the meeting room. Some people might just realize that the meeting had been started after he has talked for a while.

In reality, very few people can match exactly with one of the types that are discussed above. Many people have a mixed personality. Further, the way people talk and behave would change along with the changes of occasions and moods. However, we can still identify their main personality characteristics through careful observation and consequently adopt corresponding methods to deal with them.

11.4 Project Team's Capability Comes from Team Cohesion

What project teams need most is cohesion. Project groups that are lack of cohesion are difficult to form teams and therefore ineffective.

We have five fingers and which one is most important? Some people might say it is the thumb, and others might say it is the middle finger. Some others might see the five fingers are equally important. Different people have different opinions. In fact, it is the finger that you accidentally broke. Similarly, in a team the most important thing is the cohesion.

Project cohesion refers to the harmony among project (including the project characteristics, its clients, and other stakeholders), project team and project management mechanisms (including project tools and methods), which is illustrated in Fig. 11.6.

Fig. 11.6 Project cohesion
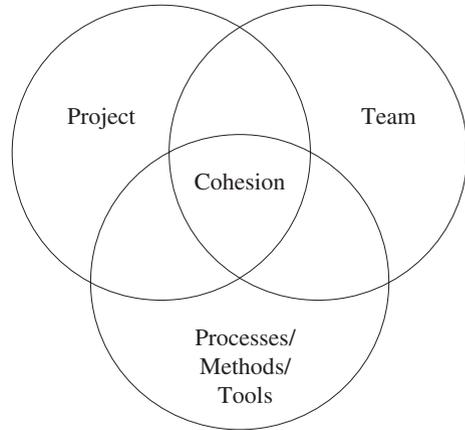
The cohesion among project group members is the basis for project groups becoming project teams as well as the project success. To become a real team, project group members must be able to support each other and take responsibilities together. When projects are complex and therefore impossible to clearly and accurately assign each member with responsibilities, the cohesive interpersonal relationships among project group members cannot be replaced by any policies and regulations. One of the major reasons a project team cannot fulfill its functions is that managers pay too much attention on the knowledge and skills a member should have, while neglecting the personality differences among team members.

Project team members must have supplementary skills, which should include supplementary personality characteristics. For examples, the instructional type of people can always keep the team with clear project directions, help the team establish achievement awareness, and can motivate members to overcome obstacles. The social activity type of people is a master in resolving team conflicts. As long as we have this type of people in a project team, the internal conflicts would not develop into an unmanageable disaster. The collaborative type of people is born partners and is the lubricant of the project team. The rational type of people is rigorous analysts and always hops to achieve better on quality. They can help project teams identify project scopes and risks. They can also develop reliable project plans and guarantee project quality can be controlled.

Of course, a team consisted of team members with diverse personalities can also bring troubles to the management. If a member in a project team does not understand how to adapt to and appreciate other types of personality, the misunderstandings will emerge which will isolate team members. There is detrimental to forming the team.

Therefore, the selection of project team members should follow the procedure illustrated in Fig. 11.7.

The selection of project team members is built upon work analysis. Tools such as work breakdown structure (WBS) can be used in work analysis. The results of work analysis are which tasks are included in the project and what knowledge and skills are required to complete the tasks, which need careful definition.
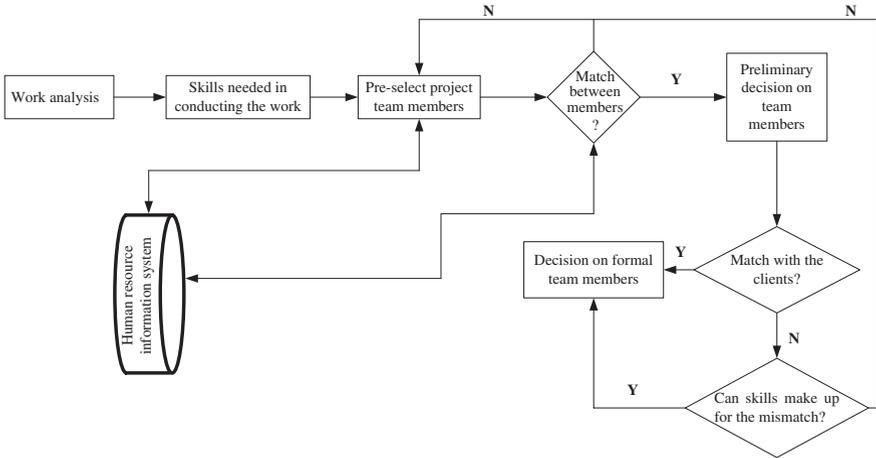
Fig. 11.7 The selection of project team members

After defining the knowledge and skills needed to finish the project, we need to identify the personnel who have these knowledge and skills. This process is called preselection of project group members. If the enterprise has the aforementioned human resource management information system, this step can be done through its "successful project experiences", "work status", and "knowledge and capability orientation". This step also determines if the project group matches the project characteristics.

After preselecting project group members, we need to examine whether these members can get along with each other, if they are matching with each other on personality, and if they are capable of their team roles. If the answer is yes, we can preliminarily assign them as project team members. If not, we will have to reselect project team members. This step can be done through analyzing "sentiment/personality orientation" and "the orientation of team roles" in the human resource management information system.

In the recruitment process at Microsoft, if a recruitment team consists of 7 people and 2 of them think that a candidate is not qualified, then this person will not be hired. If a recruitment team consists of 4 people and 1 of them thinks that a candidate is not qualified, then this person will not be hired. The reason is that, the cohesive relationship among team members plays a crucial role in a project team.

If project group members achieve cohesion with each other, then we need to see whether these members can be harmonious with the clients. We need to emphasize again that project tasks need to be completed together by project teams and other stakeholders especially clients. Without supports from the clients to the project, it is difficult to realize project objectives, not to mention to satisfy clients' requirements. If a preselected member can get along with the clients, then this person can be decided as formal team members. If this member cannot get along with

the clients, we still need to see whether the skills this person has can make up for the weakness. If the knowledge and skills the project group member has are really excellent and can make up for the disharmony the member has with the clients in interpersonal relationships, then this person can become formal members. Otherwise, project group members need to be reselected.

For those projects that consider achieving final objectives as key tasks, people with instructional characteristics play the leading roles. A project team that is dominated by instructional type of people likes challenges. They can make the project situation under control and have problems solved.
When projects' key tasks are emphasizing people's emotional needs and spiritual realms, people with social activity characteristics play the leading roles. Since they value more on human beings and would never like to see interpersonal conflicts, they would try their best to seek various methods to reduce tensions among different people.
When projects' key tasks are mutual collaboration, people with collaborative characteristics will become best candidates since they are most happy to tolerate with different opinions. Project teams dominated by the collaborative type of people can extensively collect different thoughts and develop a great solution by synthesizing each one's wisdom.
When projects' key tasks are to develop deliberate plans to keep objectives realized, people with rational characteristics will become the most important. A project team dominated by the rational type of people does things in a very organized manner. They can first make full estimation on every possible project risks and then develop a detailed solution to each type of risk.

It is critical to maintain the cohesion among project team members and cohesion between project teams and the tasks as well as characteristics of projects. In addition, it is also crucial to select the appropriate project management methodology. During the selection of project team members, it is easy to make such assumption: as long as the selected team members have work capabilities and enthusiasm, everything will be ok. In fact, project teams can produce good performance only under the conditions that they adopt proper management mechanisms, tools, and methods that are consistent with the team tasks and the characteristics of the team members. Otherwise, it cannot only reduce team effectiveness, but also cause team conflicts that might lead to the collapse of the team.

11.5 Make a Project Team Go Through a Complete Life Cycle

Projects have life cycles. Similarly, project teams also have life cycles. A typical project team goes through 5 different stages from the establishment to disbandment, namely forming, storming, norming, performing, and adjourning stages.

1. Forming stage

Forming stage refers to the establishing phase of a project team. The main characteristic of the team in this stage is "politeness". Team members just arrive and may not know one another well. They gather together with their own expectations on the project and on themselves. They are very polite to each other.

During the forming stage of project teams, it is very important to clarify project goals and project team's working principles and methods and make them as a common focus for everyone. Project teams must be able to shorten this period. During this stage, every member controls his or her behaviors intentionally or unintentionally. But they might ask some questions in private such as, does this team deserve my endeavor? Am I suitable for this team? Is it better to be an outsider? Who can be my friends and who might be my opponents?

It is very important to let project team members assimilated to the team psychologically. Therefore, people with instructional characteristics will play important roles since they are good at analyzing problems and defining concepts. Based on their rational analysis abilities, they can make project team members understand the real purpose of the project and the benefits of having collaboration. They can also help team members decide on how to start.

Management styles vary significantly in different team development stages. The best management style for the forming stage is a combination of the two methods in terms of participation and centralization of power. By encouraging team members to participate, we can let them strengthen their mutual understandings and trust, and collect more ideas about project plans and associated risks. Through centralization of power, we can unify diverse focuses from various team members.

A colonel wanted to select an assistant from three excellent captains. This position was very important and was responsible for many managerial tasks. The colonel called in these three captains separately and assigned them with the same task: everyone led a squad of soldiers and set up an arm flag in front of their barracks. The captains knew this task was very important to them and they worked very hard on it. After they completed the task, they were called in again separately into the colonel's office to report their work process. The first captain reported "I assigned everyone with clear tasks and everybody worked based on his assignment. I watched them during the whole process." The second captain said "we first held a meeting to discuss how to conduct this job. We finished the job based on our discussion." The third captain reported that "I called in the squad leader and assigned the task to him. I also told him that he could come to me if he needed my support. Later, the squad leader finished the task with his subordinates."

Management styles refer to the methods superiors use to deal with subordinates. The first captain adopted a management style of centralization of power. This style is suitable for situations such as the tasks are urgent, or it is difficult to reach agreements and mandatory methods are needed at the same time. The second captain adopted a participatory management style. This method can be used when time is sufficient, and innovation, collaboration, and team spirit are needed. The third captain adopted an authorization management style. This style can be used

when the subordinates have abilities to take responsibilities and when we want to cultivate the subordinates.

Same to people's characteristics, there are no absolute good or bad styles in management. They are good management styles when they match the tasks and the personnel's characteristics. Otherwise, they are bad management styles.

2. Storming stage

When project teams begin to work, they will face various problems and have different types of conflicts among team members. This stage is called the storming stage of a team. Many teams come to an end because they cannot survive during this stage.

This stage is troublesome. After a short period of politeness, people are not satisfied with only spiritual motivations. Practical problems often confuse them. Project team members begin to feel the challenges and difficulties in completing project tasks. They begin to have different understandings about project views and methods. During this stage, it is not practical to assume that team members will keep cohesion and devote themselves to work.

During this stage, a project team must know how to deal with issues such as authority and principles. To do this, the team members must frequently communicate and collaborate with others, and propose more constructive ideas and suggestions. Otherwise, the team might be unraveling. Therefore, people with social activity characteristics should play their important roles here. They should encourage other team members to communicate with one another so that they could pay more attention to teamwork. They can also help them establish team spirit.

Many project teams cannot survive this stage. They might be busy with various negotiation meetings. Although people tell one another that they should cooperate with absolute sincerity, in fact it seldom achieves ideal effect. Project team members take precautions against or attack one another, and they do not see themselves as a part of the team.

At this stage, project managers need to adopt the three management styles simultaneously in terms of centralization of power, participation, and authorization. As a manager, first you need to encourage others to communicate and interact since many misunderstandings and conflicts come from little communication. Second, you need to authorize intentionally to those people that share same views with you, which cannot only motivate these people, but also allow more people to help you get more supports. Lastly, you can adopt the style of centralization of power. No matter how, you cannot forget that you are the manager, and you need to take full responsibilities for realizing the project outcomes.

3. Norming stage

If a project team can go through the storming stage safely, it enters the third stage of a team life cycle, i.e., norming stage.

At this stage, project team members begin to have fewer conflicts and more agreements on many aspects. With compatibility from the storming stage, the necessity of communication and collaboration is widely accepted. The team begins

to establish mutually agreed-upon behavioral standards and values. Team performance and morale begin to increase. The self-awareness of team members is gradually replaced with team-awareness, and team efficiency gets improved obviously.

During this stage, people with collaborative characteristics begin to play important roles quietly because they are good at tolerating with different opinions and they are able to convert personality differences and opinion divergence among members into joint forces in work.

The feasible management styles at this stage are also participation, authorization, and centralization of power. Compared to the storming stage, the frequency of using authorization gets obviously increased, while the frequency of using centralization of power is reduced gradually.

4. Performing stage

At this stage, project teams have become effective teams. Team members are proud of their teams, and they know how to collaborate and support each other. The teams have high morale and everyone in the teams has make self-management and self-constraint as his or her habit. The characteristic of this stage is delivery, which means a lot of project objectives will be achieved.

People with instructional characteristics are needed in the first three stages, because they can make decisions and remedy situations. However, at this performing stage, this kind of people is not very useful. Further, this kind of autocratic and tough management method might lead to new phenomenon of disharmony and consequently reduced the team efficiency. At this stage, people with rational type perform effectively. They know how to make best use of their professional capabilities. Of course, the management style at this stage is dominated by authorization.

5. Adjourning stage

Toward the project completion, project team members are leaving the team. This stage is called a project team's adjourning stage. If new members join in, the team enters the forming stage of a new project team.

Low efficiency might occur at this stage because project teams face adjustments and many team members must consider where to go in future. At this stage, people with the four different characteristics are all useful: people with instructional characteristics are needed to make sure projects can be delivered; people with collaborative characteristics are needed to reconcile with performance evaluation; people with social activity characteristics are needed to make sure team members have good memory about the team and get rid of their worries about future work; people with rational characteristics are needed to guarantee the qualities of the project deliverables so that no problems emerge after team members leave the projects. This stage also requires the three management styles in terms of centralization of power, participation, and authorization, i.e., to accumulate team experiences and lessons through participation, to maintain team efficiency through authorization, and to deal with conflicts in evaluation and distribution through centralization of power.

There is one more thing to point out about project teams' life cycles. Although both projects and project teams have life cycles, the lengths of these two cycles are not the same. The stages and processes in project life cycles might be completed by different teams, which all go through the five stages. It is very unusual that a project is completed by only a single project team from start to finish.

11.6 Improve the Project Teams' Execution Ability

Under rapid changing business environments, any strategic objectives of an enterprise are achieved through specific projects. The critical role of project management is to guarantee the delivery of project outcomes, which needs actions. However, it is not easy to take actions.

Changing people's mind-set is fundamental to improve a project's execution ability and to improve the degree of implementation of modern project management methods in an enterprise. However, it is far from adequate to simply change mind-set as environments for taking execution actions also need to be developed. Further, we need to conduct the following managerial tasks.

1. A role model transcend all

Many enterprise "leaders" like to hear words like "execution ability" and "no excuses at all". Books written on these aspects are also very popular. General managers in enterprises buy most of them and distribute to their employees. However, these general managers forget such a fact employees are smart, and they do not easily believe in what the bosses have said. Rather, they value more on what the bosses do. If the bosses require the subordinates finish project plans carefully while they themselves are casual; or they require the subordinates to fill out project diary while their own dairies are mysterious; or they require the subordinates to cut down their project expenditures while they spend wastefully, then do not count on the subordinates to execute effectively. These kinds of leaders' behaviors will lead to the situations such as "where there is a measure, there is a countermeasure", and "everybody is busy with covering the truth". We cannot deny that top management in enterprises need to take a broad and long-term view. But to Chinese enterprises, they must set examples in many detailed and tedious basic managerial work.

To improve a project's execution abilities, it is very helpful for enterprise managers to remember this sentence: "you must first become a madman of project management, otherwise problems in project management will make you a madman". To improve the subordinates' execution abilities, general managers must first improve their own execution abilities. Otherwise, employees could have low morale and it becomes difficult to lead them. A typical example is having a meeting. An enterprise usually needs to hold hundreds of meetings during a year. However, it is very rare these meetings started and finished on time. In most cases, these meetings only have starting time and do not have finishing time, and they do not have expected outcomes or conclusions either. If general managers in

enterprises cannot control such simple projects as holding meetings, how could they expect employees to manage more complex projects in an effective way?

2. Each person fulfills his or her own duty

There is a very popular word recently, which is called "guaranteed satisfactory solution system". We often run into such situations in enterprises, which is whoever taking the first inquiry must be responsible for a guaranteed satisfactory solution. As time passes, people begin to understand that since the person who takes the first inquiry will take the responsibilities, then it is better not to be the first person.

Guaranteed satisfactory solution system is a method that guarantees that a task is taken care of. However, helplessness about unclear responsibilities is actually behind this method. Further, it implies that the more competent a person is, the more troublesome tasks he or she will be assigned to. This is a method to increase the failure possibilities of those that are competent. No matter how great it sounds to praise employees with words such as "take on heavy responsibilities", and "have the spirit of dedication", they will not be fooled. They will try to do things that can be done with artful behaviors or things that are much ballyhooed. It is a common managerial phenomenon that "a cat is catching a mouse and the mouse is teasing the cat". However, it is funny that managers and subordinates are born actors and they both think that they are great at acting.

To improve project execution abilities, employees must acknowledge that completing a project is their responsibilities. If the employees think that there are other things that are more important than improving project execution abilities, or if they think this is beyond their responsibilities, they will try to find thousands of reasons to do things following their own thoughts. Common situations might be described as follows. Project teams are busy with completing tasks. However, due to schedule and budget pressures, the way they complete the tasks might be like two crazy women fighting, which has no clear moves and the only purpose is to control the other. In these situations, we cannot ask them to learn and use formal moves, or we might be mocked. Therefore, there must be specialized people who study the feasible project management methods in the enterprise. They can train the employees to develop habits in idle times, so that these habits can be used during projects. Corresponding functional departments, especially those project management departments should take the responsibilities to research and identify project management methods that are most appropriate for their enterprises, and to use them to train the employees. If we only count on project teams, it might be difficult to improve execution abilities. Further, people might lose confidence on the project management.

3. Fostera safe atmosphere

People are capricious but they do not like to be changed. If we want to change people's work habits, we must first make sure that they feel safe. If changes bring people with insecurity or fear, the significant resistance from changes will be

expected. In fiercely competitive workplaces, anything that brings insecurity to employees' professions will be captured acutely. When they can predict the negative effects of doing such things, they either find ways to ask others to do them, or they try their bests to prevent these things from being done.

The acquisition and sharing of skills and knowledge from employees will improve the project execution efficiency of the whole enterprise. However, employees would think that this kind of improvement would bring risks to their professional security. Therefore, they would not like to share their skills and knowledge with others so that they are treated as the indispensable people. In this way, they can keep a sense of security even when the enterprise is declining. Although it is well known that "sharpening your knife won't waste your time for cutting your faggot", "sharping your knife" might do "waste your time for cutting your faggot" temporarily when we refer to a specific project. If this kind of delay can lead to punishment, people will not "sharp their knives". Instead, they would rather give others blunt knives and let them suffer. Enterprise general managers always want employees adopt modern project management methods, but in general, they would not allow waste of time temporarily. However, if whoever follows orders gets published, the execution ability will never be achieved.

4. Grasp the rhythm of management

Rome was not built in one day. Many enterprises wish they could have super management skills in one day. They introduce many new concepts in management, which only results in insufficient absorption. It only brings much money to consulting companies while does a lot of harm to themselves. To management, there are only wrong answers while no right answers exist. In other words, it is not proper to use yes or no to assess the management. Rather, appropriateness and effectiveness should be adopted.

The implementation of project management methods in enterprises can start from improving organizational methods and processes. If it starts from areas like training, the effect is too slow and general managers generally are not that patient. If it starts directly from introducing advanced methods such as network plan and earned value method, it might be too eager to achieve any success and bring no effect. Further, people might lose confidence in modern project management. Many enterprises talk about management by objectives and quantitative assessment when they are not ready for fundamental preparations yet. This kind of positive actions without systematic thinking can only decrease executive abilities.

A simple but effective way is not to eagerly improve project execution abilities and link introducing modern project management methods with evaluation and benefit distribution. Rather, it should start from reforming project meetings. Project meetings can strengthen areas such as the evaluation of project plans, the variance analysis of the results from plans and from reality, and the development of corrective actions. This not only helps to improve the project performance, but also avoids buck-passing caused by lining up with benefits, which makes it hard to find truth. This method does not mean to give up the performance evaluation. In fact,

if some people cannot finish tasks frequently, they will have hard times in project meetings. Further, it will become well-known evidences when their positions need to be adjusted.

Apart from paying attention to the above four aspects, the following three points should be avoided in order to improve execution abilities.

1.   Avoid that technical skills become great excuses

Although a lot of statistics have revealed that project failure is mainly due to organization and management, very few projects fail due to technical skills (about 4 %). "Technical skills" is, however, one of the most commonly cited reasons during the execution process of projects.

"Laymen lead experts" is criticized widely, but is hard to avoid in project management. No matter whether project managers have professional backgrounds or not, there are always some technical problems that they do not understand. For professional technical personnel, they would not like to accept managers that do not know technical skills psychologically or subconsciously. Therefore, when projects suffer problems such as low efficiency or delayed schedules, "technical reasons" becomes the best excuse for technical personnel. On the other hand, because they are not technical experts, managers are not confident in management. When technical personnel uses "technical reasons" as the excuse, managers could not make judgment and would have to accept this "truth" even they might be suspicious. Further, the top managers in enterprises might also be laymen to technical skills. The managers what are responsible for the projects would also like to use "technical reasons" to argue for themselves to pass on responsibilities. As time passes, "technical reasons" become a great excuse, which is amazingly powerful and is used widely.

2.   Avoid that experiences become the "Sacred Cows"

Project managers play vital roles in projects and most of them have successful experiences. Unfortunately, most of these experiences are from their personal understanding, experiences, comprehension, or intuition. More unfortunately, they might only trust in their own experiences and dismiss other theories or methods. Zong Qinghou from Wahaha Group once had a famous judgment: "I never trust those marketing companies. My way is that I make decisions with my own eyes." To many successful (or more accurately, successful so far) people, it is very difficult for them to change their working styles and habits, especially when they are in great power. In many enterprises, we can see that their bosses even have greater reputation than their enterprises. These "geniuses" hardly believe the theories and methods proposed by people that are not as good as them. When walking in Indian's streets, we can often see some cows wandering around, which are called "sacred cows" in India. If we depend too much on experiences, experiences could become the "sacred cows" that act as barriers to implement modern project management.

3. Avoid that employees are too idle

There is an old saying "make trouble out of nothing". To improve execution abilities, we must make employees' schedules full. A proper increase of employees' workload will reduce their idle time to some extent, which in turn will reduce the phenomenon of buck-passing and improve efficiency. If creativity is required in some tasks, it is better not to mention "execution abilities" since free time that allows wild thinking can produce more creative ideas. Execution mainly refers to situations that have clear tasks. External pressures lead to solidarity and zero external pressures lead to internal fights, which can be counted as a deep-rooted bad habit of human beings. Therefore, it might also be the reason that people in harsh environmental areas are relatively enthusiastic and united, while those in great areas relatively have weak interpersonal relationships.

The sage rules in Tao Te Ching refer to "empty their minds, fill their bellies, weaken their wills, and strengthen their bones. He constantly tries to keep them without knowledge and without desire, and where there are those who have knowledge, to keep them for presuming to act on it". We cannot simply interpret it as a policy of obscurantism. In fact, it is effective to improve execution abilities. The labor division proposed in Taylor's The Principles of Scientific Management is a similar concept, which improved labor workers' efficiency by 50 times.

Improving project execution abilities is similar to losing weights. People all know that jogging 20 min a day not only helps to lose weights but also with health benefits. However, very few people would like to do it. Instead, they would like to spend a lot of money on diet pills. People repeatedly feel dissatisfied with diet pills, repeatedly get harmed by the side effects of diet pills and repeatedly spend more money to buy new pills. On the contrary, they forget about jogging. Similarly, we repeatedly feel disappointed about project management methods currently in use, repeatedly assume the losses caused by management failures, and repeatedly seek help from new management methods. On the contrary, we forget the effective methods we already knew.

   Projects depend on teams to complete. Therefore, both project managers and team members need to understand the development process of project teams, the personality, and characteristics of team members and seek management styles that are suitable to the characteristics of projects, project teams, and personality. Only in this way can we establish a real project team.

Chapter 12
Resolve Project Conflicts

The approaches through which you want to set out to solve contradictions without looking through the totality and all aspects of them, but repudiating the necessity of analyzing the features of contradictions deeply and meticulously, having only a brief impression of contradictions by standing aside and looking afar will never succeed.

—Mao Zedong • *Contradiction*

The project conflicts are viewed as various contradictions existing in project managements. There would be no projects without conflicts. In other words, projects are born with conflicts. Ubiquitous conflicts consist in both classic project aims, such as time limit, cost and quality, and expectations of the project stakeholders. Therefore, project managers are the managers of conflicts to some degree. If you want to manage conflicts well, you would be required to know the sources and features of the conflicts, catch principal contradictions and principal aspects of the conflict, and find approaches to solve conflicts through internal and external relationships of things.

12.1 Comprehending Conflicts

The following 3 points about conflicts should be paid attention to.

1. Conflicts are related to choices

Conflicts come into being with choices making. Choices are corresponding to abandonment. If you have to choose one from two solutions which are equally matched, there will be conflicts. If you do not need to choose or you can choose all, there will be no conflicts.

Here are 12 suggestions which will be helpful to establish a project team. Now, I hope you can rank all the suggestions from the most important to the least according to your own situations.

(a)   *If we have to be late or absent, we should inform team coordinators, team contacts, or some team member at least one day earlier.*

(b)   *We always attend the meetings according to the agendas received in advance. Our preparations and collected data are complete so that we could carry on the discussion at the meeting according to the agenda.*

(c)   *We always respect everyone's advices and feelings. Every member has equal participation rights at the meeting. When discussing the team businesses, members should take part in actively and listen to others' advices carefully.*

(d)   *We always avoid criticizing somebody owing to his/her defects. When the team cannot complete tasks well, we would check whether there are some problems in team program and find ways to improve it. If some members have difficulty to realize promises, the team will take best efforts to help them.*

(e)   *Members should support decisions made by teams. Behaviors, such as destroying decisions made by the team, talking of them behind their backs, and defaming the team and its work to the people outside the team, are not acceptable.*

(f)   *Members should make their commitments to the team and realize that breaking promises will affect the course of the team adversely. If you may not be able to complete your own tasks, you should inform the other members in time in order to get supports.*

(g)   *When we face decision-making, we should determine how to make decisions in the first instance. The principles are as follows: ① point out issues; ② talk about different ideas; ③ analyze advantages and disadvantages of all different schemes; and ④ choose the scheme which is supported by all members.*

(h)   *We will deal with conflicts in an effective way. The fundamental rule is to understand where the problems are as deeply as possible from views of both sides of contending parties. In order to achieve that, we will listen to the opinions from all parties related to the conflicts and collect facts as well as evidences. If there are still some conflicts of facts, we will collect more data. When the problems are confirmed, teams will help to identify a solution.*

(i)   *We realize that coordinating team can often engender high-quality ideas and make high-quality decisions. If we find no such gains from teamwork, we will stop to assess our work until we can comprehend the team and team working better.*

(j)   *No matter how the topic of the discussion is related to the topic of the meeting, we will not discuss it after the meeting. Any related discussion should be shared with all team members.*

(k)   *We will reduce external disturbances to the minimum so that all members can take part adequately within a time limit.*

(l)   *Those decisions discussed and made by the team should be kept secretly. You should not share them with anyone outside the team unless all team members agree to disclose them.*

*What's your answer? If it is as I guessed, you will spend some time in rank-
ing all the 12 suggestions. If we choose a group to do this practice, the views of
group members may vary significantly. If this group must draw a conclusion, the
approach may be drawing lots, voting by raising hands, complying with major-
ity rule, or even repressing some members' opinions by some other powerful team
members. What can be affirmed is that conflicts exist in the entire process.*

*Then, do these conflicts really exist in this practice itself? No, these 12 suggestions
themselves are not conflicting. It is not that you choose one at the cost of another.
All of them are important and compatible to a team. The so-called conflicts come
from our assumptions and choices.*

We have emphasized that our environment should not be regarded as problems by
mistake. It is meaningless for us to treat an object or a work as a conflict when we
have no choice, because the only thing we can do is to accept and face it.

2. Conflicts are related to the psychology and ways of thinking of people

Conflicts often start when someone feel there are or will be adverse impacts,
caused by some others, of what they care about. Many conflicts are caused by peo-
ple's mentalities, assumptions, and ways of thinking.

*Then, let us play a card practice. There are a few or dozens of people participating
in this exercise and are divided into Group A and Group B. Each team may have
two options: red card or black card. The rules of scores for two teams are shown
in Fig. 12.1.*

*There are two rules: two teams cannot snoop the other's decision, and decisions
should be presented and announced by the organizers; the decisions can be made
when all members come to an agreement. Finally, the winner is who gets the high-
est positive score.*

Fig. 12.1 Scores of group A
and group B

In each box, the upper figure is the score of group A;
the bottom figure is the score of group B.

This is a game practice, and the best result is that the both groups choose the red card. However, few groups made such choice in dozen practices among different companies. In most cases, one group or even two groups chose the scheme which puts the opposite side at disadvantage. Once this behavior occurred, it would motive the other groups to take tit-for-tat policies to revenge. In the process of the game, groups which break win-win rules firstly would obtain benefits. However, the result in this case is that both groups finally get negative scores. In other words, neither of them is winner.

In June 2000, the leaders of 9 color TV key enterprises, including Konka and TCL, gathered together in Shenzhen and announced to establish China Color TV Enterprises Summit and Color TV Price Alliance. However, there were numerous contradictions in the price alliance. Venus color TV and West Lake color TV did not execute the price guarantee policy, and as the result, the price alliance members gathered together again to solve internal contradictions in Nanjing at the end of June. Finally, the price alliance ended in failure, and more serious price battle broke out, resulting in no winner in the Chinese household appliance industry. The price battle of household appliance industry broke out again in China in 2013. The result was that several major companies fell into war of words with no real winner.

Win-win situation is the best result of business negotiation; however, the biggest barrier lies in that we all hope to win more than others and think mistakenly that defeating opponents is the victory. Business is war without bullets. However, it is all wet for us to take the business competitors even though cooperative partners as the enemies on the battlefield. The win-win situation occurs only when we allow others to obtain more benefits than us or gain more market share.

You would get 600 thousands yuan from 60 % of 1 million yuan, but 100 thousands yuan from 10 % of 10 million yuan.

Many people value market occupancy and perceive that the success is their rising market occupancy accompanied with others' declining market occupancy. The problem is not valuing market occupancy, but treating the market space as fixed. At business activities, what you gain is not necessarily that I lose out. The real winning is no need of any conditions. It is keeping yourself win rather than beat.

3. Conflicts may be beneficial

Traditionally, conflicts, which are detrimental, could be avoided and eliminated. However, some conflicts are beneficial.

Europeans like to eat sardines. An important fact affecting the price of fish is that whether fish are alive or not. A clever Norway fishing boat captain always put a few catfishes in fish tanks which contained the captured sardines. Catfishes will swim around to hunt sardines. In order to avoid being devoured, sardines must swim quickly in the limited space. Finally, most of them can go back to the port lively.

The enterprises could be authentic enterprises only when they are put into a competitive environment. Managers need to be capable of making the best use of the circumstances.

12.2 The Sources of Project Conflicts

The conflicts root in many different causes during the project's life-cycle process. According to the previous studies, project conflicts are mainly reflected in 7 aspects. We rank them with their level of intensity from the highest to the lowest.

1. The conflict of schedules. Time becomes the resource competed most vehemently by companies. Project schedules, the ultimate reflection of all other conflict factors, put most pressure on project managers. What is more, schedules are based on conforming quality requirements.
2. The conflict of project priority. Project priority is the priorities of the resource allocation among multiple projects in enterprise when there is lack of sufficient project resources. Enterprises sometimes lack the clear definition of project priority, making the occurrence of the phenomenon which is the squeaking wheel gets the grease. Finally, the competition of resources among projects and departments will be more and more achieved.
3. The conflict of project human resources. This conflict comes largely from the competition, conducted by project groups and functional department, of human resources. If the organizational structure of the enterprise is not properly changed, or functional managers do not make formal promises of serving project teams, problems of human resource would be hard to eliminate. And this situation will be quite adverse to the progress of project.
4. Technical contradictions. For the technology required for the implementation of projects, team members with various professional backgrounds will have different understandings. These different technologies or understandings of technologies will impede projects' integration. In addition, the team faces a large number of technical difficulties are in store for the team because projects are innovative to a certain degree.
5. Management procedure conflicts. Characteristics of project management are different from those of routine enterprise management. Thus, management styles of every project team vary and are inconsistent with the enterprises management procedure.
6. The conflict of team members' personalities. Differences in personalities will lead to conflicts of manners and some other aspects. Although personality conflicts are less fierce than other conflicts, it will be difficult to deal with personality conflicts. It becomes worse as it is easy to confuse personality problems with technical problems and communication problems. Sometimes, disputes of technology problems among technical personnel or between technical personnel and project managers are actually due to the personality conflicts.
7. Project cost conflicts. The same as project schedule conflicts, the project cost is the most fundamental indicator. There are two possible project cost conflicts: one is without sufficient and specialized project expenses; the other is without timely project expenses after misappropriating.

These conflicts have different levels of intensity during the different processes of project life cycles. Therefore, project managers should pay attention to the major conflicts.

1. The main conflicts during the project initiation process. During the initiation process, the most critical thing is to confirm projects' positions in the enterprise and to determine priorities of projects. Project managers should strive to improve project positions in the enterprises and obtain full support from the top management. This would allow good preparation for the resources and power needed by the activities in the latter phases of the project life cycle.

In addition, unique administration methods should be adopted in the project management. Similarly, project managers should decide the method and obtain the understanding and support form top management in this phase. For example, a number of issues should be negotiated and confirmed during the initiation phase. These include: the design of project organizational structures, the project managers' authority of the assignment of staff, equipment and other materials, and the functional managers' support to the project.

2. The major conflict of projects planning process. The main task of project planning process is to develop documentation of planning works as much as possible. Plans and approved documents are used to guide future works. Although planning does not consume a lot of resources, the importance of planning is often ignored by many managers who pursue rapid effects and achievements and hold the mentality of getting effect instantly. The appropriate way is to spend some time on planning carefully and to avoid putting in work without good preparation. "Planning slowly and acting quickly" is an important principle of project management.

The same as initiation process, the determination of project priority remains the focal point which the manager should pay attention to. It will have more substantive effects in striving for the project priority when project managers confirm, by making plans, how much and when the resources are needed by projects.

Although the project has not yet been carried out, the conflicts of project schedules cannot be neglected. Project planning process should determine the schedules of key milestone and other activities of the project. These schedules need to take stakeholders' commitment and get their promises of respective responsibilities through consultation.

During this process, the conflicts of management procedure begin to wane, while the conflicts of technology begin to increase. This is because the technical proposals needed in the implementation of project should be considered during the planning. In addition, the degree of cost conflict is not very significant as the project is still in planning process and a variety of resources have not been put through yet.

3. The major conflicts in the process of project execution and control. During the project execution and control process, scheduling conflicts are most critical and

become the main problem which should be solved by project managers as all parties begin to focus on the actual progress of the project.

In these processes, technical conflicts have also become one of the major conflict factors. In the course of project execution and control, conflicts among all kinds of professional technical proposals and technology tools, which will make real effects, appear frequently. The problems, such as reliability, quality standard, design problems, and test program problems, will also break out intensively during this process.

The most common issue in technical aspects is "the superstition of silver bullet", which means the technical personnel tend to believe the use of new technologies or tools can reduce the working time of projects. However, it is not necessarily the case because it will cost considerable time of technical personnel to acquire and master the new technology and tools. The use of unfamiliar new technology would probably cause more project delays, especially when there is a tight project schedule.

During the course of project execution and control, due to the growing demand for human resources, the conflicts between project teams and functional departments grow further.

4. The main conflict of project closure processes. The conflicts of schedules which occurred in the processes of project execution and control will extend to the project closure process. What is more, the schedule delay will have serious impacts on project in the final stage through accumulation.

The conflicts of team members' personalities rise to the second place. Firstly, this is because team members are nervous about their future work and will pay more attention to the recognition of the future enterprises when the project ends. Secondly, it is because that team members will fell more pressure because of the exact demands on the project schedules, costs, technologies, and objectives.

We should note that the conflicts derived from project budget are always not the main problem. This is because that although it is difficult to control the project expenses, but once determined, it is generally not disputable.

12.3 General Ways to Handle Interpersonal Conflicts in Projects

From the occurrence to the end, interpersonal conflicts in a project can be divided into five stages.

1. Potential conflicts. Potential interpersonal conflicts always exist in projects due to the differences in characteristics, inefficient communications, and organizational and cultural factors. What should be noted is that some conflicts, which were judged by people because of their subjective assumption based on intuition, actually do exist.

2. Cognition of conflicts. One party or both parties of the conflicts, who have been aware of the existence of the conflicts and experienced nervousness and anxiety, have to begin to envisage conflicts. Consequently, conflicts become clear. During this process, it is crucial for both parties to decide the nature of conflicts which will affect the possible solutions of conflicts to a large degree.
3. Generating action intentions. This stage sat between a person's deep inner cognition and explicit behaviors, referring to taking some specific action decisions. This stage is separated from other stages in order to emphasize that action intentions can lead to actions. Many conflicts exaggerated constantly because one party misunderstands the other party's intentions. Action intentions can be considered from two perspectives: one is the extent to which one party of the conflicts would meet the other party's wishes; the other is the extent to which one party of the conflicts would satisfy themselves.
4. Taking action. This is a stage in which conflicts have been shown and actions must be taken.

People have many optional choices of reaction when they realize conflicts. According to the extent to which one would like to satisfy his own desires or the others' desires, these reactions can be divided into five categories, i.e., competition, collaboration, avoidance, accommodation, and compromise. (See Fig. 12.2).

① *Competition. The so-called competition refers to people think more about their own aspirations while considering less about others' wishes.*

Competition results are generally "I win, you lose." Competition often contains the power factor, which means that one party often forces other parties to abandon through exerting pressure.

Fig. 12.2 Common approaches to deal with interpersonal conflicts
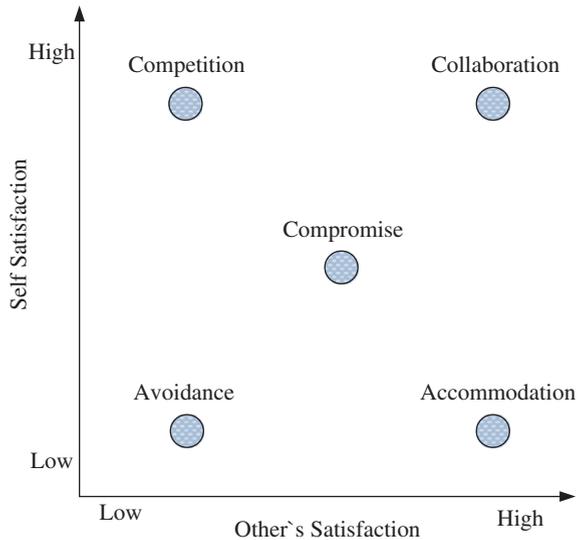
Competition strategy can be adopted in the following circumstances:

When swift and decisive actions are extremely important;
When an undesirable vital measure need to be implemented;
When you are right;
When you are in the moment of vital importance;
When the stakes are fairly obvious;
When the fundamental principles are threatened;
When you are in an advantageous position; and
When one party of the conflicts chooses competitive strategies, the other party often takes the same choices.

② *collaboration. So-called collaboration refers to try to meet the interests of both parties and strive to keep everyone satisfied.*

Successful collaboration can enable both parties of conflicts win, thus achieving a win-win situation so that the both parties will feel a strong sense of responsibility toward the result. Collaboration requires creativity, which needs both parties think positively about new approaches.
It is the key success factor of collaboration whether both sides would be benefited. Both parties can define the problem in the first instance, followed by sequencing their respective goals, and then figuring out a practical solution. If the solution is not feasible, the acceptable range should be defined.
If a solution can maximize the interests of both parties while being better for one of the two parties, appropriate compensation should be made for the other party as a consequence.

You can choose collaboration strategy in the following situations:

When you find the result is very important to both parties, and there is no way to compromise.
When your aim is to learn;
When you need to integrate different opinions; and
When you need to integrate different opinions to achieve common commitments.

③ *Avoidance. Avoidance refers to satisfy neither themselves nor others, but leave things alone to be dealt with later on.*

Avoiding conflicts means nothing to solving conflicts. However, it is useful to trifling matters, especially which can vanish by themselves. It can enable people, who met conflicts triggered by emotional problems, to calm down and make preparations to put forward constructive solutions in the future by adopting avoidance strategy at the beginning.

In the following cases, you can choose avoidance strategy:

When the problem is insignificant or there are other urgent things to be dealt with.
When you realize that your requirements cannot be met;
When the loss of solving of problems outweighs the gain;

When information collection is more important than making decision immediately;
When others are able to resolve conflicts more effectively;
When a question is a blasting fuse for the other one;
When you can win through delay; and
When you think the problem will resolve by itself.

④ *Accommodation. Accommodation means that one party attaches importance to the interests of others and tries to meet other parties' desires. The main performance of accommodation is to transmit information about improving relations, praising, or providing help.*

If a conflict is triggered by emotions, accommodation can avoid an escalation of the conflict and help to improve bilateral relationship. However, if the conflict involves substantive issues such as resource planning and allocation of responsibilities, accommodation will not only fail to solve the problem, but also cause more problems later in the project.

Accommodation strategy can be used in the following circumstances:

When you are aware of your mistakes and want to show you are reasonable;
When the results is more important to others than you;
To establish mutual trust for the future;
When others' victory makes tiny damage to you;
When harmony and stability is critical; and
When you allow subordinates to learn from their mistakes.

⑤ *Compromise. Compromise is a transaction through which the both parties involving in the conflicts hope to maximize their own benefit under the existing conditions. So both parties will compromise to take into account the desire of others, will make some concessions, and give up some things. The key of compromising is to make both parties feel fair.*

Compromising is effective when both parties are willing to come to an agreement, but the premise is to meet the basic expectation of both parties, who must keep a flexible attitude and trust each other.
The worst effect of a compromising tactic is that two sides will meet short-term interests at the cost of long-term benefits. For example, two project managers budget for their respective projects, which need money. Due to the limited capital, they may compromise to gain some funds. But the result is that both of the two projects may fail because of the shortage of funds.

In the following situations, you can choose compromise strategy:

When the target is very important but is not worth adopting self-affirming approaches, which may cause damages as "going too far";
When opponents have the equivalent power to make a commitment to common goals;
When you need a temporary reconciliation for a complex problem; and
When you need an expedient because time is urgent.

Generally speaking, the major reason for failing to achieve the win-win situation is that people make wrong psychological assumptions. What is more, compromise will always leave some sequel finally.

5. Getting results of dealing with conflicts. Behaviors and reactions between two parties of a conflict lead to the final results of dealing with conflicts. If resolved conflicts can improve the quality of projects, stimulate innovation and creativity, and arouse the enthusiasm of project team members, the conflict resolution mechanism is beneficial to improve the performance of an organization. If resolved conflicts lead to communication delays, reduced cohesion, and fighting among members of the organization, the settlement of this conflict is destructive as it will not only reduce the performance of projects but also threaten the survival of enterprises.

12.4   Trade-off Strategies in Projects

Excellent project management means we can do more things with less time and funds. As projects generally face resource constraints, successful project managers need to have a trade-off between schedule, cost, scope, quality, and so on. On the one hand, project managers need to satisfy project stakeholders; on the other hand, they must control stakeholders' unreasonable demands and inappropriate expectations for the projects.

The content, which trade-off is required in a project, includes the following aspects: Projects cannot be completed in the expected time; projects can meet the quality standards of the product in accordance with project schedule at the cost of high expense; project expenses can be accepted, but other resources (personnel, equipment, material, etc.) are difficult to obtain.

The following strategies can be adopted for trade-off in projects.

1. Re-estimating the project duration and expenses

When developing project estimates, we always leave time and funds to mitigate risks. Therefore, we can cut down the project schedule and cost through reanalyzing to reduce some pessimistic estimates on the basis of reasonability.

However, using this strategy, we may fall into wishful thinking and become over optimistic. When we feel schedule or cost pressures, it is necessary to analyze these estimates to ensure they are reasonable. Thus, we can improve the accuracy of project estimates.

The US NASA software engineering laboratory is one of the world's most successful software development organizations. They make a preliminary estimate after determining project requirements, and then amend and improve the estimates five times successively in the whole process. Every time when they amend the estimates, the development team will make standard estimates of the remaining works and then assign weighting to the standard estimate to redefine the possible scope.

2. Using floating time in schedule effectively

In order to accelerate the pace and compress the duration, you can transfer some resources from non-critical path to critical path.

In Fig. 12.3, there are resource conflicts between activities A and C so that they cannot proceed at the same time. If activity C is arranged after A, the schedule will extend 1 day; if activity A is after C, the schedule will extend 8 days.

However, when using this trade-off strategy, you need to pay attention to the following two questions. First, the resources needed by these project activities are the same types; second, non-key path activities have sufficient float time so that you can extend the finish date without delaying the finish date of the whole project. As moving resources from the non-critical path to the critical path activities will reduce the float time of all the activities not in critical paths, this may lead to changes to the projects' critical path.

3. Assign more human resources to the project

During the project, we usually assign more human resources in order to shorten the duration. This approach can accomplish more tasks within the same time or increase the number of people participating in a task. You can concentrate superior forces to eliminate the project's bottlenecks and then reduce the project duration as more human resources are available in everyday of the project.

   However, this approach has significant negative effects. The growth in the number of staff will bring difficulty in communication and coordination, which in turn reduces the efficiency of projects. Using this approach needs to be vigilant about The Mysterious Man-Month. When project activities are relatively independent, in which, people do not need a lot of collaboration, this approach can be adopted.
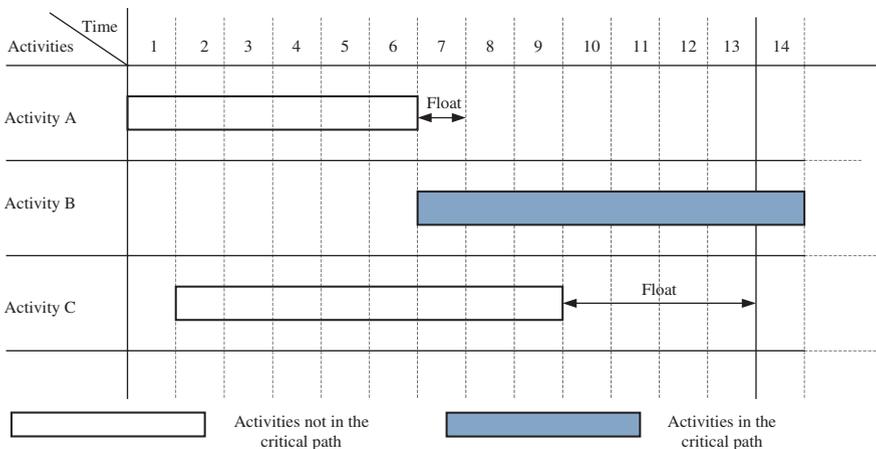
Fig. 12.3 Manage project schedule

4. Using efficient professionals within the enterprise

Experts within the enterprise are important resources available for projects. As we know, some people have higher productivity than others. Therefore, we should use these efficient personnel, who cannot only expedite project schedule, but also reduce project expense in projects. Those staff's productivity is higher than others, however, do not request that high salary as a return. In addition, they are able to produce quality and reliable works.

Using this strategy, attention should be paid that putting these specialists in a team means that they need to coordinate with each other, but nobody will bow his/her head initiatively. In this way, this strategy cannot improve the productivity which may even have an opposite effect. Similarly, the experts may be employed to do some work which can be done well or better by some junior staff. In addition, if other projects within the company fell into troubles, those professionals may be transferred for firefighting. As a consequence, the project may be delayed.

In order to organize and dispatch human resources sufficiently, human resources should be classified and managed accordingly.

Due to the lack of dynamic programming of human resources according to the specialization, it is hard for many companies to reduce human resource costs, so as to ensure the effect of project management efforts. Due to the increasing level of competition, it has become a priority to reduce the project costs, where reducing the project's human resource costs has become the top priority. At present, many companies use their human resources as "5 person, who get 4 person's money, are doing 3 persons' jobs". The effective approach to change such state and achieve the goal as "3 person, who get 4 person's money, are doing 5 persons' job" is to classify and manage human resources accordingly.

Adopting "classification" means that the enterprise divides employees into different professional categories according to various demands, such as analysts, systems analysts, designers, coders, and testers and QA. Grading different levels of capabilities can measure the hourly rate of employees at different types and levels. This price is the basis of project budget and cost control.

At present, many companies emphasized "versatile talents," which easily lead to a misunderstanding. In many software development projects, many people not only design, but also do coding and test. This leads to low efficiency and satisfaction, high error rate, and human resource costs. It is appropriate to integrate all kinds of personnel through effective mechanism on the basis of the specialization of work and classification.

5. Making good use of external resources

Nowadays, enterprises, which improve productivity through using external experts, have no strict boundaries. Their projects also need the support of external resources.

The use of external and internal experts in the project is consistent in essence. Without the control of external resources, the enterprise will face additional uncertainties inevitably when using external resources. Firstly, some external experts cannot meet commitments due to their own or other reasons, resulting in reduction of project efficiency that occurs because projects cannot count on those experts. Secondly, finding suitable external experts is time-consuming. Finally, experiences of external experts cannot be kept in the enterprise, which will lead to the loss of project experiences.

Using external experts efficiently can speed up project progress and ensure project quality simultaneously. Therefore, efforts are required to make those experts actively engaged in the project work, e.g., participating in product development, design, planning, and estimation. Efforts are required to avoid them working alone or being distant from work for a long time which will make them to become a "isolated island" in the project. If enterprises pay an exceedingly high salary to external experts, they should require experts to use their best knowledge and skills to solve the problems in the project. What is more, it is imperative to document their outcomes as well as to summarize their knowledge and experiences before they left. In addition, it is worth building a longtime cooperation with these external resources.

6. Project outsourcing

An enterprise should adopt outsourcing to balance a project's work when the enterprise does not have sufficient resources to complete some works. These works are clearly different from others, and it is not worthwhile to develop relevant resources due to economic and other factors.

This approach would help to improve efficiency and shorten the project duration. However, if the enterprise has no sufficient capacity to manage the outsourcing components, some issues may emerge which brings risks to the entire project. These include the following: uncontrolled schedules and costs, difficulties in integrating subcontractors' outcomes, and other components of the project.

7. Alter the project delivery method

When it is difficult to meet the resource requirements, staging may solve this problem. Delivering some useful goods as soon as possible can enhance stakeholders' confidence in the ultimate completion of the project. On the one hand, such approach can concentrate limited resources on a certain stage. On the other hand, due to stakeholders' confidence in the project, they will coordinate the use of resources actively to meet the project's resource requirements. At the same time, delivering products in stages can downsize the scale of the project team. A small scale of project team can reduce the cost of coordination and communication which helps to reduce the demand of human resources. All of these factors can improve productivity and reduce project expense.

Despite a number of advantages, delivering products in stages is not suitable for all kinds of project products. This approach is suitable for those modular products of which components can operate independently.

When deciding how to deliver products in stages, foundation of these products and the service condition of required resources in the project should be taken into

consideration. At the same time, the next component to be completed should be confirmed. It is imperative to use the same evaluation criterion during the entire confirmation process.

8. Changing the project scope

When it is difficult to obtain the resources required for the project and there is no way to get other alternative resources, you may consider to narrow down the project scope. However, this decision is beyond the terms of reference of project managers and the team. Reappraising the project scope is the authority of all stakeholders, especially of project customers and project sponsors.

Reassessing the project scope is not reducing the quality standards of project products. It is not appropriate to save the project resources and assure the schedule through lowering the quality standards of work or products, as loss will always outweigh gains. On the one hand, the declining work quality may lead to reworks and result in "haste makes waste", which led to more resource consumption and delays. On the other hand, customer may refuse to accept the products due to the declined product quality, which leads to significant loss. If the project fails because of unqualified products, there will be a significant negative effect on enterprise's reputation and such effect is long term.

The basis of changing the project scope is reappraising the authenticity of consumers' demands. Too high-quality requirement leads to excessive resource requirements. Therefore, reducing some unnecessary project scope will not sacrifice project quality but reduce the excessive use of project resources. This ensures that the project can be completed within limited resources.

If the resources are still failing to meet the project's demands after reappraising product requirements and reducing project scope, efforts are required to consider customer's use of project products and to identify which customer demands are revisable or essential. At this time, the WBS and QFD of the project should be redeveloped and serve as assessment tools for every activity.

Under the limitations and constraints of resources, enterprises should carefully decide which projects should be preceded. It is hard to select projects, as every project has appealing justifications. However, if companies attempt to complete 10 projects with only resources available for the completion of 8 projects, the result would be that each of these 10 projects is completed by only 80 %. No project can be finished although all resources are committed.

Although limited resource is a common problem, we can always find ways to solve it, and the key is to provide organizational guarantees for the acquisition and use of resources.

The ideal results of project conflict management must be the satisfaction of all stakeholders. In other words, the ultimate goal of the project conflict management is to achieve a win-win situation.

Chapter 13
Control Project Risks

Accomplishments reached under importunity are not reliable;
words kept under demanding are incredible.

— Guanzi • *The Situation*

Similar to life, projects are changing all the time. All projects are unique with a certain level of innovation. Therefore, projects are full of uncertainties. All projects are associated with risks. However, project without risks is normally without new value.

13.1 Risks Should Be Managed Properly

Risk is a common concern of project management professionals. What is risk? In short, risk is any factor that may affect project success. From this perspective, the occurrence of risks may have positive or negative impacts on a project. Following the habit of thinking, the former is defined as opportunity, while the latter is defined as threat.

Indeed, risk is inherent of a project and originates from a variety of uncertainties. It is impossible to eliminate these uncertainties prior to the project completion regardless of the level of skills, knowledge, or commitment of project team (Fig. 13.1).

There are generally two kinds of uncertainties that exist in projects, i.e., known and unknown uncertainties. Known uncertainties are the uncertainties whose probability of occurrence can be predicted regardless of the level of accuracy. We only care about the uncertainties whose probability of occurrence is predictable. It is difficult to make good use of resources and time to be prepared if sources of threats are unknown. Therefore, efforts should be made to minimize unknown uncertainties during the project management process and to transform them to be known.

When the probability of occurrence of an event is available, decisions will be made under the condition of risks. Otherwise, decisions will be made under the context of uncertainties. For instance, a decision could be made to bring an umbrella to the workplace due to the observed dark cloud in the sky. This is a
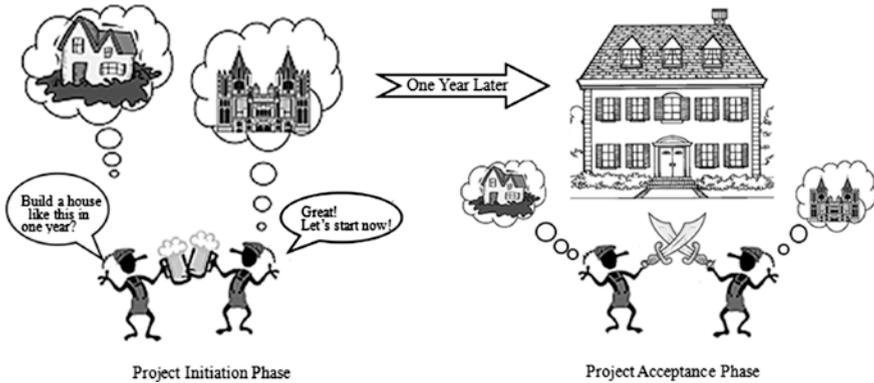
Fig. 13.1 Project uncertainties are impossible to be eliminated

typical decision made under uncertainty conditions (in case of rain). Alternatively, we may be informed by the Bureau of Meteorology that the probability of rain is 90 % so that the decision is made to bring an umbrella to the workplace. This is a typical example of decision-making under the risk conditions. A complete definition of project risk is not possible without the following three elements:

- *What are the events leading to uncertainties?*
- *What are the probabilities of occurrences of these events?*
- *What are the impacts of these events?*

In addition, it is imperative to differentiate direct risks from indirect risks. In a simple term, direct risks are those that can be controlled to a certain degree, while indirect risks are those that cannot be controlled. Although indirect risks should be understood as well, there is lack of practical sense to control these risks as we are not able to change them.

The ultimate goal of project risk management is not to eliminate risks. Although it is ideal to eliminate all risks, it is rather difficult to achieve this goal until the project is completed. Instead, attention should be paid to enhance the awareness of direct risks so that the project team is prepared even if these events occurred.

Some of project risks could be fatal to people even if they have extensive scientific knowledge. A group of scientists located bodies of some earlier explorers in Antarctic. These explorers were found dead in the tent due to lack of food and heating device. It is worth noting that there were plenty of foods in the tent, and however, the fuel barrels were empty. The thorough investigation showed that these barrels were welded by tin. Under the extreme low temperature due to a snowstorm, tin became powder, with all the fuel leaking. Explorers went back to the base and found no fuel for the heating purpose in the tent, whereas all food remained cold as rock. They could do nothing but wait for the last minute of their life.

The general procedure of a project risk management plan is shown in Fig. 13.2.
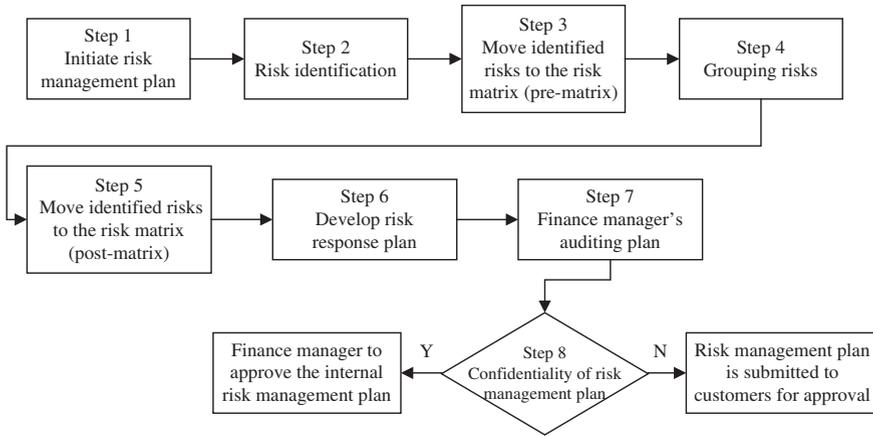
Fig. 13.2 A general procedure of a project risk management plan

13.2 Initiate a Risk Management Plan

A project risk management plan should form part of project plan documents and be determined during the development of project plans. This allows these plans to be implemented during the project process.

A risk management plan should provide a detailed description of all factors related to risk management during various stages of the project. Some of these factors are related to the procedure of identifying and analyzing project risks. Others are more management-oriented, such as those with the responsibility of managing various risks, the approaches to monitoring risks during the project execution, the way to implement contingent responses, and the number of contingency reserves for project risks.

There are two forms of contingency reserve resources for project risks, i.e., contingency funds (mainly for known uncertainties) and management reserves (mainly for unknown uncertainties).

Contingency funds are established on the basis of risk planning. Decided by the project manager, contingency funds are used to guarantee that the project can be executed successfully even though risks occur. Management reserves are formed following the decision of senior management. Management reserves should be in place when the capability of securing additional budget could affect the project success. In practice, management reserves form part of project budget, but are not covered by a project risk management plan. It is imperative to identify risks and establish risk funds during the project planning stage so that all risks can be identified, monitored, and managed during the entire project life cycle.

Inputs to the development of a risk management plan include the following:

- *Project charter;*
- *Existing risk management policies and procedures of the enterprise;*

- *Project WBS;*
- *Project risk management template of the enterprise (including the classification of risks);*
- *The level of acceptable tolerance of key project stakeholders.*

The project risk management strategies should be approved in a meeting dedicated to project risk planning. Attendees of this meeting should include the project manager, the project sponsor, in-house risk management personnel and other key project stakeholders and necessary personnel related to project risk management.

13.3 Identify Risks

1. Determine the person responsible for risk identification

The main purpose of risk identification is to determine various risks that may affect the project and consequently document their characteristics. The risk identification process should engage stakeholders as much as possible such as the project team, the client, project managers of other related projects, and other project stakeholders and external experts.

    The project manager should take the responsibility for tracking risks and developing response plans for those risks that have been identified. In some cases, brainstorming can be adopted to identify all kinds of risks during the early stage of risk identification. The advantage of brainstorming is that project team members are able to gain an understanding of various aspects of project risks so that they can be managed systematically.

Risk identification is an iterative process. The project team (or project management group) prepares the draft in the first instance. This is followed by the contribution of the entire project team and other key project stakeholders. In order to achieve robust analysis outcomes, inputs should be sought from those who did not participate in the project.

2. Determine when to identify project risks

The identification of project risks should commence during the project initiating process. During the project planning stage, efforts should be made to further identify and document risks and develop corresponding risk response strategies.

    The identification and analysis of risks and contents of response strategies should go through all stages of a project life cycle, from project initiating to project closing.

    Along the project progress, new project risks normally emerge due to changes in both the external and the internal environment. When the probability of occurrence of risk events increased or one risk turned to a reality, the project manager has to deal with these real issues according to risk response strategies. In addition, the project manager has to redevelop a project risk management plan according to budget variation, schedule variation, and changes to resources.

3. Determine categories of risks

In order to identify risks effectively and efficiently, enterprises should classify project risks according to project characteristics and lessons learned from previous projects. In addition, the rationale of risk classification should be clarified so that various sources of project risks can be highlighted.

In general, common categories of project risks are as below:

1. Technical, quality, and performance risks, e.g., the level of reliance on the new technologies or complex technologies that have not been fully verified; very challenging performance goals; changes to the adopted technologies; changes to the industry standards during the project period; and changes of demands from clients on the product specification.
2. Project schedule risks, e.g., total duration of project, milestone achievements, and accuracy of estimated duration of project activities.
3. Project management risks, e.g., unequitable allocation of time and resources, robustness of a project plan, lack of full authority to project managers, and the utilization of different project management tools.
4. Organizational risks, e.g., incompatibility of cost, schedule, and scope to the requirements of the enterprise; vagueness of the sequence of different projects; unavailability or interruption of funds; and competition in obtaining resources with other projects within the enterprise.
5. External risks, e.g., changes in law and business environment, changes in the client's requirements, weather conditions, and policy-oriented risks. Another external risk is the contractual risk of seller (contractor), which includes the relationship with the contractor, the contract types, and the contractor's responsibility for the defects of deliverables.

Every enterprise should draw lessons learned from projects so that a project risk checklist can be developed. As a critical intellectual property of the enterprise, such checklist is very useful for other similar projects in terms of risk management. An example of a project risk checklist is shown as below[1]:

- *Organizational risks*

  - *Is there a sufficient level of support to the project (including management, test personnel, QA, and other related external personnel)?*
  - *Is this the largest project that this enterprise has ever undertaken?*
  - *Is the procedure clearly defined for project management?*

- *Financial risks*

  - *Have all funds necessary for project execution been in place?*
  - *Have funds been allocated for training and guiding project team members?*
  - *Is there any restriction on the project budget that specifies that project products have to be delivered at a fixed rate (otherwise will be called off)?*
  - *Are the cost estimates accurate?*

---

[1]Refer to Rational Unified Process, 2000

- *Staffing risks*

  – *Can sufficient staff members be sourced?*
  – *Do these staff members have adequate skills and experience?*
  – *Have they worked together before?*
  – *Do they believe the project will succeed?*
  – *Will the client representative be able to act as the liaison?*
  – *Can experts in this field be located?*

- *Schedule risks*

  - *Is the timetable feasible and realistic?*
  - *Is it possible to run scale management on functions in order to satisfy time lines?*
  - *How strict is the requirement on the delivery date?*

- *Project-scale risks*

  – *Can project success be assessed?*
  – *Is there an agreement on the assessment of project success?*
  – *Are the project requirements very stable and fully understood by the project team and stakeholders?*
  – *Is the project scope fixed or expanded continuously?*
  – *Is the project time scope too tight and not flexible?*

- *Technological risks*

  – *Are technologies adopted in the project verified in previous projects?*
  – *Is it reasonable to use the same technology?*
  – *Is the current technological framework reasonable?*
  – *Is there any special or stringent technological requirements (e.g., requiring the project team to deal with issues they are not familiar with)?*
  – *Does the project success rely on products, services, or technologies that are new or under pilot testing? Does the project success rely on hardware, software, or technologies that are new or unproven?*
  – *Does the interface with other systems (including all systems beyond the boundary of enterprise) rely on any external factors? Is there any interface necessary for the project success that exists or has to be established?*
  – *Is there any availability and safety requirement with very low level of flexibility (e.g., no system failure forever)?*
  – *Do project clients have any experience related to the type of product developed in this project?*
  – *Does the risk level increase due to the novelty of technologies?*

- *External reliance risks*

  – *Does this project rely on other (parallel) development projects?*
  – *Does the project success rely on external products or components developed by external parties?*
  – *Does the project success rely on the successful integration of development tools and implementation technologies? Are there any alternative plans so that the project can be delivered without these technologies?*

4. Approaches to risk identification

There are a number of approaches to identifying project risks.

1. Investigate the specification requirements defined in the Statement of Work and project deliverables. As all products and procedures produced by the project are new, it is imperative to investigate the specification requirements defined in the Statement of Work and project deliverables.
2. Audit project documents. These include the following: the project charter, WBS, cost estimates, staffing management plan, all assumptions, and constraints. Auditing these project documents helps to identify those potential risks that were not identified during the development of these project documents.
3. Consult project experts. Consultation with those experts involved in similar projects and auditing of previous project documents are helpful for the project manager to further understand when and where risks will occur. In addition, it is useful to consult those personnel familiar with (or in charge of) the governmental environment.
4. Brainstorming. It is recommended to organize meetings for all project stakeholders and project team members so that they can freely express and document their opinions and ideas. Consequently, these opinions and ideas will be categorized and evaluated.
5. Analogous method. Auditing of lessons learned from similar projects helps to identify potential risks. It is very helpful to establish a database for all previous projects for risk identification.

A number of management tools are available to be used to identify project risks. One of these management tools is the fishbone diagram, which has been commonly used in quality management. It provides a useful tool to identify project risks simply and clearly (see Fig. 13.3).
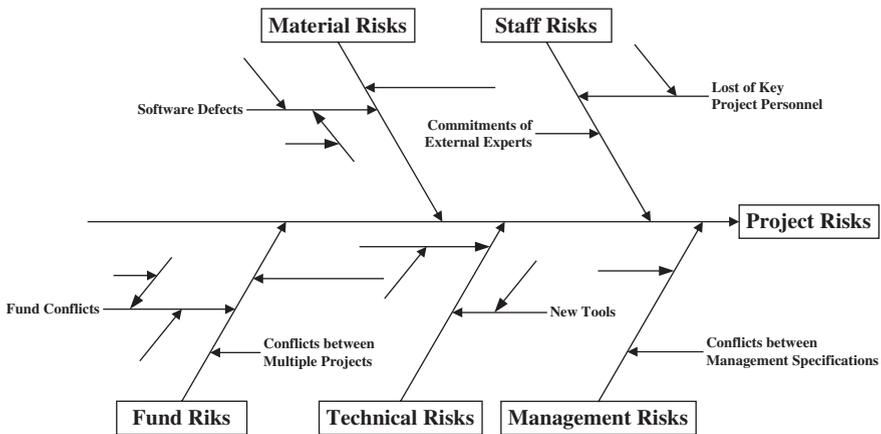
Fig. 13.3   Fishbone diagram to be used to identify project risks

5. Documentation of risk records

All project risks should be recorded in the form of documents. This helps to take corresponding measures in order to mitigate the effects derived from risks. Similarly, it allows tracking and comparison of effects pre- and postresponses to project risks.

Prior to the project execution process, the project manager should reaudit the risk management plan and list all newly identified risks. Along the project progress, project team members should identify new risk areas and update the risk management plan accordingly. Similarly, those risks that have been identified in early project stages and have been dealt with should be removed during the project controlling process.

13.4 Develop the Risk Matrix

To identify risks comprehensively, apart from identifying the sources of risks, efforts should be made to analyze the probability of occurrence of risk events, as well as the impacts (severity of consequences) once these risk events occur.

1. Perform qualitative risk analysis

Qualitative approach is very useful to analyze project risks, particularly when there is lack of precise definition of the probability and impacts of risk events.

Steps of qualitative risk analysis are as below:

1. *List all possible risk factors.*
2. *The probabilities of occurrence of risks are ranked as five levels from low to high, i.e., "very low," "low," "moderate," "high," and "very high."*
3. *The impacts of risks if they occurred are ranked as five levels from low to high, i.e., "very low," "low," "moderate," "high," and "very high."*
4. *All risk factors are categorized and prioritized according to their level of probability and impacts.*

Qualitative risk analysis can prioritize all the risks. The level of risk is the comprehensive evaluation of their probability of occurrence and impacts. Accordingly, all project risks can be classified as extremely high, very high, high, moderate, low, very low, and extremely low (see Table 13.1). The project manager should develop measures for each individual project risk according to its level in order to facilitate the allocation of human resources as well as other resources. The risk management procedure should be approved and confirmed by other project stakeholders.

2. Perform quantitative risk analysis

The purpose of quantitative risk analysis is to numerically analyze the probability of occurrence and the severity of impacts for each individual risk. In general, quantitative risk analysis will not be undertaken until the end of qualitative risk analysis.

Table 13.1 Risk probability and impact matrix

Probability						
		Very low	Low	Moderate	High	Very high
Impact	Very high	Moderate	High	Very high	Extremely high	Extremely high
	High	Low	Moderate	High	Very high	Extremely high
	Moderate	Very low	Low	Moderate	High	Very high
	Low	Extremely low	Very low	Low	Moderate	High
	Very low	Extremely low	Extremely low	Very low	Low	Moderate

Extremely high risks Dedicated staff will be assigned to monitor risks daily. Regular (at least weekly) meetings will be held between the project manager, line managers, and other project personnel to analyze risks. When necessary, project initiators and customer representatives will be invited. Main measure is risk avoidance
Very high risks Dedicated staff will be assigned to monitor risks daily. Project risk analysis meetings will be held weekly
High risks Dedicated staff will be assigned. The milestone risk analysis meeting mechanism will be implemented
Moderate risks Staff will be assigned to monitor risks. The risk analysis report will be presented in project regular meetings
Low risks Project team member should pay attention to risks and report in the project regular meetings when necessary
Very low risks Pay attention to these risks when necessary
Extremely low risks These risks will not be considered at the moment

The necessary conditions of quantitative risk analysis include the following: (1) accurate probabilities of occurrence that are available for all risks; (2) accessibility of all quantifiable data; and (3) large-scale projects requiring accurate probability data and the high-risk projects according to qualitative risk analysis results.

Inputs of quantitative risk analysis include the following: information related to the risk management plan (e.g., complexity, technological maturity, organizational risks, and risk assumptions), potential risks identified, outputs of qualitative risk analysis, and any other related information that is useful for quantitative risk analysis.
    Major methods to quantify risks include the following:

1. Delphi technique. All project stakeholders and related experts are interviewed in order to quantify the probability of occurrence and severity of impacts on project goals.

The Delphi technique is also called the expert evaluation method. It is a technique to evaluate or predict based on experts' opinions. The common procedures of Delphi technique for quantitative risk analysis are as below:

(a) *Invite related experts to analyze all project risks in terms of quantifying the probability of occurrence and severity of impacts.*
(b) *Collect data from all experts and undertake statistical analysis.*
(c) *Provide feedback to experts on the analysis results and invite them to requantify the probability of occurrence and severity of impacts.*
(d) *Repeat steps (b) and (c) until unanimous agreement is arrived at.*

2. Sensitivity analysis

   Sensitivity analysis helps project personnel to determine "what risks have significant impacts on the project." By keeping the base value of other uncertainties unchanged, sensitivity analysis can help the project team to audit the impact of the uncertainties associated with a certain project factor on project goals.

3. Decision analysis

   Decision analysis is usually conducted via the decision tree technique. Through decision tree analysis, the expectation value is calculated based on the analysis of cost and benefits. This should be followed by decision-making to formulate strategies aiming for the maximum expected benefits.

4. Simulation

   A number of techniques such as Monte Carlo simulation can be used to simulate probability of occurrence of a project risk.

Following qualitative and quantitative analyses, all risk factors can be categorized and placed in different locations of the risk matrix. Measures for risks located in difference places of the risk matrix provide useful guidance to calibrating risk management strategies.

For instance, a risk was identified as a result of analysis of the "Yinghu Information System" development project. The product design requires a computer operating system which has not been formally released. However, the reputation of the vendor of this computer operating system is questionable. The quality of its products may not be reliable, and delays are expected for its delivery.

The further investigation showed that the probability of operational system defects with impacts on the system is 15 % and the probability of delayed delivery of operational system for 1 week is 70 %. If operational system does not meet the requirements, the client's software will have to be recoded. The delayed delivery will result in time overruns.

Assume that the risk codes of operational system defects and delayed delivery of operational system are A and B, respectively.

The probability of 15 and 70 % is defined as "low probability" and "high probability," respectively. "Recoding client software" and "1-week delay of delivery" are defined as "very high impact" and "low impact," respectively. These two risk factors are placed in the risk probability and impact matrix (see Table 13.2).

As shown in Table 13.2, risk A should be assigned to a dedicated personnel and a milestone risk analysis meeting should be organized. By contrary, project team members should monitor risk B and report in project meetings.

Outcomes from Table 13.2 can be compiled and consequently placed in the overall project risk summary table. This summary table should cover the measures to deal with each individual risk factor and allows the analysis of changes to these risk factors following taking corresponding measures.

The summary table for the risks associated with the "Yinghu Information System" development project is shown in Table 13.3.

Table 13.2   Risk factors A and B in the risk matrix

Probability						
		Very low	Low	Moderate	High	Very high
Impact	Very high	Moderate	High A	Very high	Extremely high	Extremely high
	High	Low	Moderate	High	Very high	Extremely high
	Moderate	Very low	Low	Moderate	High	Very high
	Low	Extremely low	Very low	Low	Moderate B	High
	Very low	Extremely low	Extremely low	Very low	Low	Moderate

Table 13.3   Project risk summary table

Project title	"Yinghu Information System" development project				
Cited reference (code of risk management documents)	Risk factors	Probability	Severity of impacts before treatments	Treatment	Expected severity of impacts after treatments
Management measure 100A01	A	Low (15 %)	Very high	Avoid. Choose another operational system which is based on stable design	Low
Management measure 100A01	B	High (70 %)	Low	Mitigate. Join the β-testing team and reduce the delivery time	Very low

Table 13.4   Risk impact matrix after identification and treatment

Probability						
		Very low	Low	Moderate	High	Very high
Impact	Very high	Moderate	High	Very high	Extremely high	Extremely high
	High	Low	Moderate	High	Very high	Extremely high
	Moderate	Very low	Low	Moderate	High	Very high
	Low	Extremely low	Very low A	Low	Moderate	High
	Very low	Extremely low	Extremely low B	Very low	Low	Moderate

Preliminary treatment strategies are proposed following the risk identification. Based on probability of occurrence and severity of impacts, all risk factors are classified and placed in the updated risk matrix.

The risks of the "Yinghu Information System" development project after risk identification and treatment are shown in Table 13.4. Attention should be paid to risk A when necessary, whereas risk B could not be concerned at the moment.

13.5 Plan Risk Responses

The feasible and practical risk response plan should be formulated on the basis of preliminary treatment strategies. If the identified risks do occur, the response plan should be activated.

In order to implement the risk response plan effectively, the project manager should have fund and time resources corresponding to risks. When risk becomes a real issue, the project manager usually has to search for fund and time to deal with consequences if there are no such resources in place. It is ideal to keep a certain level of contingency reserve resources and be prepared to deal with potential problems within the initial budget and schedule.

Various strategies should be defined in the risk response plan together with the specification of decision-making procedure. This allows the project team to take prompt and appropriate actions to minimize threats of all kinds of risks to achieving project goals.

These strategies should be approved and confirmed by all project stakeholders with dedicated personnel to take the responsibility.

Common strategies of risk response include the following:

1. Avoid. Risk avoidance aims to eliminate threats derived from risk events by changing the project management plan. Although it is impossible to eliminate all risks, some of detailed risks could be avoided. To propose appropriate risk avoidance strategies, creativity is required during the project execution.

For instance, we could choose not to use any heating device in order to avoid firing incidents. This is a typical example of risk avoidance. Risk avoidance may lead to the reduction of benefits.

2. Transfer. Risk transfer aims to shift the impact of a threat (risk) to a third party via contracts and agreements, use of insurance, and performance bonds of sellers. It is worth noting that risk may still occur even though it has been transferred to a third party.

A typical example is to transfer risks to an insurance company by purchasing insurance policies. One person travelled with his family by air. When the airport staff asked him whether or not he would like to purchase insurance, he refused by stating "insurance is useless as all my family are on board."
In many cases, risk events will take place even though they have been transferred. The occurrence of risks will result in losses of the project.

3. Mitigate. Risk mitigation is to reduce the probability of occurrence or impact of an adverse risk to be within acceptable threshold limits.

In some cases, some risks cannot be prevented or dealt with by any means. If that is the case, efforts should be made to reduce the probability of the risk as much as

possible. If the risk event does occur, project manager should update the project plan accordingly and include the impacts of risk events.

Taking proactive action to reduce the probability and/or impact of a risk occurring on the project is often more effective than trying to repair the damage after the risk has occurred. It is especially the case for those risks derived from uncertainties associated with project requirements.

4. Accept. Risk acceptance is a risk response strategy whereby the project team decides to acknowledge the risk and not take any action unless the risk occurs. This strategy can be adopted for those risks with a low level of impact.

The outcomes of risk response plan are as follows:

1. Risk identification, risk description, aspects of project affected (e.g., elements of WBS), and reasons and ways in which project goals are affected;
2. Allocation of human resources for risk management and their responsibilities;
3. Outcomes of qualitative and quantitative risk analysis;
4. Strategies to avoid, mitigate, transfer, and accept risks;
5. Risk levels after the implementation of risk response strategies;
6. Detailed actions to implement risk response strategies;
7. Budget and progress of risk response strategies.

13.6 Evaluate a Risk Response Plan

Risk response plans normally have implications on the allocation of resources and budget. Similarly, the development of project plans on resources and schedule always involves risks. Therefore, project risk response plans should not be implemented until they went through the evaluation by all project stakeholders such as the finance manager.

The main focus of financial assessment is to estimate the contingency reserves required in the risk response strategies by means of analyzing the probability of occurrence and impact of project risks. As a result, the acceptable thresholds will be specified.

The project risk response plan is confidential to clients, if the response strategy can be completed by just the project team or its enterprise, or if the client's confidence on project may be affected when strategies are made available to them.

The project response plan should be submitted to the client for evaluation prior to the implementation, if it has to be communicated with the client, or additional support is required from the client such as extension. Under such circumstances, project documents, such as the project charter and the project plan, may have to be amended.

Risks can be dealt with using one or more of the following approaches:

1. *When significant resource risks were identified, risk management items should be added to WBS. Alternatively, contingency reserves should be assigned in order to deal with impacts of possible time overruns.*

2. *When it is predicted that project resources present an issue, project duration should be extended. The degree of extension is subject to the risk level or the impact of the resource issue on the entire project.*
3. *When new technologies were adopted or estimators are always optimistic, duration of specific task should be increased to a certain degree. It is worth noting that technical personnel tend to underestimate the time required to complete a specific task.*
4. *If project team members lack skills, time and resources for training them should be increased.*

Project risk management does not refer to taking no action until the occurrence of risk events. Indeed, taking early actions to manage project risks is often more effective than trying to repair the damage after the risk has occurred.

13.7 Social Network Risks Between Stakeholders

Behavior of project stakeholders should be fully understood so that project risks can be managed properly. This is due to the fact that human being's behavior is the real subject to be managed. All kinds of risk management rely on human being's behavior to resolve. The uncertainty associated with human being's behavior is the most significant risk to be managed.

Project stakeholders are featured with diversity. They interact with each other and form a complex social network. Project stakeholders may have different interests and resource investments, taking both opportunities and risks into consideration when participating in the project. Role risks exist if project stakeholders cannot make their commitments.

It is very common to regard risk as "uncertainties associated with occurrence of events" and consequently classify and analyze risk factors. However, such a perspective does not fully take the impact of stakeholders on project goals into consideration, which overlooked human being as a source of risks. As a result, management of project risks is not examined fundamentally. From the perspective of achievability, project risks refer to "the probability, the degree of impact, and the level of manageability derived from uncertain behavior of project stakeholders."

There are two groups of factors that may lead to uncertain behavior of project stakeholders. The first group is related to only one specific project stakeholder. Such factors vary from one person to another, and therefore, the first group is called "attribute risk." This risk includes technical capability, well-being, and personal desire. The second group is related to social attributes. Such factors are affected by the social network comprised of the roles that project stakeholders play in the project, and therefore, the second group is called "structural risk." This risk includes social relationships and titles. Structural risk refers to "the degree of probability, severity, and manageability of achievement of project roles affected by uncertain external forces." Structural risk supplements attribute risks. In essence,

structural risk involves various uncertainties that may affect the stability of network relationships. There are two types of structural risks, i.e., relationship risk (i.e., the judgment of reliability and effectiveness of the role from one specific stakeholder's point of view) and network risk (i.e., the judgment of reliability and effectiveness of the entire social network which consists of project stakeholders). Therefore, there are two aspects of risks, i.e., reliability and effectiveness. Reliability is related to uncertainties, whereas effectiveness has implications to project success.

Social network analysis provides a useful tool to identify role risks borne by project stakeholders.[2]

The basic elements of social network are nodes and lines. Each node represents each individual project stakeholder, whereas lines represent the relationship between project stakeholders. Social network diagram can be drawn with or without directions. Lines can be assigned with weighting according to the type and intensity of relationships. There are six basic judgments of risk analysis based on social network.

1. The higher density of social network where one specific stakeholder is located, the higher level of constraints from the network, and the behavior of this stakeholder is more reliable. Network density refers to the proportion of direct ties in a network relative to the total number of possible ties. A high density indicates a high level of reliance of one stakeholder on other stakeholders. Its actions are influenced by other stakeholders. Therefore, the stability level is high.
2. The higher centrality of one specific stakeholder within the social network and the higher capability to counteract pressure of other stakeholders. In other words, this specific stakeholder has more capabilities to ignore constraints of other stakeholders. Centrality refers to the distance between one node and other nodes. It quantifies the "importance" or "influence" of a particular stakeholder within a network. A project stakeholder with a higher centrality has more power to negotiate.
3. When other conditions remain unchanged, those stakeholders with higher density and higher centrality are more likely to adopt negotiation and compromise strategies to deal with other stakeholders. This is due to the strong interdependence between these stakeholders so that none of them could obtain significant advantages. Compromise is the best solution. These stakeholders play a crucial role in balancing the relationship among all project stakeholders.
4. When other conditions remain unchanged, those stakeholders with lower density and higher centrality are more likely to control other stakeholders. This is due to their capabilities to control other stakeholders' behavior and expectation. These project stakeholders are influential but receive little influence from other stakeholders.
5. When other conditions remain unchanged, those stakeholders with higher density and lower centrality are more likely to adopt compromise strategies to deal with other stakeholders. These stakeholders experience no difficulties in adjusting themselves during cooperation with others. These stakeholders do not have negotiation advantages due to strong reliance on other stakeholders and weak reliance of other stakeholders on them.

---

[2]Details of social network analysis can be found in Lin, J. R. (2009) Social network analysis: theory, method and applications, Beijing Normal University Press, Beijing.

6. When other conditions remain unchanged, those stakeholders with lower density and lower centrality are more likely to have disassociation attitude in projects. They have neither strengths nor weaknesses when negotiating with other stakeholders. They may persist their own way which leads to project risks. However, these stakeholders easily join alliance with other stakeholders, which may change the status of the entire social network.

There are two main measures of the social network, i.e., centrality and centralization. Centrality refers to the key role a node plays in the network. Centralization refers to the closeness or consistency of the entire graph, i.e., the centrality of entire network graph. Stability of the entire stakeholder network can be measured by using the indicator of centralization. Such method can be used to not only manage behavioral risks of project stakeholders but also analyze and manage social media of major projects.

As a mega project, the urban rail transit Line 6 of a city adopted the engineering supervision system as the organizational structure. It was featured with a large number of stakeholders and difficulties in construction and coordination. In this project, the engineering supervision firm experienced significant challenges. It was clearly specified in the business contract that the engineering supervision firm has power of monitoring and controlling. However, during the project execution, functions of the engineering supervision firm were disrupted by a number of human-induced factors. Therefore, the status of and relationship between the engineering supervision firm and other stakeholders in the social network should be taken into consideration. For instance, it was imperative to deal with numerous challenges to the engineering supervision firm from in-house network defects and alliance.

All stakeholders involved in this project are shown in Table 13.5. Each node in the social network diagram represents each individual project stakeholder. There are resource flows between major project stakeholders. Arrows represent the relationship between stakeholders. According to the relationships obtained from investigation, an adjacency matrix is developed which covered all stakeholders. NetDraw software was employed to draw the network diagram of this project[3].

Based on the data collection and drawing of social network, the institutional network structure of the urban rail transit Line 6 project is shown in Fig. 13.4. The social network diagram allows the analysis of density and centrality of the entire network. Under the context of project governance, these two metrics can be used to explain the level of communication and coordination within the entire network. The engineering supervision firm is a project participant with special functions. Through the analysis of engineering supervision firm's various indicators such as centrality, density, and structural hole, it can determine whether and how to achieve its functions.

[3]Ding R G., Liu F., Sun H.: The study on project governance based on social network analysis–An example of large construction project supervision. China Soft Science, 132–140 (2010).

Table 13.5   All project stakeholders of the urban rail transit Line 6 project

Types of stakeholders	Names of stakeholders	Roles of stakeholders
Client	Urban Rail Transit Group Co. Ltd.	
Design JV	China Railway First Survey& Design Institute Group CO., Ltd	Lead design consultant
	Municipal Rail Transit Design Institute	Design subcontractor
Supervision JV	CIECC Engineering Construction Project Management Corporation	Lead engineering supervision firm
	Municipal Design & Research Institute of Sinocoal International Engineering Group	Coengineering supervision firm
Contractors	China State Construction	Winner of bid for Line 1 and Line 3
	China Railway Tunnel Group Co. Ltd	Winner of bid for Line 1 and Line 3
	China Metallurgical Construction Engineering Group Co. Ltd	Close relationship with the municipal government due to significant contribution in the disaster recovery
Surveying consultant	Municipal Surveying Institute	Surveying supervision firm for Line 1
Suppliers	The Robbins Company	Supply TBM, the main equipment
	Other suppliers	
Government administration	Municipal government	
	Municipal Development and Redevelopment Commission	
Government authorities	Municipal Urban Planning Authority	Coordinate on urban planning and electricity supply
	Municipal Quality Authority	
	Municipal Safety Authority	
	Municipal Transport Authority	
Other stakeholders	Farmers suffered from land expropriation	

The density of entire network was 0.3472, which meant relationship existed with a probability of 34.72 %. In this project, the outward degree centrality (31.250 %) was significantly lower than the inward degree centrality (45.313 %). This indicated that there were much more stakeholders exporting information than those utilizing external information. The value of centrality indicated that there were stakeholders within the network that can control information effectively (35.16 %). The centrality of the entire network was not high. It can be found that the variations to the inward closeness centralization were lower than those to the outward closeness centralization. The closeness network centralization cannot be calculated as there were isolated nodes within the diagram. The distances between some stakeholders were treated as indefinite during the calculation.

Lower density and scattered power centers existed in this project network. This can be explained according to the status quo of major engineering supervision
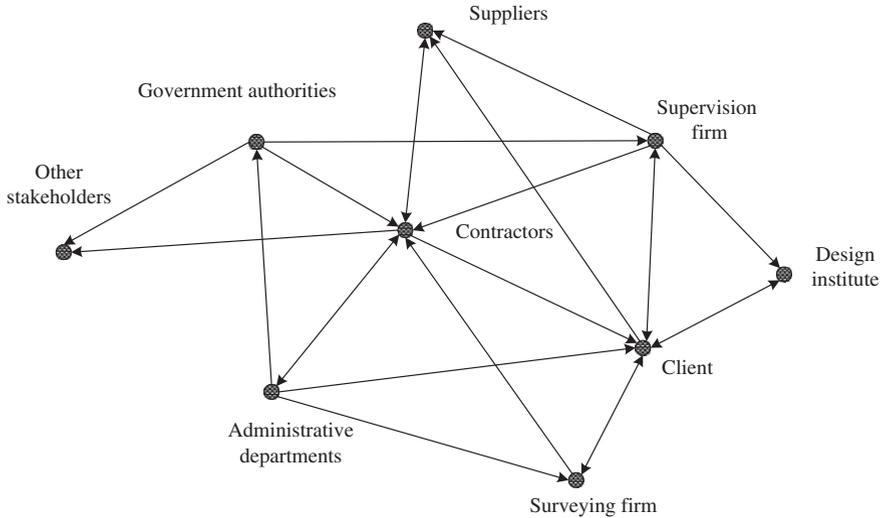
Fig. 13.4 Network regulative structure of the urban rail transit Line 6 project

projects in China. In China, the competencies of engineering supervision professionals were questionable due to a number of factors such as social factors and regulations. Many supervision professionals were not able to manage the project comprehensively and effectively due to their narrow skills and expertise on specific discipline. Indeed, incompetency of supervision professionals is mainly contributed to the low density and centrality of the network.

With the highest outward degree centrality (62.500), the client was considered as the most influential stakeholder within the network. By contrary, contractor had a higher inward degree centrality (75.000). The betweenness centrality indicated that contractor and client were more influential to other stakeholders. Other stakeholders had higher inward closeness centrality (53.333). This indicated that these stakeholders were unlikely influenced by other stakeholders. The outward closeness centrality of client, contractor, and government administration were higher (66.667). This indicated that these three stakeholders were less influenced by other stakeholders during the project governance process.

The results of analysis showed that the contractor and client were most influential in the urban rail transit Line 6 project. The engineering supervision firm was not able to realize its function in practice due to the less power and delegation. During the dispute and court cases, the evidence supplied by the engineering supervision firm was not accepted by the court as it was considered as interested entities with the developer. The engineering supervision system in China appeared more in vain. In addition, there was a higher level of redundancy to the relationship between suppliers and client. This was due to the existing relationship between the client and more than 75 % of other stakeholders. The surveying firm and contractors
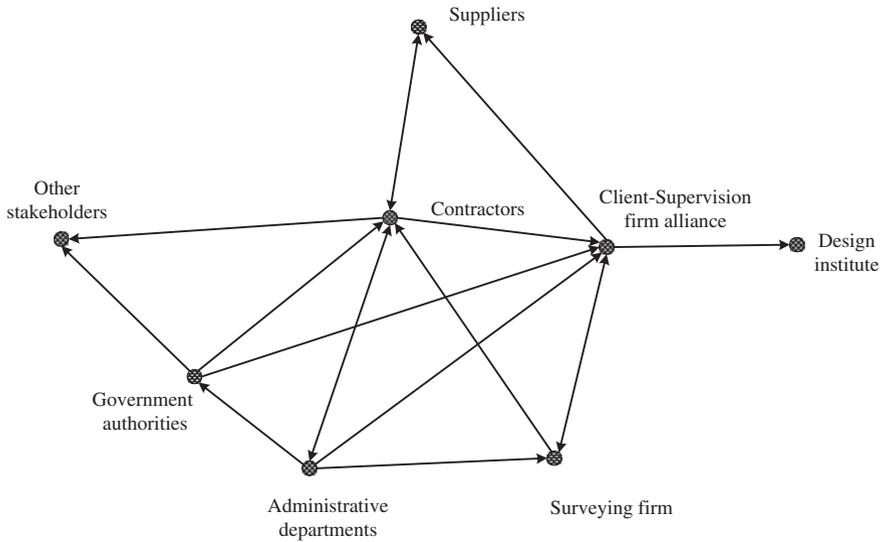
Fig. 13.5 Network regulative structure when the engineering supervision firm and the client choose cooperation strategies

were embedded into the network in the form of not having a number of structural holes. Constraint indicators showed that the client was the most influential to the engineering supervision firm, with the constraint of 0.24. Therefore, the requirements of clients should be most concern of the engineering supervision firm. Indicators of structural hole analysis demonstrated the effective network scale, efficiency, the aggregate constraint, and hierarchy of every single stakeholder. The calculation results showed that the effective network scale of the supervision firm was 3.286, with an aggregate constraint of 0.519. Structural hole analysis further reinforced the previous finding that the engineering supervision firm had less power in mega engineering supervision projects, which meant that the engineering supervision firm was more likely to be controlled. Under such circumstances, as an independent decision-maker, the supervision organization should adopt governance strategies according to the embedded relationship, density, and centrality of network as a response to the pressure from the client and contractors.

These findings showed that it was very common that the client affects the engineering supervision firm for its own interests, even cooperating with the engineering supervision firm. The strategy selection of the engineering supervision firm was closely related to contractors. Therefore, powerful contractors were willing to cooperate with the engineering supervision firm in order to control more network resources. Institutional relationships under different governance strategies are shown in Figs. 13.5 and 13.6, respectively.
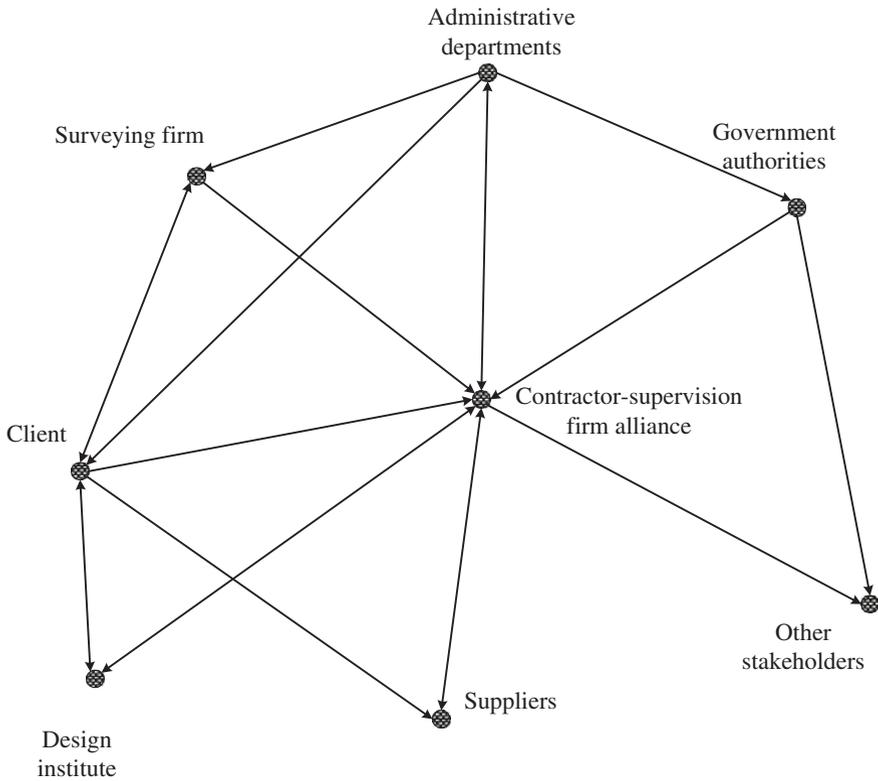
Fig. 13.6 Network regulative structure when the engineering supervision firm and the contractor choose cooperation strategies

When the engineering supervision firm and the client chose cooperation strategies in the social network, density and centralization were reduced slightly, whereas the value of betweenness centralization was increased slightly. When the engineering supervision firm and the contractor chose cooperation strategies, density and network centralization increased significantly. The entire network was featured with high level of power concentration.

When the engineering supervision firm and the client chose cooperation strategies in the social network, the contractor remains powerful and influential. At the same time, the client–engineering supervision firm alliance became the core of interactions (57.143, 71.429). When the engineering supervision firm and the contractor chose cooperation strategies, this alliance had the highest bargaining power (71.429, 85.714).

When the engineering supervision firm and the client chose cooperation strategies in the social network, contractor can still effectively control other stakeholders (42.857). Cooperation strategies provide the engineering supervision firm

alliance with a higher level of capability to control resources (34.524). When the engineering supervision firm and the contractor chose cooperation strategies in the social network, contractor–engineering supervision firm alliance was the most beneficial. The contractor–engineering supervision firm alliance had more power (54.762) due to its core status in the network.

When the engineering supervision firm and the client chose cooperation strategies in the social network, the centrality of contractor, government administration, and other stakeholders remained high. This indicated that such governance strategy was not influential to the independence or effectiveness of information transmission. When the engineering supervision firm and the contractor chose cooperation strategies, the contractor–engineering supervision firm alliance would become the powerful and independent decision-maker of governance strategies.

In summary, risks associated with project stakeholders can be managed with the following three scenarios: (1) When the engineering supervision firm is the independent decision-maker, the supervision organization will adopt strategies to deal with pressures from the client and contractor according to the embedded relationship, density, and centrality of network. In detail, the engineering supervision firm finds it difficult to refuse the client's requirements. (2) When the engineering supervision firm and the client choose cooperation strategies in the network, stakeholders may choose different strategies. Under such circumstances, the structure of social network is influential to the contractor, which will reduce the reliability of the project. (3) When the engineering supervision firm and the contractor choose cooperation strategies in the network, the structure of social network comprised of various stakeholders is featured with an increase of density and centrality network centralization. This will make the client less influential or powerful.

Indeed, project risk itself is not horrible. What is really horrible is that we do not notice project risk until risk occurs and surprises us.

Chapter 14
Communication Is the Key

All expressions should be of some use and being sophisticated is not the purpose. All kinds of behavior should be conducted out of benevolence, and venture should not be the purpose.
—Guanzi • On Complying with the Law

Communication is the most important project management skill. Project manager's main duty is to communicate with project stakeholders. To some extent, the success of the project depends on the effectiveness of communication among project stakeholders. Similarly, if the company's management is not so good, the company can offset that by strengthening the effective communication skills.

According to the Genesis, the Babel Tower was the second largest construction project for human beings only second to the Noah's Ark, which is also the first failed large-scale project. In ancient time, during a migration from East to West, human beings found a plain in the Sumerian region and settled down there. Then, they burnt the bricks to build a towering Babel so that people can live together without separation. The God heard and said, "If they speak the same language and they can build the tower. Then there is nothing they cannot do." So the Lord scattered these people all over the world and made confusion in their language, so that they could not communicate well with each other. Babel had to be suspended.
The Babel project did not lack clear goals, time and materials, human resources, and technology. However, it lacked an effective communication. Therefore, it was the communication that ruined the project.

14.1 Beware of "Information Funnel"

Communication refers to the transmission and reception of information. So, what is the information?

To understand the real meaning of the information, let us take a look at the Fig. 14.1.

Fig. 14.1   Double portraits.
Source Edwin Boring, 1930

From Fig. 14.1, we can see two faces: One is an elderly woman, and the other is a young woman. Although from the same picture, we still can see different results.
At the beginning of the twentieth century, there was a British expedition coming to the mountains in the south of Malaysia where expedition members found a tribe still keeping a Stone Age lifestyle. By gesticulation, they found that the tribal chief was thoughtful and then brought the chief to Singapore. A week later, they brought the chief back to the hometown where he lived, and asked him what the most impressive thing in Singapore was. Chief's answer surprised expedition members. His deepest impression was neither the skyscrapers nor the ships, but "I have never thought that a person (with unicycle) can carry so many bananas." Visibly, we see the world is not the world itself; it is just a subjective reflection of the objective world in our minds.

Information is a processed data, which is of greatest reference value to a variety of specific activities. Therefore, the information exists because of people's needs. If they had no thoughts or needs, there would be no information.

Information varies with different individuals. Human beings will subjectively sort, filter, and process objective data.

Now, we can do another experiment. Please read the following passage twice:
"A businessman turned off the lights as soon as another man came and asked for money. The shopkeeper opened the cash register, and everything inside was poured out. Then the man fled, and a policeman received a report shortly."
Then, let participants in the experiments choose the answers for the following 12 questions. There are three possible answers to each question, i.e., true, false, and don't know.

Question 1: The story involved three characters: shopkeeper, a man asking for money, and a policeman.
Question 2: The robber did not take the money away.
Question 3: A man entered the room after the shop light was turned off.

Question 4: The robber opened the cash register.
Question 5: Man asking for money fled after taking the things in the cash register away.
Question 6: The robber asked the shopkeeper for money.
Question 7: While there was money in the cash register, but the story did not tell us how much it is.
Question 8: The shopkeeper poured things in the cash register out and then fled.
Question 9: The man who opened the cash register was the shopkeeper.
Question 10: The man did not ask for money.
Question 11: The robber was a man.
Question 12: After the lights went out, a man came to the shop.

You will find that very few people can answer 7 questions correctly. Most participants can only correctly answer 4 questions. If you give this paragraph to them again, and then let them choose. Some of them still got wrong in the 3rd, 7th and 9th question.

The model shown in Fig. 14.2 can represent process of information communication. Every aspect of communication may contain noises, misunderstandings, or other obstacles.

These obstacles will produce a phenomenon called "information funnel," which can be simply expressed as shown in Fig. 14.3.

If what we want to say is 100 %, we may actually say only 80 % due to a number of factors
Due to a number of factors such as the environment, the speaker's rate of speech, and dialect, what was heard by others may account for only 60 % of what we want to say.
Similarly, what was heard and understood precisely account for only 40 % of information of what we want to express originally.
After been understood, what were remembered may account for only 20 % about what we want to express originally.
These words will play a tiny role.

As the project team members come from various professional fields with different backgrounds and work experience, they can more easily have problems in the communication than those from the functional departments. As a result, this
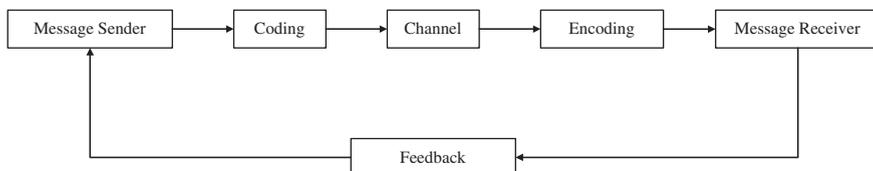
Fig. 14.2   The general model of information communication

Fig. 14.3 "Information funnel" in the communication

What you want to express, 100%

What you actually express, 80%

What was heard, 60%

What was understood, 40%

What was remembered, 20%

How the customer explained it

How the Project Leader understood it

How the Analyst designed it

How the Programmer wrote it

How the Business Consultant described it

How the project was documented

What operations installed

How the customer was billed

How it was supported

What the customer really needed

Fig. 14.4 Information communication problems bring disaster to the project. *Source* Harold Kerzner, Project Management, 8th ed John Wiley & Sons, Inc, 2003, p. 228

"information funnel" is more likely to occur, while any communication issue would bring harm to the project (see Fig. 14.4).

In order to improve the effectiveness of project communication, it is helpful to remember the following proverb. For the project manager, the most valuable and least used word to say is "no". Customer will only tell you what you ask, but will not tell you what they think. What cannot be put into writing would be equal to saying nothing.

14.2 Project Communication Plan Must Be Standardized

It is almost impossible to eliminate the "information funnels" completely during the communication. However, it is relatively easy to maintain the effectiveness of project communication. It is an effective way to reduce the harm of "information funnel" by establishing a standard project communication plan. It is more reliable than improving stakeholders' communication skills and communication arts.

All projects have channels of communication. However, in most projects, attention was paid to budget and schedule during the project planning, while the establishment of a standardized communication plan was largely neglected.

Table 14.1 shows a questionnaire for the enterprise information communication channels. As can be seen from the table, there is a big difference between the channels of communication that companies think on their own and what are actually used. In practical applications of communication channels, rumors and gossips actually accounted for the second place, while bottom-up communication channels were only ranked 10th!

The standardized project communication plan is to solve how to deliver the right information at the right time, at the right cost, and effective way to the corresponding project stakeholders.

To form a standardized project communication plan, the following 5 steps should be followed.

First step: clarify the purpose of communication. Different communication measures are to achieve different project management objectives. Many managers believe that only action is the most important. They rarely carefully defined clear aims before actions. Yet another misunderstanding is equating action to

Table 14.1   The main communication channel of the questionnaire

Information sources	Survey results	Actual situation
Immediate supervisor	1	1
Group meeting	2	3
Bosses/top managers	3	10
Annual report	4	8
Employee handbook	5	5
Work plan	6	11
Internal publications of the department	7	7
Internal publications of the corporation	8	6
Bulletin board	9	4
Bottom-up exchange program	10	15
Community meeting	11	9
Audiovisual programs	12	14
The union	13	12
Rumors and gossips	14	2
The social media	15	13

purposes. "Take your time with the plans, and act faster" is very important but often forgotten.

Second step: clarify communication objects. If you want to give the right information to the right people, you must define who the right person is. What needs to be emphasized again is that the value of information is an individual matter. If we cannot clearly identify and define the object of communication, such communication is meaningless. As the different project stakeholders bear different responsibilities for the project, the information that they need is different.

Third step: determine the contents of communication. The following principles should be followed.

1. The information should be concise, focused, and accurately expressed. A communication process cannot contain too much information, generally with no more than three problems. Otherwise, receiver of the message will experience difficulties to grasp the key information, or there will be discrepancy between what they think is critical and the key that we hope they should think.

Remember the KISS principle, namely Keep It Simple and Short.
If 1000 stones are required for a pyramid, and 900 stones have been laid, has the project been completed 90 %? Absolutely not. This is due to that the workload to lay the last 100 stones may exceed the previous 900 stones. Therefore, we can only say "we have laid 900 blocks of stone", rather than "we have completed 90 % of the task".

2. Information should be honest. The contents of the information must possess sufficient reliability. We should never provide false information for some interests or to make up the information to receive a temporary solution. This false information will not only be more troublesome during later stages of project, but also may lead to legal disputes. Remember: "when you think others are stupid, you are probably the biggest fool."
3. Information should be standardized. Standardized information is not only easier to be understood but also gives people a good feeling, as the level of standardization reflects the level of management.

Fourth step: determine the manner and time of communication. Sometimes, the form of communication is even more important than the contents of the communication.

It is imperative to grasp the right time during the communication, which should be reflected in a way that is most suitable for project stakeholder's role characteristics and personality characteristics. There are several common problems in this regard.

1. The language problem. Many problems in project communication are due to the using of different language. As project team members come from different professional fields, they will use expressions, more or less, within their respective areas of expertise to communicate. They often ignore that the other project stakeholders may have an ambiguous understanding of these expressions.

There are always "language barrier" when dealing with Chinese personnel of the joint venture. These personnel generally use three kinds of languages. The first is Chinese; the second is a combination of Chinese and English, both of which can be understood by others. The third is a combination of Chinese, English, and professional language such as equipment types. It is very difficult for those without professional background or proficient English to communicate with the Chinese personnel in joint ventures who use such language.

2. The different levels of knowledge. Due to the different level of knowledge among project stakeholders, the understanding degree of project tasks is not the same. This should be taken into consideration when setting the forms of communication.

"A man use metal teeth to pick up objects consisting of a starch." What does this mean? Actually it is, "a man with a fork took a potato." At the moment, academics tend to use complex language to show a simple truth. This phenomenon is spreading, which should be an alert in the project communication.

3. The lack of face-to-face communication. With the development of modern communication technology, more and more people prefer to communicate by telephone, e-mail, or other methods, particularly in remote project management. These approaches will never replace the face-to-face communication. Information communication process without a face-to-face interaction will increase the likelihood of delivery of error messages.

We can look at the following sentence: "I did not say he had stolen my money."
According to the speaker's different tone and pause, this sentence will have at least seven different meanings!
There was a business manager who plans to attend an international conference. He was a scholar visited in Canada and had a good level of English. But the majority of participants were Chinese people. Therefore, he made a simple greeting in English and then finished his speech in Chinese. Once finished, many foreigners congratulated him. He felt very weird and asked whether these foreigners understand Chinese. A foreigner replied, "although we do not understand Chinese, either what you are talking about, I can see that you know what you're talking about."
According to the survey, in the transfer effect of speech information, nonverbal or body language to convey information accounts for 55 %, tone and voice account for 38 %, while the contents only account for 7 %.

4. Wrong timing of the communication. Communication of information needs to be timely and more attention to be paid to the mental state of work and communication targets. Outdated information is valueless, e.g., "I forgot to tell you that yesterday they had bid." Such information is not only worthless, but also very irritating. In general, project communications should be strengthened

during the transition period, milestones nodes, and when project variation occurred in the various stages of the project life cycle.

Fifth step: establish an effective feedback mechanism. Feedback mechanism is mainly designed to answer the following three questions: Whether the information has been received? Whether the information has been understood? and Whether the communication has reached the purpose?

The lack of effective feedback will not only lead to inconsistency of the understanding of information, but also have a "negative feedback," which intensifies misunderstandings among the project stakeholders.

Suppose you get off work at 6 o'clock every afternoon and arrive at home at 6:30. One day, you encounter something on the road, and there is no way to notify your family. You do not get home at six thirty, or even seven thirty. So, what would your family think? They must think the worst.

There was a fable: Because of the lack of a nail, a horse cannot be nailed; because of the lack of horseshoes, troops are lack of a horse; because of the lack of a horse, a warrior cannot play a role; and because of the lack of a warrior, the entire campaign failed. Similarly, we may also make such a fable: Because of no feedback, misunderstandings will occur among the project stakeholders; because of the misunderstanding, stakeholders will lose the trust on each other; because of the loss of trust among stakeholders, the project failed; and because of the failing project, businesses went bankrupt.

Standardized project information communication plan must also include the following three parts.

1. How to obtain the information. This part mainly tells members of the project team and other stakeholders the information they need to be obtained from where and in what manner, including project documents/file repository, as well as the use of electronic media, where information is stored.
2. How to collect and update information. This part mainly discusses the types of project information as well as information collection methods. When the information changes, how to ensure the project stakeholders to get the latest and consistent information?
3. How to control and diffuse information. The purpose of this part is not to limit those who need the information to obtain relative information, but to provide a way to prevent those people who are trying to harm the project from accessing to the sensitive information. Project communication plan must have information security policies.

Project communication plan contains a number of reports, for example:
The inspection reports of project milestones;
Project execution status report;
Project tasks completion report;
Report of major emergencies;

Project variation request report;
Project management reporting; and
Postevaluation report of the project execution.

Means of project communications must be determined at the beginning of the project, which should be endorsed by all stakeholders in the project kickoff meeting.

14.3 Grasp the Key Project Metrics

Project managers need to find ways to obtain the necessary resources and coordinate the various stakeholders. Especially for large-scale projects, the project manager even wishes that he could become a "thousand-hand Bodhisattva", because they have to deal with too many things.

Middle managers are often called "who are scolded by the boss and hated by subordinates". They are often criticized by bosses, and these criticisms often come unexpectedly. They have just taken corrective measures under instructions from the boss, and then, new criticism comes again. "Every project is different, and there are really no rules to follow", an EMBA graduate from a famous school complained. Yes, no projects are identical. However, let us see how doctors work! Each patient differs in terms of gender, age, personality, and physical characteristics. So, how can doctors tell who is healthy and who is sick? Because the doctors know what a healthy person is, they know what to ask and what to check. While many managers do not know what the healthy project is, they do not know how and where to look for information.

Project management requires the project manager to have the capability of "skillfully deflecting the question". It is a big challenge for project managers to master the key information and determine the health status of the project and their own focus. As a result, it is not only difficult to guarantee the project health but also hard to protect project managers' own health.

Apart from the critical chain method, the earned value method is also an effective way to help project managers to secure the key information.

Figure 14.5 *is the Gantt diagram of a project X. As can be seen from the diagram, the project activity A was completed in the first three weeks; the project activity B was completed in the third, fourth, and fifth weeks; the project activity C was completed in the fifth, sixth, seventh, and eighth weeks; the project activity D was completed in the eighth and ninth weeks. When we checked project status at the end of the sixth week, the project activity A had been completed, the project activity B had only completed half of the plan, the project activity C had completed 5/8 of the plan, while the project activity D did not start. That is to say, the project activity B fell behind the schedule, and the project activity C was ahead of schedule. Then, overall, was the project delayed, or ahead of schedule? To answer this question, obviously we cannot simply add activity C 0.5 weeks ahead of schedule*
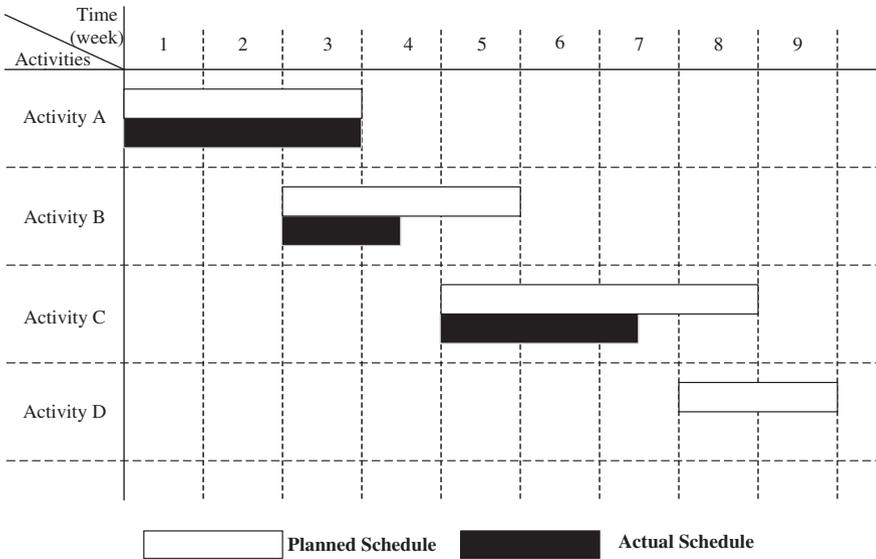
Fig. 14.5   Gantt graph of the planned and actual status of project X

to the activity B behind of schedule with 1.5 weeks to draw the conclusion that the project is postponed for 1 week. This is simply due to that the degree of difficulty and workload of the activities B may be different from those of activities C.

If the budget and actual expenditures of the project's activities were shown in Table 14.2, generally speaking, was there an overrun of the project budget? Similarly, to answer this question, we cannot simply add or minus the actual cost of activities and then compare with the budget.

In addition, what will be the project costs and duration in accordance with the current state of progress? Will the project's status be under control? Can this be managed internally or other stakeholders should be involved?

The most fundamental indicators of earned value method are as follows:

1. The budgeted cost for work scheduled (BCWS), which is a required budget to complete work in a stage during the process of project implementation.

   When the BCWS is calculated, we usually assume that all project activity costs are uniform, i.e., BCWS = the completed project activities * unit quota budget of work

Table 14.2   The activity budget of project X and actual expenditure at the end of 6th week

Activity name	Budget	The actual expenditure
Activity A	100	90
Activity B	150	110
Activity C	200	100
Activity D	50	0

2. The actual costs of completed work (ACWP), that is, the actual cost of actually completed work at one stage of the project implementation process.
3. Budgeted cost for work performed (BCWP), which is cost calculated by the actual completion of work and the budget quota at one stage of project implementation, namely earned value. BCWP = the completed project activities * unit quota budget of work.

On the basis of these three fundamental indicators, the following indicators can be used to determine the overall project cost and duration (see Fig. 14.6).

1. Cost variance (CV). CV refers to the discrepancy between the BCWP and ACWP during the project inspection. The calculation formula is CV = BCWP − ACWP.

When CV is negative, the project's actual expenses exceed the budget, which means the project cost overruns.
    When CV is positive, the project's actual expenses are below than budget, which represents savings with the project cost.

2. Schedule   variance   (SV).   SV   refers   to   the   discrepancy   between BCWP and BCWS during the inspection. The calculation formula is SV = BCWP − BCWS.

When SV is a positive, the actual project progress is ahead of schedule. When the SV is negative, the actual project progress has lagged behind the schedule.
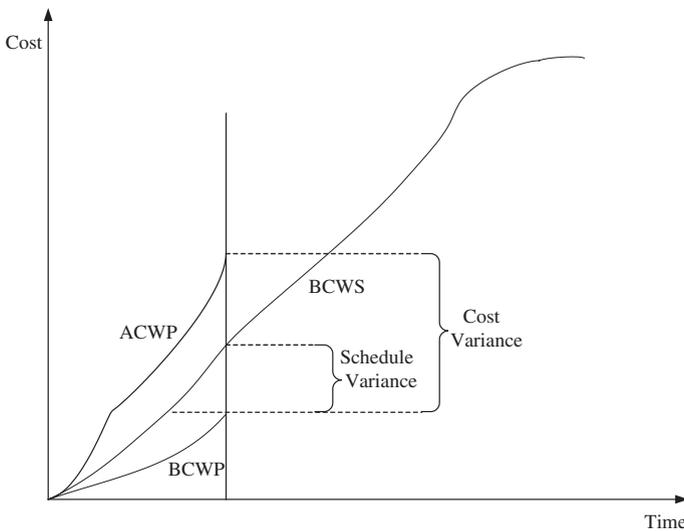
Fig. 14.6 Various indicators of EVM

Table 14.3 Parameters of earned value in X project

Activity name	Budget	BCWS	ACWP	BCWP
Activity A	100	100	90	100
Activity B	150	150	110	75
Activity C	200	100	100	125
Activity D	50	0	0	0
Total	500	350	300	300

Now, we can analyze the schedule and cost performance of the project X from the beginning to the end of the sixth week. Table 14.3 shows the related parameters of earned value in project X.

As can be seen from Table 14.3, project X is in the end of the sixth week:

$$SV = BCWP - BCWS = 300 - 300 = -50$$
$$CV = BCWP - ACWP = 300 - 300 = 0$$

In general, the project X is behind the schedule, but expenditure is according to the plan.

Similarly, we can use the cost performance indicator (CPI) and schedule performance index (SPI) to determine the project cost and schedule performance.

CPI = BCWP/ACWP
When CPI > 1, representing the project savings;
CPI < 1, representing the project overruns; and
CPI = 1, representing that the project actual expenditure is equal to the budget.
SPI = BCWP/BCWS
When SPI > 1, representing the project is ahead of schedule;
SPI < 1, representing the progress is behind the schedule; and
SPI = 1, representing that the actual schedule is equal to planned schedule.

There are two kinds of methods to predict the final project cost and schedule performance. The first method is to re-analyze and plan the project based on current completed data. This method is typically used when the project implementation shows the original estimate or assumed condition is nearly invalid. Another method is to use earned value data to make the estimate. Of course, the best method is to combine these two methods.

Assuming the original project budget is BAC, when the project is completed, the total cost (EAC) can be predicted as EAC = BAC/CPI.

Assuming that the original duration for the project duration is SAC, the ultimate duration of the project (EAS) can be predicted as EAS = SAC/SPI.

The problem associated with this method is that a linear assumption was made to predict the future based on the current trend. A better approach is to re-evaluate for each project task and then to predict project costs and duration again. However, this method is still regarded as effective to determine the current project status.

Now let us to use the earned value method to further analyze the project X.

$$SPI = BCWP/BCWS = 300/350 = 0.857$$
$$CPI = BCWP/ACWP = 300/300 = 1$$
$$EAC = BAC/CPI = 500/1 = 500$$
$$EAS = SAC/SPI = 9/0.857 = 10.5$$

In other words, project cost is still 500, while the project duration will be extended from 9 weeks to 10.5 weeks.

Earned value method is not an accurate prediction method, and its importance lays in that the project manager or project sponsors determine the project cost and schedule by regularly checking the earned value data.

Table 14.4 shows a project's earned value, which gathers data every two weeks. As a result, cost and schedule deviations can be calculated as shown in Fig. 14.7. Consequently, a conclusion can be drawn that the overall trend of the project is positive even though large time and cost overruns at the beginning.

In addition, we can use the following two parameters to set the control areas for the project management.

$$CV\% = CV/BCWP$$
$$SV\% = SV/BCWS$$

Where CV% is the cost deviation rate and SV% is the duration deviation rate. We can set the control lines shown in Fig. 14.8 to determine when the CV% and SV% are in what areas can be dealt with by the project manager and when CV% and SV% are in what areas must be reported to senior managers.

Table 14.4 Data of a project's earned value

Date	BCWS	BCWP	ACWP	SPI	CPI	Standard values
05-15-99	50,000	50,650	50,650	1013	1	1
05-30-99	110,000	95,000	100,000	0.863636364	0.95	1
06-15-99	250,000	235,000	256,000	0.94	0.91796875	1
06-30-99	1,500,000	1,480,000	1,560,000	0.986666667	0.948717949	1
07-15-99	1,750,000	1,750,000	1,850,000	1	0.945945946	1
07-30-99	4,570,000	4,590,000	4,805,600	1.004376368	0.955135675	1
08-15-99	5,200,000	5,300,000	5,550,000	1.019230769	0.954954955	1
08-30-99	5,600,000	5,800,000	5,865,000	1.035714286	0.988917306	1
09-15-99	6,200,000	6,100,000	6,500,000	0.983870968	0.938461538	1
09-30-99	6,358,520	6,358,520	6,650,000	1	0.956168421	1

Schedule and Cost Performance Indices
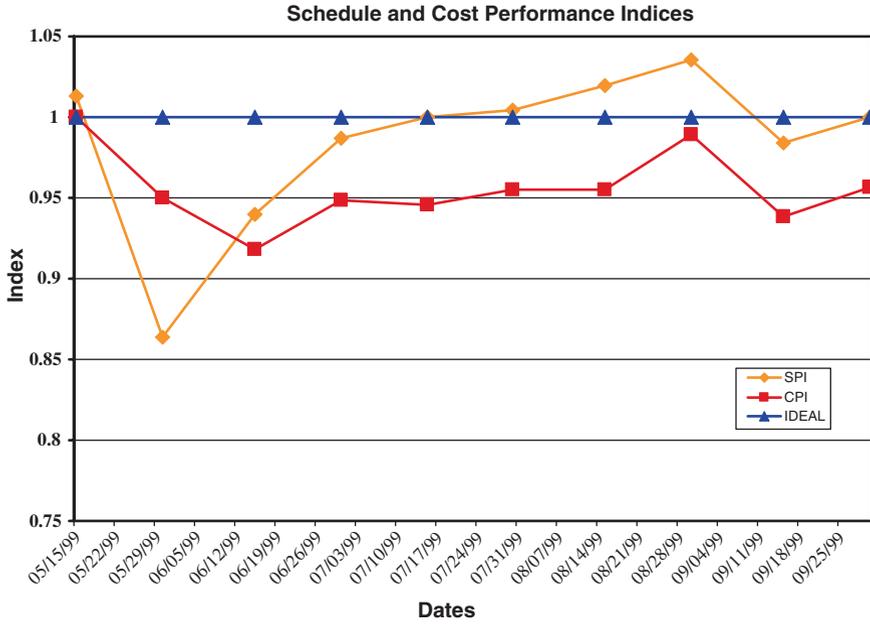
Fig. 14.7   The trend of cost variance and schedule variance from Table 14.4
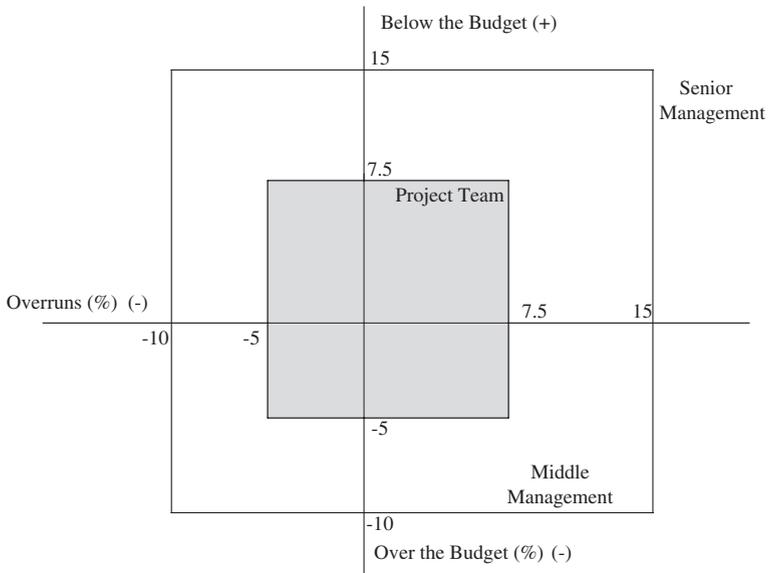
Fig. 14.8   How to control project variance

14.4 Ensuring the Effectiveness of Project Meetings

It is indispensable for the process of project management to hold a variety of meetings. A face-to-face meeting has both advantages and disadvantages. For example, the cost will rise and other works cannot be completed during the meeting. Similarly, some contradictions may occur if the meeting is not organized properly.

To make the project meeting more effectively, the following principles should be adopted.

1. Determine the agenda and the contents prior to the meeting. Many meetings, particularly the so-called regular meeting, do not tell participants what will be discussed. When attending these meetings, people cannot make a full preparation, which leads to low effectiveness of the meeting (see Fig. 14.9).

People often follow the 3S principle at meetings, namely silence, smile, and sleep. This means keeping silence at meetings, keeping smiling if the leader watches you, and sleeping if the leader does not watch you. Only, three kinds of people dare to speak in the meeting: the leaders, whatever they say will not lead to a death; a ruined man, no matter what they say, they will die; and daredevils, they are crowned by others and emerged to dead. Leaders often shout themselves hoarse at the meeting, while subordinates practice writing in the notebook. After the meeting, no leader wants to suddenly ask everyone to hand over the notebooks, and if they do so, the game will be over.
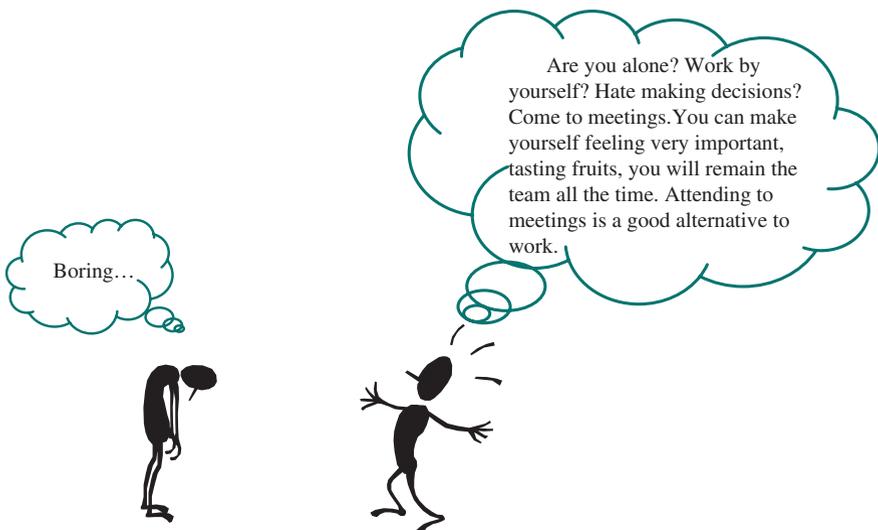
Fig. 14.9   Real aims of meetings

2. Determine the objectives of the meeting in advance and insist these objectives. There are many purposes of the meeting such as communicating information, solving the problem, and making decisions.

   The purposes of the meeting must be clarified in advance. Meeting goals will then be developed based on these purposes which will be passed on to all participants.

   In addition, during the meeting we must stick to those goals. "Off topic" phenomenon often occurs in project meetings, which wastes a lot of time.

3. Only invite those who must attend. Some bosses like a full meeting room, which gives them a feeling of power. Similarly, some subordinates also like meeting, because they believe it is a treatment to participate in the meeting. In fact, although many people try to record in the notebook during the meeting, only those related to the topics would look at those records after the meeting. Those "accompanies" simply take notes as they want to show respect to the boss.

The way to solve this problem is to send a notification about the contents of the coming meeting and specify that "The following persons must attend. Others who think it is related are welcome. If they cannot attend, we'll send everyone a copy of the meeting minutes after the meeting."

4. Start on time. It is a common phenomenon in which putting off the meeting's beginning for those coming late. Some may be delayed for a few minutes, while some may come late for several hours.

   Some companies will require latecomers to pay fine, and this approach may be effective. However, it also implies a question, i.e., after you pay the fine, being late would become "legal" and that can make people feel at ease.

5. Control the proceeding. It is not as easy as we thought to control the proceeding. Many meetings will restrict the time of each spokesman; for example, it is ruled that time of each speaker should not exceed 10 min. But a common phenomenon is that the first spokesman talks about 15 min. The second spokesman saw the first using 15 min, and felt like he cannot talk too little, so he talked about 20 min. The result is that speakers spent more and more time, leading to a non-controlled meeting.

The meeting is a small project. If we cannot control this small project, how can we control a project?

6. Make a summary of the meeting. Every meeting should have a conclusion and a result. If there are no results, the whole meeting is a failure.

7. Record the contents of the meeting and put the meeting decision into practice. To ensure the meeting decision is implemented, it is necessary to clearly define everyone's responsibility and set the feedback time.

8. Ask yourself whether such meeting is necessary. Although this principle is placed at the last, it is the most important one.

14.5 Try to Use a Standardized Form of Communication

Everyone say "formalisms kill people." In fact, it is imperative to use standardized forms of communication in order to eliminate the "information funnel" and to prevent "the information isolated island" phenomenon in enterprises. Standardized form of communication has the following advantages.

1. To avoid the risk of reliance on personal experience

Each of us has the habit of working practices. However, individual's experience in a changing environment is very prone to problems. When we are too accustomed to one thing, we will adopt a "knee-jerk" behavior, rather than planning and inspecting. Standardized form of communication requires doing work step-by-step and leaving evidence; thus, we can reduce the risk of personal habits. This is the reason the commander's order needs to be repeated.

To improve the effectiveness of project plan, we can use the checklist in Table 14.5*, which can reduce the risks from insufficient experience of project team. This checklist should be provided by the enterprise project management office, which is important intangible asset of enterprises.*

2. Statistical trends can be formed to grasp the key points

"Law of 20/80" has a variety of purposes, such as "20 % of customers bring the 80 % of income" and "80 % questions are from the 20 % of causes". Managers, especially top managers, have to handle a lot of things. They must put the limited time into the most critical areas. Similarly, enterprises need to put the limited resources into places with the largest output. Where there are no statistics and metrics, it is difficult to manage anything. Without standardization, a statistical law cannot be formed, which makes it difficult to highlight the 20 % of what we should control.

> *We must note the quantitative aspect, and have the basic quantitative analysis to situation and problems. Any quality manifests itself can be expressed in a certain quantity way, without quantity there can be no quality. Many of our comrades are still do not know how to pay attention to the quantity of things, do not know how to pay attention to the basic statistics and the main percentage, and do not know how to pay attention to the boundary of quantity which determines quality, everything has no idea of its quantity at all, the results cannot help to avoiding making mistakes.*
>
> —Mao Zedong • *The Working Method of Party Committee*

3. Interpersonal conflicts can be reduced

Interpersonal conflicts generally come from misunderstandings and other defects of communications. Speaking of "do not regard yourself as an outsider" or "do not regard yourself as an insider" is very easy to lead to the communication problems and interpersonal conflicts. This is especially the case for temporary projects, and for people with different cultural and professional backgrounds. If there is lack of

Table 14.5   Checklist for project plan (partial)

Serial number	Items	Review comments
1	Whether or not it meets the requirements in the contract?	
2	Has it planned activities according to the proposals for the projects/project task?	
3	Have you identified all of the assumptions and constraints?	
4	Are the cost, schedule, and quality goals clearly defined?	
5	Are there project task proposal and meeting minutes of project kickoff?	
6	Are key milestone defined clearly?	
7	Do major milestones make sense? Are they corresponding to the payment schedule?	
8	Does the project plan meet the contractual?	
9	Has criteria been defined for the reformulation of plan?	
10	Is there a cost plan? Has the costs been assigned to each major milestone?	
11	Has the assessment method of products been defined?	
12	Has explicit examination of the company's quality management system been conducted?	
13	In the resource plan, has the start and finish time been defined for the demand and occupancy of resources? do you identify resource requirements and the starting and ending ti	
14	Is there a communication plan? Is there a clear communication cycle and submission?	
15	Are there internal training programs? Have needs, time, and methods of training been identified?	
16	Is there a plan of internal training? Are the content, standards, and completion time of training clearly defined?	
17	Is there a measurement plan? Are there clear reports, metrics, metrics, and metrics cycle?	
18	Is there a QA plan? Are there clear contents of QA activities, timing, and criteria? Are there clear QA form and submission of the periodic reports?	
19	Is there a configuration management plan? Is there clear configuration management tool? Are they explicitly configured? Is there clear baseline? Is there clear backup strategy?	
20	Is there a risk management plan? Are there clear methods to determine the magnitude of risk as well as risk mitigation?	
21	Has the preparation of user manual been reflected in the plan?	

a standardized form of communication between stakeholders, a variety of sensitive issues will emerge, causing a conflict. Guan Zhong said "can be light or deep, float or sink, direct or indirect, voiced or unvoiced." Such communication skills are very difficult to grasp.

*In a meeting, a lot of senior executives will unconsciously make the meeting cen-
tralized, which not only makes the meeting very poor, but also let the executives
make the conflicts focus upon themselves. The following meeting management reg-
ulations of a company can provide us with examples to avoid this kind of contra-
diction (see Table 14.6).*

*As shown in Table 14.6, the top manager attending the meeting is the vice presi-
dent of production, who does not stand at the forefront of conflict, but the pro-
duction planning department runs on the front of the meeting. However, the
production planning department simply worked according to company policy. Its
agenda also comes from the procedures and methods of data collection at the com-
pany level. Thus, even those departments that did not complete the task will not*

Table 14.6   A company's production control and management regulations (part)

4.1	Preparations for the meeting
4.1.1	Production scheduling meeting time: every Monday morning at 10 o'clock; participants: manufacturing manager, procurement manager, quality manager, process manager, and above department-related personnel must attend. If workers in other sectors need to participate in, the production planning department will notify them the day before the meeting
4.1.2	The number and reason for the variations occurred during the week (last Friday until this Thursday) should be submitted by the production planning department as electronic version to the relevant departments on Friday
4.1.3	Every Friday (five-day week, if it is six-day week or seven-day week, that is on every Saturday), before 3 o'clock in the afternoon, all departments submit an electronic report that includes the completion of the task assigned on Monday schedule meeting, the overall status analysis of production planning this week to production planning department. If some of them do not report on time, they should be regarded as unfinished processing
4.1.4	Production planning department is responsible to audit the analysis of the reasons and solutions from various departments, to follow up to confirm the effects of corrective measures
4.1.5	Five minutes prior to the meeting, staff of production planning department should arrive at the place in advance and prepare for the meeting
4.2	Meeting agenda
4.2.1	Production planning department reports the completion of production of last week and analyzes the plans and the reasons for the variations, with clearly defined responsibilities, and deadline for resolution by the departments
4.2.2	Brief the completion of last week's work arrangements and reassign the leader and schedule of the departments that did not finish scheduled tasks
4.2.3	Each department analyzes the actual status of production plan and the overall trend of last week
4.2.4	Production planning department assigns the tasks according to the production plan schedule
4.2.5	Tasks involving multiple departments should be assigned a lead department by the vice president of production, while a due date is assigned
4.2.6	The vice president of production makes the summary and assigns immediate tasks
4.2.7	The works of other departments needed to emphasize in the production scheduling meeting can be arranged specially

consider it as troublemakers. Sometimes, leaders' leading is not only unnecessary but also harmful. During business negotiations, the top decision-makers never join the negotiation team at once.

To determine whether a family has a proud history, it is necessary to understand what its ancestors do. An enterprise's management level depends on how many management staffs are used to using Excel when they are in reporting.

14.6 The Communication and Coordination in Government-Related Projects

It is hard to have a pure commercial enterprise in the world. Enterprises that achieve a certain degree will inevitably have close relations with the government. In China, there are many projects that are carried out under the government's attention. This type of projects can be generally defined as "projects related to government's performance". Such projects possess both enviable, i.e., they are easy to get support from the Government, and disturbing, i.e., they are vulnerable to the government intervention.

In order to improve the success degree of the project, we must take effective ways to communicate "management" with these superiors. The key points can be summarized into the following three aspects.

1. Pay special attention to the work reported

Leaders are too busy to deeply understand a lot of things, but this does not mean that you do not have to let them know the details. This is a bit like the scenery where we greet leaders. You may think that the leader will not see you in a hurry, so you did not greet him as you pretend not to see the leader. However, in fact, it is normal that leaders do not greet you, while your ignorance of leaders will be accounted. Therefore, when you meet the leader on the road, regardless of whether they hear and see you, you should greet him. Similarly, regardless of whether the leader has time to look at your report, you must consistently do reporting well as he would see your report.

There are many functions of reporting. Firstly, it can let the leaders know you are on your work, doing something they care about, and working very hard for such a thing. We often hear the following phrase: "It's a question of attitude." This sentence is very meaningful. Although it may not be tangible, its role is often more significant. Secondly, it can attract leader's attention to your project. The more the leaders spend efforts on your project (even if they just have a look), the greater the project's influence on them, the more they do not want the project to fail, and the more they will support the project. Finally, it can be your death-free card. This is the reason people claim some authority and hand back some authority, like reporting everything, at the same time. Why? Leaders like this and you can shirk the responsibility. Reporting tools can also play such a role.

To do a report well, we need to control the timing, contents, and manners. First, an appropriate time is required. If the interval is too short and only tiny daily activities are reported, managers who deal with numerous affairs everyday will sooner get tired. If we report when crucial issues occur, for a long waiting time, leaders will cool their heat. Therefore, we must grasp the rhythm of reporting and set setting milestones accordingly. There are four types of milestones: where the contract requires, where the life cycle is turning, before the crucial resource is in place, and everywhere need to set aspirations. The latter two types, especially the last one, can be used flexibly to attract leader's attention. Submitted contents should consist of not only good news but also bad ones as only reporting good news has an opposite effect to what we wish. It is best solution to report most good news that is closely associated with leader's support with a few sad ones which needs further support. As to manners of reporting, it should be concise and reflect the status of projects in line with the government's regulations. Efforts are required to avoid the use of overly specialized vocabulary and expressions so that leaders can remember, repeat, and improve. We would better arrange the report in two parts. The first part is a highly concentrated form for a better review. The other is a detailed one which the leader can choose to scrutinize if he or she has time.

2. Standardized management procedures

Leaders' casual intervention and instruction, which are called "ideology of the chief", should be regulated and restricted. Leaders' private demand also requires certain restrictions. It is difficult to achieve this. However, if we fail to do so, project will face even more difficulties.

Effective program for "management of superiors" must include the following aspects.

First, define the project assessment process. Government intervention often starts at the beginning of the project. Proposal stage is the best stage to showcase the power, as well as the performance, benefits, and hidden risks. Therefore, scientific, rational, strong, but not stiff proposal process has become especially important. To avoid risks in later stage of the project, this procedure should be properly disclosed. What is more, you should make the process of implementation transparent and take the initiative to request the involvement of the government. This helps to achieve the purpose of respecting officials as well as securing support from the government (even symbolic support is important). These practices may trap their own hands and feet or disclose business secrets. However, these practices are deemed profitable as the political risks outweigh the business (including personal) earnings.

The overwhelming majority of officials do not care about getting some economic benefits from the project. Rather, most of officials are concerned about some achievements from the project. Officials are also ordinary people. Even if they generally have higher public awareness, they also have selfish motives, and one of the most common is hoping to reflect their own capability through the success of the project. Thus, the starting point of the "blind commanding" is not bad in most

cases. However, staying in the leader positions for a long time, they are praised and echoed all the time. Inevitably, they will forget about the fact that they are not experts. Telling the officials the rationality and necessity of the project is the basis for getting their understanding and support, and the foundation to avoid their "arbitrary" interference in the future. In our society, the "underappreciated" situations often occur. However, after careful analysis, most of the causes lie in the "talent" who has problems. In other words, they should bear the responsibility. Similarly, the main reason of inappropriate intervention may lie in poor project communication.

Second, control the management procedures of tender invitation. Government officials' intervention on the bidding process is quite different from the project intervention. The reason the government concerns about a project lies in the impact of the project on the society, politics, market, and its relationship with the government performance, etc. Whether this should not be conducted or not and how to conduct involves political interests. That is why officials intervene. This is common. What to do after the tender invitation is mainly an economic question. Thus, the intervention of government officials is also concerned with economic interests. By strengthening this aspect of the procedure, we can reduce not only economic losses, but also the political and criminal risks from inappropriate invitation of tender and the likelihood of officials' active and passive crime. This is also a protection of government officials from another perspective.

Sometimes, officials expect improper benefits through projects. It is crucial to prevent such situation. However, in most cases, officials have to intervene in the project. Under such context, the standard procedures of tender invitation can help the project team to find a reason to refuse the intervention.

Third, establish a good change management program. The change management here does not refer to the changes derived from negligence and unpredictable problems during common project management processes (of course, these changes also should be managed according to the standard procedures). Rather, they are developed to deal with officials' command (mainly occur during the inspections) during the project implementation. Governments place focus on procedure, and project managers can use it to resist the "non-procedure" behaviors.

Fourth, develop project acceptance procedures. The government will focus on project that improves government's performance. Therefore, similar to the project approval, during the acceptance of the project, initiatives should be adopted to invite government intervention. These initiatives should reflect the contributions of the project to the improvement of government performance and sum up the government's contribution to the success of the project.

Fundamental principles to regulate the project management procedures are as follows: securing understanding by means of communication, securing support by means of understanding, and eliminating obstacles by means of support. As we cannot control government officials, we have to let them to control themselves. This requires some good reasons so that they can accept.

3. Establishing a coordination mechanism

Since the project is associated with the government performance, the government cannot just enjoy the results without commitments. It presents a significant challenge for the project management team to secure effective support from the government. For performance-related projects, some policies and funding supports will be received, no matter whatever is the scale of the support. A number of government departments will be involved. Due to the uneven benefits of government achievements, supports from these government departments to the project are quite different. The simplest coordination mechanism is the coordination meetings. Coordination meetings are divided into two categories: event-driven coordination meetings and regular coordination meetings.

Event-driven coordination meeting refers to a meeting that project senior officials hold to coordinate related departments for some problems that cannot be settled by project unit and government agencies (such as management department of finance, planning, land, and environmental protection). Regular coordination meeting refers the meeting regularly held by project senior officials, involving project units and related departments, to inform the progress of the project and decide the each unit's responsibilities and objectives accordingly, and so on.

No matter what kind of meeting it is, the project unit should remember one thing: don't act as a "villain", and don't become the focus of conflict. Coordination meetings are needed because the project undertakers cannot solve the problems between them and the government by themselves, and they cannot afford to offend these government departments. Even getting a lot of grievances, the project undertaker should not report to the departments' superiors; otherwise, there will be more troubles in the future. Asking more senior officials to attend the coordination meetings is a threat to the departments. If a department is criticized at the meeting, the undertaker of the project will have a lot of hardship in the future. So, we must find ways to build a stable institution of coordination meeting that some government departments hold and senior officials attend before the occurrence of problems at the beginning of the project. Project undertaker is just a member of the system, and the problems to be solved are not introduced by the project undertaker but through a programmed management approach. In other words, at the coordination meeting, the department that holds the meeting needs to report the progress and problems of the project, which is provided by the program and guaranteed the authenticity by the department. In this way, there would be no bad guy, no department will lose face, and problem would be solved easier.

Information collection prior to the coordination meeting must be structured and carried out around several key aspects, in order to highlight critical issues. The meeting's objectives must be clear to ensure the problem can be solved. The meeting should not be too long; otherwise, the leaders will not be able to attend to the whole process.

GE's former CEO Jack Welch said, "communication, communication, communication." In all of the project management skills, communication is the most important.

Chapter 15
Performance Management Has Become the Driving Force to Promote the Project Success

Before any action is taken, an order must be issued first. That is to make clear the standards for awards and punishments when any action is taken.

—Guanzi • *On Establishing Right Policies*

According to Standish Group, a specialized research institution on project management, only 30 % of projects could achieve project objectives in terms of key performance indicators such as schedule, budget, and quality.[1] However, the survey revealed that more than 90 % of respondents were not satisfied with performance management approaches. Thus, it is urgent and critical to improve the project performance management.

15.1 The Way of Thinking for the Performance Management

Any method is supported by a theory, although may be we have no idea about what the theory is. The hypothesis is behind the theory, while the way of thinking is behind the hypothesis.

There is a kind of dandelion that is so annoying that people want to get ride of them away in Australia. In the first year, they were cut off, and however, they became lusher at the second year. Consequently, the roots of dandelion were pulled out. In the following year, it came out again. Later it was discovered that dandelion's seed was about eight meters below the ground.

Project performance management comes the same way. In practice, the performance appraisal was paid most attention to solve the issues of performance management. However, theoretical researchers paid more attention to the new theories on performance management. Nevertheless, there is lack of efforts to reflect on the "seeds" of these methods and theories, i.e., the validity of the assumptions and way of thinking for the performance management.

---

[1]Refer to www.standishgroup.com

In medieval Europe, with the support of the Catholic Church, people widely believed in "geocentric theory" that the Earth is the center of the universe. Polish astronomer Copernicus put forward the "heliocentric theory" that the Sun is the center of the universe. This is further developed by the Italian Bruno that the Sun does not rotate around the Earth. Instead, the Earth rotates around the Sun, and at the same time, it also rotates around itself. This was perceived as a ridiculous argument at that time. Bruno was arrested in Venice and imprisoned for 8 years. He was finally adjudicated as "heresy" by the inquisition and burned to death in the Fresh Flowers Square in Rome.

Natural science is based on the hypothesis, so is the management. The difference is that no matter what the assumption of science is, the laws of nature will not be changed. However, for management, different hypotheses can lead to different actions, which will lead to different results. The effect of the hypothesis behind the management theories and methods to the reality is much larger than that of the underlying hypothesis of natural science researches to the reality. A manager should continue to reflect on the validity of the hypothesis and the way of thinking behind the hypothesis, rather than simply changing their methods or theories.

At present, the vast majority of theories and methods of performance management focus on the evaluation and incentive for those staffs that undertake the work. It is a mechanical thought behind this kind of performance management.

1. Mechanical thought and its negative effects on the project performance management

Mechanical thought views everything as a machine or part of a machine in order to complete a task. In other words, people can understand things according to the way of understanding the machine. As people do not understand the meanings, essence, and characteristics of the mechanical thought, they will often fall into this way of thinking unconsciously.

The process of mechanical thought is known as the "decomposition first, followed by synthesis." There are three steps of this process. First of all, the task is broken down into several elements. Secondly, these elements were studied in order to understand their properties or behaviors. Finally, the understandings of these elements are combined so as to understand the whole task.

Mechanical thought has two main features.

1. Mechanical thought focuses on the inside of things, their elements, and the relationship between these elements. According to the mechanical thought, a thing can be interpreted by the decomposed elements, and this interpretation is not only necessary but also sufficient. Therefore, it is not necessary to use other factors to explain this thing. In other words, according to the mechanical thought, the properties or behavior state of things has nothing to do with the environment, i.e., things are independent of the environment.

Based on this way of thinking, during the project performance evaluation, focus is placed on the project team members. There is an implicit assumption, i.e., the project team members are the only factors contributing to the project performance.

A manager of a company's production department once complained that they were the most unlucky within the enterprise. This is because the company blames the department for the loss beyond its control during the performance evaluation. For instance, due to the late payment to suppliers, the quality of materials is not guaranteed, which led to the decline of production efficiency. Similarly, due to the inaccurate prediction from the marketing department, the production cannot keep up with the changes in the market. In some cases, the equipment in the production workshop broke down, but the maintenance department cannot fix it up in time, which caused the delay. All of these issues did not root in the production department. However, the production department had to take the responsibility.

2. Mechanical thought views that the optimal overall system comes from the optimum of each component. According to the mechanical thought, the broken-down system elements play a role in the whole system via predefined functions. If there is anything wrong with the whole system, there must be one element or some elements that have problems. Similarly, as long as the performance of each element has been optimized, the overall performance will also be improved.

If the entire enterprise is viewed as a chain, each department is each link of the chain. The weight of the chain is equivalent to the cost of enterprise, and the strength of the chain can be regarded as the income of enterprises. Every 100 g reduction of any link's weight will lead to the reduction of the entire chain's weight by 100 g. In other words, the reduction of any department's cost can reduce the cost of the entire enterprise. However, it is not the case for the strength. If any link's strength is enhanced by 1 %, the overall chain's strength does not always increase by 1 %, unless the weakest link is enhanced. It is necessary to achieve the harmony between different departments so that the income can be increased. The individual department can be taken into account in order to reduce the cost.

When using mechanical thought for the project performance management, managers tend to focus on the project team, project team members, and the problematic areas. They perceive that project team members are decisive to the project outcomes. As long as individual problem is solved, the desired performance will be achieved. Similarly, as long as each component's performance is enhanced, the overall performance will be improved.

There is a wooden box which is segmented evenly with a funnel filled with sand on the top. Sand is very fine and uniform. The funnel moves horizontally at a speed of one meter per second, so the sand will fall evenly into each compartment of the wooden box. However, will the sand in the wooden box appear as a horizontal line as shown in Fig. 15.1a? No, it appears as the curve as shown in Fig. 15.1b. When the sand is finer and more uniform, the funnel's speed is more constant, and the sand is more likely to appear as a horizontal line. Otherwise, it is more likely to appear as a curve. However, the sand will never become a true straight line. This is because there are a number of uncertainties (such as the viscosity of sand and the air resistance) that keep the sand from falling into each compartment in the

same way. The deviation derived from these subtle, complex, and uncontrollable factors can be called a "common-cause deviation".

When we hit the funnel with a small hammer, the fallen sand will show obvious patterns (see Fig. 15.1c). It is comparatively easier to find causes to these deviations. As a result, these deviations are more controllable which can make more obvious differences to the system. They are called "special-cause deviation."

Common-cause deviation has the following characteristics: Despite various levels of impacts, such deviation exists in the whole process; each individual factor has a small impact on the occurrence of deviation; however, this impact will be much more significant if all factors are combined together.

Special-cause deviation has the following characteristics: It does not always appear in the process; it is outside of the general process; it has a large or small impact on the overall deviation, but its impact is larger than any single common-cause deviation.

Any dynamic system has common-cauObjectivity. It is not performancese deviation and may also have special-cause deviation.

Project performance is also determined by the controllable factors and uncontrollable factors associated with project team members. Within the project life cycle, there are two types of deviation, i.e., common-cause deviation of the project system and special-cause deviation of the project system.
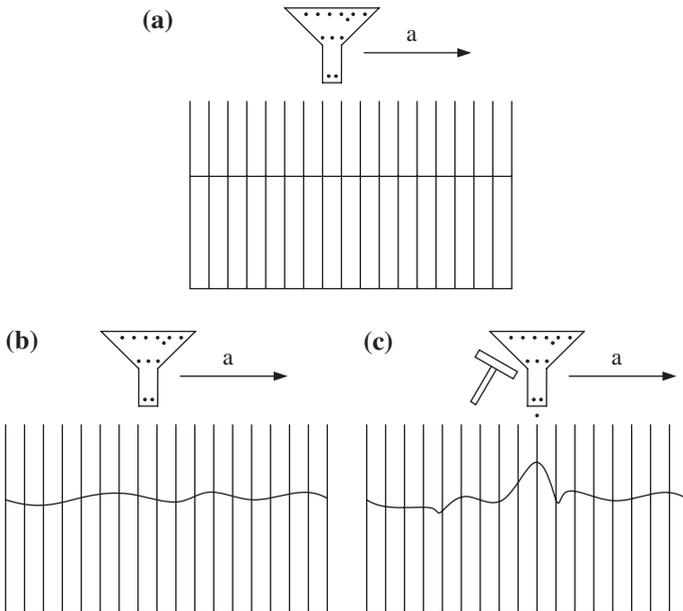

Fig. 15.1 System deviations

As the project is affected by common-cause deviation and/or special-cause deviation, uncertainty is associated with each project activity which led to statistical fluctuations, thereby resulting in project delays, cost overruns, and so on. The project activities are interrelated. Due to the impact of statistical fluctuations, local improvement in these interrelated project activities may not necessarily improve the project performance synchronously.

The effectiveness of a project activity is determined by other constraints in the project system rather than its local efficiency. During the project performance management process, the improved performance of non-bottleneck components will not improve the overall project performance.

When managers carry out performance management based on mechanical thought, they see projects as a closed system. They do not realize that common-cause deviation generated from the project system and its environment has a significant impact on the project team members and project performance.

To improve the project performance management, it is imperative to change the way of thinking first, i.e., from the mechanical thought to the system thought. If the way of thinking is not changed, the project performance will not be improved fundamentally by simply using a new performance management theory or method.

2. System thought of project performance management

The so-called system refers to an entity which comprises two or more elements. To become a system, the following three conditions must be met. First, the properties of each element affect the properties of the entity. Second, the properties of each element and its effect on the entity depend on each other. Neither of these elements can influence the entire system by itself. Third, no matter how these elements are further decomposed, all these components affect the entire system. However, no single component can affect the entire system by itself. In other words, various elements of the system are closely interlinked and cannot be divided into separate parts.

There are two deductions from the connotation of the system. First, every part of the system has its own property. When it is separated from the system, the property will suffer from some losses. Second, each system possesses certain properties. However, none of these parts can possess these properties by itself.

There are three parts of the process of system thought, which is markedly different from the process of mechanical thought. First, efforts are required to identify systems that are larger than this system, namely the containment system. Second, the properties or behavior of the containment system should be explained. Finally, the properties of the system should be explained from the perspective of its role in the containment system or the functions that it should have.

Compared with the mechanical thought, system thought has the following distinct features.

1. System thought pays attention to not only the inside of the systems, but also the interaction between the system and the environment. System's properties cannot be adequately explained only by the elements of the system. The

relationships among these elements and the relationships between these elements and the system environment should be taken into consideration. The environment is not controlled by the system. Rather, the change of environment is the important reason for the deviation of system performance.

2. The performance of system is more determined by the interaction among its elements than their independent actions. Harmonious relationships among the system elements are critical to the system performance. This harmonious relationship is generally at the expense of the local efficiency. If all the elements of the system achieve the maximum efficiency, the system generally cannot achieve the best overall performance. Improvement of the local performance may even lead to the reduction of the overall performance. System operation has common-cause deviation and special-cause deviation. Human being is the essential factor but not the only factor for the better performance.

Based on the system thought, the main target of project performance management should be a project operating system, rather than merely the project team members. In order to improve the project performance, efforts are required to seek the harmonious relationships among the project stakeholders, technologies, processes, etc.

15.2 The Connotation of Project Performance

Project performance is the sum of data that contain the process state and the final product of the project operation.

Project performance has the following characteristics.

1. Objectivity. It is not performance if there are only project processes or project products. This is because the purpose of modern project management is to satisfy all stakeholders who have different views of project performance.

Enterprises pay attention to the final commercial value of the project. By contrast, the project team members concern what new knowledge and skills they can learn from the project process. The suppliers expect to obtain their desired business benefits from the project.

The evaluation standard for the project performance is different from stakeholder to stakeholder. As a result, the evaluation of the project performance should not be limited to the final result or process of the project. Project performance should be the sum of all the original data rather than the selected proportion. Due to the objectivity, all stakeholders should evaluate the performance based on objective facts, rather than on the information that is explained or screened by other people.

2. The whole process. The project is a dynamic process. During the project life cycle, the whole process is affected by a number of factors. The status varies according to the time, and its value differs for various stakeholders. Particularly, the project team members pay more attention to the improvement

of their professional skills obtained from the project. As a result, they are bound to judge the data collected from the whole project process, which is regarded as the basis for the performance evaluation.

3. Not completely human driven. Project performance is obtained via the harmonious interaction between all stakeholders and the environment. In the course of the project, the operation status and final outcomes are affected by a number of factors such as various stakeholders, the project operation processes, and tools, as well as other factors known or unknown, and controllable or uncontrollable.

However, for any stakeholders of the project, the project performance can be represented by the following four categories of evaluation index system (see Fig. 15.2).

1. The benefit index of the project. Benefit refers to the final, staged, and direct outcome that the project stakeholders can enjoy from the project. These include any outputs and outcomes that are measurable, tangible or intangible, and verifiable or appreciable.
2. The efficiency index of the project. Efficiency refers to the ratio of the profits to the investments of various stakeholders. These include investments that are tangible or intangible, measurable, verifiable or appreciable by the evaluators, etc.
3. The deferment index of the project. Deferment index reflects the extent of the future effects of the project's operating process and products on the project stakeholders. It is indirect benefits project stakeholders obtained from the project operation. They are measurable, and tangible or intangible and can be confirmed in the future.
4. The risk index of the project. Risk index refers to the performance data about measurable events, activities, and so on, which should alert project stakeholder.
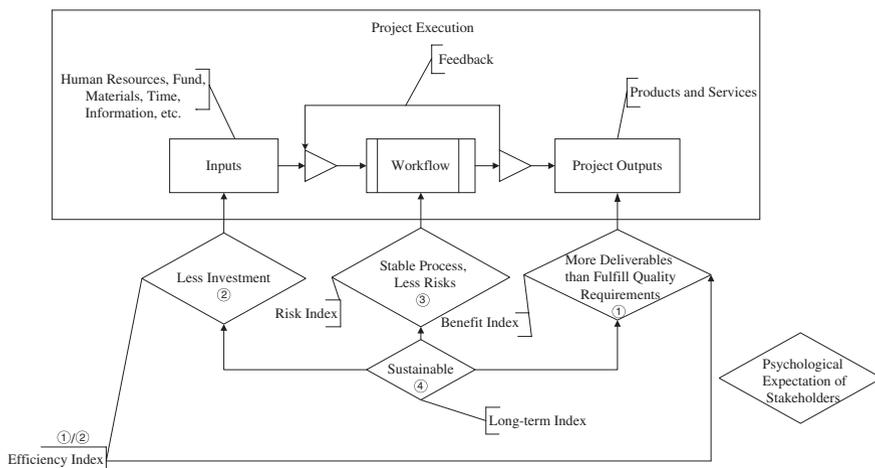

Fig. 15.2   Project performance indicators

15.3 Evaluation Methods of Project Performance

During the project performance evaluation, it is a common practice to make an overall evaluation of the project. In other words, a variety of performance indexes were combined to draw the overall conclusion. Comprehensive evaluation method is widely used. It is a method to determine the final score by means of multiplying the score of various indexes by the corresponding weights. Consequently, these scores are added up to obtain the evaluation data. However, there are significant disadvantages associated with this method.

1. Focus on the personnel evaluation

Comprehensive evaluation methods focus on the investigation of individual project group members, while the interaction among these members is overlooked. In order to improve their own performance, sometimes each individual project team member took actions either consciously or unconsciously to damage the interests of the enterprise and other members, which is detrimental to the project.

In the university system, a common practice is that credits will be given to students if they pass the examination. Under such circumstance, very few students analyze the reasons for losing some points and then continue to learn after the examination. The examinations in the senior grade three are entirely different. Although the examinations are frequent, teachers and students keep analyzing the results and reasons. They will not stop learning just because they passed the examination. This is because many examinations in senior grade three are held to assist students to grasp knowledge so that they can pass the university entrance examination ultimately. The purpose of university examinations is different from that of examinations in the senior grade three, while the effect is different too.

2. Ignoring the dynamics of the system

There is an assumption associated with the comprehensive evaluation method that the project system is static, where a variety of environmental and internal factors remain unchanged.

If the cost index of a project is RMB 10,000,000 Yuan, but finally only RMB 9,500,000 Yuan were spent. Is there cost saving or cost overrun in this project? According to the comprehensive evaluation method, there are cost savings and the project team should be rewarded. However, in reality, it might be simply due to the unexpected and substantial price drop of raw materials. If the price of raw materials does not change, there might be RMB 1 million of cost overrun.

3. Compromise to the psychological expectations of stakeholders

According to the comprehensive evaluation method, multiple criteria of project performance can be substitutive to each other. It mixes up the desired performance indexes of different project stakeholders. Compromise means persuading parties in

conflicts to make concessions, which also reduces the mutual satisfaction. In fact, if some stakeholders are satisfied while others are not, it will lead to the project failure. Different stakeholders and various performance evaluation indicators are irreplaceable.

A man was sentenced to death for the crime of intentional homicide. The man pleaded: "I killed a man, but last year I saved two people, I can kill another. It is reasonable to kill me when the number of people that I kill is equal to the number of the people that I save." This plea is ridiculous, because the one cannot simply substitute for the other. However, the comprehensive evaluation method considers various indicators as substitutive with a different conversion ratio.

It is well recognized that it is very difficult to change human being's habits of mind. Surely, we can establish a system to force people to do things according to some standardized approaches. However, as the uniqueness of the project leads to countless uncertainties, systems tend to be less flexible, or become meaningless in a changing environment. To adapt to these changes, it is imperative to ensure that the project performance management is based on system thought. It is not only valuable but also necessary to establish the following principles.

1. To pursuit the mutual harmony among people, processes, and technologies

The architecture of each project system can be defined by three parameters, i.e., people, processes, and technologies. In accordance with the system thought, the performance of the system is determined by the relationship between the three aspects and their attributes. If they are isolated, the performance of the project system will be much lower. Similarly, the change to any of these three parameters will lead to the reaction of the other two parameters. Therefore, it is necessary to establish a harmonious relationship between people, processes, and technologies in order to achieve the desired project performance. In recent years, the concept of the capability maturity has drawn a wider attention. The core of capability maturity lies in pursuing the harmony among people, processes, and technologies at different levels.

   If there is no harmony among people, processes, and technologies, a constraint (or the bottleneck) to the project system will be formed. According to the theory of constraints,[2] during a period of time, there must be a few constraints in the project system which largely determine the level of project performance.

   In order to ensure the harmony among people, processes, and technologies, the following five steps must be adhered to.

① Discovering and defining the constraints to the project system;
② Exploring the ways to eliminate these constraints;
③ Making adjustment to other aspects of the project system in order to adapt to the adverse reactions derived from the constraint elimination;

---

[2]For information about the theory of constraints, see Eliyahu M. Goldrantt. Theory of Constraints. The North River Press, 2000.

④ Eliminating the constraints;
⑤ Looking for new system constraints.

In the above steps, special attention should be paid to the third step. Although the system constraints exist in each component, they affect the overall system performance. Any measures taken to eliminate or improve constraints will cause the reaction of other aspects of the project. If these reactions are not considered, improvement measures will make even severe disharmony among people, processes, and technologies. This in turn makes the project management falling into the trap of mechanical thought.

2. To promote stakeholder engagement during the entire process

Engaging stakeholders in the entire process is the necessary condition for improving the success rate of the project.

The project is a social system that is open to the environment. Resources needed to complete the project generally exist outside of the project team. They are in the hands of project stakeholders. Meanwhile, the final assessment criteria of project performance are determined by the project stakeholders.

Any project brings some degree of change to an enterprise. Project sponsors, customer, and other project stakeholders must have sufficient psychological preparation to accept these changes. To ensure the project stakeholders' participation in the whole process, these steps must be followed.

① Identifying and defining stakeholders;
② Clarifying the expectations, roles, and responsibilities of stakeholders;
③ Using tools such as the responsibility matrix (LRC) to lock in stakeholders' roles and responsibilities;
④ Establishing the norm, visual communication, and feedback mechanism.

In the above steps, special attention should be paid to the step 4. Project management is a typical change management. There are different ways for the division of work among project stakeholders. It is imperative to let them to understand the effects of their work on the project objectives. To achieve this, it is not enough by making them to have a sense of responsibility for the project performance goal. Rather, efforts are also required to show them the dynamic relationship between their work and the project objectives. To solve these problems, it is imperative to establish a standardized and interpretative communication and feedback mechanism. By strengthening communication and feedback, stakeholders are able to follow the same communication styles even they are from different organizations, with different cultures and customs. Meanwhile, the performance management will not be valid if there is only conclusive feedback without interpretive feedback. The conclusive feedback can only make stakeholders be aware of the project status. It cannot make them be aware of the goals, measures, reasons, and justifications of the project performance improvement.

3. Distinguish performance evaluation from personnel evaluation

Performance measurement is an important part of performance management. To some extent, changing the method of performance evaluation is equal to changing everything. People will choose their behavior style based on the ways of

performance evaluation. If the performance evaluations focus on the personnel assessment, staff may choose to get the required performance data at the expense of others' performance or partial performance, or deceive the evaluators by tampering with the performance data. In other words, if the results of evaluation are linked to the rewards and punishments to each person, people often protect their own interests at the expense of others' interests, or sacrifice the overall goal to pursuit the local goal. This is detrimental to the performance management.

The way of performance evaluation facilitates the development of organizational culture. Edward Deming's study about quality management showed that at least 94 % of factors that affect a person's performance are system factors, which are beyond individual's control. Therefore, it is necessary to change the focus of performance evaluation from controlling and personnel evaluation oriented to studying and project system improvement oriented. To achieve this change, these steps must be followed.

① Identifying and defining the key performance areas;
② Identifying and defining the key performance index;
③ Making an evaluation, analysis, and feedback on key performance index;
④ Stimulating the stakeholders.

In the above steps, special attention should be paid to the step 4. Common errors of the incentives are equating incentives with rewards and punishments. Furthermore, it is equating incentives with personal rewards and punishments. Originated from the mechanical thought, incentive approach separates project stakeholders in silos. The essence of this incentive approach is to encourage internal competition. The project is full of uncertainties. As a result, the responsibilities of project stakeholders cannot be defined clearly straightaway. To deal with this uncertainty, it is necessary to encourage shared responsibilities rather than internal competition among stakeholders. Personal incentives will lead to a number of issues among the stakeholders such as distrust, mutually making excuses, and fighting for high local efficiency.

As an important part of the performance management, the real purpose of the performance evaluation is not rewarding and punishing R&D staffs after the event. It should contain at least four aspects: improving performance, discovering talents, adjusting the work, and fair rewards and punishments (see Fig. 15.3). Improving performance is the primary task with a purpose to expand the horizons of appraisal to the operating system so that good relationships between people, technologies, and processes can be explored. A flexible system is better than efforts to empower, motivate, organize independent team, and pay bonus.

A Group Company is a large state-owned electronic enterprise. There is a growing demand to enhance the operating efficiency and reduce the structural operating costs so that the needs of market competition can be met. As a result, the top management decided to redesign the business process and implement it in the H Corporation at first.
H Corporation has 5000 employees. Its main businesses are designing, production, and sales of electronic test equipment. It has 20 subsidiaries throughout the
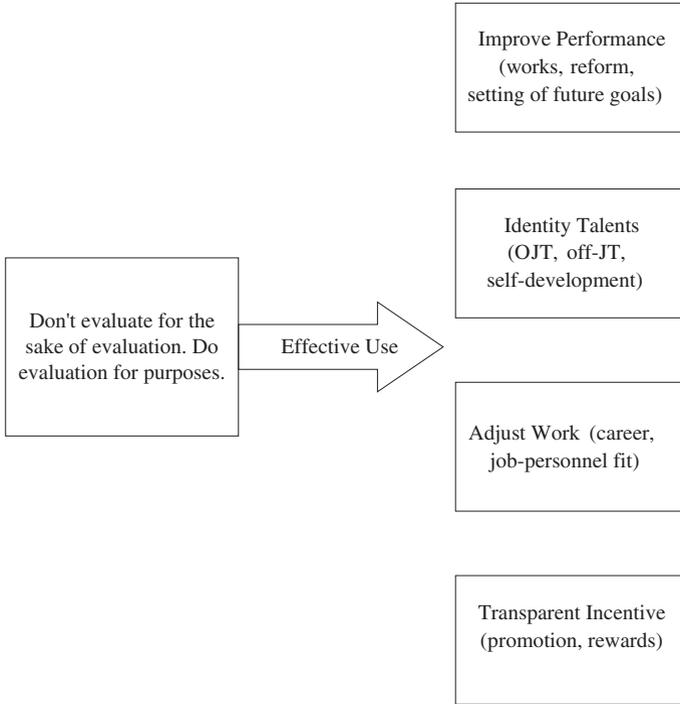
Fig. 15.3 The flexible use of performance appraisal

country and research institutes or offices in the USA and other countries. The director of the operation management research center of the Group Company was appointed as the project manager. A vice president of H Corporation was appointed as the deputy project manager. Before the project was launched officially, executives of the Group Company realized that BPR project is related to the management change where significant challenges exist. Therefore, a research institution was engaged as an advisory organization for the project.

The project started on March 12, 2001, and was scheduled to formally be brought into use before January 1, 2002. As the project involved some changes of the corporate information system, the company made a rough estimate of the funds that the total project investment should be controlled within RMB 2 million (which did not include the labor costs).

After some discussions within the core members of the project, the BPR project team defined the boundary of stakeholders (see Table 15.1). The project performance evaluation index was obtained by analyzing the expectations of project stakeholders (see Table 15.2).

After repeated discussions with the advisory organization and extensive surveys of employees, H corporation's BPR project team paid more attention to the following two issues.

Table 15.1 Stakeholders of the BPR project in the H corporation

Roles of stakeholders	Name of stakeholders	Their main functions in the project
Project sponsor	Executive vice president of the Group Company	Approve project funding, identify project objectives, start projects, assess project results, assist the project team to coordinate resources
Project customer	General managers of H corporation	Determine project requirements, ensure requirements are fulfilled, prepare for changes
Undertaking organization	Project group	Fulfill project requirements, satisfy stakeholders
Supporter (functional departments of the Group Company)	Business center	Provide management consultation and consulting services to project managers and relevant members
	Financial department	Provide funds, approve investment benefits
	President's office	Coordinate related subsidiaries in the project
Supporter (functional departments of the H corporation)	General manager's office	Coordinate branches and each functional departments with project
	Human resources department	Coordinate project team members and personnel changes
	Enterprise management department	Provide management support, cooperate with the project implementation
	Marketing center	Provide market demand, coordinate the marketing activities according to the project needs
Supporter	Advisory organization	Provide consultation on project management

First, determine the key performance area and key processes' performance index for performance audit and monitoring. Most of the performance indexes listed in Table 15.2 are the final performance standards. They cannot be regarded as objects in the pre-event and concurrent review and monitoring. BPR project team sets each stakeholder's expectations as project effect and resolves causes of these effects according to the effect–cause–effect method to determine the KPA of project performance review and monitoring (see Fig. 15.4). According to the characteristics of the project, the balanced scorecard method was used as the reference, and each milestone was set as KPA. Furthermore, in each milestone, duration/ finance/deliverables, stakeholder satisfaction, process/specification/quality, resource/personnel/responsibilities, were set as the KPPI of audit and monitoring (as shown in Fig. 15.5).

Second, distinguish the audit results from personnel rewards and punishments. The BPR project team has adopted a unique bonus distribution system to ensure that the real purpose of the project performance evaluation is to satisfy stakeholders rather than judgment on personnel issues.

Table 15.2 The summarized performance indexes of the BPR project in H corporation

Performance type	Stakeholders	Performance connotations	Performance standards
Benefit index	Project sponsor	The successful experience of BPR project in H corporation stimulated the group's improvement of management capacity and improved the image	BPR project passed the review and won the national innovation award
	Customer	Company's sales revenue increased	Sales revenue increased by 20 % than last year
	Implementation (project group)	Got bonuses	Received a target bonus of 200,000 Yuan
	Supporter (enquiry agencies)	Got contract incomes	Got a contract income of 300,000 Yuan
Efficiency index	Project sponsor	Finished on time, and project funds were under control	Completed before January 1, 2002, and the total cost (except for labor costs) was less than 2 million Yuan
	Customer	Enterprise profit is increased, and labor productivity is improved	Profit is increased by 5 %, and the total labor productivity is increased by 20 %
	Implementation (project group)	Hourly bonus is increased	Scheduled hour bonus was 5 Yuan
	Support (enquiry agencies)	Contract profit rate	The contract profit rate is 40 %
Risk index	Project sponsor	BPR project succeeded for the first attempt	Passed the management review for the first attempt
	Customer	Did not have a negative impact on marketing activities	Delivery speed was not reduced, and customer complaint rate was less than 1 %
	Implementation (project group)	On-time achievement rate of milestones	95 % of intermediate milestones are completed on time. Eventually, all milestones were finished on time
	Support (advisory organization)	Method of payment	Advance payment: 30 % of contract amount was paid when project deliverables were submitted, and 20 % of contract amount was paid after the project passed the management review

(continued)

Table 15.2   (continued)

Performance type	Stakeholders	Performance connotations	Performance standards
Deferment index	Project sponsor	Enterprise's operating efficiency and image	Overall productivity of the corporation improved 20 %, and the corporation obtained the management innovation award
	Customer	Customer satisfaction	The degree of customer satisfaction was 98 %, which is 5 % higher than that prior to the implementation
	Implementation (project group)	Skills were improved, and functional departments are satisfied	The project team members and the relevant departments showed 90 % of satisfaction
	Support (advisory organization)	Customer satisfaction	The satisfaction of the Group Company, H corporation, and project team reached 95 %
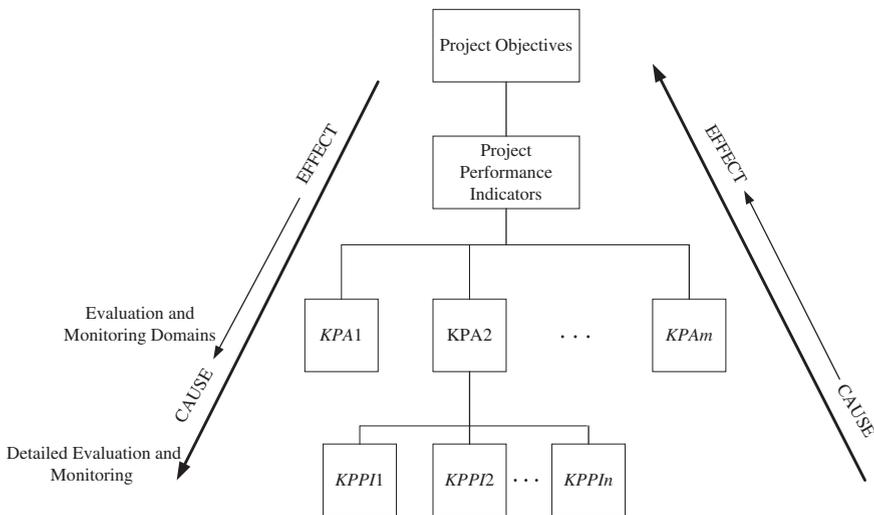
Fig. 15.4   Effect–cause–effect analysis method

This allocation scheme is not based on individual performance or behaviors to distribute bonuses. Rather, the total bonus is determined for the project team based on the overall performance. Consequently, bonus is distributed according to the proportion of the pay rate of each team member (depending on the value of each post to the project) and working hours to those of the whole team. Namely,
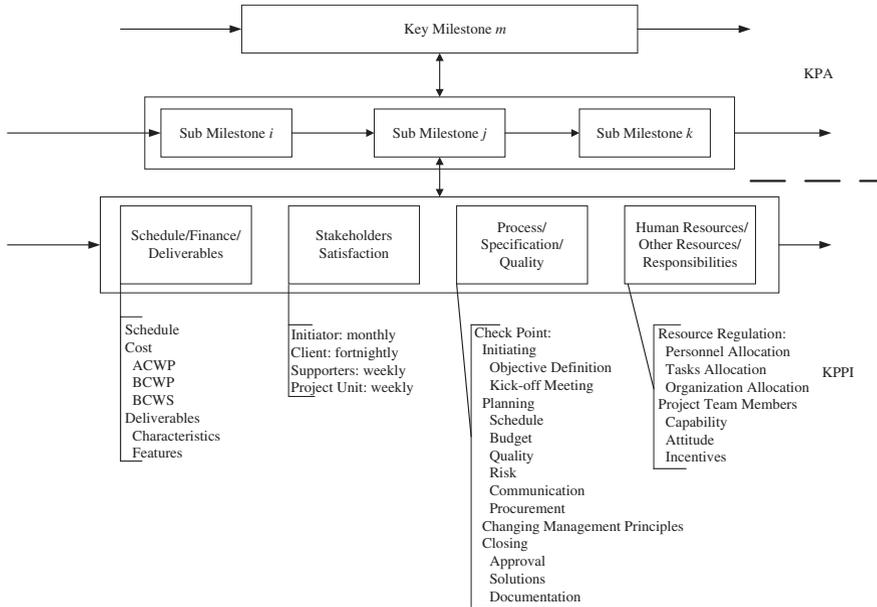
Fig. 15.5 KPA and KPPI for the performance management in project BPR of H corporation

$$b_j^k = \frac{w_j^k t_j^k}{\sum_{i=1}^{n} w_i^k t_i^k} B^k$$

where b_j^k is the bonus that the jth project team member received after the kth milestone review; B^k is the total bonus received by the project team after the kth milestone review; w_i^k and t_i^k are the salary of ith project team member and the actual working hours spent on the implementation of kth milestone; and n is the total number of project team members.

In order to review and monitor the project effectively in each milestone stage, BPR project team adopted a dashboard model to analyze and evaluate each KPPI. There are three aspects of the critical points of this approach.

First, statistical data are the basis for performance reviews. There are a number of numerous common-cause deviations and potential special-cause deviations in the process of project operation. These deviations cannot be identified unless statistical analysis is conducted with the team system state data. It is inadequate to use the data depending on the status at the end of a certain period, or output as a basis for performance management despite being commonly used. BPR project team requires team members to report the discrepancy between planning and actual work in terms of time and cost every day. Consequently, the trend can be identified in order to improve the accuracy of plans and get ready for the monitoring of the

project schedule and cost. This allows the project team to divide sub-milestones on a weekly basis. In other words, the project team analyzes four aspects of KPPI, i.e., the duration/finance/deliverables, stakeholder satisfaction, process/specification/quality, and resource/personnel/responsibility every week. It is critical to facilitate the recording and statistical analysis of daily discrepancy between work plans and actual situation on a timely basis. Therefore, the project team developed specialized statistical software, which provides the drop-down menus for the standardization of each project. It only takes around 15 min for the project team member to complete today's work record and the next day's work plan.

Second, continuous feedback is used as a means to monitor the performance. Continuous feedback is the primary approach taken by the BPR project team for performance monitoring. Feedback comes from the interaction among project stakeholders. BPR project team abandoned the comprehensive evaluation method commonly used in the H Corporation. Instead, dashboard, modified fishbone diagram, and fault tree analysis method are used.

1. *Dashboard methods. During the course of BPR project, defects of any aspect of KPPI will have negative impacts on the project such as delays and increased project risks. It will be difficult to achieve the ultimate goal of the project. Each index of KPPI cannot be substituted for each other. Rather, they must be analyzed and evaluated separately. Similarly, these indexes cannot be synthesized by setting coefficients. Thus, the BPR project team uses a dashboard shown in Fig. 15.6, to reflect the accomplishment of each KPPI. To make each KPPI more intuitive, the project team designed the shape and color of each "instrument."*
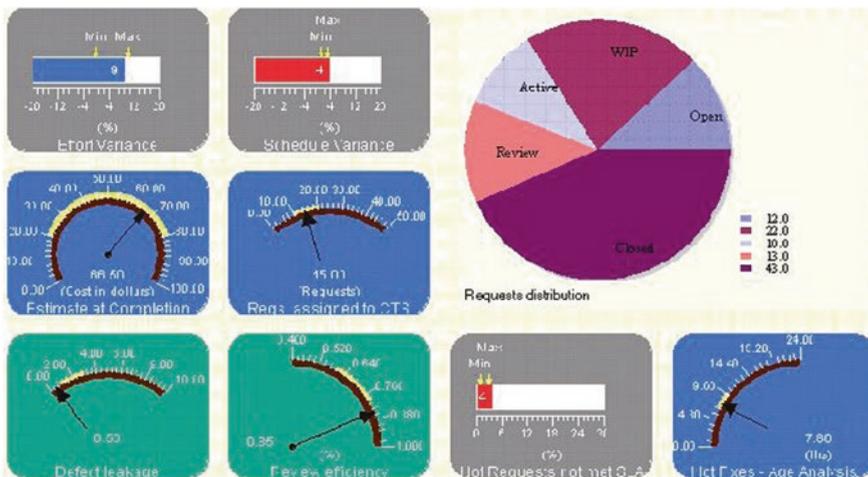
Fig. 15.6   Dashboard model adopted in the project BPR (partial)

2. *Modified fishbone diagram and fault tree analysis method. The fishbone diagram method is an intuitive tool proposed by Ishikawa Kaoru, a Japanese management expert to analyze the quality management issues. He classified the quality issues into five aspects, namely man, machine, material, method, and environment. The BPR project team amended these factors to four main KPPIs. With the assistance of fault tree analysis method, problems arising from the evaluation process are analyzed and improved continuously (see Fig. 15.7).*

Third, the team motivation is used as the main incentive. The performance review and monitoring should play a proper role. BPR project team realized that it is crucial to establish a mutual trust and risk-free dialogue environment within the team. Similarly, it is necessary to establish the dialogue environment to change competition and evaluation mechanisms within the team. Research shows that an excellent team performance does not need competition. Indeed, it often requires the elimination of the competition. To achieve this goal, the project has taken the following reward policy.

First of all, radar chart can be used to analyze each key milestone so that the area of milestone performance can be determined. The project team negotiated with various stakeholders, particularly the project sponsors (vice president of the Group Company in charge), customers (general manager of H Corporation), and advisory organization. As a result, the project team determined key milestones,
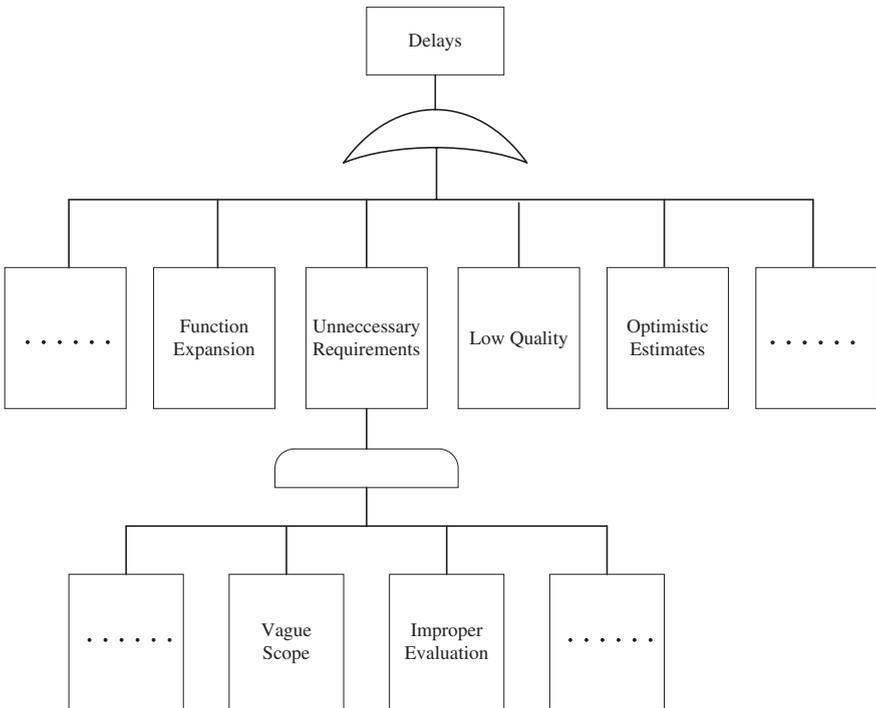
Fig. 15.7 FTA used to analyze delays in the project BPR

such as approval of project plans, the completion of the description of the exist-ing business process, the preliminary approval of the reform programs, and the approval of the trial of reform process. In each milestone node, radar diagram was drawn (shown in Fig. 15.8). The flowchart has four dimensions. This repre-sents that there are four aspects to balance KPPI, i.e., period/finance/deliverables, stakeholder satisfaction, process/quality/specification, and resource/personnel/ responsibility. Every aspect is evaluated to five grades from low to high. According to the evaluation of these four aspects, the area of the project group's milestone performance is classified.

Secondly, the project sponsor (vice president of the Group Company in charge) and the finance department approve the bonus amount for the project team once each milestone has been reviewed. 70 % of the total standard bonus (20 million) is distributed evenly to each milestone node as a milestone standard bonus, and the remaining 30 % is the quota once the project final inspection succeeds. If all indi-cators are ranked at the level 5 in the radar chart, the bonuses will be paid 100 %. If indicators are ranked at the level 4 or above, the bonuses will be paid 80 %. If all indicators are ranked at the level 3 or below, there are no milestone bonuses.

Finally, the project managers pay personal bonuses and adjust positions and adjust posts according to the post value of working hours of each project team member. The project manager also wrote a review report according to the
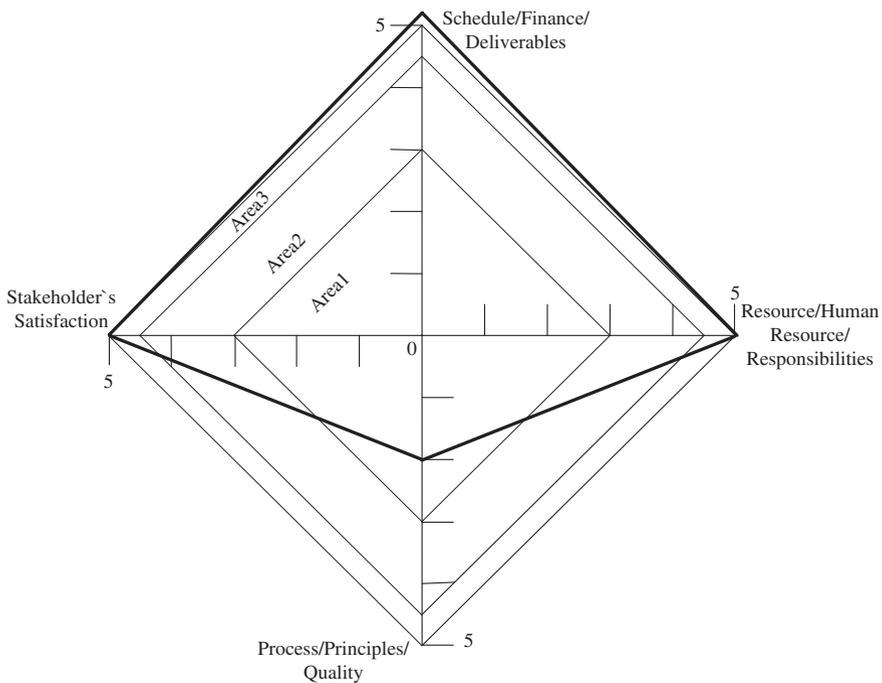
Fig. 15.8   Radar model for the performance evaluation in project BPR

contribution of other supporting departments (personnel) to the project. An assumption is made in this allocation mechanism, i.e., each member of the project team is crucial to achieve the project results. Therefore, project team members should not be separated for performance evaluation. Rather, the performance evaluation should be carried out by means of assessing the value of different project posts, confirming working hours of each project team member (through the project log). Consequently, the position can be adjusted.

Through effective project performance management, optimal outcomes are achieved in the BPR project of the H Corporation (see Table 15.3).

As shown in these practices of the project performance management, the effective project performance management requires attention to be paid to the project operation system and its environment, rather than the team members. The essence of project performance management is the management process. In the operating process of the project team, it is imperative to organize and coordinate the interactions between project stakeholders. Similarly, the environment and atmosphere should be established for the project operation. These are essential for achieving a management process which helps to realize the project requirements and to improve the satisfaction of stakeholders.

Table 15.3 The contrast between performance indicators and the actual performance in the BPR project of H Corporation

Performance type	Stakeholders	Performance standards	Actual performance
Benefit index	Project sponsor	BPR project passed the review and won the national innovation award	In 2002, the Group Company won the national quality prize
	Customer	Sales revenue increased by 20 % than last year	Sales revenue was increased by 35 %
	Implementation (project group)	Received a target bonus of 200,000 Yuan	Received a bonus of 150,000 Yuan plus 100,000 Yuan after the Group Company won the quality award
	Supporter (advisory organization)	Received a contract income of 300,000 Yuan	Received a contract income of 300,000 Yuan
Efficiency index	Project sponsor	Completed before January 1, 2002, and the total cost (except for labor costs) was less than 2 million Yuan	Review is passed at December 15, 2001, and the total cost was 2.3 million Yuan
	Customer	Profit is increased by 5 %, and the total productivity is increased by 20 %	Profit was increased by 4.3 %, and the total productivity was increased by 18.5 %

Table 15.3   (continued)

Performance type	Stakeholders	Performance standards	Actual performance
	Implementation (project group)	Scheduled hourly bonus was 5 Yuan	Hourly bonus was 3.6 Yuan
	Support (advisory organization)	The contract profit rate was 40 %	The contract profit rate was 32 %
Risk index	Project sponsor	Passed the management review for the first attempt	Passed the review for the first attempt
	Customer	Delivery speed was not reduced, and customer complaint rate was less than 1 %	Customer complaint rate was 0.6 %
	Implementation (project group)	95 % of intermediate milestones were completed on time, and eventually all of them were finished on time	90 % of intermediate milestones were completed on time, and eventually all of them were completed 15 days in advance
	Support (advisory organization)	Advance payment: 30 % of contract amount was paid when project deliverables were submitted, and 20 % of contract amount was paid after the project passed the management review	According to the contract schedule
Deferment index	Project sponsor	Overall productivity of the corporation improved 20 %, and the corporation obtained the management innovation award	Productivity was increased by 18.5 % and won the state quality award
	Customer	The degree of customer satisfaction was 98 %, which is 5 % higher than that prior to the implementation	Customer satisfaction was 97.2 %, which is 4.2 % higher than that before the implementation
	Implementation (project group)	The project team members and the relevant departments showed 90% of satisfaction	The degree of satisfaction was 87 %
	Support (advisory organization)	The satisfaction of the Group Company, H Corporation, and project team reached 95 %	The degree of satisfaction was 90 %

15.4 Effective Incentives to the Project Team

It is not enough to only have a reasonable system in place. Similarly, it is impossible to achieve optimal project outcomes without the hard work from project team members. It is imperative to develop effective incentives for the project team. The following aspects should be paid attention to.

1. Salary incentive

If there is no attractive salary, it is difficult to make a competent person to participate in the project team. It is often said: "Money is not everything, but you can do nothing without money." As the business environment is changing rapidly, the life of corporate is becoming shorter and shorter. It is difficult for enterprises to promise to its employees: As long as you work well, your job security will be guaranteed. It has become more and more difficult to obtain the loyalty from talents, while high salary is one of the major factors that attract talents.

> *Ancient monarchs, who made great achievement and were respected widely and illustrious in the world, could not be forgotten by future generations. Such monarchs could not get the support of the people, which we have never heard. The reason why a tyrant lost his reign, endangered the country, subverted shrines, and were buried and forgotten, is losing the support of the people. We say: the better way to get people's mind is to give people benefits.*

> —Guanzi • *The Five Supporting Principles*

In the salary structure, the ratio of fixed income to floating income indicates the party which bears the risk. The higher the percentage of fixed income to total salary, the greater the amount of risk borne by the enterprise. Otherwise, more risks are borne by the R&D personnel.

A lot of project team members are just "individual contributors". We cannot force them to shoulder the responsibilities of managers. As long as they finish the task with competency and positive attitude, they should be given remunerations which are in line with the market conditions. It is not appropriate to require them to believe that "I am very pleased when company is good, and I am very lost when the company is bad". If managers really do as what we have said to cover up their own problems, project team members will "not play with you" and then abandon the ship. A mechanism needs to be in place to measure the ability of employees. Consequently, enterprises can pay wages based on the ability and pay bonuses based on the performance. However, it is not appropriate to transfer the responsibility of the managers to ordinary workers by means of so-called "management by objectives" method used in the "horse racing". It is always an important topic of enterprise management how to use the "materialistic" rather than "loyal" talents.

2. Achievement incentive

There is an old man who likes to take a nap. One day, some kids kicked empty cans for pleasure downstairs of his apartment at noon. The old man could not hold his

horses, so he tried to keep these children away, but with no effect. They played even harder. Later, the old man got an idea. He said to the children that they would receive rewards for a dollar per person if they could kick the cans every day. The children were very happy and played very hard. Everyone received a dollar as the reward. The next day, the old man said money was not enough today. Therefore, each child would receive 50 cents; however, he still hoped that they played hard. Children were less happy and did not kick very hard. On the third day, the old man said there is no reward today as they did not play very well yesterday. Children responded by saying that we will not do it as there is no money! The old man finally could take an ease nap again. This story illustrates a truth that even children need to have a sense of achievement when they play. Consequently, they can play with enthusiasm.

The biggest motivation for the staff comes from their desire for success. However, in the real world, it is often assumed that staffs' abilities are hidden. This actually opposes the motivator to those to be motivated. The most common assumptions are as follows: Subordinates need motivation, subordinates are easy to slight their duties, subordinates often hide their abilities, etc. A myth of management is that the boss knows more than subordinates and superiors are smarter than subordinates. It is not appropriate to have such attitude. If there is lack of effective incentives, subordinates can easily find ways to hide their strength and consequently avoid being punished.

There are a lot of people that have already been working at the position of senior management of the enterprise for many years. However, they do not have an accurate understanding of what is a manager. In fact, there are two aspects of real managers. First, managers should be good at using others to achieve results. Second, managers should help others to succeed. Both these two aspects are indispensable. They are not good managers if they only require employees to work whereas cannot help them to achieve their success.

3. Ability incentive

Enterprises need to design some dedicated short-term and long-term welfare projects for R&D personnel to meet their demands in the areas of learning, working, and living. These include implementing the reimbursement plan for books and newspapers expense for key technical personnel, housing subsidy plan, corporate annuity scheme, and contract allowance plan. As R&D personnel are engaged in creative work, flexible working system can be implemented in order to enhance the flexibility and diversity of their works. Similarly, the matrix organizational structure helps to build a platform for employees' professional development.

The organizational structure with a combination of functional departments and project teams not only helps enterprises to complete more onerous tasks when understaffed, but also is helpful for the employees to receive trainings in different project teams and grow rapidly. Particularly, beginners can learn from experienced R&D personnel for advanced professional knowledge. At the same time, they can

cooperate and exchange ideas with colleagues from other departments in the project team and accumulate valuable experiences.

> *Punish the guilty, not just the perpetrators themselves; reward the meritorious, not specifically the meritorious himself.*

<div align="right">

—Guanzi • *On Establishing Right Policies*

</div>

4. Promotion incentive

The CEOs need to keep in mind not to promote all of the excellent technical experts to the management position. Similarly, they do not let them to perceive that only the employees who are promoted to the management positions can get better development and treatment. Therefore, the "wide-range promotion" approach should be adopted. Under such approach, employees who come from both management position and technical position can achieve the very high status in the enterprise.

For the same title, there is significant amplitude associated with the post differential. Taking department manager as example, all departments need a head. As a result, someone should be appointed as the department manager, regardless of the size of the department, or the contribution to the company. However, some department managers have less salary than the deputy manager of other departments. This is normal. This will not only provide employees in the same post with the ladder of progress, but also avoid employees in different positions crowding to management positions.

There is a big difference between management and technical work. Not all outstanding technical staffs like management and not all technicians are capable of management. By promoting technical personnel to management positions, companies often not only get mediocre or even bad managers, but also lost excellent technical staff.

5. Be kind to departed staffs

When it comes to core staff, we instinctively think of giving more money to retain talents. However, you will find out that a better package will be offered by your rivals to talented staff, no matter how much you offer.

To a certain extent, departed staffs are treasures. Therefore, efforts are required to make them friends rather than enemies if they have made up their mind for departure. They know the company very well, but the company knows very little of them. It is really easy for them to hurt you. Therefore, good relationship with them should be maintained even they work for the competitors. If doing well, the company will benefit from gaining more popularity and enhancing the company's reputation. They may help the company at a critical moment and even return to the enterprise.

Before an edict is issued, if people who have haphazardly done something in accordance with it out of chance are rewarded, it is nothing but rewarding people wrongly. If the sovereign rewards people wrongly, officials with outstanding achievements will become unsatisfied. When officials with outstanding achievements are unsatisfied with the sovereign, foolhardy people will do whatever they want. If foolhardy people do whatever they want, the order of the state will be severely disarranged. If people who have done something forbidden by the prohibition and has not openly announced yet, are punished, it is nothing but punishing people wrongly. When people are punished wrongly, they will not attach much importance to their lives. If people do not attach importance to their lives, the ferocious will become active, cabals will be built up and the wicked will conspire rebellions against the regime. After an edict is issued, if people with outstanding achievements are not rewarded correspondingly, it is nothing hut making the common people discouraged, not comply with the military orders or devote their lives for the sake of integrity. When people are discouraged, not comply with the military orders or devote their lives for the sake of integrity, then they cannot win any attack launched against other states or defend their own state. If they cannot win any attack launched against other states or defend their own state, the state will be in danger. After an edict is issued, if people acting against them are not punished, it is nothing but making people disobedient. When people are disobedient, the formidable and powerful will become very active. When the formidable and powerful are very active, the throne will be in danger. So, it is said that make sure the constitution and all regulations are in accordance with the right ways of governing the state, and all edicts are clarified, both awards and punishments are dispensed reasonably and honestly; these are the right rules for rectifying the people.

—Guanzi • *On Complying with the Law*

The biggest mistake in the project performance management is to turn the performance management into the "catching criminals" type of personnel evaluation. To achieve the optimal project performance, attention should be paid to the management system itself. System should be improved first, followed by people. Once the system has been changed, the human behavior could be changed consequently. Changes to human being's behavior may not necessarily lead to the changes to the system. For employee motivation, efforts are required to develop the incentive system and enact the agreements on reward and punishment. It will lead to negative outcomes if ad hoc rewards and punishments are provided to employees according to manager's personal emotions.

Chapter 16
Project Closure Aiming for Maximum Value

Do not take action that will never be achieved. Do not seek things that are unreachable at all. Do not stay at places that are unsafe. Do not take action that is not allowed to be repeated again.

—Guanzi • *On Governing the People*

It is well recognized in the military science that it is more difficult to retreat successfully than attack successfully. This is the similar case in mountain climbing and politics. In World War II, it was found that the most loss of fighter aircrafts occured in returning to the military base after tasks were accomplished, rather than during battle at air. Project management is no exception. It is easier to initiate than close projects. Under the business environment featured with economy turbulence, the performance of project closure will determine not only the profits of enterprise but also the satisfaction level of project stakeholders, which plays a critical role for future business opportunities.

As the last critical process of a project life cycle, project closure will occur if all project goals are achieved and customer acceptance of project products can be undertaken. Project closure is a regular process. Although project closure takes place at the end of a project life cycle, it does not mean that all activities of project closure cannot commence until the start of this process.

A project is a temporary endeavor undertaken to create a unique product, service, or result. However, the impacts of project products on clients could be long term. Project closure is crucial for project success to avoid those uncompleted activities and outdated information that should have been tackled before the project team is dismissed.

16.1 Be Persistent

Heading toward the project closure, the number of project staff decreased constantly. However, it presents a significant challenge for the project manager to maintain efficiency to complete project with fewer human resources.

It is imperative for a project manager to take the relocation of project team members into consideration proactively. It is a waste to both the project and the enterprise if project team members have nothing to do. Project team members should be informed 1–2 weeks prior to the relocation. At the same time, the line manager of project team members should be informed as well. As a result, line managers can allocate new tasks when project team is being dismissed.

With the reduction of project team scale, the working style of project team members may change as well. The responsibility of project team members during this process is focused on project closure. It is possible to break down project team members to workgroups according to the number of project tasks. However, it is a common practice that the project team runs the project closure process collectively.

During the project closing process, the skills required for project managers are different from those during the initiating, planning, and executing processes. During the last process of a project life cycle, if a project manager has to be replaced, it is ideal that the new project manager is the deputy to his/her predecessor. With a proper understanding of the project and its progress, the new project manager is able to guide the project to completion properly.

If facilities (equipment) of an enterprise were taken by the project team during the project process for a long period of time, the personnel in charge of these facilities (equipment) should be informed during the project closing process. This is to ensure these facilities (equipment) can be obtained and used by other projects if necessary. It is imperative to check the manual of facilities (equipment) to highlight any changes occurred (e.g., in terms of structure, device, or technical parameters), which is a responsibility of project managers. It is worth noting that there are cost and human resource implications by restoring the status of facilities (equipment).

16.2 Keep All Project Data

There are a number of benefits of recording and documenting project data. These include the effective use of project products, accumulating experience on the design, planning, estimating, and management of future projects.

During the project closing process, attention is usually paid by the project team to the completion of tasks and expectation of new tasks. By contrary, the documentation of project data and lessons learned is usually overlooked.

It is possible that project team members perceive this may distract their efforts on the next project, not to mention the associated cost. Documentation of project data is often overlooked, particularly when cost overruns occur. In fact, the identification of causes plays a most critical role when dealing with cost overruns. Only when causes were identified and documented, can such issues be avoided in future projects.

A project historical database is one of most important references to assist improving project management within the enterprise boundary. The specific requirements on project documentation vary from one enterprise to another. However, common elements of project documentation should include the following:

- *Project log*
- *Project plan (including project charter, scope statement, and risk management plan)*
- *Project correspondence*
- *Project meeting minutes*
- *Project progress reports*
- *Contract documentation*
- *Other information*

An enterprise should develop and maintain the computer information system for these project data. This allows indexed searching on demand. When sufficient project data are collected, enterprise management may choose to develop a "lessons learned database" which provides a useful reference for developing a realistic project plan and a reasonable project cost estimate.

16.3 Contractual Closure

One of most important tasks during the project closure is the client acceptance of project products and deliverables. Client acceptance will be based upon the project requirements defined in the contract and follow the formal acceptance procedure. Project customers should be reminded of any variation from its demand and demonstrate the variation record approved by the client (e.g., with the client's signature). In addition, all unsolved project issues should be able to be dealt with formally.

The best solution is to conduct a final meeting between the client and all other project stakeholders. Such a meeting is helpful for the project manager to clarify all unsolved issues individually to stakeholders.

One major agenda of this meeting is the report of project execution by the project manager, i.e., concluding the variation between the final project deliverables and requirements defined in contract documentation.

The following issues need to be taken into consideration during the handover of project products to the client:

1. Develop handover plan. The project manager has to develop the product handover plan as approved by the project initiator and client. Key elements of this plan include when, where, and how to hand over project products, and who will be involved.

2. Ensure customer acceptance. The project manager should devote to engaging the client into the process of developing the product handover plan. This is helpful for customer acceptance. When the project is completed, the clients should have the opportunity to confirm whether or not their requirements have been satisfied. In strict contractual relationships, the client should sign off the acceptance report, which confirms the formal customer acceptance of project deliverables.

3. Provide trainings to the client on the utilization of project products. It is not unusual that the client is not an expert on running project products. Therefore, necessary training should be provided to the client in terms of operation and maintenance. Such training sessions should be provided as early as possible rather than until the project closing process. However, it is worth noting that vast majority of training for the client was not undertaken until the project closure process.

   Customer training has significant cost implications. For instance, training cost accounted for one quarter of the project budget when IBM transformed a printing factory to a computer manufacturer. This should be taken into consideration during the project budget planning.

4. Ensure the clarification of responsibilities during the handover. It is imperative to clarify the responsibility of each individual project stakeholder during the handover process, so as to ensure the final payment from the client.

5. Keep project design and development documentation. It is imperative to keep the project design and development documentation, which is essential for the continuous and effective operation of project products. Parties to be responsible should be specified whether accidents occurred due to confusion between design and development documentation.

6. Ensure the continuous service and maintenance of project products. It is expected that some simple maintenance and service of products will be undertaken by the client itself. Therefore, a product manual should be developed to provide necessary assistance to the client. However, it should not be expected that the client can run such tasks at the same level as technical experts. Therefore, the enterprise should maintain regular communication with the client throughout the project life cycle. These communication channels should be defined as part of the handover procedure. In the engineering sector, a large proportion of profits are derived from services.

7. Finalize payments. It is the project manager's responsibility to finalize payment unless it is specified elsewhere.

   In practice, some of final payments are hard to be finalized. The amount of these final payments may account for a small proportion of project cost. Some project managers may not pay attention to these final payments due to difficulties or any other reason. However, these final payments might be the profit which the enterprise could obtain from the project.

16.4 Project Acceptance

Project acceptance is the formal activity undertaken between the project team and the project client/initiator.

During this activity, the representative of the client/project initiator will check and confirm the conformance of products and supporting documentation delivered from the project according to project requirements and goals.

Project acceptance criteria should be defined during the project-initiating process rather than until the project closing process such as acceptance procedure.

Common elements of project acceptance are to do the following:

1. Arrange the agenda of the project acceptance meeting
   Attendees at the project acceptance meeting are as follows: the representative of the client/project initiator, the project management team (project manager and anyone responsible for each functional area in the project team), and the project acceptance committee. Once all attendees are confirmed, the schedule of the meeting should be finalized. It is necessary to consider time required for attendees to assess the related documents prior to the meeting.
2. Distribute meeting materials
   Prior to the meeting, all related documents should be distributed to attendees. It is imperative to distribute these documents as early as possible so that project acceptance personnel have sufficient time to assess them.
   These documents should include at least the project statement and project execution plan (and associated project acceptance plan).
3. Run the project acceptance meeting
   During the project acceptance meeting, attendees will assess and consequently test the project deliverables submitted by the project team. In accordance with the acceptance criteria defined in the project acceptance plan, attendees will determine the following:

   (a) Physical assessment results, i.e., has the client received all project deliverables?
   (b) Functional assessment results, i.e., have results of product acceptance and test indicated that the conformance of project products?
   (c) Business assessment results, i.e., have all necessary trainings been provided to the client? If necessary, have all on-site installation been completed?

   At the end of project acceptance meeting, the conclusion should be drawn by the project acceptance personnel. The final outcome could be one of the following.

   (a) Unconditional acceptance. The representative of the client/project initiator agrees the conformation of project products to acceptance criteria, and the ownership of deliverables and supporting documentation.
   (b) Conditional acceptance. The representative of the client/project initiator agrees to accept the project outcomes; however, some remedy measures have to be made beforehand.

(c) Reject, i.e., non-conforming project products to the acceptance criteria.

   If the representative of the client/project initiator does not accept the project products, the project team should take the pre-arranged remedy measures and resubmit new products for the project acceptance.

   Under the context of conditional acceptance, only specified remedy measures will be assessed for its completion. If the original conclusion is "reject," the overall procedure of product test and acceptance should be followed again.

4. Record decisions

   Decisions should be recorded at the end of project acceptance meeting. These include all the critical acceptance notices or suggested actions to be taken and the conclusions made for project acceptance. If the conclusion is "reject," the next product acceptance meeting should be scheduled.

16.5 Financial Closure

Financial closure refers to completing the project from the project finance and budget perspective. This includes both internal and external project accounts. In addition, financial auditing should be undertaken to ensure all payables and receivables comply with laws and enterprise institutions.

1. Project account closure

   Project account closure is the internal procedure for enterprise staff during the project completion. If there is no specified dates or a formal project account closure procedure, project accounts will remain even after the completion date of the project. This means that the project personnel can still use the financial and other resources allocated to the project.

   If this occurred, it is no longer a project, as it becomes an activity without completion date. As a project has its limited budget and definite life cycle, the project account should be concluded at a certain point of time.

   A project manager provided a good example of this. One day, the finance department manager rang him by stating a project, which that was completed two years ago, was experiencing cost overruns. The finance department manager enquired the reason. This project manager has no idea as this project was completed two years ago with certain budget surplus. There were no activities following the project completion. The finance department manager explained that in the last two years project team members had required for monthly salary payment as their contractual disputes were not solved properly. This project manager explained that he has no authority to close the bank account and perceived that the finance department should be able to do so. However, the finance department perceived this was against the company policy, which indicated the project manager should take such a responsibility.

Vast majority of projects have account codes, which allow the finance department to track project costs and other resources. When project is completed, these account codes should be canceled to ensure no other people can use these account codes for salary payment and material procurement, etc.

The cancelation of project account codes should be submitted by the project manager to the finance department in writing. Alternatively, the finance department can issue a notice to the project manager and other functional departments. This is to inform related personnel that the enterprise will not be able to provide salary and procurement resources for their time commitments after the project completion.

When necessary, a date can be specified to compel people to solve those issues delayed and unsolved for a long period of time.

2. Project financial audit

   Project financial audit refers to that an enterprise needs to form an independent evaluation team to review the project in detail, e.g., the financial procedure, budget, and related records. The financial audit could be undertaken on the entire project or a specific component of the project.

   Project financial audit could take a few hours to a few months. This depends on the project scale, the provided information, and the level of transparency. Although auditing can be undertaken anytime of the project, the focus should be placed on the financial auditing in the project closing process.

   (a) Aim of project financial audit. Project financial audit normally relies on quantifiable data to determine whether the actual cost of the project exceeds budget or with surplus, as well as the reasons for variations. Similarly, the ethics and sense of responsibility of project personnel will be investigated.

   In addition, the outcomes of financial accounting provide an opportunity for the project manager and enterprise to learn lessons. This also helps them to improve in future projects from the financial perspective.

   (b) Information requirements of project financial audit. Project financial audit requires a large amount of information so that an accurate evaluation can be made. This information should include the following contents:

   (i)   Project budget plan (human resources baseline plan)
   (ii)   Job log (attendance list)
   (iii) Contracts signed with external parties
   (iv)   Procurement policy
   (v)   Procurement list
   (vi)   Budget execution report
   (vii) Variation control results

   A financial audit team should evaluate the above information to ensure time, and other resources spent by the project team are actually spent on this project.

(c) Composition of a project financial audit team. Project financial audit can be executed by an external or internal audit team. An external audit team is chosen mainly due to their experience and fairness. An internal audit team is chosen mainly due to the project scale, and familiarity of audit team members with the enterprise financial policy. If an internal audit team is chosen, members should include the representatives from the project team, the enterprise financial department, the senior management, the human resource department, the contract/procurement department, and the legal department.

The audit team has authority to request all records related to the project and communicate with project personnel so that a fair evaluation of the project financial situation can be achieved. There are some difficulties in communicating with project team members as sometimes they may be offended. However, it is imperative that project team members should realize the importance of communicating with the audit team. During the execution, the audit team should be cautious to avoid any misunderstandings. It is the responsibility of audit personnel to be fair, open, and just.

(d) Execution of project financial audit. Similar to other financial audit, project financial audit provides critical inputs to forming the financial audit report. As a formal report, a financial audit report should adopt a style which is understandable and standardized. It is necessary for an audit team to explore a method to distinguish information relevant to the project from those not relevant.

Although the forms of financial audit vary significantly, at least the following information should be included:

(i)   Current financial situations. Mainly describe the cost expenditure of the project.

(ii)   Financial variations. Mainly describe major variations compared to the financial baseline indicators (from the cost perspective) and whether the procedures to approve these variations conform to laws and enterprise management guidelines.

(iii)   Explanation and recommendation. Explain the reasons for these variations with the degree of rationality, propose measures to deal with these variations, and provide recommendations for dealing with similar issues in future projects. An audit team should provide recommendations on issues such as "which areas require special concerns" and staffing. This is especially important as it is difficult to act upon the health level of project financial situations during the audit after the project completion.

(e) Submit the project financial audit report. When project financial audit is completed, the complied audit report should be submitted to the financial department or the personnel taking the responsibility, with a copy to the project initiator and the project manager. This will help them to understand various assumptions made by the audit team and to clarify all unsolved issues.

16.6 Lessons Learned

There should be three aspects of contribution of project completion to the enterprise, i.e., enhancing enterprise image, improving enterprise profits, and forming enterprise knowledge (see Fig. 16.1).

As the documentation of project success or failure, a lessons learned summary report presents an important channel to generate enterprise knowledge through projects. This documentation provides historical data and useful references for the budget and schedule planning of future projects to be undertaken by the enterprise.

Common contents of a lessons learned summary report include the following:

- *Do project deliverables conform to specification requirements and achieve project goals?*
- *Are customers satisfied with the final deliverables?*
- *Has the budget goal been achieved?*
- *Has the schedule goal been achieved?*
- *Have project risks been identified and dealt with according to the response strategies?*
- *Is the project management methodology effective?*
- *What could be further improved in terms of the project management process?*

The main purpose of a lessons learned summary report is to document those lessons learned, which means that project team will explicitly present those issues experienced in the project. During the summarization of lessons learned, attention should be paid to the responsibilities of not only the project team but also the functional departments of the enterprise. This is helpful to provide useful guidance for undertaking future projects.

Individual issues that occurred during a specific stage of the project life cycle should be recorded and documented with the development of corresponding measures. A summary of lessons learned at the project closing stage places the focus on the assessment activities on the senior management.

Due to the confidentiality, a lessons learned summary report should be assessed by all related parties prior to the formal submission, which is an effective approach. Similarly,
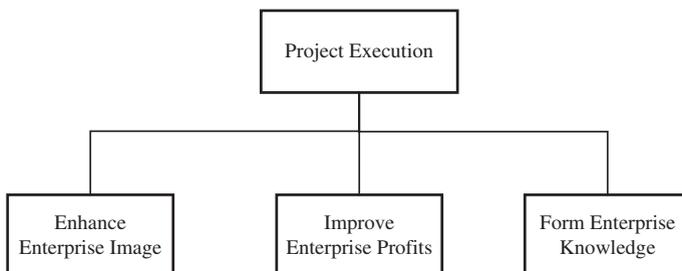

Fig. 16.1 Contributions of the project to the enterprise

an interactive discussion meeting is an effective approach. This is to ensure all parties are able to discuss how to improve project management in a fair, just, and open manner.

A lessons learned summary report should identify not only the project success factors but also various issues experienced during various stages of the project life cycle. If possible, all the project success factors, which have been recognized, should be included in the procedure to be followed by the management of future projects within the enterprise.

In general, it is project manager's responsibility to develop the lessons learned summary report. The sources of information are the project team, the client, and other project stakeholders. Personnel in different function areas could have different opinions on the solution of project success or failure. Therefore, it is imperative to ensure that each functional area has a representative, if it is not possible to have all project team members involved. It is also important to invite customer's overall opinion on the project and project team.

Regardless of the success or failure of a project, apart from communication in written form, "lessons learned workshop" is another valuable activity for project closure. A "lessons learned workshop" is normally a large-scale meeting where attendees are all project stakeholders or their representatives. Running such workshops indicates the formal project closure, which provides an opportunity to obtain recognition from project stakeholders and to discuss the improvement of the project management process and procedure in future.

The value of a "lessons learned workshop" is as significant as the project initiating meeting. This event indicates the conclusion of the project where all project team members work together. As part of a project team, everyone can present their unhappiness, doubt, and happiness. Through this process, project team members will be rewarded according to their contribution to the project. The project manager should devote to keeping happiness of every single project team member when they depart so that they will come back to work together again in another project.

16.7 Celebrate Project Success

The achievement of project goals should be recognized. The recognition of a project is on the basis of the project success criteria defined in early stages. The recognition of a project can be formal or informal, according to the standard defined in early project stages.

The definition of project success should be finalized during the project-initiating process. Project success should go beyond traditional measures such as budget and schedule performance. Some projects are considered successful in spite of significant cost overruns.

Common criteria of project success are as follows:

- *Have all success criteria been achieved?*
- *Are project stakeholders satisfied with the project and its outcomes?*

- *Has project management been implemented effectively?*
- *Is the project team cohesive and effective?*

There are many ways of rewards for successful project completions. Enterprise can hold meetings or major events to praise those successful project teams as a way of recognition. Alternatively, articles could be presented in professional magazines to recognize project teams. With the approval from the enterprise senior management and the sufficient budget, some physical rewards such as medals, certificates, and bonus can be provided.

The celebration event is one of most important motivation mechanisms for projects and can therefore be considered as one of key millstones. Similarly, the celebration event should not be held until it is fully justified.

It is worth noting that the recognition of project team members should come from not only the project manager but also their line managers. As a result, the contribution of project team members to the project will be considered as the contribution to the functional department and enterprise.

Similarly, the underperforming project team members should be evaluated properly. Thus, the team members with good performance will perceive their efforts valuable, while those without satisfactory performance will understand how to enhance their work in future.

16.8   Dismiss Project Team

Feelings of project team members are very complicated. Toward the project completion, project team members' emotion becomes very instable, which reduces their productivity. If new opportunities are present to project team members, their performance will be improved. By contrary, the productivity of project team members will drop significantly if their future remains unclear. Therefore, it is the responsibility of both line managers and the project manager to deal with the emotional reaction of project team members, maintaining their productivity.

When dealing with the emotion of project team members, one fundamental issue to be considered is that they belong to the enterprise. A project is only the temporary taking of these personnel. In other words, after the project completion, the enterprise should pay even more attention to these project team members although they are not required by the project anymore. This is due to the contribution they have made in the project to the enterprise, and their accumulative and extensive experience, which is necessary for the future projects.

From the enterprise's perspective, the personnel who successfully completed projects are invaluable assets. Therefore, it is imperative to keep project team members as part of the enterprise development strategies and retain the talents. Indeed, cautious should be guaranteed when dismissing the project team.

Key factors to be considered during this process are as follows:

1. Developing the plan for project team dismiss
   Project team members will be more motivated to complete current tasks if they
   are made aware of new jobs straight after the project completion. This is espe-
   cially the case when they will be promoted.
   At the same time, it should be clarified that these new jobs will not become
   available until the current tasks are completed as required. The error that
   occurs during the project closure will be accounted, e.g., not to be promoted.
   Similarly, the project manager should maintain effective and efficient commu-
   nication with line managers so that they can arrange the future jobs for project
   team members according to this plan.

2. Sending project team members back to their functional departments timely
   After the project completion, the project manager should send project team
   members back to their functional departments timely in accordance with the
   plan developed in early project stages. Otherwise, other projects of the enter-
   prise will be affected, so as to increase the cost of this project. Similarly, line
   managers will be pleased and more willing to support future projects if their
   staff can be used effectively.
   Cautious is required to deal with dismissing the project team. Project team mem-
   bers have made significant contribution to the project, even with some sacrifice.
   They will feel lost during project closure if their contribution and sacrifice are not
   paid attention to. If these issues are not dealt with properly, project team members
   will take this sense of feeling to future projects or jobs, even back to their func-
   tional departments. This is detrimental to the future development of enterprise.
   Therefore, measures should be in place to ensure that project team members are
   rewarded or recognized according to the level of their contributions. Only when
   these issues are dealt with properly, can the project be declared finished.
   Approval of project completion is on the basis of project closure documenta-
   tion signed by all project stakeholders who signed the project charter. Contents
   of project closure documentation vary from one project to another. However,
   common elements of project closure documentation include the follow-
   ing: deliverables, main characteristics, and other information related to final
   deliverables.

   *One lecturer told a story to his students. Three hounds were hunting one wood-
   chuck which hided itself in a tree hole. There is only one hole in this tree. After
   a while, one rabbit came out of the tree hole. This rabbit ran forward very
   quickly and climbed up another tree. The rabbit was in such a hurry to hold
   itself and fell of the tree, and hit the three hounds into unconsciousness when
   they were looking up. In the end, the rabbit escaped.*
   *Afterward, the lecturer asked a question to his students: "are there any issues
   of this story?" Issues raised by students include the following: rabbit cannot*

climb trees and one rabbit cannot hit three hounds into unconsciousness before running out of questions. At last, the lecturer asked the final question: "you are all correct, but there is one more question: where is the woodchuck?"

16.9 Terminate Project When Necessary

It should be noted that terminating a project does not necessarily mean a project failure or unsuccessful project manager. There are a number of drivers of project termination. These drivers can be generally categorized into three groups, i.e., the desire by the project sponsor, desire by the project management unity, and external factors.

There are generally three scenarios of project termination desired by a project sponsor or contractor:

1. One of the parties discovers a new business opportunity which generates more benefits than the project. Due to resource constraints, the project has to be terminated in order to retrieve resources. In this scenario, the other party can demand compensation such as financial damage or signing agreements for other projects.
2. The project has to be terminated if one party experiences difficulties on its budget. In this scenario, it is possible to demand compensation in accordance with the contractual requirements. However, the counterpart is not capable of providing the compensation, even finding some reasons for passing on the responsibility. This will lead to disputes and a lose-lose situation. Therefore, it is imperative to pay attention to the issue of "information asymmetry" when selecting project partners. It is essential to understand partner's market trend, e.g., trend of turnover and profits, financial prospect, key financial indicators, priority of this project compared to others, and the potential conflicts of budget allocation.
3. The project contractor is forced by the project sponsor to terminate the project due to the conformance of project performance indicators (e.g., schedule and quality) to the specified criteria. In this scenario, the project contractor will bear all responsibilities.

However, there is a scenario that both parties lose due to some uncontrolled events such as policy changes, natural disaster, and wars. A proper risk management mechanism should be in place to deal with such issue.

Nevertheless, these projects should be reviewed and concluded with a process similar to the closing of ordinary projects. Special attention should be paid to the spirit of project team members even though it is not possible to celebrate project success. This is due to the irrelevance of project termination with project team members. Under such circumstances, it is especially important to manage the documentation of the project processes.

Senior general Peigong Zhou during emperor's reign of Kangxi expressed his desire to be "a general capable of defeating strategically." This is due to "according to The Art of Wars, the good campaign winners never fight with enemy directly in battles, good battle winners never fight with enemy face to face, good fight winners never lost every competition, and good learners will be the winners at the end." All military artists, such as Han Xin, Zhuge Liang, and Sun Wu, were very good users of retreat strategies. Project management is no exception. At least one-third of project management competency depends on the capability of project closure.

Project closing process needs caution and stability as similar to the project-initiating process. Restlessness should be avoided when project success can be expected. Overlooking any project issues will lead to difficulties in solving issues in the future project stages.

Chapter 17
Being a Highly Effective Project Manager

Therefore, a sovereign who is going to establish one of the most powerful states or even to unify the world should start with regarding the people as the roots for his regime. When the people are well administered, the state can be safeguarded. When the people are badly administered, the state will be in danger.
—Guan Zi • *The Ideas of Establishing One of the Most Powerful States*

Project manager is in charge of the project, and s/he has to perform the planning, organizing, coordinating, and implementing of the project to ensure its successful completion. In project management, the project manager plays a key role and can be considered as the soul of the project.

17.1 Mentality Adjustment

There are many causes leading to the unsatisfactory work of project teams, and one of the major causes is the team's manager. The incompetent project manager is a killer, even a professional killer, of the project.

If you like someone, let him be a project manager, because the project would make him to achieve performance. If you hate someone, let him as a project manager, because in all likelihood he would be ruined by the project.

Most project managers used to be technical experts. In other words, the important reason for quite a few (if not most) people to become project managers is that these people have a technology needed to complete the project tasks and have a superior technical capacity.

There will be obvious advantages if technical experts manage the project team. They are familiar with the professional technology; therefore, they scarcely make inferior errors of technology. Similarly, they are able to guide the professional work of subordinates. They can easily communicate with most of the team members (mostly professionals) and establish authority within them, and so on.

However, there are some dangers behind the advantages of technical expert project managers. Knowing some kind of professional technical work of the project is not necessary their greatest strength. In fact, this could be their most significant weakness. Originally, they know how to fulfill all their professional duties well. All of a sudden they only understand a portion of their duty and often do not know how to deal with remaining duties. What is more serious is that they often deal team management problems with a kind of technician mentality and do not understand many inherent differences between accomplishing technology work and managing project team.

Studies have shown that in practice, 70 % of the managers, originally as technical experts, still remain a technician mentality.

> *A lot of people would like to be a manager, but most of them do not want to manage.*
>
> —James P. Lewis

Technical experts who want to be professional project managers need to make adjustments in the following areas.

1. Shifting focus on technology to technical personnel

Project manager obtains achievements through the work of others. This reflects a very important feature of managers, namely coordinating others' works.

> *Please do not have such an idea; that the relationship between people is only one chapter of management works. No, absolutely not. All issues discussed in a management book are the relationship between people. If you cannot handle the relationship between people well, you cannot achieve any success.*
>
> —Parkinson

Many project managers were originally technical personnel. As a result, they could easily fall into the trap of doing specific work. In particular, when they encounter some interesting technical issues in the project, they will not put issues down and forget about their management duties.

However, if the manager can only get outcomes through others' works, staff members might become unhappy which leads to a lot of trouble. Therefore, project managers should understand how to achieve their own success based on others' success. Project manager is not doing his or her job unless project team members have a sense of achievements. Project manager should help team members to identify the significance of the project. In the course of achieving the project success, team members can experience the sense of accomplishment at work.

However, in general, the technical staff is a man of action. Therefore, for those holding the mentality of technical personnel, the thinking will be futile unless he is thinking something needed to be done. It is far from enough if technical expert-turned project managers, when organizing the team and selecting team members, only allocate their energy for determining whether candidates have the techniques and skills required to accomplish project tasks.

There are three elements for a person to complete a task, i.e., capability, motivation, and attitude. Capacity allows us to do certain things; motivation determines what

we do; and attitude determines how well we can do. Therefore, project managers must not only know whether the team member have the technology and skills to complete a project, but also their motivations and attitudes. Without good motivation and attitudes, the project team work will become a mess if only technology is used.

Technical expert-turned project managers must divert their attention from concerning the technical capability of the project team members to stimulating the passion for team members. Similarly, they should seek values that are compatible with group members in order to form the shared vision. Only in this way can group members' potential be stimulated.

2. Shifting from rationality to a combination of emotion and rationality

In terms of technology, the value and level of achievement can be evaluated objectively. The mathematical model is a powerful weapon for technology personnel. For managers with strong technical mentality, the value of everything is questionable if it cannot be measured or quantified. If it cannot be quantified, it cannot be managed.

However, in the practice of management, not everything worth managing is quantifiable and not all quantifiable things are worth managing. Management itself has no scale of measurement. Its outcomes are reflected through other indicators. Therefore, it is easy to let technicians to produce a "void" view of management. When a tree falls in the forest, no one heard the sound of its fall. This does not mean that it does not fall. Management effect with no direct measurement does not mean that such effect does not exist. Project team members are mostly engaged in creative work which is hard to define clearly what we expect in advance, not to mention quantifying its management.

Quantitative management is based on logical thinking, which is related to technical experts' education and training background. Even after been promoted to management positions, they still pursue rigorous system analysis and logical reasoning, and rational decision-making. However, as the Nobel Prize winner, Herbert, a Professor of psychology at Carnegie Mellon University goes: every manager needs to systematically analyze problems and to respond quickly to the situation. The skill need to cultivate intuition and establish judgment is based on many years of experience and trainings.

Creativity is very important for both technical and management works. However, intuition is different from creativity. Despite associated jump thinking during the process, it is not difficult to reasonably explain the conclusions with creativity. By contrast, intuition is often difficult to explain. Due to a large number of uncertainties, the project team must combine logic, experience, and intuition in decision-making.
Intuition is widely used in Japan and the USA. According to the survey, 45.8 % of managers in Japan and 43 % the managers in the USA often rely on intuition.

Logic-based rational decision must be based on clear objectives, complete set of alternatives, and objective assessment criteria to the alternatives (values). It is obviously that creative tasks faced by the project team hardly meet these requirements. In addition, the world is changing so rapidly that time has become the

most prestigious resource and competition advantage. People do not have enough time to collect all the information necessary for the logical thinking. Similarly, it is impossible to collect all of this kind of information. In managing the project team, managers can only be bounded rational. Technical experts will be required to adjust their behavior pattern from rationality to bounded rationality.

In the past decade, automation and computerization have eliminated the repetitive works at the workplace. This has freed people from repeated works so that they can focus on jobs that cannot be automated and jobs that have high added values such as launching new products or new services. This is an important reason for the existence of the project team. The role creativity plays to the project team is what air plays to human beings. Aiming for rational, logical, and quantitative management brings a mental disorder that is the fear of failure to technical expert-turned project managers, which is the enemy of creativity. According to Thomas Watson, the founder of IBM, it is a great way to increase the success rate by increasing the "failure rate". The team innovation capacity of the 3M Corporation is noticeable. 30 % of its annual sales come from the last four years' products. 3M team's successful experience is learning from failure. These two examples can provide a good lesson to those technical expert-turned project managers that assigns the rationality the top priority.

3. Shifting from the pursuit of perfection to the pursuit of satisfaction

In Chinese culture, scholars have been scorning each other since ancient times. One important reason is the lack of a clear measurement of the liberal arts. In the technology sector, however, there are a clear set of metrics for the technical capacity. This is because the technology can make "nails are nails, riveting is the riveting". For the technology, the conclusion is either right or wrong.

> *Technology assumes that there is only one right way to do things, but in reality it is always wrong.*
>
> —Robert·M·Pirsig

Management is a kind of a beauty of imperfection, and a process of continuous improvement. There is only reasonable and effective management, but no right or wrong management. There is no standard answer for management. The pursuit of the perfection in management is not economically viable or realistic.

Technical experts know that proof by contradiction is a very important mathematical method. It cites a counterexample to show that assumption is not valid. However, proof by contradiction does not suit the management. If technical expert-turned project managers transplant this method to project management, it will lead to a disaster to project team and themselves. This is because every management policy has its own limitations. There is certain level of applicability associated with any suggestion. As Edward Deming, a quality control guru stated: "all theories are right in a certain context."

If technical expert-turned project managers want to get rid of traps of pursuing standard answers, an effective approach is to remember and to keep using the 20/80 principle. 80 % of results come from 20 % of causes. For team management, the 20/80 principle can be transformed into when developing incentive

policies, if you cannot cover every single aspect of a matter, try to make key members of the team, namely who share the team values and are very capable, satisfied. Similarly, the meaning of quality is also "to meet the characteristics and traits that are the needs of project stakeholders".

In the technology field, repeated experiment is the common approach to achieve a perfect outcome. The best-known experiment expert is Edison. However, this approach does not work in project management. One reason is that management effect may not be copied and transplanted; another reason is that duplicate experiments will make managers lose the trust of the project team.

The pursuit of deformation of the standard answer is based on the successful experiences of the previous projects as the only criterion to guide future works. The same technique can be repeatedly confirmed, but the management is almost unique and customizable. Introducing the mind of technology to management field will lead a kind of philosophy that "there is one, or at least one correct approach of people management". However, nothing is more incompatible than this idea with the reality.

In management, management approaches vary significantly for different people. Members of the project team should rely on marketing to be managed rather than the command. When promoting the products, the project manager must ask what the client needs. Obviously, there is no standard answer.

4. Shifting from doing what you interested to what you should

Napoleon Bonaparte stated: "If you want to do things well, do it by yourself." Many technical expert-turned project managers regard this sentence as their principle at workplace either consciously or unconsciously.

They often say "It is easier to do it by myself than to tell others how to do", especially when they are disappointed with team members' work which they are very good at. However, team members cannot learn lessons from their own mistakes through this way, but making mistakes again and again. Such wrong repetitions have encouraged technical expert-turned project managers to do everything by themselves, resulting in a vicious circle. Another hazard is "a thankless task.. Without doing work, subordinates cannot gain the sense of achievement of accomplishment, which is the best incentive to them.

It is the team's performances rather than what s/he does which should be used as the criterion to assess the work efficiency of project managers. The team's performances are project managers' performances; the team's mistakes are project managers' mistakes. Technical personnel focus on "doing the things right" where project managers should focus on "doing the right things".

Technical expert-turned project managers must learn to authorize, especially those technical works they are familiar and beloved to other team members. Similarly, they can turn their focus on other tasks such as conceptual thinking, accessing resources, and interpersonal coordination, etc.

Many technical personnel will reverse the power in the project, which means that they return the power to project managers. There are many reasons contributing to such behavior where the most common reason is that technical personnel are afraid of taking responsibilities. There are some fundamental reasons. First,

there is lack of definition of benefits corresponding to responsibilities. Second, there is lack of definition of responsibilities and duties. Third, power is not necessary of the interest of technical personnel.

In particular, the second reason is more crucial to project teams. Because project teams undertake some innovative work, it is hard to set predetermined evaluation criteria for their work, let alone quantification. Without objective standards, project teams cannot ensure whether they can gain the expected benefits. As a result, they do not want to take responsibility. To eliminate the adverse authority, it is imperative to define roles and responsibilities.

The third reason is related to the characteristics of technical personnel. Technical personnel's sense of pride depends on their specialties in some aspects (often in technology sphere). However, the responsibility accompanied by empowerment is usually beyond their professional field. This not only challenges their authority, but also brings them tension.

When becoming project managers, most technical experts do not attach importance to the causes of adverse authority. Instead, they often give up rather than authorizing.

To operate effectively, three kinds of people with different skills are required in a project team: people who have technical expertise; people who are able to solve problems and make decisions; and people who are good at listening, feedback, and other interpersonal skills. In the process of project management, project managers mainly act as the last two kinds of people. However, for many technical expert-turned project managers, their psychological comfort zone falls on the first kind of people. Rather than attending by themselves, they took freestyle approach for the roles of last two kinds of people while mistaking their behaviors as the advocated and popular approach in modern management, i.e., authorization.

The really means of authorization are to be able to allocate people important missions, empower people rights, let them take responsibilities, and ensure a good report and feedback system. Only an effective organization system can convert team members' exclusive knowledge and skills to the team performance.

In contrast to the common assumption, disciplines and principles will not affect the performance of professional personnel's creativity but will promote their job performance. Robert, the Chrysler's Chief Executive, believes that the first task of true creativity is not to relax standards but to master them. The research conducted by the Carnegie Mellon University's software engineering institute shows that although most software programmers are not supporters of the process, 60 % of employees in a team with a clear process have a terrific or good morale. By contrast, only 20 % of employees in a team without a clear process have a terrific or good morale.

5. Shifting from focusing on project work to focusing on its business value

For technical experts, technology is the technology. Technology itself is often a purpose. It is a kind of motivation to be able to work on the beloved job. However, the project is goal oriented, rather than process, technology, or activity oriented. Technical expert-turned project managers should know this clearly.

The initiation of each project is to achieve certain business purposes. Even if the project is initiated in order to solve some technical problems, project managers should not ignore the cost to achieve the project objective and should determine what values will be achieved by solving technical problems for the enterprise, customers, and other stakeholders. Bill Gates' expression of "technology's only purpose is to make money" has provided an extreme illustration of this value.

Professional project managers must be able to have an accurate understanding of the business value of projects to enterprises, customers, and other stakeholders. When choosing a qualified project manager, we cannot expect his or her business talent. However, a person without awareness of project stakeholders and business should not be selected.

If project managers are accustomed to consider the project value from the perspective of stakeholders, he or she will have the premise to manage projects successfully and the basis to explore the commercial value of projects.

Technical experts will infer that customers have the same hobbies and recognition of technology values according to their own understandings. As a result, the project team under these experts' management is easily to launch unnecessary featured products or to overly pursue the quality without the financial control.

Unnecessary featured products generally have a unique feature in technology. Therefore, technical experts prefer these characteristics, even fall in narcissism. Paul, the CEO of Cap Gemini, the biggest software firm in Europe, treated the unnecessary featured products as "it is true that we can gain short-term advantages by charging consumers for unnecessary features. However, in the long term, customers will discover this, and we will lose their trust". It is necessary to share this experience with all technical expert-turned project managers. In addition, technical experts should pay special attention to avoid playing the role as "customers' teacher" because of customers' limited technical capacity.

6. Shifting from technology authorities to management experts

In the project team, the level of technology makes a big difference in whether people can win other members' respect and trust. Technical personnel generally do not believe in power but in authority. Therefore, the technical authority is the capital that the technical expert-turned project manager prefers and is proud of. However, if you want to always keep this technical authority or make it as the main even the only approach in the team management process, it will bring tremendous negative impact on the team and make you falling into trouble as well.

At present, knowledge updating is in its fast lane, which exceeds any individual's learning speed. It is nearly impossible that a person can always remain ahead in a field. Hence, it is more and more difficult for project managers to surpass other team members and consequently build the professional authority. Any organizations' managers will inevitably encounter this problem: They must be able to manage their subordinates who exceed them in some professional knowledge field. Only by giving up technical authority and seeking new ways to influence

team members, can they manage these subordinates better. "Layman leads expert" was criticized in the past, but it will be inevitable in the future. Apart from building the technical strength, it is more important to change the way of management, namely to let "Layman can manage expert" become true.

The role project managers play in the team should be a negotiator, resource allocator, chaos handler, and evaluator, not or not just a worker. As a negotiator, project manager should strive to improve the status of project in the enterprise, which could give team members a sense of proud that is a kind of incentive to them. As a resource allocator, project manager should not only focus on person–job fit, but also secure the support from external resources. As a chaos handler, project manager should set up a team order and deal with conflicts that exist within team members and between the team and the external stakeholders. As an evaluator, project managers must evaluate each team member's value fairly and reasonably and recognize their work in an appropriate manner. In addition, they should ensure the project team's work is aligned with project goals.

Asking while listening can make us learn and be able to lead. In team management, knowing why is more important than knowing how for team members. After losing the technical authority, "good at asking questions" becomes an effective approach. We cannot furnish team members with professional guidance in the specific work, nor give answers on numerous professional problems. The only thing we can do is to provide proper questions to team members with full of wisdom and encourage them to communicate and understand. Thus, outcomes can be achieved that are expected by the team, customers, and stakeholders.

In the process of project management, it is the managers who arrange employment, job assignment, performance evaluation, profit distribution, and so on. Five questions must be considered by effective project managers. What is the purpose of customers and project team? Who can be team members? Why can they be selected? How does the team pursue its goal (in what system, process, or method)? And how does the team know they have made it? By asking right questions, fundamental revolution has taken place in management thought, i.e., "leading" rather than "managing" but employees. The purpose is to maximize each team member's inputs, improve their satisfaction, strengthen their commitments to accomplishing project tasks, and improve the productivity of the project team.

Technical work is necessary for a project team. However, to make project team operate effectively, we need not only professional technicians, but also those people who can solve problems, make decisions and be good at listening, feedback and have other interpersonal skills. After becoming project managers, technical experts must adjust their mentality and action to take the management role and become real managers and real team leaders, rather than technical experts who are engaged in management. This has significant impacts on the project success.

17.2 Be Influential

Every manager needs power. However, for temporary project managers, influence is a powerful weapon for the effective management.

1. The key factors for the effectiveness of project managers

The theory of management effectiveness proposed by Peter Drucker is applicable to project managers as well.[1]

(a) The working hours of project managers often only belongs to someone else, rather than themselves. Project managers have more stakeholders to deal with than functional managers. Therefore, they suffer from a greater degree of interferences. It is difficult for project managers to fully control their own time. Therefore, they should understand how to manage time.

In the contents of project management, time management concerns not only for the schedule of the project, but also project managers' own time. If you ask the project managers what they are doing, they are most likely to tell you they are planning, organizing, coordinating, and controlling. However, it is not a surprise if you find out what they are doing have nothing to do with these four words.

(b) Project managers' management styles are constrained by the institution in their enterprises, unless they dare to take actions to change everything around them. Project management styles and institutions need to be set in combination with the specific project characteristics. However, this will break the general management standards of enterprises. Therefore, the most likely project managers negotiate with their bosses, i.e., the project sponsors and the senior managers.
(c) Generally speaking, the people most influential to the project manager' working efficiency are not usually project team members, but those who work in other areas. They may be functional managers, clients, or other project managers.

A valid question will always be asked in job interviews— "how will you allocate your time when you transfer from the management position in one department to another?" Different way of using time is determined by the understandings of project managers to their works, which in turn determines their effectiveness.
There are three kinds of managers. The first one is ordinary managers, namely the general manager, to which most managers belong. The second one is effective managers, who get their job well done and complete the task well. The third one is successful managers, who are promoted quickly. Of course, the last two types of managers are different from each other. Best performance does not necessarily lead to the rapidest promotion, and rapidest promotion does not necessarily mean that the work is best done.

---

[1] Peter Drucker. Effective managers. Shanghai Translation Publishing House, 2000.
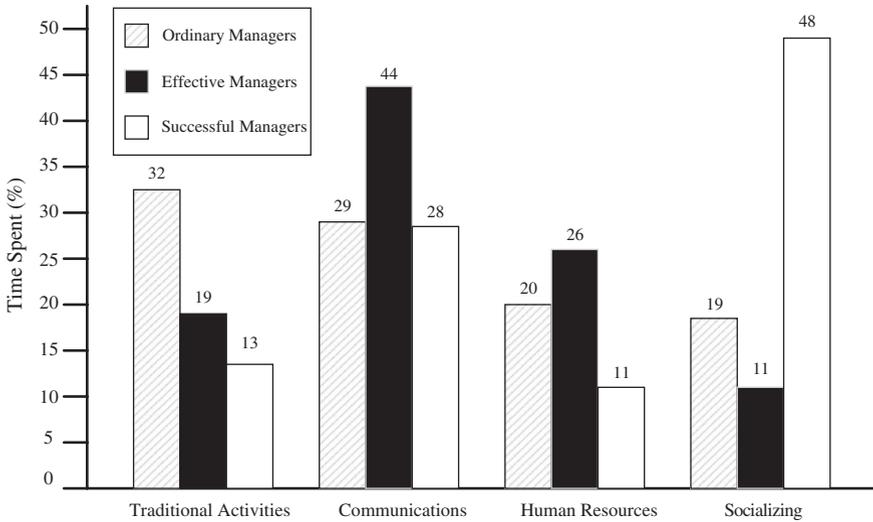
Fig. 17.1 Various ways of time allocation

Now take a look at how their time is allocated (see Fig. 17.1). It can be seen that general managers spend 32 % of total working hours on traditional management activities, 29 % on communication, 20 % on supervision, and 19 % on social activities.

Effective managers spend 44 % on communication and 26 % on managing supervision. In project management, managers must constantly communicate with team members, functional managers, and senior managements to ensure the sufficient support to the project.

Successful managers spend only 13 % on traditional management activities; and in terms of communication, successful managers will spend 28 % of their time, and nearly half of their time (48 %) is spent on social activities, but only 11 % on managing staffs.

A successful project manager must coordinate all aspects of the relationships. S/he should understand the operational process of a project, know how to deal with its stakeholders, and have a high level of organization and coordination capability. However, many project managers with technical backgrounds are not willing to deal with people outside the project team. They are more likely to do more work without corresponding promotion.

(d) Project managers are constrained by the project and do not produce results within the project team. The results lie outside the project team. Since every project is completed jointly by the project team and other stakeholders, if the customers or sponsors do not accept the result, all the efforts will go down the drains even if the team is highly coherent and efficient.

2. The sources and uses of influence

Project managers have limited authorities. Therefore, they must pay attention to setting up and exerting their influence. The so-called influence is the ability to make people obey you and follow you. Influence is also called leadership.

Project manager's influence is reflected in the following aspects.

(a) Resources. Resources can be any useful thing, either material or immaterial. Owning resources is not equal to controlling them. Therefore, as a project manager, you should focus on fighting the right of using project resources.

Support from the top managements is the primary resource to project managers. With the support of corporate executives, project managers will have enough power to dominate other corporate resources. Therefore, project managers must manage their bosses well.

In addition, project managers can get access to resources by exchanging with the functional managers.

(b) Information. Information is also an important power. For example, secretaries serving the leader do not have authorities. However, they hold a lot of information, which relates to subordinates' rewards and punishments, promotion and demotion, work allocation, and so on. These are crucial for subordinates' own interests. Therefore, many subordinates obey secretaries.

Information that project managers need to pay attention to and be aware of includes technical information and the information from stakeholders' social system.

(c) Expertise. Many project managers used to be technical personnel. Thus, expertise is relatively easy for them to obtain.
(d) Relationship. People value relationships, especially in China. In order to manage the project successfully, project managers must build good interpersonal relationships with all stakeholders.

During the life cycle of a project, the project manager should communicate with customers and learn from them. By doing so, the project cannot only gain support from the customers but also influence them. This is because the more time invested in doing something, the more easily people are influenced by it.

Enterprises have four kinds of products: profitable products in the past, profitable products in the future, profitable products at present, and the most "terrible" products that meet managers' emotional needs. Although the latest products are not profitable any more, managers are fond of them and reluctant to give them up because they have invested so much effort and energy in the process of product development. As a result, enterprises not only waste a great deal of funds but also lose opportunities of market development.

If the previous investments give us a strong sense of responsibility and the responsibility which is hard to change, we are more likely to be influenced and constrained by these investments.

(e) Pressure. When you give someone pressure, you can make influence on them at the same time. Therefore, project managers can enhance their influence by exerting pressure on team members. This pressure can be achieved by setting milestones and constantly checking the implementation of the projects at the checkpoints.

Project managers should constantly encourage their teams, motivate team members, and create a good reason to reward them. The milestones can play such a role.

(f) Personal strength. Charisma is important for all managers.
(g) Position. Authority is the project manager's bottom line when all above aspects are not sufficient to exert influence on others.

The success of a project means not only the satisfaction of stakeholders but also the establishment and development of a team, in which all members get improved and growth. Only if team members get benefits after participating in a project, they will have enthusiasm to participate next time. As a leader of a team, though temporary, a project manager should strive for the interests of the team members, under the premise that the enterprise's interests in general will not be hurt. A good leader always pays attention to his subordinates' interests. If a project manager is very strict to subordinates while unusually kind to someone irrelevant, subordinates will be unhappy and the project outcomes will be affected negatively.

Project managers should make full use of the authority for evaluation and recommendation that they possess. When the team members return to their functional departments after the project completion, the project manager needs to provide written evaluations, which serve as the justification for department managers to reward those team members.

Someone says that a project manager is the one that is most likely to become a general manager. To some extent, it is correct as a project manager has more comprehensive management capabilities than a functional manager and faces more challenging jobs. In fact, functional managers can be divided into two categories as well: "officer" and "collectors." An "officer" is the main head of a department, while a "collector" is the deputy or a supporting staff. In government departments, the promotion channels of "officers" and "collectors" are different. An "officer" needs to be elected, while a "collector" can be appointed. It is the same in enterprises. An "officer" must have hands-on work experience, especially experience as a project manager. By contrary, a "collector" can be appointed from campus recruitments or directly from internal promotion. Those government officers without governing experiences experience difficulties in obtaining the sufficient prestige. Similarly, those without experiences as project managers, as the lead in the front line, or as officers who once achieved good sales are difficult to maintain prestige in the enterprise.

It is very challenging to become a real professional project manager.

Chapter 18
Becoming a Successful Enterprise that Is Adapted to Changes

The key of using the principle is to seize the opportunity, of showing the principle is using the situation, and of succeeding in the principle is the trust of the monarch.

—Six Secret Teaching

The changing era requires us to establish different theories of business from the past. These new theories should be able to effectively balance the dialectical relationship between change and stability and to reflect the idea of "with both of management and rights." In the future, the survival capability of an enterprise will not be only reflected by the operating profit, number of staffs, market share, product range, etc. These criteria will not provide enough evidence to judge the credibility of enterprises. A lot of giant enterprises fell apart in a very short period of time. Under such context, the scale and the strength of an enterprise are no longer standards for determining the ability of survival. Indeed, new standards will emerge. Enterprises need to be well prepared to deal with those reforms.

18.1 Be Aware of the Misunderstanding of "Project-Based Enterprises"

"Everything is project" is a sentence which makes everyone's blood boil. The project orientation would prompt us to be task- and result-oriented. However, there are serious hidden troubles derived from agitating for the project orientation and "everything is project."

If we assign the unique and temporary task as the definition of project, all of tasks are projects, and we can treat tasks as projects. However, only similarity leads to efficiency, and we need to make a trade-off between the uniqueness and efficiency. "Everything is project" may equal to some philosophical propositions: "White horse is not a horse," "people can't step into the same river" and so on.

Two comrade-in-arms were transferred to civilian work as mukhtars of two townships. Mukhtar A usually did some corrective works, such as fixing ditches, repairing

channels, and others. Mukhtar B carried out radical reforms, such as building new roads and building high rises, and the meetings of county were regularly held in town B. Unfortunately, the flood came. The destruction was very light in town A due to plenty of water conservancy projects which had been done at ordinary times. However, township B was badly damaged where roads were washed out and buildings were washed down. Mukhtar B took the lead in fighting with the flood and finally fainted for the excessive toil. The reporters went to interview him. The leaders also went to the hospital to visit him and people said he was a good leader. When the flood receded, Mukhtar B was promoted to be vice county magistrate, while Mukhtar A still worked as the mukhtar. What does this example illustrate? There will be no achievements if there are no projects. However, are they real achievements?

It is very easy to produce the blundering mood when adoring the innovation overly and pursuing the performance blindly. Nobody is willing to be mediocrity. However, it is the reason which leads to a lot of offbeat and mediocre "innovations." This kind of behavior will dissipate the precious resource of enterprises. Under the guise of the project based is "everything is project," everyone will try to start some projects, while the goal of enterprises will be ignored. Project is temporary, and the temporality can exacerbate if there is lack of sense of job security. After securing the project, the employees will think about how to secure the next project before making the achievement of the current project.

The following fable is very meaningful. Mouse trouble occurred in a farmer's home so he bought some mousetraps and placed them around the house. Chicken, sheep, and cattle were waiting to jape mouse. One morning, the farmer's wife got up early to prepare the breakfast. However, her foot was badly injured by one mousetrap accidentally. For his wife's nutrition, the farmer killed the chicken. As the farmwife's foot was inflamed and festered, she had to be taken to a hospital. In order to make enough money for hospitalization, the farmer had to kill the sheep and sell it. His wife's injury was aggravated and was finally died of sepsis. The farmer had to kill the cattle to give his wife an honorable funeral and to thank friends for attending the burial ceremony. Those we think irrelevant may bring disasters to us as a result of misunderstanding the causal relations of system.

This is common in reality. What we are educated since the childhood is to make us standing out, rather than how to work. "The soldier is not good unless he wants to be a general." This statement is not wrong. However, if it comes to a situation like "The soldier is not good if he doesn't emulate to be a general," the complexion as "Better be the head of a dog than the tail of a lion" will appear. Similarly, the staffs will do everything possible to initiate projects regardless of the overall goal of the enterprise. It will be more important to pursue the new projects than to pursue the project outcomes, and the staff will be on the go like in red shoes. This contributed to the situation as "everyone is busy in the enterprise, but busy to cover up the truth of the matter." As a result, a number of "professional judges" emerge in enterprises that are busy in evaluating projects and coordinating project resources. Such unhealthy customs will emerge accordingly, which makes the boss tired and enterprises fall into the extreme mess.

In a rapidly changing society, it is essential to achieve innovation. However, we cannot innovate for the sake of innovation. Project is important, but we cannot run projects for sake of projects. Such lessons occur very frequently in enterprises, government agencies, universities, and research institutions. The top management of enterprises mainly manages non-repetitive projects. However, it is not appropriate that everyone focuses on projects. Majority of staffs should do productive, efficiency-based, and standard-based works. Only with the alternation and complementation of these two kinds of works, can enterprises achieve benefits and efficiency. Japanese emphasizes the word of "improvement." In English, "improvement" is often replaced by the Japanese pronunciation of "kaizen," which is not an accident. "Improvement" leads Japanese to work carefully and efficiently. Although there are some doubts about the contemporary Japanese corporate management, it is not hard to find out that many Japanese companies are still ahead of us and even most of enterprises over the world.

When accomplishing tasks, we need the project management way of thinking. However, it is not beneficial to adopt the form of project unless the task involves various people, the scope of the task can be defined, and uniqueness is more significant than repetitiveness. "Everything is project." However, it depends on the real situation whether or not to adopt the project management approach.

18.2 The Transformation of Enterprise Management Thoughts and Methods

As Peter Senge puts in "The Fifth Discipline," our mental models must be changed at first so that an enterprise can be changed. An enterprise that is adaptive to changes regards the project management as one of its core competence. To form this core competence, the following six fundamental changes are necessary. Although many of these changes have been mentioned earlier, it helps to learn them more systematically by putting them together.

1. Changing from human-depended to system-depended

More than two thousand years ago, Guan Zhong had pointed that "a one year's plan is cultivating grains; a ten years' plan is planting trees; a life plan is educating people." Today, the concept of "human resource is the first resource" is widely known. The fundamental meaning of "people-oriented," however, is making people as the fundamental purpose of all our works, not making people as the fundamental resource for finishing our works.

"Human resource is the first resource." However, since person is within the system, this resource will not work unless it is put into a proper system. No enterprise can survive if it relies on talents isolated from the enterprise system. Similarly, a country that relies on talents isolated from the country system will be hard to stabilize.

System refers to an entity that is consisted of no less than two elements. To become a system, the following three conditions must be met. Firstly, every element must have an effect on the whole system. Secondly, the behavior of each element and its effect on the whole system must depend on each other. No one can affect the whole system alone. Thirdly, no matter how these elements are decomposed, all the decomposed parts can still affect the whole system. However, no single part can affect the whole system by itself. In other words, the various elements in the system are closely interlinked and cannot be separated as independent parts. Two deductions can be drawn from the connotation of system. First, every part of the system has its own properties. Once a part is liberated from the system, the properties of this part will make a loss. Each system has certain properties, but any single part of it cannot have these properties independently.

Human resource is only one of the various elements of a system. Although it is very important, its importance can only show up when it is well combined with other elements. The behavior of "recruiting excellent talents of science and technology, trying all the way to improve their enthusiasm, and then pushing all the responsibility of achieving scientific and technological achievements to them" is not respecting talents, but giving up the responsibilities of managers. This practice is detrimental to the improvement of the competitiveness of the enterprises effectively and quickly. Similarly, it is difficult for talents to play a role.

2. Changing from relying on enterprise employees to relying on stakeholders

Corporate incomes are all produced from the outside. What is produced inside of an enterprise is cost. In fact, more and more employees are no longer the exclusive resources of enterprises and no longer bear the burden of responsibility with no doubt. The saying "If you don't work hard today, you will strive to apply for a job tomorrow" is no longer true for the talents needed by enterprises.

It is a luxury for enterprises in this changing era to expect employees to share difficulties with them. Similarly, the time that employees work for free and allow enterprises to delay their payments becomes much shorter. It is the contractual relationship between employees and enterprises. Furthermore, the government has to constantly make efforts on supervision and protection in order to enhance the equality of this contract.

Stakeholders will decide the destiny of the enterprise. The survival and growth of an enterprise depends on whether it can continuously meet the needs of its stakeholders. Human resource department of enterprise is no longer a nickname of labor and personnel department. It is more like a composite of public relations, marketing, and legal departments.

3. Changing from function-oriented divisional management to goal-oriented process management

The fundamental purpose of process or procedure is to clarify the logical relationships and accountabilities among works in order to improve the work efficiency and reduce the risk. To improve the success rate of the project, it is necessary to improve the organization management mechanisms of the project. Firstly, project

management process is established to clarify working relationships. Secondly, institution setting is improved to clarify responsibility relationships. Finally, performance evaluation mechanism is improved to facilitate the implementation of responsibilities.

In practice, a common mistake is to replace management by motivation. In other words, the performance evaluation mechanism is changed in the first instance, or even simply adopting financial incentives, to improve the success rate of projects.

Ministry of Public Security stipulated that, from January 1, 2013, drivers of motor vehicles will be punished by six points if they "rush the yellow light." However, not until a week since the announcement of this regulation, the Ministry announces that "rush yellow light" will not be punished temporarily because of the need of formulating detailed rules and regulations. This is changing incentives in the first instance however without clarifying the process and responsibility (improve light settings and the tools and methods to define "rush yellow lights," etc.). By contrast, there are no such twists and turns when identifying drunk driving because of the developments and uses of alcohol detector, blood testing, and other methods in advance.

Another common phenomenon is multiple management. According to the fundamental principle of management, everything must be cared by someone. Everything should be cared by only one person, and everything can only be cared by one person. However, multiple management does exist in real life, which is the phenomenon that a work involves multiple management departments. This kind of phenomenon leads to such a result that each department is busy, but there are more and more problems at the same time. "A dozen departments can't hold a vegetable basket," and "seven or eight departments cannot manage the slag car" are such phenomena. The result of multiple management is spitting on each other, and the result of "undertaking responsibility together" is usually no one will take responsibility. Solution to the multiple management can be "super-ministry system," namely combining departments into one synthetic department, and then, "multiple" becomes "a". However, as different projects involve different departments, we cannot constantly establish different "super-ministry systems" accordingly. This is the organizational mechanism for project-oriented systems, which will consume a lot of resources, Along with the beginning and end of projects, even in different stages of the project, there are always organizational adjustments that not only affect the efficiency, but also are detrimental to the stability requirements for the functions of each department.

Multiple management is actually a pseudo-proposition. Many projects need cooperation; however, cooperation does not necessarily mean multiple management. Multiple management is a result of the workflow without elaboration. Every piece of work can be assigned a leader. However, when multiple works are grouped together, there will be several leaders, leading to multiple management. When multiple management occurs in a task, it is necessary to break the task down into several more detailed works and clarify the logical relationship until there is only one person responsible for one task. This is the effective way to solve

multiple management. Due to the development of information technology, it is not difficult to increase the span of control and to achieve the flat management.

Stable functional departments can raise the efficiency of using the same kind of resource. Dynamic projects can meet the requirements of different goals. Synergy of the both can ensure both project efficiency and effectiveness. Projects are unique or full of innovation. Similarly, a stable department will involve asynchronous and different kinds of projects. Therefore, no one will take responsibilities if the project is managed by stable departments with clear functional interface. The uncertainty of projects brings fuzzy functional interface among departments. At the same time, for respective benefits, information ownership, and respective efficiency, each department will take different priorities, which can cause the delay of multiple projects. To solve these problems, it is required to use invoke department resources based on the process. Only in this way, the resource efficiency of stable departments can be satisfied and guaranteed, the needs of projects for specific objectives can be met, and the wrangle can be avoided.

Open and transparent process is not only the basis of obtaining stakeholders' trust, but also the guarantee of replacing rule of men with rule of law as well as reducing the associated risks. The so-called government official is also a high-risk profession is due to the unspecific, opaque, and unscientific workflow. When problems arise, traceability cannot be achieved and there is no exact evidence to prove who should bear responsibilities. Process management can not only clarify responsibilities, but also provide the acceptable reliability. Some managers take the lead of breaking the procedure in order to improve the efficiency or for some personal reasons. The increase of local efficiency or benefit may affect the risk and efficiency of the whole system.

Projects are different and enterprises cannot make a policy for each project. However, there will be "sweeping approach" problem when general policies are applied in specific projects. According to "Cybernetics," if a problem is difficult to solve, efforts are required to start from its conjugate problem. Solving the conjugate problem is solving the original problem. Although every investment project is different, their life cycles and the main flows are the same. We can formulate corresponding management methods according to these flows. The more complete these flows are, the higher the maturity level of enterprise management is, and vice versa.

"Either following the process, or changing first and then following it" should be the norm of enterprises that carry out works in the future.

4. Changing from static position-based human resource management to role-based human resource assignment

There are a number of benefits associated with employee turnover, such as promoting the social equity, promoting the reasonable competition and growth of talents, promoting the improvement of the degree of specialization, and reducing the decline of the demand for human resources, etc. The income and welfare will be similar for the same post at the same region. This is due to the protection of the Labor Contract Law, the improvement of distribution mechanism, and the reform

of national social security system and household registration system. This shows that the appointment and distribution are according to capability and contribution. As a result, the social equity is enhanced as well.

Since people's living security is not entirely depend on a certain institution, the way of appointment such as "can be both at the top and the bottom" can be implemented. People will enhance the job security according to their capability, but not depending on "a secure job." Thus, the professional capability will be improved. It is very common that the workload in the enterprise is not balanced. The demand for human resources is not the same between busy time and idle time. As a result, only when employees mobilizing, can human resources achieve "coming successfully, doing well, and going away easily." Due to the aging population and growing human resource costs, government should consider how to encourage staff turnover, while the effectiveness and fairness of turnover are ensured. Similarly, the trend of social development must be understood by enterprises.

Guan once said, "a man who is good at managing state affairs can make use of goods that do not belong to him and enslave people that are not under the jurisdiction of him." In other words, we should be good at using resources and staff that do not belong to us. The important characteristic of modern project management is being able to use the dynamic human resources. Project is completed synergistically by stakeholders. In particular, large-scale projects are more likely to be completed by dynamic human resources from multiple organizations. For a temporary project, it is very unlikely that resources, especially human resources, are made exclusive for the project.

Talents owned by enterprises are venture capital to some extent. The rapidly changing business environment makes enterprises to face the threat of depreciation which accelerated all the time. The salary of talents is increasing constantly; the cost of taking complete possession of talents will be growing; and input–output ratio will be declining. In addition, people are more inclined to be more loyal to their careers rather than a particular employer, and there will be more mobilizing "free man." As a result, people will focus on their best skilled fields and give their unskilled fields to who are good at. This is the reason that a growing number of projects will be completed jointly by multiple enterprises.

It is noteworthy that completing a project by multiple enterprises does not mean the simple approach of main contracting, subcontracting, and multilevel contracting. Such approach often increases the costs and expenses rather than real value of projects. Therefore, they cannot be regarded as "completing projects jointly" in essence. They may simply increase the cost of projects for some unreasonable and illegal interests. In other words, the result of these methods is the increasing project costs with no project value added. The real projects jointly completed by multiple enterprises should be dynamic human resources conduct works to increase the value of the project and all participants should contribute to increasing the value of the project and therefore share project benefits. The relationship between human resources of different enterprises and the project should be a kind of value network.

Obviously, the project efficiency is very important. To improve the project efficiency, it is a common method to employ competent interdisciplinary talents. In fact, no method is more attractive than this. Excessive dependence on interdisciplinary talents will make us ignore accumulating the reusable knowledge and skills that belong to the enterprise. This leads to more dependent on interdisciplinary talents. When an enterprise does not have their own knowledge and skills, "lacking of high-quality talents" becomes the best but the most useless excuses. There is a large market demand of interdisciplinary talents. Therefore, qualified interdisciplinary talents will often jump ship or are lured by other companies. As it takes a long time to nurture these talents, they are increasingly unwilling to donate their individual knowledge/skills to form enterprise knowledge/skills. This will make enterprises more dependent on these "talents" and thus fall into a vicious circle.

To improve the efficiency of the project using dynamic human resources, it is necessary to shift the human resource management from the relatively static position-based management to the relatively dynamic role-based management. Despite rapid changes to the business environment, we are still affected by the inertial thinking in many aspects. The word "post" is still important for a stable organization. However, for a dynamic organization which is temporary task (the project team) oriented, the word "role" is worth more attention than "posts." Posts are faced with repetitive and routine works, while roles are geared toward the needs of dynamic tasks according to processes. The ability required by a role is relatively simple. Because the work is component-based and standardized, this ability can easily be formed. Therefore, we should reduce the dependence on scarce interdisciplinary talents and shorten the time of new staff coming to their positions through the division and integration of roles.

The project tasks are unique and innovative, and project environment is changing all the time. As a result, "post," which needs to be replaced by "role" aiming at tasks, is not enough to cope with flexible tasks. At present, the salary is increasing constantly, the price of possessing employees (especially knowledge-oriented talents) will be growing exclusively, and input–output ratio will be declining. These changes contribute to using employees dynamically where projects are used as carriers. For the ability of using dynamic resources to cope with dynamic tasks, it is necessary to transform "department affiliation system" of resources to "roles deployment system" of project. This helps to turn static posts into dynamic roles. Only in this way can enterprises go forward to the way of real project management.

To achieve the transformation from posts to roles, three requirements must be met. Firstly, various functional departments are turn into "resource pools." This change can solve two bottlenecks of dynamic resources dispatching. One is that resources are usually solidified to make the organizational structure to become project management structure, which reduced the efficiency of resources utilization. The other is the conflict of matrix organization coming from the competitive use of resources between functional departments and project team. Secondly, employees have been "graded and classified." So-called grading and classifying management refers to classifying staffs into different types of roles and ability

grades (each employee can have multiple role types and grades). Organizations can determine employee's hourly price (salary) according to the amounts and grades of roles that the staff can play, and the project leader determines the bonus according to their actual roles and effectiveness. Finally, enterprises have the ability of knowledge extraction, reusing, and integration. In order to promote the role transformation of functional departments and the dynamic scheduling of employees' roles, the project must be broken down into components (including processes, activities, roles, tools, documents, models). As a result, the efficiency of role transformation can be improved through the standardized encapsulation and reuse of above components.

5. Changing from staff's personal knowledge to reusable knowledge within the enterprise

Basic organization units to complete projects are the project teams. In a project team, personnel may come from a variety of organizations, have different culture and professional backgrounds, have no long-term cooperation basis, and so on. These are the obstacles and constraints of knowledge management in the team. In addition, in order to realize the role management of project human resources, it is necessary to solve the dynamic scheduling problem and then making team members to come when there are needed, do well quickly after arrival, and able to leave after doing well. To do these, knowledge management is very important.

Of all enterprise resources, human resources and knowledge resources are most influential to the project efficiency. The importance of human resources to projects is obvious. Enterprise carrying out project management should deal with a number of issues such as how to make team members get into roles quickly, find problems quickly, come up with solutions quickly, submit project results quickly, and withdraw from the project roles timely once the task is completed so that they can undertake new roles. The fundamental of dynamic scheduling project human resources according to roles is transforming employees' personal knowledge to enterprise reusable knowledge.

It is not easy to achieve this. On the one hand, employees do not want to contribute knowledge to enterprises. This is because the exclusiveness of knowledge can bring competitive advantages to managers and professional staff which in turn bring a higher income for them. Once sharing with others, their competitive advantages will be affected inevitably and their critical role to enterprises is reduced. Thus, personal benefits are affected. Therefore, relevant personnel are reluctant to share their knowledge and experiences with others. On the other hand, intense work schedule and lacking of communication platform and opportunity also restrict the knowledge sharing among relevant personnel. These lead to the slow speed of accumulation of relevant personnel knowledge. As a result, we cannot react to the project implementation problems quickly and efficiently. In addition, project teams will usually be dismissed or restructured after the project completion. Many valuable materials of these projects will be lost as knowledge was not collected on a timely basis and enterprise knowledge will be lost too.

We can understand the uniqueness of project from two aspects. On the one hand, the project itself is unique for the enterprise that undertakes the project. However, if the project is decomposed continuously, many of these detailed works are what we have done before or what we are familiar with. On the other hand, for the person who undertakes the project, the project is unique. However, within the enterprise, someone has ever completed the project or a part of the project. Our main problem does not lie in the uniqueness of project, but in that, we do not know how to subdivide project tasks, in that we do not know how others complete the project tasks successfully.

Knowledge management receives an increasing lever of attention. However, the execution efficiency of project will not be improved until the knowledge is transformed into technology. On contrary, only when we know what kind of technology is helpful to improve the execution efficiency of project, can we know how to refine, accumulate, and apply the knowledge. A common case is we rely on those interdisciplinary talents and hope that they can improve the execution efficiency of project, rather than seeking for what can be standardized and reusable in their work. If there is lack of sufficient capable personnel, more human resources will be invested in the project. As a result, the number of employees required completing the project increases exponentially and the complexity of management grows rapidly when the projects are more and more complex. The project knowledge of many departments is much less than that of their employees and managers As a consequence, we will give up the management responsibility consciously or unconsciously and hope to motivate staff's enthusiasm so that the execution efficiency of project can be improved.

Improving the replaceability of talents can provide enterprises the competitive advantage in the fierce competition and in the business environment with a high mobility of talents. There is no doubt that each department will always have some indispensable staff. However, the ratio of these staff to the total number of employees must be controlled to a very small scale. In fact, nobody is completely irreplaceable. When we say that a person has a weak substitutability, we actually mean that it takes longer time and higher cost to find a replacement. Therefore, we are desperately in need of methods to shorten time and reduce costs. This method is the professional division of labor. All kinds of professional talents should be integrated effectively according to the different division of roles so that the project can be completed efficiently. Many enterprises are lack of the mechanism of integrating human resources effectively. They put responsibilities on the staff with interdisciplinary skills. This leads to a low level of personnel replaceability and low work efficiency.

Only when we are able to define and subdivide project roles, can we train project team members effectively, make them playing the project roles quickly, and deal with the common issue of discrepancy between the job description and the actual work.

It is often difficult for efficiency and personalization coexist. It is not realistic in a project to improve execution efficiency while meeting the team members' personality and unique style at the same time. As project activities are closely

interlinked, the flexibility of one activity will cause a chain reaction and finally cause the turbulence of project plan. This makes the plan a name only. In order to achieve component-based project management, we must establish the concept of "working efficiently, living happily" firstly. After all, only a few employees can get pleasure from works. It will confuse work with life and affect both of them if we hope everyone can work with pleasure.

We cannot regard human as machine. We cannot consider that employees are only driven by financial interests neither. However, these are not reflected during completing project works, but are mainly reflected outside of project works such as motivation, job allocation, training, and development. Therefore, it is required to establish the corresponding management system which helps to ensure the realization of the concept of "working efficiently, living happily." At the same time, it is necessary to make team members aware of the relationship between project roles and tasks, the influence of local changes on the entire system. Team members should handle interfaces between packaging components well with standardized communication. Only in this way can ensure the realization of component-based project management.

6. Changing from the postevent evaluation and motivation to whole process-based prevention and promotion

It is a common mentality of "telling me how to evaluate firstly, then I'll decide how to do." Changing the way of evaluation is changing everything; otherwise, nothing will be changed. There are three parts of project organization system, i.e., clarifying the process of project activities, clarifying the responsibility relationships of each stakeholder's role, and promoting and ensuring these roles to undertake and fulfill their responsibilities and commitments by means of performance management. In other words, performance management is established on the basis of the completion of former two parts. However, the most common approach is that the former two parts are replaced by the performance management. Furthermore, the performance appraisal replaces the performance management. These practices cannot play the role of what performance management should be. Rather, they will make things worse. Phenomenon such as academic misconduct, GDP magnification, and accidents cover-up is caused by this mistake to a great extent.

The emphasis of performance management is the review and monitoring before and during the event, rather than evaluation after the event. Performance management should evaluate not only technical characteristics of projects, but also its management features. So far, in the practice of project management, most of performance management practices still belong to evaluation after the event. These result-oriented or personnel evaluation-focused performance management methods may contribute to recording the computational results and rewards and punishments. However, the evaluation results cannot tell project stakeholders what can be done to improve the performance. The main purpose of performance management is to cut down all kinds of deviation in the project operation system so that the satisfaction of stakeholders can be improved. Therefore, it is imperative to strengthen

the review and monitoring of the project operation process; and to discover and resolve the problems that existed in the project operation system on a timely basis. As a result, the reliability of realizing project goals can be improved.

Effective project performance management includes the following three aspects.

1. Performance management system includes three subsystems of evaluation objects: job evaluation subsystem, talents evaluation subsystem, and personnel evaluation subsystem. They form a very complete evaluation system.

Management should be on the front of problems. The purpose of job evaluation is to provide real-time assessment and feedback to project processes, the implementation of project role responsibility, project risk management, and change management.

Talent evaluation is the important basis of discovering and training talents in the project process. The talented personnel may not achieve ideal project outcomes; thus, we cannot evaluate a person only based on the success or failure. Outstanding scientific talents and management talents have different characteristics. Thus, the design of evaluation standards should be based on these characteristics. This kind of evaluation is carried out with the comparison among a cycle's initial condition, final condition, and future demand.

Personnel evaluation is the basis of adopting awards and punishments and other incentive measures for stakeholders, mainly based on the comparison between the beginning and the end of the period. There are many methods to achieve this purpose. It is worth noting that the personnel evaluation is carried out at the end of the period. However, the end of the period should be based on the project milestones, rather than the calendar used by routine works. Nowadays, in the process of project management, many people still get used to adopting the method where the evaluation is conducted once or twice a year, rather than as per project milestones. This method does not reflect project characteristics or facilitate risk control. This is detrimental to the implementation of the dynamic responsibility of the project stakeholders.

2. Performance management system includes four complete process subsystems: P (plan)-D (do)-C (check)-A (act).

Evaluation is an approach to achieve purposes. Evaluation should not be conducted for the sake of evaluation or for rewards and punishments. Prior to the evaluation, efforts are required to work out the detailed standards and plans. Similarly, project stakeholders should be made aware of, understand, and accept these plans in order to help them prevent project problems and determine work goals. After the evaluation, the strength and weakness identified in the evaluation need to be fed back to the corresponding stakeholders.

In the current project evaluation process, people go through the motions occasionally. It is commonplace that the evaluation and feedback are replaced by the concluding reports, the expertise reports, and so on, and little feedback is there for improvement. Although project is one-off, the enterprise that manages or

undertakes projects is long-standing. It presents significant challenges to find out how to generate knowledge from a one-off project so that the organization and individuals can reuse in a long-term. This helps to improve the robustness and effectiveness during the process of project approval, implementation, and outcome evaluation.

3. Performance management system includes stakeholders training subsystems.

Evaluation is a specialized ability which can be improved by training. Science capability has strong relationships with evaluation ability. However, it does not mean that people with professional skills have adequate abilities of assessing the advancement of science and technology related to projects and the reliability of managements. All approved projects should have a certain level of innovativeness. The reliability of the judgments made by personal experiences or intuitions of evaluation experts is limited. The training of evaluation experts contains not only how to understand evaluation standards and draw evaluation conclusions, but also how to write evaluation reports which are helpful for project applicants and organizations. Without trainings, experts will experience difficulties to bear the responsibility for the evaluation outcomes.

18.3 Improve the Maturity of Enterprise Project Management

Many enterprises have secured the ISO900 certification. Before 2000, there were three kinds of ISO900 certification, i.e., ISO9001, ISO9002, and ISO9003. ISO9001 covers three aspects, i.e., the design, manufacturing, and service. ISO9002 covers both manufacturing and service, while ISO9003 only covers the service. It can be found that the ISO9000 certification was based on the types and scope of enterprise business. Since 2000, ISO abolished such categories and combined all three of them into ISO9001. Fundamental change is made from business type and business scope-based to unified process-based. The similar change took place on Capability Maturity Model (CMM) series that are widely accepted in the IT industry. They also played down the specific external features of their business where more focuses were placed on the essential commonalities and refining a common flow domain. There are two purposes of this change from the operational management to process management. On the one hand, we can retrieve the management of businesses that have common characteristics in essence but different types of appearance. It helps to reduce the dependence on the industry experience that manager possesses personally and improving the efficiency of management. On the other hand, it can reduce the management black boxes, reduce the risk of completing tasks, and improve the reliability. With this change, a new and important management standard emerges, i.e., maturity.

The "management by objectives" is well recognized. This is correct as whatever we do is to achieve certain goals. However, "management by objectives" often becomes an excuse used to conceal the nature of problem. Quite a few enterprises and managers use "management by objectives" as a signboard. Actually, after defining an objective by experience, they wait for results by adopting "carrot and stick," i.e., you can get reward if succeed and be punished if fail. The approach has ignored the duty of managers where risks of enterprise are transferred to some people that do not have abilities to deal with these risks. Under such management approach, it is very easy to be a manager and have more advantages. For those projects depending on cooperation of all participating parties, they may not necessary share the same goal. We can make an agreement among those enterprises by exploring their expectation and demand during the goal-setting process. However, many uncertainties exist. For instance, they can give this project up at any time for other projects, which are more valuable for them or closer to their needs. In the course of a business management, efforts are required to avoid too many "black boxes." In project governance, the "black boxes" are more common and more difficult to solve. An enterprise has low level of maturity if it successfully complete the task, but full of contingency. By contrary, an enterprise has high level of maturity if it controlled the key process even though failed to accomplish tasks. For the former case, success is an accident; for the latter case, failure is an accident. Contingency always exists.

There are many "project management maturity models," such as PMI's OPM3 model, Kerzner's project maturity model, and Judgev and Thomas's project management maturity model. Among them, "OPM3" is the most typical and the most widely used. "OPM3" divides the project management maturity into 4 levels, i.e., (1) standardizing, (2) measuring, (3) controlling, and (4) continuously improving. PMI defines "OPM3" as "…an approach by which we can estimate the ability of organization implementing its strategic goals by managing single project or project portfolio; and a tool which can help organization to improve its market competitiveness." The goal of OPM3 is to provide a fundamental approach for enterprises to develop the ability of project management and to link its project and strategy closely. OPM3 provides users with an ample knowledge to understand the organizational project management, and provide reference standards as self-assessment tools to help users to confirm the current organizational situation thus formulating the improvement plan. OPM3 can be applied in following ways: (1) identifying the direction of improvement through vertical comparison and evaluation within the organization. OPM3 maturity standards furnish organization with the evaluation methodology in crucial occasions so that we can compare the current results with previous results. Consequently, the effect of the implemented reform can be confirmed, which guides the future improvement. (2) Enhancing the organizational market competitiveness through horizontal comparison beyond the organization. (3) Enhance the corporate image through assessment, improvement, and advertisement. (4) Clients can require suppliers to meet certain maturity levels according to the OPM3 standards. This can be used as a means of project

control, so as to the selection of more capable bidder. So far, OPM3 has confirmed more than 600 best practices, and the relationship between more than 3000 kinds of ability and more than 4000 kinds of ability. Those results have provided organization, a method, and tool to measure, compare, and improve the competence of project management.

Project management or multiproject management cannot solve the issues associated with those projects involving the collaboration among multiple organizations. Similarly, OPM3 cannot solve issues associated with the project governance either. We cannot directly use OPM3 as the blueprint for the maturity of project management. Although the process of getting governance patterns can be unified, the roles of enterprise governance vary from project to project. Project governance is the unique partnership using projects as the carrier. The maturity of project management is established with the main purposes of determining risk control methods of role governance according to maturity levels and establishing performance guarantee mechanisms. Its utilitarian of realizing project objectives is more than the "measurement, comparison, and improvement" of the enterprise.

The maturity levels of project governance can be simply shown by the degree of risk control borne by governance roles among stakeholders in the process of project governance (see Fig. 18.1). The lowest level is "take the matter on its merits." In other words, enterprises participating in the project believe in "case by case." At this stage, it is arbitrary for enterprise to determine whether to involve in a project or not, and there is a lot of negative phenomenon, such as "empiricism," "stronger will of the leader," and "waiting for death without project, courting death
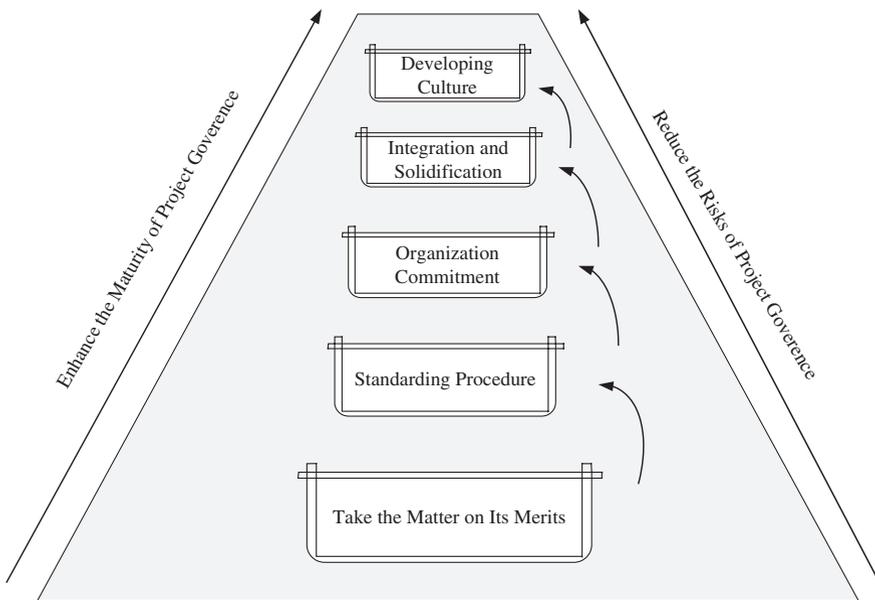

Fig. 18.1 Classification of risks and maturity of project governance

with project." Enterprise makes decision mainly depends on scattered personal experience. The second level of project governance maturity is "standardizing procedure." At this stage, enterprises participating in the project have explicit management processes to determine whether to participate in one project and how to select stakeholders, clarify the participation methods as well as roles. There are a number of control points during those processes. However, those processes are usually fragmented, discrete, and contradictory. It is often difficult to reliably implement the internal processes of enterprise unless senior managers support them. The communication and coordination of processes between enterprises need more participation of all parties' senior managers. The third level is called "organization commitment," in which enterprises participating in the project have a normative negotiation mechanism to deal with contradiction and conflict between each other. Those enterprises form a project-based alliance. A clear definition of governance body and methods during different stages and on different issues is made available. Processes have been systematized and controlled. The fourth level is called "integration and solidification." "Integration" refers to that the goals and processes of all participating enterprises have been integrated so that they have made agreement with each other and have solved their conflicts. On this basis, the role relationship of project governance is "solidified," so as all parties' demands and operational processes. There are strict change management procedures and incentive mechanism, which is integrated with day-to-day operation and management of other projects for all participating enterprises. The highest maturity level of project governance is "developing culture," which mainly refers to that this project governance style becomes instincts and habits of all participating parties. All participating parties develop a strong ability to retrieve and reuse knowledge, to manage emergencies effectively, and to improve continuously.

There are fundamental differences between project governance and organizational project management. Similarly, there are different ways to distinguish the maturity of project governance and the maturity of organizational project management. The object of organizational project management is an organization (enterprise). Therefore, only this enterprise meets certain standards on process, organization, and culture of the project management, can we say that it reaches a higher level maturity of the organizational project management. However, for project governance, although one enterprise or multiple enterprises have reached a higher level maturity of organizational project management, the rest of participating enterprises (even there is only one enterprise) only have a low maturity of organizational project management. Then, the maturity level of this project management is low. Similarly, although all enterprises participating in the project have a high-level maturity of organizational project management, their respective processes cannot be integrated unless there are normative procedures and organizational commitment during the project management processes. The lower the project management maturity, the higher possibility for the project manager breaks commitment and the lower success degree of the project (see Fig. 18.2). In other words, the maturity of project management involves in distinguishing the harmonious degree within projects, within departments, and between departments and projects. However,

| Level of Satisfaction / Risk Level — Project Stakeholders	Take the Matter on Its Merits	Standarding Procedure	Organization Commitment	Integration and Solidification	Developing Culture
Enterprise 1					
Enterprise 2					
. . .					
Enterprise n					

Enhance the Maturity of Project Goverence
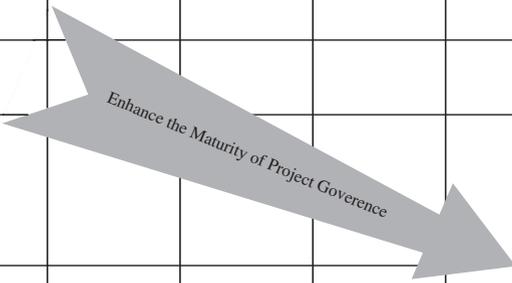
Fig. 18.2   Judgment of the maturity of the project governance

the maturity of organizational project management tries to judge the harmonious degree among all stakeholders in respect of procedures and organization.

For different projects, appropriate project governance approach can be determined by means of unified iterative process. This approach can be expressed by the P-R^4 model, where P represents the iterative process needed along with the stakeholders' entrance and exit. This iterative process is conducted surrounding the 4 R: determining stakeholders' Requirements, defining Roles of governance, analyzing Role risks, and building Relationships among management roles. We can seek for the ways to improve the project governance maturity through establishing the 4 R and associated key processes, and 5 grades of preventing the risks of project governance (see Table 18.1).

In the rapidly changing business environment, it does not matter for the era if an enterprise does not value projects or cannot manage projects successfully, but the enterprise will hardly survive. The management of enterprise has to shift the ways of thinking from managing manufacturing-oriented enterprises to managing project-oriented enterprises.

18.4 Improving the Project Management of Enterprise Reform

To be more adaptable changes, enterprises need to complete a lot of reforms successfully. Every reform is a project, and thus, we should do a good job of project management. At such rapidly changing era, no matter how strong an enterprise

Table 18.1 The content framework of project governance maturity

Grade standard						
Governance process		Maturity level				
		Take the matter on its merits	Standard procedure	Organization guarantee	Integrated curing	Cultural cultivation
Determination of stakeholder need	Stakeholders identification					
	Expected mining					
	Clear need					
	Demand integration					
Definition of governance role	Division of responsibility					
	Clear subject					
	Role determination					
Analysis of role risk	Risk identification					
	Risk analysis					
	Resolve measure					
	Monitor mode					
Establishment of governance relationship	Risk management Role identification					
	Role control					
	Role recognition					
	Relationship formation					

is, enterprises will not survive unless they are good at using external intellectual resources. Enterprise reforms normally need assistance of external resources. It presents a challenge to the enterprise reform management to make good use of these external expert resources. Nowadays, buyer's market is prevailing where many enterprises accumulate lots of experiences of being contractors but not good at being the client. They do not exactly know how to make project reform management more effectively.

The following issues should be paid attention to so that enterprises can make good use of external experts and improve the management capability of reform projects.

1. Defining roles of both parties clearly

To make the project reform management more effectively, enterprises should be a good client. The most important reason for the failure of project reform management is the ambiguous definition of roles. The role of external experts is supporting, not taking place of enterprises decision-making. Unlike technology or engineering, management problems cannot solve by others, and managing reform project cannot be outsourced to external experts. If you simply put forward demands to external experts and wait for results, it is most common that you will receive a wonderfully looking report, like a beautiful artwork, which is used for appreciation rather than for using.

External management experts are perceived as enterprise doctors. Similarly, the experts themselves usually admit that metaphor. Indeed, there is one similarity between doctors and external experts. In the eyes of doctors, all the people are patients. Similarly, in the eyes of external experts, all the enterprises have some problems. This is truth as no enterprises have no problems or have no areas to improve, which is the reason for enterprises to employ external experts. While patients will usually take the medicine given by doctors or accept to have an operation, enterprises will not. Enterprises are difficult or even not to accept the plan given by external experts entirely, not to mention that there is a growing level of distrust to doctors nowadays.

Once the solution of management problems is arrived, enterprises need to consider how to adjust and then adapt to these plans. At this time, external experts are needed to take the role of agitators, making the employees to accept those reforms. Sometimes, the most important reason of enterprises employing external experts is not their given plans but their agitator role during the enterprise reform. In order to let external experts play this role well, enterprises need experts rather than their employees to understand their will. No matter how good a management plan is, it is nothing if employees cannot accept. Therefore, this role is more important than giving a plan to a certain degree. However, such contents are usually left out in contracts between enterprises and external management experts. The inappropriate definition of project scope presents future challenges to the enterprise, so as to the external experts.

  The success of management reform project is not possible unless external experts have a better understanding of the true situation of enterprises. This helps enterprises to be fully aware of the project progress in order to adjust and improve the enterprise work on a timely basis. Similarly, enterprises can cultivate their own human resource. Members of the reform project team should be selected carefully. They should have the knowledge of functional departments and technical departments. At the initial stage of the project, only a few people are needed to work in the project team. With the development of the project, all the staff who is relevant with the enterprise reform should take part in the reform project more or less. This helps to remove barriers when putting project achievements into effect. Enterprises need to set up the performance management method of the members from the

client. Do not hold the thinking of "we pay so external experts should work for us," but hold the attitude as "we pay so external experts will work with us."

2. Clarifying the need of reform projects

There are a number of factors that affect the role of external experts as assistance to decision-making. Enterprises need to confirm their need, which part they should make decisions by themselves, why making decisions, and what the goal of decision is, etc. External experts want revenues and accumulated cases so they prefer big contracts. In addition, enterprises hope to fix all of the troubles with little expenses. Making a nonspecific, framework style and grand target with external experts will not really make reform projects work. Incomes of the enterprise are depended on its bottleneck. Normally, only one or few management bottleneck problems exist within a period (a week, a month, a year, etc.) of time.[1] Thus, enterprises must make the focus of management reform projects on how to resolve these bottlenecks, rather than diffusing limited resources and time of enterprises such as scattering sesame.

If enterprises cannot identify the bottleneck, external experts should firstly help to identify these bottlenecks rather than trying to get a bigger contract via this chance. Once enterprises identify and eliminate these bottlenecks, new bottlenecks will still occur. Once trust is obtained, these clients will be stabilized as they do not want too much external people to know the truth of their enterprises. A steady client is more important for external experts than a one-off client. Once enterprises identified bottlenecks, the supporting role of external management experts is depended on whether they can offer alternative solutions and analyze the relative merits of each solution and the terms of enterprises needed in implementation process. No management plan is perfect. Therefore, enterprises should be alerted if external experts cannot provide alternative solutions and highlighted disadvantages and application conditions.

Scott Adams made an accurate description of management consultants in "The Dilbert Principle": "Consultant aims at taking away your money, making employees feel boring, and trying best to extend the consulting contract… Consultants use a set of standard decision tools, including drafting plans based on various assumptions. If there is any discrepancy between the reality and preset assumptions, all realities will be dismissed very quickly."[2] This paragraph is worth deeply thinking by numerous external management experts and those enterprises that are reforming or will reform.

Another outstanding problem in the process of defining needs is that only the management has the opportunities to put forward demands when setting up the need of management reform project. By contrast, employees are usually not involved,

---

[1]Eliyahu M Goldratt.: Theory of Constraints. The North River Press (1997).
[2]Scott Adam.: The Dilbert Principle. HarperCollins, New York (1997).

ignoring employees as the direct stakeholders will lead to the failure of the management reform project.

3. Managing the process of reform projects

Who should bear the responsibility if the plan offered by external experts is not implemented? If this is external experts' responsibility, they will say "Good effect will be achieved if the client implements our plan well." This is a kind of good "medallion" as enterprises cannot try these plans again due the high level of risk. It is no doubt that there will be some financial loss. The most direct one is the loss of reform fund and the indirect one includes the loss of time, if enterprises do not implement the plan as recommended by experts. However, no matter how much is the value of reform contract, it will not be bigger than the loss of adopting a wrong plan. Therefore, sometimes it is difficult for enterprises to implement the plan entirely as what experts recommended. If enterprises have implemented the plan without satisfactory effects, it is not hard for external experts to find some good reasons, e.g., lack of personnel during the implementation process, and there is misunderstanding of demands, etc. This is truth and is also an all-powerful excuse. In turn, is the contribution totally belonged to external experts if satisfactory effect after implementing the recommended plan? It is hard to tell because the ideas and suggestions of employees must be referred to in the process of establishing plans. Moreover, there is no instant effect of the management plan. Similarly, the plan has hysteretic nature which needs enterprises hold on it. This is like worshiping Buddha: It will come true if faithful. As a result, the performance of management reform projects cannot be judged only by the result of the plan implementation. Rather, process management is more important in management reform projects than postevent performance evaluation.

As a result of management reform projects, employees are often asked to give up old living style to some extent. As a result, they are often scared and resistance of new working styles. This kind of mentality is the obstacle of the reform and the success of management reform projects. Humans want reforms but are reluctant to be reformed. Therefore, we must try our best to make employees feel that these reforms are their desires. Similarly, this result will not be achieved unless they take part in this process, and their desires are included in the project goal.

Communication should go through all the process of the entire reform project. There are various communication channels for management reform projects, including visible exhibition room, discussion meeting, project e-mail, announcement update on the intranet, project report printed regularly, and 24-hour hotline for relevant questions and suggestions of projects. Compared with external experts, enterprises themselves consider this risk more thoroughly and allocate certain amount of resources to study the behavioral and cultural changes needed to guarantee the realization of new process. Prior to the reform, those who reform and people who are to be reformed should both study the mentality of people on reform and provide adequate information and suggestions for employees to undertake reform. These help all of employees to understand how to deal with reform so that they can make constructive responses. Enterprises, with the assistance of

external experts (not in reverse), should make employees know what changes will the enterprise make, what adjustments should they make in these changes, what assistance will they receive to make these adjustments, the difference between before and after these adjustments, and what benefits will these adjustments bring to them.

Enterprises should avoid that the reform process becomes a process as black box. This kind of phenomenon is very common. At first, external experts spent a lot of time in the enterprise. Then, they disappeared for a period of time. After that, they returned with a "mature" plan suddenly. The volume of reform fund saved by this kind of behavior and plan is the symptom of the reform project failure. Enterprises should not worry that external experts charge at an hourly rate. Rather, they should specify every step of action plan during reform activities together with external experts. In terms of guaranteeing the effective use of time, enterprises should also play a leading role.

Furthermore, to make the reform project management more effective, it is imperative that thorough consideration is required prior to the decision of management reform. Some enterprises roll out new management conceptions all the time. This kind of "bear collecting corns" behavior will lead to a kind of bad habit that too much attention is paid to the superficial aspects. Management reform projects will never get real success if they are unnecessary, too frequent, or used to satisfy the emotional need or vanity of the top management.

What really matters is using one method very well rather than knowing thousands of methods. Many connotative principles of management system are the same. In essence, a lot of new management nouns, methods, and systems are in fact the circle of P (plan)-D (do)-C (check)-A (adjust) that are well known for several decades. How many enterprises have really achieved this four-word circle?

Learning by Doing: Becoming an Impeller of Spreading the Project Management (Postscript)

A number of people have shown strong interest in project management on various occasions such as EMBA, CEO class, and CIOB training courses. They would like to learn and make use of project management. However, such passion does not sustain too long. It is common that project management personnel neither learn project management theories rightly nor apply project management rightly. On many occasions, project management within an enterprise is messy even though the CEO goes through project management courses. I have been pondering over a question, "how can we learn and make use of project management?"

Each Enterprise's Management Theory Needs to be Tailored

Many senior executives made a similar statement such as "theoretically it works, not in reality." Such issue exists not only in project management but also large-scale project-based enterprises. There are similar issues in diverse enterprises and management activities. Why?

Senior executives usually do not trust, and even discard management theories. As a result, they make mistakes even though they are not aware of it. Lots of obvious mistakes can be avoided if they pay attention to the theories behind the management phenomena.

In general, a person can become a manager through training, not an entrepreneur. To a large degree, entrepreneurs are born to be. Entrepreneurs are unique and always outside of the enterprise system. Maybe that is the reason entrepreneurs are still in favor of those unique personnel despite emphasizing regulations and management orally.

In ancient China, the State of Lu had a policy that the government would reimburse the cost for freeing residents who were taken as slaves in other states. As

a result, many slaves were freed and came back to the State of Lu. Once, a student of Confucius freed a slave from other states but did not ask for reimbursement from the government. He was praised by many other people but was criticized by Confucius. Confucius explained that others would be embarrassed to ask for reimbursements from the government if we were praised for not doing so. In a long term, nobody would be willing to free slaves from other states without reimbursements. Confucius had foreseen that it was detrimental to the entire system if praising individuals who did not abide rules. Let's revisit senior executives' saying and behavior. Do they emphasize the regulations on the one hand, and praise those personnels obtained better outcomes by avoiding regulations on the other hand?

A kind of law is explained by theories. It is important, as we do not have to test everything to get the result. Many senior executives have their own theories, i.e., "Do not trust any theories as we are utterly unique." It is true that every single enterprise is unique which is worth paying a great deal of attention. However, general principles are overlooked by a great deal of enterprises. These include the lessons learnt from other personnel and enterprises. These lessons learnt can be used to form the theory suitable for the enterprise with a consideration of its own unique circumstances. This helps to achieve success once more and avoid similar failure. Innovation is a hot topic in China currently. According to Peter Drucker, entrepreneur is equal to innovation in essence. Similar to counterparts in other countries especially Western countries, Chinese entrepreneurs never lack spirit of innovation. In fact, they continuously break the rules to find new ways that are abandoned next time. The entrepreneurs' innovations do not last for too long. Chinese enterprises need further development; however, personal magnetism of entrepreneurs is recognized excessively compared with the enterprise theory, which is an alarming sign.

It is quite urgent that Chinese senior executives pay more attention to theories and grasp methods to refine theories. It is interesting to compare senior executives of Chinese enterprises with those from German enterprises. Imagine a circumstance that someone loses a needle at a square and how to find this needle. Chinese senior executives would rely on a magnet (or a person accepted by the Chinese senior executives) to search the entire square. The end result would be that either the needle would be located very soon or it would be never located. It is very difficult to estimate how long it will take to locate the needle or define who can locate the needle. On contrary, German senior executives would subdivide the entire square to the grids and number them. By doing so, it is much easier to define the person and time needed to locate the needle. Apparently, the later approach applies a management theory, while the former approach does not.

Successful senior executives generally have some great qualities, such as courage and insight. However, theories are required to spread out their personal experience and knowledge. Senior executives may not have the time and ability to extract their own theories. Under such circumstances, researchers could be invited to extract the unique theory along with the senior executive for each enterprise. It is better not to outsource this process to researchers. This is because researchers

normally make these theories more general that will not be adopted by senior executives eventually.

Throughout ancient history, people usually estimated time according to sunrise and sunset. However, this method of calculating time is not accurate at all. Thus afterward, to acquire the accurate time, people invented the sandglass, horologe, and the most advanced timepiece, i.e., atomic clock nowadays. Just because of the invention of timekeeping methods, the human civilizations appear. However, the Earth's rotation period of every day is changing. Therefore, when inaccurate Earth's rotation period met the accurate timekeeping methods, how should people handle the contradiction between the objective reality of inaccurate Earth's rotation period and the accurate timekeeping methods? To deal with this contradiction, people set leap second to adjust the calculation of time at intervals. In this way, we could not only benefit the accurate timekeeping methods, but also keep ourselves from being in a paradox situation that timekeeping devices show it is daytime, while actually it is darkness. Similarly, setting "leap second" of management field could help us resolve the contradiction between management theories and management practices.

Flexibility should be allowed for theories. Senior executives may not trust management theories proposed by researchers. However, they should devote themselves to develop their own management theories for which support from researchers is needed. Similarly, researchers should pay attention to the theory that belongs to a specific enterprise. They should proactively approach senior executives so that these specific theories could be customized. As such, the discrepancy between theories and reality can be minimized.

Become a Valuable Researcher in the Field of Management Research

Excellent enterprise is dependent on excellent researchers, and vice versa. The principle of "learning by doing" is applicable to the close cooperation between researchers and enterprise managers.

Researchers in the management discipline should learn from tour guide. An excellent tour guide should:

1. *have been those places he/she is going to provide services;*
2. *have done some researches on these places; and*
3. *be able to introduce for tourists with an easy-to-understand language and enlighten them on exploring some valuable information.*

These principles can be applied to researchers in management as well.

Firstly, we should have the courage to practice. The theories of management are derived from practices, and the value of management is also evaluated by how much those theories can be used to improve practice. Management theories cannot

be drawn from literature alone. Without practices in real projects, management theories are hardly validated. In the past, new management researchers might have been invited to test their theories in enterprises. Nowadays, only well-experienced researchers can be invited to guide the development of the enterprise. Researchers should not only carry out research in but also learn from enterprises.

Secondly, we should conduct intensive research. We are not qualified researchers if we simply visited 10,000 enterprises without thinking. Practices pave the way for thinking, which is what the management researchers should focus on. To achieve effective management thinking, we should start from selecting a target client, whom we would serve and all our thinking is for the selected client. After that, we should understand what the client cares for the most and according to that collect related information, extract theories, and provide solutions for the client. Only by this way could we assure that the research is valuable for practices rather than pieces of so-called academic papers which are hardly used in practice. There is an abominable phenomenon that some researchers make use of academic research to conceal their diffidence and superficial opinions about management in academia. It is quite common that plenty of researchers regard academic research as a shield. They make use of a great deal of mathematical functions whose assumptions would never materialize and a long list of references varnish their pale thoughts. They make use of a complex derivation process to prove obvious conclusions. It seems that management researchers have been enjoying a beautiful illusion that their researches have an enormous market prospect. I have attended China—Japan Symposium on Industrial Management many times and found that the researches Japanese researchers are carrying out and the research methods they are applying are greatly different from those of Chinese researchers. Our country's researches usually oriented in two extreme directions. One direction was to research from macroscopic views, i.e., making discussions on business management from the perspective of nation. The other direction was to research from so-called pure academic views, which made people confused about which field these researches belonged to, i.e., mathematics or management? However, the researches Japanese researchers did mostly were from microcosmic views and quite specific questions, which were normally based on experimental programs. For example, they have been researching about perceptual problem for more than a decade and achieved "*kans*ei engineering" to promote industrial design engineering. We should learn from Japanese research.

Lastly, we should devote ourselves to disseminating research outcomes. Management research is not for playing among researchers. Rather, research outcomes should be fed back to the client that we are serving. To be influential, all sciences and technologies have to gain the support of management, which indicates that the management disciplines need to collaborate with other disciplines. A fundamental characteristic of a manager is to make somebody else to get things done. Only when managers sell their management thoughts out could they be taken as qualified. Similarly, only when their theories can be accepted by real managers, could management researchers be taken as valuable. To make managers willing to accept researchers' theories, the researchers should introduce their

theories, methods, and tools by some popular and easy-to-understand expressions. Effective and efficient communication plays a key role.

> *There is an ironical story that is worth consideration by senior management. During a battle, the loser asked the winner "why did we lose even though we have more soldiers and weapons?" The winner responded that, "our commander said to soldiers 'come with me' while your commander said to soldiers 'go for me'."If the law is not implemented by force, there will be no fixed rules. If the law is not implemented by force, orders issued by the sovereign will not be carried out. Orders are not carried out normally because they are not compulsory. They are compulsory but still cannot be carried out, because people who have made them are not scrupulous. The order-maker is scrupulous but the orders still cannot be carried out, because the awards and punishments dispensed are not generous or heavy enough. The awards and punishments dispensed are generous or heavy enough but the orders still cannot be carried out, because the awards and punishments are not dispensed reasonably or honestly. Both the awards and punishments are dispensed reasonably or honestly but the orders still cannot be carried out, because the sovereign cannot set himself an example to others. So, it is said if the sovereign follows prohibitions himself, then people of the state will follow his orders.*
>
> *For the people, submitting to the sovereign does not mean to follow what he says, but cater to what he likes from the bottom of his heart. When the sovereign is fond of prowess, the people will not hesitate to devote their lives to him. When the sovereign is fond of benevolence, the people will belittle wealth and properties. So, if the sovereign likes something, his people will try their best to pursue it for him. Hence, a sage sovereign will establish the law to restrain himself and set up the rules of propriety to rectify his own behavior. So, when the sovereign does not comply with the law, his people will not abide by it either. If the people do not abide by the law or devote their lives to defending the system of the state, the state will be in chaos. Hence, a sage sovereign who knows the right way of governing the state will establish the law, modify the system and then abide by them scrupulously to set up a good example for his people.*
>
> —Guanzi • *On Complying with the Law*

It presents significant challenges to manage transformation. Senior executives of enterprises should support and participate in the management of project transformation. Employees are very sensitive to the attitudes of senior management toward the projects. It is one of the biggest mistakes to assume that your employees are not as smart as you. If senior management does not want to change but only concentrates on gaining benefits from the transformation, then employees would be capable of finding plenty of ways to make up that senior management would not be capable of figure it out.

Significant efforts are required to improve the competitiveness of enterprises in the changing era; and it is necessary for companies to reconstruct their culture. To facilitate a project management mechanism, senior executives have to be committed and patient. Project management knowledge is easy to know but hard practice, which means there are many specific difficulties in front of us. Without genuine commitment, achievement of project management will not be realized.