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The MERge Model for Business Development

The Amalgamation of Management, Education and Research

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Contents

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Ronit Lis-Hacohen is a project manager at the Technion of two main initiatives: (a) establishment of the Technion Guangdong campus in China and (b) Technion MOOCs strategic development. She is an industrial and management engineer and IT analyst with 20 years of experience in designing and managing information systems projects in various fields, especially ERP projects. She has a master's degree in Education from the Open University of Israel.

The two authors have extensive experience in the implementation of the MERge model in industry, academia and the public sector in various managerial, educational, and research roles.

Part I
Prologue

In the five chapters included in this part, we present the rationale of the *MERge* model (Chap. 1), how to use this Brief (Chap. 2), and the three meta-professions on which the *MERge* model is based on—Management (Chap. 3), Education (Chap. 4), and Research (Chap. 5).

Chapter 1 presents the rationale of *MERge* model for professional development which encompasses three meta-professions—management, education, and research. We propose that each practitioner should acquire these three meta-professions in order to gain a comprehensive understanding of his or her professional environment as well as improve the accomplishment of his or her organizational role.

Keywords: *MERge* model, Professional development, Career planning, Management, Education, Research

Chapter 2 lays out the structure of the Brief as a user guide to be used by any practitioner who holds the role of a manager, an educator, or a researcher.

Keywords: *MERge* model, Professional development, Career planning, Management, Education, Research

Chapter 3 presents the meta-profession of management as well as different approaches exist in the discipline of management.

Keywords: *MERge* model, Professional development, Career planning, Management, Education, Research

Chapter 4 presents the meta-profession of education from the perspective according to which in today's global markets, both in for-profit and nonprofit organizations, team members as well as managers should go on learning during their entire professional career.

Keywords: *MERge* model, Professional development, Career planning, Management, Education, Research

Chapter 5 presents the meta-profession of research and argues that a research perspective is needed in the professional development of all practitioners. This is because research enables to monitor, steer, and navigate the practitioner's professional development and activities based on data that directs the path toward the accomplishment of one's goals.

Keywords: *MERge* model, Professional development, Career planning, Management, Education, Research

Chapter 1
Introduction

This Brief presents the *MERge* model for professional development in the following sectors: industry, academia and the first sector. The *MERge* model encompasses three meta-professions—management, education, and research—in which, as we propose, every practitioner should acquire in order to gain a comprehensive understanding of his or her professional environment as well as improve the accomplishment of his or her organizational role. Sometimes, some aspects of these meta-professions are referred to as soft skills; indeed, though soft skills and meta-professions do have some common characteristics, meta-professions are wider and encompass a set of soft skills that together enable the practitioner to adopt an additional, holistic, and more global angle at his or her profession on a higher level of abstraction.

Specifically, the concept "meta-profession" refers to a set of skills, which can be expressed meaningfully only after one has gained first disciplinary professional knowledge. For example, let us examine the case of big data. In order to *manage* the development of a software tool that is based on big data analysis, *educate* graduate students, or *research* a new algorithm that works with big data, one must first gain a disciplinary professional knowledge in computer science, as the basis upon which each of the meta-professions is performed. Only after gaining the disciplinary knowledge, he or she has the basis on which to implement the meta-professions of the *MERge* model.

The target readership of the *MERge* Brief consists of practitioners in industry, academia, and the first sector. In all cases, the purpose of the Brief is to increase the practitioners' awareness of the need to consider and apply aspects of the three meta-professions encompassed by the *MERge* model—management, education, and research—in their ongoing professional activities in general and decision-making processes in particular.

The first target group, practitioners from the industry—engineers, lawyers, economists, analysts, human resources managers, etc.—can use the *MERge* model for gaining a competitive advantage and improving their role performance. In particular, entrepreneurs and managers can use this Brief for the actual management of

their business from the first day of the initiative (even during the maturing process, before its actual deployment as a business).

The second target group, practitioners in academic institutions, both academic adjunct and administrative staff, can use the *MERge* model for the development of their research projects, educational activities, and administrative role. In particular, professors, whose main professional focus is research; instructors, whose main professional focus is education, who are sometimes employed by the university without tenure; and administrative staff, e.g., lab engineer, whose professional role includes management, can foster their professional career by harnessing the other two components of the *MERge* model while performing their either research, educational, or managerial role, respectively. The *MERge* model is highly relevant today in the academia due to the significant changes that have taken place in higher education lately, partially, but not only, as a result of new technological tools that foster globalization and democratization processes (Berman, 2012).

The third target group of this Brief are practitioners in the first sector, who work, for example, in government authorities, schools, and health organizations. This group may benefit from the application of the *MERge* model since, in many cases, practitioners in this sector are expected to perform their daily work routinely for many years, by focusing on the professional accomplishment of their role, without considering how to steer their own professional development as well as how to improve their organization performances.

In general, we propose that in the postmodern era, where barriers between disciplines are falling in every aspect of our professional life, we need managerial, educational, and research skills. The *MERge* model delivers the message that the reciprocal influence between the three meta-professions results in higher-quality outcomes.

We hope, as we convey in the last part of this Brief, that universities give their graduates the opportunities to be exposed to the *MERge* model. Such a trend may have several effects. For example, job recruitment processes may take advantage of this broader professional knowledge and, in addition to disciplinary knowledge required commonly from job candidates, value familiarity with management, education, and research skills. Needless to say both individual practitioners and organizations will benefit.

The idea of the *MERge* model emerged out of the authors' many years of experience in the three fields that the model represents: management, education, and research. Moreover, it evolved from experiencing the application of the amalgamation of these three professions. To deliver this usefulness of the *MERge* model, it is illustrated in all chapters by case studies taken from the literature as well as ours and our colleagues' professional experience, in fostering different types of initiatives by the implementation of the model. We note that sometimes some details are changed to highlight the *MERge* perspective, as well as to keep practitioners' privacy. However, when we mention a practitioner's identity, we have received the practitioners' permission. We attempt to address both success and failure stories and, as much as possible, to attribute their outcome to the awareness to the application of the *MERge* model.

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Chapter 2
How to Use This Brief

One of the main purposes of the Brief is to provide the readers with applicable and practical professional tools. Therefore, we have built this Brief as a user guide for any practitioner who holds the role of a manager, an educator, or a researcher. We hope it will help professionals improve their professional work in terms of quality, efficiency, and achievement of their professional goal.

We assume that any reader of this Brief, no matter what role he or she holds, is familiar (even superficially) with at least one theory related to either management, education, or research or is capable of getting familiarity with such theories. Therefore, we do not teach theories in this Brief. Rather, we refer to each of the three meta-professions—management, education, and research—in terms of their role and application as they are expressed in the other two professions. For example, when explaining the implication of *MERge* model in the role of a manager, we aim at raising the awareness to the educational and research aspects in the manager role by demonstrating their contribution to this role. Based on these working assumptions, we combine theory (Chaps. 3–5), practice (Chaps. 6–17), and reflection (Chaps. 18 and 19).

Specifically, the Brief includes five parts.

The first part presents the three meta-professions which create the *MERge* model: management, education, and research (Chaps. 3–5). These chapters provide the theoretical background of the *MERge* model.

The next parts are organized according to the three target groups: industry (Chaps. 6–8), academia (Chaps. 9–14), and first sector (Chaps. 15–17). The academia part is divided into two sections: academic staff (Chaps. 9–11) and administrative staff (Chaps. 12–14). All chapters include detailed case studies that demonstrate the implementation of the *MERge* model. For each target group, we illustrate the usability and the application of the *MERge* model by case studies that represent three roles—managers, educators, and researchers, corresponding to the elements of the *MERge* model. For each role, we show how the role holder's awareness of the three components of the *MERge* model may foster a successful accomplishment of the primary role. Table 2.1 presents this structure.

Table 2.1 The *MERge* case studies by sectors

	Management	Education	Research
Industry	Chapter 6	Chapter 7	Chapter 8
Academia - Faculty members	Chapter 9	Chapter 10	Chapter 11
Academia - Administrative staff	Chapter 12	Chapter 13	Chapter 14
First sector	Chapter 15	Chapter 16	Chapter 17

The last part of the Brief is about reflection and implementation. Chapter 18 first reflects on the implications of the *MERge* model for undergraduate and graduate programs, MBA and teacher certification programs, faculty members' professional development, and training and development processes in the industry. Chapter 19 proposes the *MERge*-toolkit for the model implementation on both the individual and the organizational levels.

We illustrate now how to use Table 2.1 as a road map. Each cell of the Table 2.1 represents an intersection between a *MERge* element and a sector. The intersection between the *MERge* element and the sector represents the chapter number in which the relevant role is described.

For example, the intersection between the "management" element of the *MERge* model and the sector "academia/faculty staff" refers to faculty members in the academia who serve in a managerial role in their organization, e.g., deans. The cell in Table 2.1 indicates the number of the relevant chapter (i.e., Chap. 9) in the Brief that explains the essence of this role and demonstrates by a case study how a faculty dean can implement the *MERge* model in order to accomplish the role successfully.

Here is another example of how to use Table 2.1 as a roadmap. Helen works in a Training and Human Resources Development department in a big hi-tech company. Her role is defined as a Training Material Developer. Recently, she has been appointed to lead a new initiative in the company—the development of a MOOC[1]-based training program. Helen is a talented training material developer and therefore has the relevant background in education. Specifically, she has an extensive experience with developing training programs and is familiar with MOOC platforms and the relevant pedagogy. Indeed, she seems to be the best candidate to lead this initiative.

However, since Helen is aware of the *MERge* model, she recognizes that in order to lead the initiative successfully, she needs additional tools—management and research—in addition to her expertise in education. How can she use the map?

1. Helen first defines her role in relation to the *MERge* elements. Since she has an extensive experience in building and developing training programs and since this is also the focus of the current initiative, Helen locates herself in the education column of the map.
2. Helen works in a hi-tech company; therefore, the industry is her sector.

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[1] MOOC: Massive, Open, On-line Course.

3. The intersection of the education column and industry row of the map leads Helen to read Chap. 7 of this Brief. This chapter presents two case studies, one of which illustrates how an educator who works in the industry can implement the *MERge* model in his or her professional work; therefore, it fits Helen's case and Helen can gain several insights for the implementation of the *MERge* model for coping with the challenge she faces.

The analogy to other roles and sectors is clear. Needless to say that we could not present all roles in all sectors; nevertheless, we hope that the variety of presented examples clearly conveys the message, and all mangers, educators, and researchers will find the relevant examples for their specific case.

Chapter 3
Management

The meta-profession of management implies that one can improve his or her professional development by adopting a managerial perspective, even if he or she does not hold a formal management position and his or her role definition does not include managerial responsibilities. Different approaches exist in the discipline of management. Among them, we mention the classic approaches developed in the early eighteenth century, e.g., the scientific management approach that states "The principal object of management should be to secure the maximum prosperity for the employer, coupled with the maximum prosperity for each employee" (Taylor, 1998); the general management theory, represented by 14 general managerial principles (Fayol, 1916); and modern approaches, such as agility (Hazzan & Dubinsky, 2014) and quality management frameworks that aim at "implementing and sustaining competitive advantages through quality management" (Black & Porter, 1996).

Academic management programs usually emphasize the understanding of the discipline in the context of a global, dynamic, and changing world. Therefore, in addition to basic and classic foundations (finance, marketing, etc.), these programs include also dynamic managerial capabilities, such as creativity, entrepreneurship, global networking, and multicultural and interdisciplinary studies. Furthermore, in addition to the main ideas and skills of classic management approaches, in the postmodern era, management is sometimes conceived as the profession of decision-making in a dynamic environment.

The manger role involves many facets and encompasses aspects related to budget, human resources management, marketing, and many more. When we asked ten people, randomly picked, "What does it mean for you to be a good manager?", we received a variety of answers that can be categorized into two main groups: the first one addresses personality traits, which characterize a good manager; the second one addresses the manager's roles and typical activities.

Pattern of effective general managers (Kotter, 1982) indicates that most of their time managers interact with others, discuss wide range of topics, and work long hours. These activities guide mangers to focus on the two main challenges with which they face: *decision-making* and *motivating other people* (employee, colleagues, and

others), in order to fulfill the responsibility for the organization's overall performance, success and development (Hill & Schilling, 2014).

These two activities are carried out based on data—all kinds of data—quantitative and qualitative. In the postmodern era, it means that a manager should be able to manage the substantial transition to big data (Mayer-Schönberger & Cukier, 2013). Furthermore, a professional application of these two activities is essential not only for the managerial level of the organization but also for lower-level employees in different professions and roles. For example, decision-making is a required practice on the individual level in order to navigate one's career development path, whether in the academia, industry, or other sectors. In this Brief, we argue that being aware of the managerial aspects of one's role and tasks, even when not holding a management position, may benefit both the organization and the individual.

While it is expected that management skills are especially required in the industry, we show in this Brief the essentiality of these skills in other sectors as well. For illustration, we examine the expression of the two managerial skills—*decision-making* and *motivating other people*—in the academia.

In the western world, in which academia is based on the fundamental principle of *Academic Freedom*, also academic faculty members, who do not hold a managerial position, are required to make decisions about their research activities, such as research budget allocation and recruiting research students for their research lab. Thus, decision-making is a managerial skill that academic faculty should also be aware of in order to improve performance and achievements.

The same argument is relevant for motivating other people, which is a required skill also in academia not only in managerial positions. For example, both administrative and academic colleagues, from different academic units, who are involved in the same project, should be motivated to perform their professional work on the highest quality in order to achieve the project goal. The challenge here is even bigger than in the industry since in academia, hierarchical management is not common and almost does not exists, and consequently, a managerial-authority approach is not an option.

As could be seen, unlike the common assumption that managerial skills are limited to *managers* in *profit-oriented organizations*, the *MERge* model delivers the message that managerial skills are useful for all practitioners, in all levels, in all kinds of organizations, and in all sectors

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Chapter 4
Education

Education in this Brief is examined from the perspective according to which in today's global markets, both in for-profit and nonprofit organizations, team members as well as mangers should go on learning during their entire professional career. This approach is called LLL—lifelong learning.

This approach is derived from changes that have taken place in the work market in the last several decades. Specifically, while in the very near past, a person had only one career, which he or she pursued in one work place with the same set of skills, in today's work market, it is common to change careers and update professional skills several times during one's professional path. Sometimes, this shift takes place in the same work place; sometimes, it involves a change in the workplace and organizational culture. Nevertheless, such changes require learning skills that enable practitioners to adjust to new work places as well as keep gaining new knowledge and learning new skills. This approach has implications on both the individual and the organization level.

On the individual level, we assert that first, the mere awareness of the need to keep adjusting to new professions is required. Second, when one feels the need to adjust to new professional situations, one should not block learning opportunities but rather be open and understand the crucial role of learning as part of the adjustment process and, therefore, embrace such learning opportunities. Third, in such cases, one must explore relevant learning (either virtual or not) platforms, choose the one that suits her or his needs, and dedicate the time needed for this learning process. Lastly, it is important that one takes advantage on his or her current profession and find ways to leverage any change process based on his or her current knowledge, skills, and accumulated experience. As can be seen, all these activities imply that one's learning process should be managed and integrated into the current professional daily work.

On the managerial level, it should be acknowledged that employees' ongoing learning is essential for the initiative and organization success. This assertion is derived from the fact that in today's competitive environment, organizations should keep changing in order to survive and lead. A manager, therefore, should welcome

his or her employees' learning processes either individually or in teams. This way, an organization becomes a learning organization (Senge, 1990) and learning becomes an integral part of the organizational culture.

Practically, a manager can foster the learning organization perceptive in several ways.

First, knowledge management processes can be established. For example, a mechanism for employees' compensation that fosters knowledge sharing and replaces the "knowledge is power" conception can be announced, lunched, applied and fostered.

Second, it is essential to include an education component in each employee's work schedule and tasks (also for managers). The knowledge acquired in such frameworks should then be shared with other employees. It delivers the message that one's knowledge is an organizational asset and does not contribute only to the individual's professional development, but rather all the organization benefits. Moreover, knowledge management forms a cyclic process in which when the individual benefits, the organization benefits, and when the organization benefits, each individual employee benefits.

Third, knowledge transparency should become the norm. This norm can be established and rooted in several ways, such as (a) setting specific time slots in which the organization learn; (b) integration of retrospective sessions into the organization's work plan, as it is applied, for example, in agile processes (Derby & Larsen, 2006); and (c) inclusion of learning activities and processes as part of the role definition.

Yet, another form of education takes place in a one-on-one fashion, in the form of mentoring or internship, in which one learns a skill with a close guidance of an expert. Prospective professionals, e.g., teachers and artists learn their practice by observing and mimicking a master in their profession. In the academia, it takes place in the form of supervision of graduate students, when the mentor (the academic supervisor) is a professor, an expert in his or her field, who guides graduate students in the learning process of becoming researchers. The professor can also assemble a research group that disseminates and shares new knowledge, as well as research skills, among the team members.

All the above instances deliver the message that one must be aware of the need for ongoing learning in all kinds of organizations, either as a trainee or as a trainer. We note that in many cases, learning processes actually take place as part of the practice itself without being aware of the fact that it is an integral part of the job description. This Brief aims at conveying the message that an educational perspective should be adopted in all professions to enable practitioners exhaust their potential growth.

Nevertheless, the guide does not aim to turn all practitioners into professional educators, and therefore, it does not delve into the details of cognitive and educational theories. Rather, the Brief attempts to elevate practitioners' awareness to this aspect of their professional life either as mentors or managers or as novices in their filed.

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Chapter 5
Research

In most cases, people think about research as an activity that only experts perform in their labs. We argue that a research perspective is needed in the professional development of all practitioners. This is because research enables to monitor, steer, and navigate the practitioner's professional development and activities based on data that directs the path toward the accomplishment of one's goals. Sometimes, data analysis exposes pleasant phenomenon; sometimes it does not. In both cases, it is important to be aware of research results in order to take data-driven decisions and actions. The alternatives, the trust of gut feelings, intuitions, or biases (Kahneman, Lovallo, & Sibony 2011), show that such decision-making processes may mislead us, a situation we wish to avoid in general and in our professional work in particular.

We suggest several usages of research-oriented thinking in pursuing a professional career, pending on the job description.

One can use research results as a tool for decision-making. Research results simply help us to make decisions. It is much safer to decide to invest in a specific direction, to cancel a project, to use a new user interface, to allocate budget for specific purposes, or to adopt a specific manufacturing method, when one can anticipate the expected results. The data on which one can rely in such cases can be either data accumulated in the past or specifically collected for a specific target.

Another purpose of research-oriented habit of mind is for the discovery of a new future direction that an organization will pursue. In most cases, this is the role of R&D (research and development) departments, located mainly but not only in hi-tech organizations, whose target is to develop new innovations and new strategic directions for the organization. Though such departments do not yield immediate profit, their mere existence highlights their importance and contribution to the business development.

In the academia, a research-driven perspective is mainly applied in pure and/or applied research that faculty members are expected to conduct as part of their role description. In fact, high-quality research is one of the main promotion criteria of academic staff, when research skills are acquired, in most cases, during a 4-year

process of doctoral studies. The second use of research in the academia is for improving teaching and learning methods. Again, teaching is part of the faculty role description; yet, with respect to teaching, it is not common that faculty members research this aspect of their academic position, and the research on teaching methods is left to a specific unit that is in charge of teaching improvement at the institution. In this Brief, we assert that when one researches his or her teaching, not only one improves his or her understanding of his or her teaching process but also student understanding is improved.

Technology transfer is one outcome of the research conducted in universities. Technology transfer "is the process of transferring skills, knowledge, technologies, methods of manufacturing, samples of manufacturing and facilities among governments or universities and other institutions to ensure that scientific and technological developments are accessible to a wider range of users who can then further develop and exploit the technology into new products, processes, applications, materials or services."[1] As it turns out, technology transfer gains economic benefits for the university. "It encouraged universities to move away from a passive role in which they simply created the knowledge that industry would draw on—or not—as needed. Instead, they would start working actively to turn scientific innovation into economic activity through technology transfer, faculty entrepreneurship, spinoff firms, and research partnership with industry" (Berman, 2011, p. 3). Technology transfer, thus, shows that research is not an isolated activity, but rather, it is tightly connected to managerial decisions and activities.

In this Brief we suggest that the exposure to the relevance of research-oriented thinking, either when it is carried out by novices or by professional researchers in the field, fosters qualified decision-making processes, performances, and professional career paths based on safe ground. Think about a teacher who studies a new teaching method he or she wants to use in his or her course, an investor who wishes to decide on the next investment based on market analysis, and an engineer, who should design a new tool and needs to check its operation on different platforms with different target audiences. All of them will improve their understanding of their activities if they first consider what they should check and how. In practice, if one wishes to accompany his or her work with a research process, he or she needs to define the research target and questions and, based on this definition, to decide what kind of data that should be collected, how this data will be collected, and how it will be analyzed. This mere process deepens the understanding of what one wants to achieve and why.

Furthermore, research-oriented thinking requires one to conduct literature review in order to check what has been done so far in the field. Sometimes, the answer to the research questions is found during the literature review process and effort and financial resources are saved.

The importance of research should be acknowledged due to the enormous amount of options exist to implement any idea and solve any given problem. As we shall see in this Brief, research is a professional tool that enables us to improve our performances

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[1] *Source*: https://en.wikipedia.org/wiki/Technology_transfer

and, further, foster our learning process. In fact, a research process, conducted in parallel to the accomplishment of a professional work, inspires a reflective mode of thinking on the actual work, which by itself improves the job performance.

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Part II
Industry

- Chapter 6: Management
    - Team/project leaders
    - Managers of the organization's corporate social responsibility (CSR) activities
- Chapter 7: Education
    - Training and development departments
    - Engineer who is *not* part of the training and development department
- Chapter 8: Research
    - R&D (Research and Development) departments

In the three chapters of this part, we explore the *MERge* model by three roles in the industry: managers, educators, and researchers.

Chapter 6 presents the *MERge* model in the context of two managerial roles: team or project leaders, which are directly profit oriented, and managers of the organization's corporate social responsibility activities, which are indirectly profit oriented. In addition, we analyze the agile management methodology from the *MERge* model perspective.

Keywords: *MERge* model, Professional development, Career planning, Managers, Corporate social responsibility, Agile, Agility, Industry, Management, Education, Research

Chapter 7 explores two forms of training and development that take place in the industry. The first one focuses on training and development departments exist in most organizations. The second case describes the development process of a training and development program that was managed as an organizational change project by an engineer who was *not* part of the training and development department.

Keywords: *MERge* model, Professional development, Career planning, Industry, Management, Education, Research, Training and development, Change management, Organizational change

Chapter 8 focuses on research activities that take place in the industry, in most cases, as part of R&D (Research and Development) departments.

Chapter 6
Industry: Management

This chapter presents the *MERge* model in the context of two managerial roles in the industry: team or project leaders, whose role is directly profit oriented, and managers of the organization's corporate social responsibility activities, whose role is indirectly profit oriented. These two roles enable to illustrate the kind of thinking that the *MERge* model inspires in their accomplishment as well as the model's range of relevance and applicability. In addition, we analyze the agile management approach from the *MERge* model perspective.

Before we delve into the details, we mention that components of the *MERge* model have already been addressed in the *managerial* literature. Clearly, the management aspect of the *MERge* model is addressed by a huge number of famous books,[1] which tell the story of the successes of companies (e.g., Collins' 2001 book *Good to Great: Why Some Companies Make the Leap … and Others Don't*) as well as of companies' failures (e.g., Christensen's 1997 book *The Innovator's Dilemma*). The education component of the *MERge* model is highlighted, for example, in Senge's 1990 book *The Fifth Discipline: The Art and Practice of the Learning Organization*. The *MERge* model adds the research component and proposes to examine the management role perspective also from the education and the research perspective.

6.1 *MERge* and Agility

There are managerial approaches that have already encompassed some elements of the *MERge* model conceptually and methodologically, sometimes unintentionally. For example, the agile approach pays specific attention to the three meta-professions encompassed by the *MERge* model.

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[1] See the 25 Most Influential Business Management Books: http://content.time.com/time/specials/packages/completelist/0,29569,2086680,00.html

Management is directly addressed by the agile approach by tight time management, transparency and trust, and role definitions that inspire responsibility and accountability for the project success from all team members. Education is fostered by agility by applying knowledge-sharing processes (e.g., stand-up meetings and open planning sessions) and reflective thinking sessions (e.g., the reflection session that takes place at the end of each iteration and the retrospective break that takes place at the end of each release). Finally, research-oriented thinking and activities are inspired by the agile approach by the careful examination of data on a daily basis and the attention given to ongoing data collection and data-driven improvement processes. For elaboration, see the HOT—human, organizational, and technological—analysis of the agile approach described by Hazzan and Dubinsky (2008, 2014).

Indeed, agile projects are considered as successful ones. For example, in a survey conducted in 2014 by VersionOne,[2] which surveyed thousands of agile practitioners, it was found that most respondents adopted agile practices to accelerate product delivery (59 %), enhance ability to manage changing priorities (56 %), and increase productivity (53 %). Furthermore, for 4 years running, the top three benefits of adopting agility remain the same: manage changing priorities (87 %), team productivity (84 %), and project visibility (82 %).

6.2   Team/Project Manager

A manager in the industry is in charge of a group of people whose job is to jointly accomplish a task in a certain period of time within a specific human resources and budget constraints. The task can be either a development, design, or a construction task. According to the *MERge* model, in all these cases, the team/project manager should manage, educate, and research. For illustration, we consider a manager of a design team in the car industry.[3] We will not get into the theory of managing car design processes, but rather, explain the contribution of the *MERge* model to the process.

Clearly, managerial skills are needed. The following list presents only several areas that the manager should address: budget, time, role definitions, customer requirements, technology, safety, and quality assurance.

With respect to the education aspect of the manager role, it is clear that in order to survive and compete successfully in our very dynamic and competitive world, all practitioners, including managers, should go on learning during their entire professional development path. As has been mentioned in the "Education" chapter (Chap. 4), one's knowledge should be the organization's asset and, therefore, mechanisms for knowledge sharing should be established (e.g., in line with agility).

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[2] 9th Annual State of Agile™ Survey: https://www.versionone.com/pdf/state-of-agile-development-survey-ninth.pdf

[3] Automotive design is the profession involved in the development of the appearance, and to some extent the ergonomics, of motor vehicles or more specifically road vehicles. https://en.wikipedia.org/wiki/Automotive_design

In the car design process, knowledge-sharing processes can address new materials, customer preferences, and new design approaches adopted by competitors.

If the manager is aware of the *MERge* model, he or she clearly understands what benefits a qualitative exploration (Denzin and Lincoln 2011) of the car design process may yield. This familiarity may lead him or her to gather data by interviews, observations, and other qualitative research tools and analyze it, in order to improve the team's understanding of customers' need and desires.

Furthermore, if the manager has conducted qualitative research, he or she has acquired the skill of listening, which is very important in qualitative research. We argue that as a result, he or she may also improve his or her managerial skills. First, since he or she listens to his or her employees and is open to hear their opinions, knowledge sharing and transparency are fostered. Second, sometimes, such careful attention results in noticing subtle details that treating them at early stages of the project may save time and money at later stages.

For example, the BMW car design process[4] includes an emotional experience. As an emotional experience, it should be explored and understood by a research approach that fits for researching people's feeling, attitudes, etc.; qualitative research is one suitable research method for this purpose.

The above analysis refers to a managerial role which relates directly to the core business of the organization; the next role we analyze here relates indirectly to the core business of the organization

6.3   Corporate Social Responsibility Manager

This section reviews the *MERge* model from the perspective of a manager in the industry who does not manage a unit which belongs to the core business of the organization. For illustration, we focus on the manager of the corporate social responsibility (CSR) division, which is a "company's sense of responsibility towards the community and environment (both ecological and social) in which it operates. Companies express this citizenship (1) through their waste and pollution reduction processes, (2) by contributing educational and social programs and (3) by earning adequate returns on the employed resources."[5] Since the CSR approach is a prevalent phenomenon today, customers expect companies to invest back in the society.

Before we analyze the case of managing CSR activities within the *MERge* model, we first review several randomly selected examples of CSR statements:

- Google: Since its founding, Google has been firmly committed to active philanthropy and to addressing the global challenges of climate change, education, and poverty alleviation.[6]

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[4] BMW car design process: https://www.youtube.com/watch?v=RRr_GyD1fqY

[5] Corporate Social Responsibility: https://en.wikipedia.org/wiki/Corporate_social_responsibility

[6] *Source*: http://www.google.cn/intl/en/about/company/responsibility/

- IBM: IBM has developed a thoughtful, comprehensive approach to corporate citizenship that we believe aligns with IBM's values and maximizes the impact we can make as a global enterprise. We focus on specific societal issues, including the environment, community economic development, education, health, literacy, language, and culture.[7]
- Intel: Intel's success depends on young people having access to quality education and technology. As a leading technology company, we believe that we can help governments around the world achieve their economic development and educational goals by effectively integrating technology into their programs and strategies. Recognizing the lack of access to technology and education that still exists for many girls and women around the world—and the importance of enabling that access to spur economic development—we are expanding our engagement efforts and partnerships in this area (Intel's 2013 Corporate Responsibility Report,[8] p. 22).

As can be seen, CSR activities are related to the organization's core business. As indicated in Intel's CSR 2013 Report: "investing in training, diversity, benefits programs, and education enables us to attract and retain a talented workforce." (p.11). Thus, organizations invest in their CSR activities both human and financial resources that should be managed professionally as the other core aspects of the organization, toward the accomplishment of the organization's goals. This approach is called by Abrahams *et al*. the $(CS)^2V$ - Cross Sectorial Collaborative Shared Value – Strategy.

We now turn to understand the role of management, education, and research in this managerial role. For this purpose, we analyze a randomly selected item—Panera's job description for Sr. Manager, Corporate Social Responsibility, published in LinkedIn in August 2015.[9] We first categorize the job requirements by the *MERge* components[10]:

Management:

- Help refine Panera's corporate social responsibility (CSR) strategy, goals, and metrics.
- Identify, recommend, and implement areas of opportunity along with SMEs/business leads.
- Manage material issues.
- Prepare for and mitigate risk.
- Act as a change champion and use effective change management techniques to innovate and gain adoption and support.
- Work closely with various teams to integrate CSR into business decisions.

Education:

- Engage and communicate progress.
- Lead and facilitate stakeholder engagement.

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[7] *Source*: http://www.ibm.com/ibm/responsibility/

[8] *Source*: http://csrreportbuilder.intel.com/PDFFiles/CSR_2013_Full-Report.pdf

[9] *Source*: https://www.linkedin.com/jobs2/view/77557823?trk=jserp_job_details_text

[10] All requirements are included in the original ad but in a different order.

- Serve as the hub for tracking progress and impact in a quantifiable and sharable way.
- Serve as the hub for insights on industry standards, best practices, regulatory trends, and issues that impact our business.
- Promote a culture of CSR through education programs, training, and engagement programs.

  Research:

- Help coordinate Panera's efforts to reduce energy, water, and waste through company-owned bakery cafes, support centers, and fresh dough facilities (energy, water, waste).
- Optimize where we invest and how we engage associates.
- Provide data, information, and transparency on critical issues to internal and external audiences.

As can be seen, most of the requirements are categorized under the management component of the *MERge* model. This is not surprising due to the job title—Senior Manager.

The need for educational knowledge is expressed in this ad both internally (e.g., Serve as the hub for tracking progress and impact in a quantifiable and sharable way) and externally (e.g. Promote a culture of CSR through education programs, training, and engagement programs). Indeed, one must have educational skills if he or she needs to manage a knowledge center (hub) in a sharable way.

Finally, research gets attention in this ad, with respect to the accomplishment of the organizational goals (e.g., optimize where we invest and how we engage associates) and data-related activities (provide data, information, and transparency on critical issues to internal and external audiences).

6.4 Summary

A similar analysis of the application of the *MERge* model to other managerial roles in other industries, either low-tech or hi-tech, can be carried out by the readers according to their profession and role. The purpose of the above illustrations was to elevate the awareness to the importance of incorporating management, education, and research elements in one's professional managerial world.

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Chapter 7
Industry: Education

In this chapter, we explore two forms of training and development (T&D) that take place in the industry. The first one focuses on T&D departments exist in most organizations, especially in those which operate in a changing and competitive market and therefore, should keep their employees' knowledge updated with the cutting-edge knowledge in the field. The second case describes the development process of a T&D program that was led by an engineer, who was *not* part of the T&D department, and managed the project as an organizational change process.

In both cases, educational background and experience are required. To illustrate the *MERge* model, for each case we show why managerial and research skills are also needed for the actual accomplishment of the role (in the first case) and the leadership of such initiatives (in the second case). The rationale for this assertion is clear: such processes are carried out more professionally when they are *managed* properly and are accompanied with a *research* that enables to make decision methodically in a way that guides knowledge acquisition processes.

As in other chapters, we do not teach the theory of T&D. Many resources can be found. For example, see the Association for Talent Development (ATD) website,[1] a nonprofit association for workplace learning and performance professionals.

7.1 A Training and Development Department

People-related challenges of a business extend far beyond recruiting and retention. There is a need to create learning environments capable of adjusting rapidly and respond to changes that take place in the market and to offer employees different

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[1] Association for Talent Development: https://www.td.org/ (formerly American Society for Training & Development—ASTD).

options and opportunities for ongoing learning. Accordingly, most big organizations have a T&D department, whose role is to provide the employees with the needed education to bridge current and future knowledge required for the organization's success. We note that in such organizations, the importance of T&D departments is acknowledged, though they are not profit oriented and their actual contribution to the business cannot be measured precisely.

Since sometimes T&D departments are staffed with experts in social sciences and education, who do not always have the disciplinary knowledge of the organization, we highlight the importance of being familiar with the disciplinary knowledge of the organization when one's role is to promote T&D processes.

We first present Roy V. H. Pollock ,Chief Learning Officer, Fort Hill Company (2006),[2] who argues that "learning leaders need to:

- Have their "fingers on the pulse" of the business needs.
- Plan and deliver their programs with the ultimate business outcomes in mind.
- Define the outcomes of their programs in terms of what people will do better and differently as a result of attending—not just what they will learn.
- Show clearly how the program will benefit participants' careers and the organization as a whole."

Think about any new material, technology, or a patent that should be brought to the attention of the employees in the company as soon as they emerge in the market. Disciplinary knowledge is needed first, to identify their relevance for the organization, and second, if they are found to be relevant, to plan a training program in a way that associates it in the most effective way to the organization's business and potential benefits.

In its article "How to Build a Training Department,"[3] *HR Professionals Magazine* also addresses the staffing of T&D departments as well as the kind of relationships trainers/instructors should have with the organization. It argues that "The training staff is the key to building a successful department. Trainers/instructors should be subject matter experts, have practical experience in their respective fields and be able to deliver the training material effectively. […] Maintaining a high level of professionalism among the training staff is essential in building credibility and value."

As mentioned above, in what follows we describe two leaders of T&D projects in the industry: a practitioner who is part of the T&D unit and an engineer who is not part of the T&D department of the organization. We show that though in the two cases different approaches are adopted, the *MERge* model is applicable for the analysis of both of them.

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[2] *Source*: http://www.forthillcompany.com/artcles-white-papers/ExecBlueprints-Creating_an_Effective_Training_and_Development_Department.pdf

[3] *Source*: http://hrprofessionalsmagazine.com/how-to-build-a-training-department/

7.2   A Training and Development Initiative Led by a T&D Department

We now elaborate on Helen's case, which was briefly described in Chap. 2—How to Use This Brief?[4]

Helen works in a Training and Human Resources Development department in a big hi-tech company. Her role is defined as a training material developer. Recently, she has been appointed to lead a new initiative in the company—development of a MOOC[5]-based training program. Helen is a talented training material developer and therefore has the relevant background in education. Specifically, she has an extensive experience with developing training programs and is familiar with the MOOC platforms and pedagogy. In addition, Helen's disciplinary knowledge has been gained in previous projects she led. She seems to be the best candidate to lead this initiative.

However, since Helen's awareness of the *MERge* model has been increased only recently, she recognizes that in order to lead it successfully, she needs additional tools—management and research—in addition to her expertise in education. How can she apply the model?

With respect to management, she consults other people and realizes that she needs to cooperate with another institution to pursue this initiative. She contacts a university in her area and together they develop the initiative by following a pre-defined timetable which ensures a successful competition of the course development on time and on high quality from the customers'—employees of Helen's organization—perspective.

Furthermore, since this cooperative experience is a new form of partnership both for the university and the company, it is decided to check the timetable and the actual accomplishment of the tasks every week and if needed, to adjust the timetable.

Helen implements the *MERge* model also in terms of research: though she is not the researcher herself, she is aware of the importance of this aspect and promotes it. Since MOOC development is a new experience for the university as well, the university decides to accompany its MOOC initiatives with a research work that explores all stakeholders'—instructors, TAs (Teacher assistants), students, partners—perspectives during each MOOC development process and learning. This research allows Helen to evaluate the success of the MOOC-based training program that she leads and to check, on a regular basis, learners' understanding and satisfaction from the course and whether the course content meets the company's knowledge gaps. Clearly, Helen could not accomplish such a research work as part of her role in the company. However, her recognition of the research aspect, leads her to welcome cooperation with the university, rather than rejecting its potential contribution (as it sometimes happens when the benefit that can be obtained from research is not understood and it is conceived as a threat and a source for criticism).

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[4] Some details have been changed in this case to highlight the *MERge* model components.

[5] MOOC: massive, open, online course

In order to highlight the importance of the disciplinary knowledge in this case, we just mention that without such knowledge, Helen would probably contacted an outsourcing company that provides MOOC services and outsourced the development process (and the responsibility) to someone who is not part of the organization and is not aware of its culture and its current needs. It could be a successful story, or alternatively, could results with a MOOC that does not fit the company's needs and is not directly associated with its future development plans.

7.3   A Training and Development Initiative Led by an Engineer Who Is Not Part of the T&D Department

In this section, we describe a case study that took place in a hi-tech information technology organization, in which a T&D program was developed in a process that can be characterized as an organizational change project. The program development was accompanied with a doctoral research (Harari, 2014).[6] In line with the *MERge* model, it turns out that the research helped shape the program and monitor its development process. From the *MERge* model perspective, this Ph.D. thesis explicitly indicates the need for research skills for the accomplishment of such initiatives. If the leader of such programs does not have research skills, he or she can ask assistance from experts in the field. However, the mere awareness of the importance of including a research component in such initiatives, and the need to formulate a research target and questions, clarifies to the T&D initiators the research orientation.

Specifically, this case deals with the management of the development process of a T&D program for software development managers in the organization. Accordingly, the objective of the doctoral research was to design a project management model for software development managers' T&D process in IT organizations.

Analysis of the research data led to the formulation of the following organizing framework:

> Major T&D projects in IT organizations, such as software development managers' T&D, are in fact organizational change projects, and therefore, should be managed as organizational change projects.

This organizing idea was based on identifying elements of Kotter's eight-accelerator model for organizational change management (2014) corresponding to components of successful management of major software development managers' T&D projects in IT organizations. Based on the above findings, Kotter's Eight Accelerators model for managing organizational change (Kotter, 2014) was adopted and modified for the case of managing software development managers' T&D process in IT organizations.

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[6] The doctoral research was supervised by the first author of this Brief.

In line with the *MERge* model and in order to emphasize the need for knowledge management in T&D programs as well, we just mention that the doctoral student has a MBA degree, which contributed significantly not only to the actual development of the T&D program but also to the research that accompanied the development process.

7.4   Summary

In this chapter, we illustrated the contribution of education knowledge and research background to the accomplishment of Managing T&D initiatives.

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Chapter 8
Industry: Research

This chapter focuses on research activities that take place in the industry in most cases as part of R&D (research and development) departments.

R&D is a general term for activities in connection with corporate or governmental innovation. The activities that are classified as R&D differ from company to company, but there are two primary tasks: developing new products and conducting applied research in scientific or technological fields which may facilitate future product development. In either case, R&D differs from the vast majority of corporate activities in that it is not often intended to yield immediate profit and generally carries greater risk and an uncertain return on investment.[1]

Though R&D departments are not required to show immediate profit, and do not necessarily operate as a profit centers, their contribution to the organization is highly valued. IBM research is one example: "For more than sixty years, IBM research has been the innovation engine of the IBM corporation. From helping the Apollo space missions land on the moon to the discovery of fractals; from the technology behind laser eye surgery to a question answering computer called Watson now being applied to health care, IBM research continues to define the future of technology."[2]

The following job description,[3] in which we underline words which indicate *MERge* components, indicates the suitability of the *MERge* model for the analysis of this role. As can be seen, in addition to the management and education, the research component is a priority assumed as well as a disciplinary knowledge (BSc in engineering).[4]

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[1] *Source*: https://en.wikipedia.org/wiki/Research_and_development

[2] *Source*: http://www.research.ibm.com/featured/history/

[3] *Source*: https://www.linkedin.com/jobs2/view/71874036?trk=job_view_similar_jobs

[4] In many cases, R&D workers hold a PhD, where they have gained their research skills and experience relevant for R&D jobs. In this ad, a PhD is not mentioned as an indicator for research experience. It does mention, though, "7–10 years of experience in hands-on multidisciplinary R&D," which may be considered as an equivalent to the research experience gained in PhD studies.

Roles and Responsibilities:

- Direct management of the Divisional R&D Discipline managers
- Development and management of work plans and procedures
- Examination of products commonality
- Training and development of R&D developers
- Solving technical solutions

Requirements:

- BSc in engineering; MSc/MBA—an advantage
- At least 5 years of managerial experience—managing R&D managers
- 7–10 years of experience in hands-on multidisciplinary R&D (preferably software and algorithms)
- Experience from a global company; former experience with APAC customers—an advantage

In the analysis below, in line with the *MERge* model perspective, we assume that the research skills are a priory assumed in the R&D work and therefore explore the contribution of the other two *MERge* components—management and education—to R&D roles. Since R&D is about innovation, the answer we address is: How can one *manage* innovation and *educate* for innovation?

8.1   Managing Innovation

Managing innovation is a challenge.[5] The following two resources show the reciprocal contribution of management-oriented perspective to R&D positions, and vice versa.

The first one, published in *Harvard Business Review* (Hamel, 2006), shows what innovation may contribute to management positions, on the one hand, and that management-oriented thinking can contribute to innovative processes, on the other:

- Innovation in management principles and processes can create long-lasting advantage and produce dramatic shifts in competitive position. Over the past 100 years, management innovation, more than any other kind of innovation, has allowed companies to cross new performance thresholds.
- Most businesses have a formal methodology for product innovation and many have R&D groups that explore the frontiers of science.

In the second one, Satell (2013) presents a managerial approach to innovation. It starts with the need to understand the problem needed to be solved by addressing two basic questions which help clarify the path forward:

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[5] See Kotter's speak (15 September 2015) about creating two systems in a single organization—one that optimizes management and one that optimizes innovation: http://kotterinternational.us9.list-manage.com/track/click?u=a9be9364fc956b0c6375e5c53&id=ce90f92fcb&e=577ad86ee7

- How well is the problem defined? […] Unfortunately, some problems aren't so easy to frame […]. So determining how well the problem is defined is a key part of developing an actionable strategy.
- Who is best placed to solve it?

After determining the problem and the domain definition, the Innovation Management Matrix is presented. It is a simple 2×2 matrix[6] encompassing four basic types of innovation:

- **Basic Research:** When your aim is to discover something truly new, neither the problem nor the domain is well defined.
- **Breakthrough Innovation:** Sometimes, although the problem is well defined, organizations (or even entire fields of endeavor) can get stuck. […] Usually, these types of problems are solved through synthesizing across domains.
- **Sustaining Innovation:** Whatever you do, you always want to get better at it. Large organizations tend to be very good at this type of innovation, because conventional R&D labs and outsourcing are well suited for it.
- **Disruptive Innovation:** The most troublesome area is disruptive innovation, because its value isn't always immediately apparent. One growing trend is for companies to establish innovation labs, where they can test and learn without excessive risk.

Then, Satell presents examples of companies which manage successfully each kind of innovation.

We found the 2×2 matrix relevant for showing the potential contribution of a managerial perspective to research in general and to R&D processes in particular, due to the recognition of 2×2 matrices as a useful tool for solving business problems and decision-making processes (Lowy & Hood, 2004). Lowy and Hood present 55 such 2×2 matrices on the organizational and the individual level. We assume that the readership is familiar with some of them (e.g., SWOT analysis, corporate strategy, prisoner's dilemma, and urgency and importance) and hope that the matrix described above highlights the usefulness of this tool also with respect to the *MERge* model.

8.2   Educate for Innovation

In this section, we focus on teaching innovation to illustrate what educational perspective can contribute to R&D processes in general and to fostering of innovation in particular. Here again we decided to focus on two resources that address relationship between innovation and education and give tips on how to teach learners to be

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[6] One axis is the problem definition and the second axis is the domain definition. For both of them two options exist: Not-well defined and well defined.

innovative and to cope successfully with the creation of innovation processes, which requires open minds and willingness to fail and learn from failure.

Here are several teaching principles suggested by Doss (2015) to cultivate an innovative, risk-oriented mindset in young people. These principles are contrasted in the paper with the traditional academic education. We mention just the title, details can be found in the paper.

- Let students fail.[7]
- Teach students that pivoting is good and that changing your mind is great.
- Teach students personal independence.
- Breadth and depth.

To this list, Markham (2013) adds 10 ways to teach innovation (again, in most cases we present only the titles):

- Move from projects to project-based learning.[8]
- Teach concepts, not facts.
- Distinguish concepts from critical information. Find the right blend between open-ended inquiry and direct instruction.
- Make skills as important as knowledge. Choose several twenty-first century skills, such as collaboration or critical thinking, to focus on throughout the year.
- Form teams, not groups.
- Use thinking tools.[9]
- Use creativity tools. Include playful games and visual exercises.
- Reward discovery.
- Make reflection part of the lesson.
- Be innovative yourself.

8.3   R&D Management and Education

So far, we saw the acknowledged contribution of management and education skills to R&D processes in the industry. Can we refine the unique contribution of management and education background particularly in industry? We propose that specifically in industry, and in particular in R&D roles, this contribution is crucial since it

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[7] Satell (2013), mentioned in the previous section, explicitly refers to the prevalence of failure with respect to disruptive innovations: "Disruptive innovations generally target light or non-consumers of a category so require a new business model and therefore have high failure rates. Venture capital firms who focus on disruptive investments expect to that most will fail." Clearly, enabling students the opportunities to experience failure may help in managing this kind of innovation.

[8] Project-Based   Learning   Research: Annotated   Bibliography:http://www.edutopia.org/pbl-research-annotated-bibliography.

[9] See, for example, the Visible Thinking approach: http://www.visiblethinkingpz.org/VisibleThinking_html_files/VisibleThinking1.html

helps overcome paradoxes and tensions rooted in R&D processes whose target is to create innovation.

With respect to management, on the one hand, innovation processes can easily diverge without delivering defined deliveries, while on the other hand, openness, freethinking, ability to change directions, and openness to diversity are essential for processes whose target is to create innovation. Thus, awareness to management processes is needed in a way that does not block new ideas but at the same time keeps connecting and integrating new ideas to the here and now of the organization. In some sense, it reminds the rooted tension exists between tightness and the embrace-change orientation required in agile processes, originated in the crucial role of managing high-quality software development processes (Hazzan & Dubinsky, 2008, 2014). In this spirit, Hamel (2006), quoted above, says: "management innovation changes how managers do what they do."

With respect to education, we mention the crucial need of learning and teaching processes in the development and creation of innovation. These needs are originated in the fact that the knowledge required for the creation of the innovation not necessarily has not been created before. Nevertheless, if learning processes are integrated in the creation of innovation, their nature should be innovative by themselves, since what is sought for the creation of the innovation is sometimes unknown as well.

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Part III
Academia: Faculty Members

- Chapter 9: Management
    - A dean who led a change process by following Kotter's model for organizational change
- Chapter 10: Education
    - A lecturer who wishes to redesign a course he or she teaches and, in parallel, carries out an action research to support this change process
    - A dean who wishes to foster a campus-wide program in which teams of students from different faculties develop a joint project
    - A dean of an engineering faculty who invites alumni of the faculty to teach at the faculty advanced engineering courses which reflect the newest trends and developments in the field
- Chapter 11: Research
    - Application of management and education practices in the research lab

In the three chapters of this part, we analyze three roles of academic faculty members within the *MERge* model: managers, educators, and researchers. Since faculty members' role definition focuses on research and education, these two chapters are brief; the management role, which is less commonly discussed in the context of academic roles, will be longer and more elaborated relatively to the other two chapters.

Chapter 9 asserts that academic management becomes more and more similar to management positions in second sector organization whose main target (and some of their rights to exist) is based on financial profit. In this chapter, we focus on the similarities of managerial roles in these two sectors. Specifically, we describe the case of a dean who led a change process by following Kotter's model for organizational change.

Chapter 10 describes how management and research can support education in academic setting. The three cases presented in this chapter illustrate this idea:

- A lecturer who wishes to redesign a course he or she teaches and, in parallel, carries out an action research to support this change process.
- A dean who wishes to foster a campus-wide program in which teams of students from different faculties develop a joint project.
- A dean of an engineering faculty who invites alumni of the faculty to teach at the faculty advanced engineering courses which reflect the newest trends and developments in the field.

Chapter 11 examines the faculty member's role from the research perspective. It, in fact, focuses on the main role of faculty members—carrying out research that adds new knowledge to the society in general and to the academic community in particular. We examine the *MERge* model within this role and illustrate how management and education practices can be applied in the research lab.

As we shall see, the convention, according to which the teaching duty of faculty members sometimes disrupts their research role, is actually rejected from the perspective of the *MERge* model. This is because according to the *MERge* model, and as is demonstrated in this Brief, the three components of the model—management, education, and research—in fact, mutually contribute to each other.

Chapter 9
Academia: Faculty Members–Management

Academia is changing and is not anymore an ivory tower.[1] It means that, in a similar way to other sectors, managerial roles in the academia should also cope with social and financial changes. For example, in order to be competitive and gain the best students, an academic institution should adopt a more reactive approach; and when government budgets are cut, other resources should be found to cover the university increasing expenses and to support future development. In fact, it seems that academic management becomes more and more similar to management positions in second sector organization whose main target (and some of their rights to exist) is based on financial profit.

Beyond the difference related to the financial aspect, there are other differences between management in the academia and in the industry. However, in this chapter, in order to demonstrate the expression of the management component of the *MERge* model in the academia, we focus on the similarities of the two managerial roles in these two sectors. Specifically, we describe the case of a dean who led a change process[2] by following Kotter's model for organizational change (1996, 2014). This case is based on the professional experience of the first author of this Brief who headed a department, that eventually became a faculty, between January 2011 and December 2015.

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[1] See http://www.imdb.com/title/tt3263520/. A documentary that questions the cost—and value—of higher education in the United States.

[2] For the difference between Change Management and Change Leadership, see https://www.youtube.com/watch?v=yseq-v9DFqg&goal=0_8d638f5e6f-cd93285082-196686125

9.1   Background

The said organizational change took place at the Technion's Department of Education in Science and Technology. During a period of 5 years (2011–2015), not only the department tripled its number of students but also increased their academic background. At the end of the process, its status has been upgraded and it became a faculty, with an equal status to that of all the other Technion's academic units.

Technion is the oldest university in Israel. Since its establishment in 1912, it grew rapidly, becoming a global pioneer in science and engineering (e.g., in computer science, nanotechnology, biotechnology, stem cells, space, and energy). Three Technion professors have won Nobel Prizes and new sites were established in NYC and China. Currently, 12,850 students learn at the Technion and 80 graduate programs provide opportunities to express excellence in research and teaching for the benefit of humanity.

Technion Nation (Frenkel & Maital, 2012) tells how Technion scientists have given the world discoveries leading to treatments for cancer and Alzheimer's and countless innovations in information technologies that enrich the lives of people everywhere. Technion leadership in innovation led in 2013 to its ranking sixth in the world in this respect by a survey conducted by MIT.[3] The study evaluated entrepreneurship and innovation in higher education institutions worldwide. The ranking was compiled by 61 experts from 20 different countries. The significant role of Technion alumni in the global world of science and engineering is also remarkable. More than two-thirds of the Israeli companies traded on the tech-heavy NASDAQ stock exchange have Technion alumni as founders or senior managers. In addition, there are more firms from Israel listed on the NASDAQ than from France, Germany, and the UK combined.

One of the Technion academic units was the Department of Science and Technology Education, which in 2011 was called Science and Technology Teaching. Its main mission is to prepare high school teachers to teach one of the following science and technology subjects: mathematics, physics, chemistry, biology, computer science, environmental sciences, mechanics, and electricity. In 2011, it was the only department out of all the Technion academic units (all the other Technion's academic units were faculties). It suffers from low number of students with relatively (to the Technion) low academic level. It suffered also from bad reputation. Table 9.1 presents the SWOT analysis of the department in 2011.

The gap between the high Technion status and reputation worldwide and the low status of the department in 2011 required an immediate change. However, not surprisingly, it took about 5 years to make a significant change. At the middle of 2105, the status of the department was changed to that of a faculty, while increasing students' number and academic background.

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[3] *Source*:   http://www.rhgraham.org/RHG/Recent_projects_files/Benchamrking%20study%20 -%20Phase%201%20summary%20.pdf

Table 9.1 SWOT analysis of the Department of Science and Technology Teaching in 2011

Strength	Weaknesses

• Located at the Technion with:
  – excellent Technion students and alumni
  – Multidisciplinary knowledge
  – Advanced technologies
• Expert faculty members
• Excellent graduate students
	• Small number of faculty members—8
	• Small number of relatively weak undergraduate students who studied at the department

Opportunities	Threats
• Society interest in lifelong learning • Crisis in science education in Israel • Turnover in faculty members (retired and new recruits)	• Future funding is unknown • Many educational colleges in Israel with lower admission criteria

9.2   Implementation of Kotter's Model of Organizational Change for an Academic Unit

In what follows, we analyze this change process within the *MERge* framework by applying Kotter's 8-Step process (2014) of leading change, which has been widely recognized as the seminal work in the field of change management. This analysis emphasizes how crucial is the awareness to management skills for managers in the academia. When appropriate, we also highlight educational and research aspects.

In an updated version of Kotter's book, he replaced the term "steps" with the term "accelerators." As it turns out, and illustrated below, accelerate are perfectly suitable for academic setting due to two factors:

– The relatively flat organizational structure of the academia.
– The structure of the academic year which comprises two semesters which enables an ongoing improvement process in the academic aspect related to teaching.

9.2.1   Create a Sense of Urgency Around a Single Big Opportunity

In December 2010, Technion President, Professor Peretz Lavie, declared in one of the major Israeli daily newspapers that science education in Israel is in crisis. Clearly, it attracted a lot of attention and as a result, many STEM (science, technology, engineering, and mathematics) educational initiatives were suggested to the president. Professor Orit Hazzan started her term as a department head in January 2011. Naturally, Professor Lavie addressed these initiatives and ideas to Professor Hazzan. As an immediate result, the dialogue about STEM education at the Technion campus has been fostered.

This call of the Technion president created an opportunity that could not be neglected. It was decided to recruit the department for this national task and to position it as a crucial player in the promotion of the Technion vision, to be *A science and technology research university, among the world's top ten, dedicated to the creation of knowledge and the development of human capital and leadership, for the advancement of the State of Israel and all humanity*.[4] The department had a unique role in this vision: To prepare the next generation of Technion students by preparing excellent high school teachers in the STEM subjects.

The Technion president offered the head of the Department of Education and Science to coordinate all the new initiatives. The message was clear: If the Technion announces such a crisis, and due to its significant role in the Israeli economy, it should also contribute to Israel's educational system. A recovery plan for the department was submitted to the Technion management on February 7, 2011 (1 month after the department head started her position). This recovery program was formulated based on the department head's knowledge in educational research) as a faculty member in the department) as well as on her experience as a consultant on matters related to the assimilation of agile software development process to many Israeli hi-tech companies during almost a decade (2002–2010) in which the agile approach spread rapidly all over the world (see, e.g., Dubinsky, Hazzan, & Keren, 2005).

9.2.2 Build and Maintain a Guiding Coalition

This accelerator was applied by harnessing to the department's change process the Israeli Council for Higher Education (CHE[5]) international evaluation process, which was announced in September 2012. The preparation of the self-evaluation report for the CHE required all faculty (academic, administrative, and adjunct) to contribute to its preparation. It also forced all staffs to talk about barriers and challenges and to formulate a vision that included as a target the upgrade of the department status to that of a faculty, in order to exhaust its potential contribution to the Technion and Israel. Accordingly, the target to become a faculty was explicitly declared in the self-evaluation report. In parallel, several initiatives were started being implemented by the department staffs, which directly increased the number and quality of the students who study at the department (see below) and could support the achievement of this target.

The report was submitted in September 2013 and the International Evaluation committee visited the department in December 2014. During these 15 months, several meetings took place, whose target was to further strengthen the vision and clarify the justification to become a faculty. The nature of the discourse that took place

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[4] See: http://www.admin.technion.ac.il/President/Eng/Technion_vission_e.html

[5] Council for Higher Education website: http://che.org.il/en/

in these meetings, in which different opinions were expressed and connections were tightened, further promoted the delivery of the target. In these meetings, in addition to the regular staff (faculty, administrative and adjuncts), also students and alumni participated. Their participation enabled to further expand the discourse and to hear additional feedbacks.

At the middle of the evaluation process, the department submitted a request to change its name and status. In November 2012, the name has been changed (from the Department of Technology and Science *Teaching* to the Department of *Education* in Science and Teaching) and it was decided to postpone the decision with respect to the status change until the international evaluation committee visits the department and submits its recommendation. Nevertheless, the discussion about the topic of STEM education in the Technion management and senate enabled to expand the community of Technion people who talked about educational topics in general and about local topics—the crucial role of the Technion (also) in STEM education in Israel and the department role and contribution to the Technion—in particular.

Eventually, the first recommendation of the International Evaluation Committee report, submitted in March 2015, was to change the status of the department to that of a faculty. The recommendation to change the status was confirmed by the Technion Senate after three months (in June 2015) with no objection.

Once again, the educational background of the department head supported her steering the process. Without this background, she could not identify key issues to be addressed and initialize several innovative programs, as is described in the next accelerator.

9.2.3   Formulate a Strategic Vision and Develop Change Initiatives Designed to Capitalize on the Big Opportunity

The status change was not a target by itself; rather, it supported the idea that the department vision should be tightly connected to the Technion vision, and therefore, its activities should contribute both to Israel and to the world. In practice, it was accomplished by asserting that the skills learned in the department are essential for all Technion students and alumni, since learning and teaching skills are important not only for school teaching but also for the very dynamic hi-tech industry in which most Technion graduates work.

In this line, the Technion flagship program *Views* was launched in September 2011.[6] The rationale was simple: since Technion alumni contribute to Israel and the world both technologically and economically, they clearly can also contribute to the Israeli education system. Accordingly, the framework was simple.

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[6] See *Focus*—Technion Magazine: http://www.focus.technion.ac.il/Jan15/education_story2.asp

MABATIM, *Views*' Hebrew acronym, stands for engineers/scientists in science and technology education. *Views* invites Technion graduates back to the Technion—tuition free—to study toward an additional bachelor's degree in the Department of Education in Science and Technology. This extra BSc degree includes a high school STEM teaching certificate in one of eight tracks: mathematics, physics, biology, chemistry, computer science, environmental sciences, electrical engineering, or mechanical engineering. Notwithstanding their full study scholarships, participants need not commit to teaching in the education system.

In fact, *Views* implemented the *MERge* model by providing the engineers and scientists the education component of the model. Furthermore, similar to a part-time MBA course, students study one full day or two half-days a week across 2 years and can continue working as scientists and engineers in the industry in parallel to their studies. Since the skills gained through *Views* are also useful in the high-tech industry for coping with new knowledge and technological developments, they can be applied while the students study in the program. Indeed, their employers let them attend their studies without deducting from their salaries.

As of October 2015, about 100 Technion graduates join the *Views* program every year. They come from leading positions and their future contribution to the educational system in Israel is clear. *Views* encourages the best STEM professionals in Israel—Technion alumni—to be teachers; these teachers will provide the next generation with top-tier STEM education and skills.

The *Views* program has tripled the number of students in the department. It is envisioned that by 2020, some 1000 Technion alumni will be qualified to teach STEM in Israeli high schools. Since there are now in Israel about 12,000 high school STEM teachers, this implies that about 10 % of STEM teachers in Israel in the very near future will be Technion graduates. Since Israel is a small country, it is believed that the *Views* program will significantly impact Israel's science and technology education in the next coming years. It is, however, worthwhile to investigate its potential in other countries. Thus, Technion and Israel may lead also with this respect and serve as a pilot case study for countries abroad on a larger scale.[7]

In addition, the department offered *all* Technion students several elective courses that served as introductory courses on education. Once again, the rationale is clear and is inspired by the *MERge* model—all engineers and scientists need some background in education in order to foster, navigate and enhance their professional development. Eventually, this idea led to the expansion of the *Views* program to all Technion students, in addition to its graduates, through the E&E (Engineers and Educator) program. Thus, the department activities were directly connected to the Technion leadership in Israel and in the world by fostering Technion students' professional skills.

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[7] Needless to say, traditional STEM teacher preparation programs should be continued as well.

9.2.4   Communicate the Vision and the Strategy to Create Buy-In and Attract a Growing Volunteer Army

As mentioned in accelerator #2 above, the Council for Higher Education evaluation process created a unique opportunity for communicating the department vision and the rationale for launching new STEM education programs (see accelerator #3). Due to the significant increase in the number of students, different organizational changes took place at the department to support this growth in the number of students. In addition, a forum was established for discussing pedagogical issues that emerged due to the growth in the number of students (and the class sizes) and the challenge of adjusting the study program and course curricula to students' extensive work experience and extremely high science and engineering academic background.

In addition, the attractiveness of the *Views* program led to its presentation in many Technion forums in Israel and beyond. It exposes the status of the department and served as an opportunity to deliver the merging of its vision with the Technion vision.

As mentioned, the vision delivered the message of 1000 Technion graduates in 10 years with a teaching certificate in one of the STEM subjects. To illustrate its immediate impact, it was specified: If each of these *Views* graduates teaches only one class of 25 pupils a year, each year 25,000 pupils in Israel will be taught by a STEM teacher who is a Technion graduate. These pupils will be inspired by Technion graduates, and the Technion's future students will be students who were educated in high school by its own graduates. Thus, the cycle will close and a new one will begin when these future students will also enroll in the *Views* program, teach the next generation of the Technion students and so on and so forth. We have created a cycle that continues to cultivate future Technion students. As a side effect, this cycle fosters Israel's economy as described in *Technion Nation* (Frenkel & Maital, 2012) and supports the fulfillment of the Technion vision quoted above.

9.2.5   Accelerate Movement Toward the Vision and the Opportunity by Ensuring That the Network Removes Barriers

In parallel to the above conceptual changes in the department self-perception, the administrative aspect was also addressed to supplement the change. Administrative changes were crucial in order to support the change in the cohort of students who came from a different organizational culture: hi-tech industry vs. academia. Specifically, bureaucracy was reduced (in fact, almost eliminated), procedures were simplified, the organizational structure was flattened, and in the spirit of risk management, many issues were solved prior to their emergence.

As are two examples:

- Bi-yearly course schedule was designed and published. It enables the *Views* students to plan the entire period of learning at the beginning of their 2-year studying.
- Full year course schedule is published every year prior to the beginning of the academic year. It allows all students, most of them work in parallel to their studies, to plan ahead. If a problem arises, it is solved before the academic year starts.

9.2.6   Celebrate Visible, Significant Short-Term Wins

The success of the different programs is expressed in different ways, such as:

– Our faculty members and adjuncts started winning the Technion Lecturer Award. Needless to say that they were very good lecturers before the change process had been initiated; however, they could not win the award since class sizes were too small.
– Each semester the number of students who join the *Views* program is published.
– News and articles about the department and its successful students started being published frequently in Technion and Israeli media channels. These news are distributed to academic, administrative, and adjunct lecturer staffs.

9.2.7   Never Let Up, Keep Learning from Experience, Don't Declare Victory Too Soon

The entire process was characterized by a proactive approach, which was supported by an ongoing evaluation study that took place in parallel to the change process. In this evaluation, undergraduate students, *Views* students, graduate students, and adjunct lecturers are asked to give feedback on the different programs and to suggest improvements. Here, both management and educational and research aspects of the *MERge* model are expressed.

Specifically, in the spirit of the agile approach, which delivers the message of keep improving, in December 2015 (6 months after the status has been changed), it has been realized that the change of the status from that of a department to that of a faculty is only an intermediate stage toward the next climax. Accordingly, different options are targeted, e.g., to position the faculty as a leading site for research in STEM education and to establish a program for high school principals with a strong science and engineering background.

9.2.8 Institutionalize Strategic Changes in the Culture

As Kotter said: "No strategic initiative, big or small, is complete until it has been incorporated into day-to-day activities." Indeed, after the formal status change process to that of a faculty had been completed, the importance of the day-to-day activities, that were established during the transition process, were further emphasized. Specifically, role definitions and responsibilities have been clarified and procedures have been simplified and become more transparent. In general, the high level of the students pushes everyone to invest more time and thought in any activity that takes place in the faculty.

9.3 The Change Process: A Calendar Perspective

The above section tells the story of the change process by accelerators. Table 9.2 presents a calendar view at the main events that took place in this change process.

We conclude this case by pointing out that in industry "It takes about six years of hard work to become an overnight success."[8] As we can see here, in academic institutions, though we talk about different kinds of organizations in terms of size, target, orientation, culture, and business environment, it takes a similar period to make a significant change in the organization perception. This is not surprising since after all, organizations are made of people, regardless of sectors.

9.4 Summary

The above case study demonstrated the application of the management component of the *MERge* model in the dean position, which, in this case, was largely supported by educational knowledge and research experience in STEM educational. Thus, in fact, the above change process illustrates the usability of all *MERge* components.

Clearly, there are many other challenges with which deans should cope, not necessarily as part of a major change process. For example, in initiatives related to education in general, and when new teaching approaches are considered in particular, in addition to managerial practices, educational and research knowledge should also be employed to evaluate such changes and continuously improve them.

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[8] See Martin Zwilling (2011) column in edX: This Is How Long "Overnight Success" Really Takes: http://www.businessinsider.com/guess-how-long-overnight-success-really-takes-2011-3

Table 9.2 Organizational change—2011–2015 events

When?	Event
October 2010	Hazzan was elected as a department head
December 2010	Technion president, Professor Peretz Lavie, was interviewed in a daily newsletter about the status of STEM education in Israel
January 2011	Hazzan started her position as a department head
February 2011	A recovery program for the department was formulated and submitted to the Technion management
March–April 2011	Construction of a bi-yearly course schedule
August 2011	*Views* is approved
October 2011 to February 2012	*Views*—first semester—winter (36 students)
March 2012 to June 2012	*Views*—second semester—spring[a] (20 students)
September 2012	E&E is approved
November 2012	Department name is changed
October 2012 to February 2013	*Views*—third semester (57 students)
October 2012 to November 2013	CHI evaluation process took place
January 2013	Second term of department head starts
January 2013	Hazzan's speaker tour in the USA
March 2013	Presidential forum in CA, USA: *Views* was one of the Technion initiatives that was highlighted by the president
March 2013 to June 2013	*Views*—fourth semester (30 students)
June 2013	Three *Views* graduates are on the president list
October 2013 to February 2014	*Views*—fifth semester (64 students)
March 2014 to June 2014	*Views*—sixth semester (27 students)
June 2014	Six *Views* graduates are on the president list
December 2014	CHI evaluation committee visited the department
October 2014 to February 2015	*Views*—seventh semester (76 students)
March 2015	The report of the CHI evaluation committee arrived with a recommendation to immediately change the status of the department to that of a faculty
March 2015 to June 2015	*Views*—eighth semester (40 students)
June 2015	Five *Views* graduates are on the president list
28 June 2015	**The status of a faculty is approved in the Technion senate**

[a]At the Technion, enrolment to spring semester is usually small than that to the winter semester

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Chapter 10
Academia: Faculty Members–Education

Faculty members are evaluated by three main criteria: research, teaching, and service. Therefore, it is clear that the education component of the *MERge* model is relevant for the analysis of the role of a faculty member.

There are several lists that deal with this aspect of academic positions. We mention, for example, *Tomorrow Professor's Postings* that addresses among other topics teaching and learning. Here are several postings[1]:

- 1437 Seven Principles for Fostering Greater Use of Assessment Results.
- 1436 Synchronicity: The Real-Time Virtual Classroom.
- 1435 Flipping the Flipped Classroom: The Beauty of Spontaneous and Instantaneous Close Reading.
- 1434 The MERge Pedagogical Model for Undergraduate Science and Engineering Education.
- 1433 Watch Your Language.
- 1432 Learning to Analyze and Critically Evaluate Ideas, Arguments, and Points of View.
- 1429 Flawed Evaluations.

While the relevance of the education component of the *MERge* model to the role of faculty member is clear, let us explore how research and management can support it.

10.1 Action Research in the Context of the *MERge* Model

With respect to research, we mention the concept of action research (Lewin, 1946). "Action research involves actively participating in a change situation, often via an existing organization, whilst simultaneously conducting research. Action research

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[1] See https://tomprof.stanford.edu/, retrieved on October 17, 2015.

can also be undertaken by larger organizations or institutions, assisted or guided by professional researchers, with the aim of improving their strategies, practices and knowledge of the environments within which they practice. As designers and stakeholders, researchers work with others to propose a new course of action to help their community improve its work practices."[2] Action research is also widely applied in educational settings in general and in teaching processes in particular.

For example, the book *Action Research in Higher Education: Examples and Reflections* (edited by Zuber-Skerritt, 1992) "presents a series of case studies in higher education which demonstrate how teams of academics have improved their practice, skill and conditions of learning and teaching through "action research." Action research is defined as collaborative critical enquiry by academics themselves into their own teaching practice, into problems of student learning and into curriculum problems."[3]

In practice, action research is based on a cyclical process in which each cycle has four steps: plan, action, observation, reflection. From the *MERge* perspective, the plan and action steps inspire a management-oriented thinking, the observe stage is based on a research-oriented activities, and the reflect step fosters an education-oriented perspective at the process.

For example, think about a lecturer who wishes to redesign a course he or she teaches. The course is first planned according to new design principles; then, the course is taught (action) and data is collected with respect to student learning (observation); finally, the data is analyzed, and based on the data analysis and the lesson learned, the course is redesigned and modified (reflection). This process can be continued as long as needed. Not only student learning is improved, the lecturer also improves his or her pedagogical knowledge as well as his or her understanding of student learning processes.[4]

We further assert that this process has benefits both on the lecturer and the university level:

- The lecturer improves his or her understanding of the course domain. This assertion is derived from the simple observation that if the course redesign is significant enough, it requires additional reading and organization of new material in the field that clearly contribute to one's knowledge about the said field.
- On the university level, action research may contribute to the establishment of an organizational culture that mutually contributes to other fields and strengthens collaboration between different units in the campus.

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[2] *Source*: https://en.wikipedia.org/wiki/Action_research

[3] *Source*: http://eric.ed.gov/?id=ED351928

[4] We note that the implementation of action research in the academia can be based on the structure of the academic year, that is, each semester creates a research cycle. See, for example, Dubinsky and Hazzan (2005).

10.2 The Expression of the *MERge* Model in Educational Initiatives Fostered by Managerial Roles in the Academia

The *MERge* model can be implemented also by deans and other managerial roles at the academia for the promotion of educational initiatives.

Think about a dean who wishes to foster a campus-wide program in which teams of students from different faculties develop a joint project. This is clearly an *educational* initiative, since it requires the understanding of teaching interdisciplinary topics as well as project-based learning processes. In addition, *managerial* knowledge is required both for the actual leadership of the initiative approval in the relevant university authorities and for its actual implementation that is based on motivating people from different units to collaborate. Finally, as a new initiative, which changes some basic principles of the university course schedule, it is worth accompanying the initiative implementation with an action research process which will allow the dean to gradually design it based on authentic and updated data.

Another example is a dean of an engineering faculty who invites alumni of the faculty to teach at the faculty advanced engineering courses which reflect the newest trends and developments in the field. Once again, the *educational* knowledge required for this initiative is related to the mere acknowledgement that such enrichment is needed for the students. The *managerial* aspect is applied in several ways: first, by the familiarity with the relevant people; second, by the presentation of the initiative within a win-win framework form which everybody benefits; and third, by the promotion of the initiative without hurting the faculty members, since the initiative actually delivers the message that the expertise is brought from the industry (i.e., an external resource). Finally, the *research* aspect is used in such cases for the examination of the actual integration of the initiative administratively, pedagogically, and organizationally.

10.3 Conclusion

We conclude by stating that the convention according to which the teaching duty of faculty members sometimes disrupts their research role is actually rejected within the *MERge* model. Specifically, according to the *MERge* model, and as has been demonstrated in this Brief, the three components of the model—management, education, and research—actually mutually contribute to each other.

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Chapter 11
Academia: Faculty Members–Research

This chapter examines the faculty member role from the research perspective. It, in fact, focuses on the main role of faculty members—carrying out research that adds new knowledge to the society in general and the academic community in particular.

Research is a methodological process in which a researcher investigates a new phenomenon based on data he or she collects and analyzes as well as results obtained in previous studies. Sometimes, a researcher does his or her research by his or her own; sometimes, groups carry out a research work. Recently, it becomes more and more essential to carry out research in groups due to the interdisciplinary nature of research, which means that research processes involve more than one field, and therefore, collaboration between researchers from different fields is essential. Moreover, universities open local sites outside their origin country and naturally establish joint research groups that include researchers from different countries who submit together research proposals and conduct joint research This fact by itself highlights the importance of *managerial* skills for research processes.

When a researcher conducts research with his or her colleagues, he or she needs to establish work relationships which are based on trust and knowledge sharing. Yet, researchers work in many cases in their labs with a research group that they manage or, in the case of graduate students, supervise.[1] This fact highlights the *education* component of the *MERge* model with respect to the research role of faculty members.

Accordingly, we examine the *MERge* model in this chapter within these two roles: management and education practices that can be applied in the research lab.

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[1]The supervision of graduate students is largely discussed also from the emotional perspective (which is beyond the scope of this Brief). For example, see the *International Journal of Doctoral Studies* (*IJDS*) for papers about the supervision role and in particular, Nutov and Hazzan (2011) with respect to the emotional aspect.

11.1 Management of a Research Group

In this section, we show how a management perspective may support the research activity of faculty members.

When a researcher manages a research group, he or she is dependent on others' performances. He or she should coordinate their activities and expertise in a way that fosters knowledge sharing and the creation of new research results.

This task is extremely challenging in the research lab, since the people who work in research labs are knowledge workers (Austin, 2006), which means that the raw material is knowledge and the product is new knowledge. The management of such workers is challenging since knowledge is an intangible object, and thus, many management skills, which are useful in the management of the production of tangible and physical process, become irrelevant.

In addition, the managed activity is a research process, which can either succeed or fail; further, if it succeeds, the exact success moment cannot be anticipated—this is simply the nature of a research process, and the research plan should consider this aspect. Indeed, research management has some characteristics of management under uncertain conditions.

Science acknowledges the attention that should be dedicated to the management of research lab and dedicates a set of papers for this topic.[2] The mere discussion of this topic is important since it delivers the message that scientists should consider the management of a research lab as part of their role definition as researchers and accordingly should give it the needed attention.

As with the management of other kinds of groups of practitioners, it is crucial to create a culture that motivates team members to excel, innovate, share ideas, and be responsible. Here are several management elements that a faculty member who manages a team in a research lab may consider for the establishment of such culture:

- Knowledge sharing (also related to education, see below)
- Retrospective processes (also related to education)
- Incentives and motivation
- Measures
- Time management
- Collaboration with industry

11.2 Education in Managing a Research Group

The management of a research lab includes also an *education* component. This assertion is derived from the realization that, as in the industry, good managers should also be good educators and mentors.

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[2] See: http://sciencecareers.sciencemag.org/tools_tips/how_to_series/how_to_manage_a_lab_and_staff

Knowledge sharing is one component of education in the research lab and it can be promoted in different ways. Here are several examples:

- Weekly seminar can be organized, in which each team member presents his or her current work as well as an open question(s) on which all team members work together in the seminar.
- A more intense option is a stand-up meeting in which every day, for 10 min, each team member presents his or her work and contribution to the project in three sentences: what he or she did yesterday, what he or she plans to do today, and any open question or problem he or she is dealing with (optional). Following the stand-up meeting, team members can offer ways to deal with the question/problem or even actually assist by working together to solve the problem.
- Mentoring of new team members by more experienced team members. When a new team member joins the lab, one of the more senior team members mentors him or her in a way that leads him or her to be familiar with the relevant work procedure, rules, and culture.
- Educational kit can be built which includes elements such as lab safety, research topics, mentoring new researchers, etc., according to the lab nature, purpose, and work habits.

11.3 Conclusion

Each of the above management and education activities can be discussed lengthy and widely by the extensive literature existing on the topics. However, as previously noted in this Brief, our aim is not to teach management, education, and research; rather, our intention in this Brief is to increase professional practitioners' awareness to the potential contribution of the three components of the *MERge* model to their ongoing professional work. This idea is applied in this chapter with respect to the research role of academic faculty members by demonstrating how management and education aspects can foster research.

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Part IV
Academia: Administrative Staff

- Chapter 12: Management
  - Administrative project manager of an academic international educational initiative
- Chapter 13: Education
  - Administrative manager in a European public research university who promotes teaching and learning by MOOCs
- Chapter 14: Research
  - The role of a lab manager or a chief engineer/scientists, whose role is to be in charge of the ongoing work that takes place in the lab

The three chapters of this part explore the *MERge* model from the administrative point of view of three roles in the academia: managers, educators, and researchers. Thus, they enrich the perspective presented in Chaps. 9–11 which also explores these roles in the academia, but from the perspective of academic faculty members.

Chapter 12 presents the *MERge* model in the context of an administrative project manager of an academic international initiative related to engineering education. The role of the project manager in this case requires strong educational and academic background, as well as managerial capabilities, and strategic and global perspectives.

Keywords: *MERge* model, Professional development, Career planning, Academia, Administrative staff, Management, Education, Research, Project manager, International education, Project manager, Strategic and global perspectives

Chapter 13 demonstrates the importance of the *MERge* model for the promotion of educational activities from the administrative point of view. We explore the case of MOOCs, as a growing market of online education, and illustrate how an administrative

manager in a European public research university managed the university's response to this trend as a tool for the promotion of teaching and learning.

Keywords: *MERge* model, Professional development, Career planning, Academia, Administrative staff, Management, Education, Research, MOOC, Online education, Promotion of a teaching and learning

Chapter 14 examines the meta-profession of research from the perspective of the administrative staff in an academic institution, by analyzing the role of a lab manager or a chief engineer/scientists, whose role is to be in charge of the ongoing work that takes place in the lab. The analysis of this role from the *MERge* perspective demonstrates the importance of managerial and educational skills for the accomplishment of this research-oriented role.

Keywords: *MERge* model, Professional development, Career planning, Academia, Administrative staff, Management, Education, Research, Chief engineer, Scientists

Chapter 12
Academia: Administrative Staff (Management)

In this chapter, we present a case study of an administrative project *manager* in the academia. The project management role in this case requires strong educational and research background, as well as managerial capabilities, strategic, and global perspectives. Therefore, high-level management representative, a professor from the university, was the project supervisor, and Julie, who had extensive experience in project management, as well as familiarity with the wide context in which the project takes place, was assigned to be the project manager.

We demonstrate how, at the beginning of the project, Julie acted in line with the *MERge* model, without being aware of its ideas, and how, after being exposed to the *MERge* model, she adjusted and improved her managerial strategy by including the research component into the project leadership.

12.1 Case Study Description: An Engineering Program for International Undergraduate Students

The project described in this chapter deals with a new group of international undergraduate students who started a new engineering program taught for the first time in the said university. Apparently, this group is not different from other international groups in this university; however, in practice, it is different: first, this program is a component of a bigger strategic initiative of the university; and second, this group is a pioneer group for this specific academic program.

The project started with students' recruitment and admission and ended after the preparatory period—8 weeks of basic science and engineering studies, whose target was to align students' academic-level baseline toward the first semester.

Accordingly, two project goals were defined:

- To run the new academic program successfully, both academically and socially: the academic aspect encompasses curriculum design, teaching, and learning; the

social aspect deals with the absorption of the new group into the social life of the university campus, with respect to both the international student community and the local student community.

- To serve as a pilot: as mentioned above, this program is part of another bigger project, and, accordingly, its execution should provide the institution with a lesson-learned process, with respect to teaching and learning process and social and cultural aspects of international students. Therefore, learning (i.e., the education component of the *MERge* model) plays a central role.

12.2   Project Phases

For the purpose of simplicity, we skipped the pre-project phases that concerned with the examination of the project feasibility and focus on the following four phases: preparation, orientation week, studying, and post-project. We briefly describe each phase and elaborate, from the *MERge* perspective, how it handled its challenges.

12.2.1   Preparation Phase

While designing the project work plan, Julie started with analyzing the "international student life cycle" in the university. The outcome of this analysis was a comprehensive definition for "international student life cycle stages," which included the involved parties and role definitions, required IT (information technology) infrastructure and facilities, and a timetable which includes the university academic calendar with respect to various administrative and pedagogical constraints. However, this deliverables, although necessary, were just a written plan. As it is well known, it takes much more to initiate such projects. Indeed, one of the main challenges of this project was that it involved people from different units of the university and from different countries who worked together.

This challenge fosters Julie's understanding that she needs to foster collaboration. In the article *What Successful Project Managers Do*, Laufer, Hoffman, Russell, and Cameron (2015) attribute project success to the project manager's deliberate attempt to develop collaboration. Likewise, in this case study, collaboration played a key factor in the success of this phase. Collaboration enabled the project team to overcome (local and international) cultural gaps and logistics constraints and, in addition, to develop a new IT system for the admission process.

From the *MERge* perspective:

- Two managerial components—the preparation of a master plan and the awareness for collaboration—were addressed and treated as essential fundamental building blocks for the next phases.

- An academic supervisor (i.e., a professor) addressed the educational aspects in terms of a syllabus.
- At this stage, Julie did not implement any research practice. However, as part of the admission process, she collected initial data about the students. She thought that such data would be useful in the future for checking if students' achievements could have been predicated. From a research-perspective, it was acknowledged that a more systematic research approach should be adopted.

12.2.2   Orientation Week Phase

An orientation week refers to the first days of the students at the university after they had arrived from their country. These days include their placement in the dorms and introduction to the university rules, campus, and surrounding area.

From Julie's perspective, the focus of this stage was managerial oriented. In general, the international unit of the university is in charge of international students and takes care of the orientation weeks; however, in this case, the orientation week was planed in coordination with Julie: the international unit allocated resources and Julie focused on its success. The managerial challenge was to develop the different units' sense of shared purpose and responsibility. This was achieved by Julie's hands-on engagement: she was in ongoing contact with the employees of the international unit, guided them with respect to the purpose of the social aspects which were at the focus of this stage, and was in direct contact with the new students. Frequent status meetings, which took place on a weekly basis, were another managerial tool that Julie implemented to follow up the absorption of the new students, to foster commitment to the project, and to support teamwork.

From the *MERge* perspective:

- Management aspects were implemented by Julie's intense hands-on engagement.
- Research aspects were not methodologically and systematically implemented yet: as in the former stage, data was collected with no particular research purpose. It did express, however, the fact that Julie felt the need to accompany this project with research.

12.2.3   Studying Phase

While the two first phases focused on managerial aspects, this phase expressed the combination of the three *MERge* components.

Educational aspects had an important role. This was the first teaching experience of the university with this kind of class, and therefore, the teachers faced several challenges, e.g., language barrier, different studying habits of the students, different types of interaction with the students, as well as syllabus redesign. The students, as

a reflection to the teachers, faced similar challenges. Specifically, after 1 week in a new country, they have already gone through an intensive period, studying science and engineering courses in a foreign language, and had to get used to different teaching styles. These circumstances raised several educational challenges. Julie's role, as the project manager, was to be aware of these educational challenges and to communicate them to the academic supervisor. In order to do this efficiently and professionally, Julie used her educational background; otherwise, she could have missed the essence of these educational needs.

Specifically, managerial and research activities were needed to support the educational needs.

The management activities addressed short-term challenges, e.g., support was given to students with low academic performance and brainstorming sessions were facilitated with the teachers with respect to specific students. The main managerial challenge at this phase was to foster teachers' trust and collaboration; Julie coped with it by direct frequent face-to-face meetings with the teachers.

Research activities were conducted to allow the university management to base future educational activities on research findings. Specifically, at this phase of the project, Julie was aware of the *MERge* model and, therefore, established a systematic research approach. With high-level management support, she cooperated with the university Faculty of Education in Science and Technology to develop (a) a formative assessment tool that, together with the standard exam grades, will indicate students' achievements and (b) a tool to evaluate the program as a pilot.

12.2.4   Post-project Phase

The project ended as soon as the students passed the exams of the preparatory program and started the first semester.

At this stage, Julie was aware of the *MERge* model, and accordingly, she systematically implemented summative evaluation methods. Consequently, the university could learn from this pilot about the international student life cycle and could implement the lesson learned on other engineering programs. Thus, research methods became managerial tools to improve quality.

12.3   Conclusion

In order to demonstrate the significant of the *MERge* model for administrative staff who holds mid-level management positions in the academia, the focus of the case study described in the chapter is placed on the project manager; however, it does not disparage the significant role of the many other team members who participated and contributed to the project.

From the *MERge* model perspective, this case study emphasizes the importance of the project manager role in the academia, especially recently, when the academia faces changes in educational approaches, such as MOOC development and joint ventures of educational initiatives with the industry that require multidisciplinary team work. This type of activities needs project management perspective.[1] We hope that the *MERge* model increases the awareness to this aspect in educational initiatives in the academia.

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Chapter 13
Academia: Administrative Staff–Education

So far in this Brief, we referred several times to the frequent changes that take place in the world. This type of dynamic atmosphere requires quick response to new demands and needs. In higher education, these dynamic changes are expressed in several ways, e.g.:

(a) **Knowledge availability and dissemination**: Since information is widely and freely available, including academic contents, the academia faces another player in an arena in which its dominance was secured until recently. In some disciplines, quality alternatives for education are offered to the traditional university education. Moreover, open content is a global trend in educational development (Ping, 2013) in the era of global educational.

(b) **Different student characteristics**: In the twenty-first century, students are digital natives (Prensky, 2001), work in parallel to their studies, and expect to get good education that will enable them to get rewarding jobs.

(c) **Growing market of online education that takes place on MOOC platforms**: According to HBR's paper *Who's Benefiting from MOOCs*, *and Why*, published in September, 2015, "In the last three years, over 25 million people from around the world have enrolled in Massive Open Online Courses (MOOCs)." Furthermore, MOOC learners report that they have gained from these studies tangible "beneficial for furthering their education and careers" (Zhenghao et al., 2015).

Universities find the MOOC phenomenon a challenging issue: on the one hand, MOOCs offer an innovative pedagogy and an effective way for knowledge dissemination, which is a major component of the university mission. Therefore, MOOCs seem to be a good way to accomplish this task. In addition, MOOCs can expose and promote the university and its faculty member globally and enables to get big data regarding a variety of topics related to teaching and learning, e.g., learning habits of mind, student's behavior, learning outcomes, and syllabus effectiveness. However, on the other hand, MOOCs seem to be intimidating for some lecturers due to many reasons: the exposure to huge audience, the assumption that the MOOC replaces

their on-campus course, the potential judgment from wide audience, and the unknown position of being in front of the camera out of the teacher comfortable zone.

The above description delivers the message that MOOCs are disruptive technology, which creates a major change in the education landscape; therefore, university leaderships should consider how to embrace the change. The following case study demonstrates such a case. It illustrates how an *educational* role holder in a European public research university responded to these changes and used the university's response for the promotion of teaching and learning at the university.

The university was founded in the sixteenth century and has won a well-established legacy for many years. The university offers programs in various fields in science as well as research programs. It has established partnership with associated industrial companies and other organizations and has cooperated with them for research purposes as well as for technology transfer processes.

Antoni holds an administrative position. He serves as the provost assistance *for promotion of learning and teaching*, and therefore, his case is presented here from the perspective of the education component of the *MERge* model. He expresses great passion to innovative pedagogy and promotes every project that in his opinion leads to creativity and innovation in learning and teaching processes. He realizes that the MOOC trend is a new wave that the university should embrace and harness for the university's benefits. Moreover, he foresees the potential effects that may come out from MOOCs in other fields than pedagogy. Specifically, he sees the opportunity to cooperate with the industry in a way that serves both the university and the partners from industry.

In what follows, we analyze Antony's activities within the *MERge* model.

13.1 Management

Antony analyzed the changes related to the MOOC phenomenon and adopted the following managerial strategic decisions and actions:

- Antony promoted the cooperation of the university with one of the biggest MOOC platforms and signed business partnership agreement with this platform provider. This action led to the positioning of the university in line with top western universities and exposed the university to a massive number of potential learners around the globe (as it is well known, there is no way a university could reach such audience scale to present its strengths by its courses). In term of management, for Antony, it was strategic marketing decision. The outcomes of this decision were expressed in a variety of ways: public relation to the university, increase in student enrollment, and revenues from the enrollment to the MOOCs.
- Antony harnessed one of the university business partners to collaborate and support the MOOC production. By this, he motivated both faculty members of the university and the university industrial business partners to work together as a

team in a win–win situation. This strategic collaboration has led to the following outcomes from the university perspective:

- First, the university business partner financially supported the MOOC development, and therefore the university could produce it with professional production experts (video photographer and editors).
- Second, it established a potential revenue source for the development of additional MOOCs for other business partners, who seek quality training for their employees.

- He built a new professional team to support the MOOC production and through this channel developed the cooperation with the industry.
- One aspect of the cooperation was not addressed in advance. In the process of working together on the MOOC development, the team, which included a professor (the course lecturer), a project manager from the university, and a coordinator from the industry company, went through the predefined stages of the MOOC development. At some stage, the coordinator stated that some contents should be changed according to her demands. The professor did not accept this demand and a disagreement evolved within the team. It emphasized the need to clearly define the role and responsibilities of each side. Eventually, they solved the disagreement and the team continued working together as a team.

13.2   Education

Antony's managerial decisions promoted educational and pedagogical achievements as well. A MOOC is a new technological platform that requires a different pedagogical approach than the one traditionally applied in a traditional classroom. In other words, traditional pedagogical approaches simply do not work in MOOC-based leaning and teaching environments. We analyze this statement on the professor and the university levels, which complement each other.

1. **On the professor level**: MOOC development is a challenging project for the professor, which forces him or her to rethink and reflect on several pedagogical aspects, such as:

   - **Syllabus**: Though the MOOC is based on the syllabus of the course taught at the campus for undergraduate students, it cannot be borrowed as is to the MOOC platform. This fact is directly derived from the potential audience of the MOOC, which is significantly bigger and more heterogeneous than the audience of the campus course and consists of (a) everyone in the world, regardless prior education, who is interested in the topic and has an Internet connection, and (b) learners from the industrial partner. The course redesign led the professor to change the syllabus not only for the MOOC learning environment but also for the regular on-campus course. Accordingly, the professor updated the case studies, changed the portion of each subject according

   to its current recognized importance, and added and eliminated other
   subjects.
 • **Presentation and lecturing style**: The need to video the course led the pro-
   fessor rethink his or her presentation style. With the assistance of the project
   manager and the content experts from the MOOC platform provider, the pre-
   sentation style was changed, and computerized simulations and real tangible
   examples were added. Another aspect, which is a challenging one for many
   professors, is watching the video, which is not always accepted positively. In
   the said case, it led the professor to improve the presentation skills.

2. **On the university level**: This specific MOOC project added new perspectives to
   the discussion about innovative pedagogical approaches suited for the univer-
   sity, e.g., the *flipped classroom* approach. According to Bergmann and Sams
   (2012), "basically the concept of a flipped class is this: that which is traditionally
   done in class is now done at home, and that which is traditionally done as home-
   work is now completed in class." It means that students should learn by them-
   selves most of the theoretical material prior to class time, in order to dedicate the
   class time for practicing students' problem solving skills, clarifying subjects that
   should be further explained, and fostering student–teacher interaction. The
   MOOC project set the infrastructure for the implementation of this approach.
     Now, when most of the course materials were transferred into a MOOC for-
   mat, the professor could ask the students to watch the MOOC lessons prior to the
   class time and manage the class time in a different way. It actually changed the
   spirit of the discussions on innovative pedagogy in the university, from theoreti-
   cal to practical discourse. In other words, the innovative pedagogy was no more
   a theoretical issue but rather is applied in the university within the MOOC
   format.
     In a similar way, this project affected another pedagogical discussion—the
   need to adjust the syllabus in a way that prepares the graduate students in a better
   way for real-life situations. In the said case, although the professor found the
   work on the MOOC with the industry coordinator quite challenging and disrup-
   tive, he has eventually admitted that these issues should also have been discussed
   on the university level.

13.3   Research

Analysis of this case study from research aspects of the *MERge* model perspective
means to identify what research practices were applied in this case. Although the
MOOC development was not accompanied with a systematic process of data collec-
tion and analysis, Antony collected information by attending educational confer-
ences, reading research works, and subscribing to professional online magazines.
Specifically, two research aspects were expressed in this case:

1. The specific project is included in an ongoing research of the MOOC platform that focuses on student learning: what works and what does not. As part of this research, the university has the chance to decide which parameters should be examined in this specific MOOC. This type of research is a new and unique opportunity for the university since it enables the option to examine student learning with a huge number of learners, a research work which is impossible to carry out in the traditional university teaching setting. Moreover, it enables the university to compare its results with results of other MOOC initiatives developed in the world on this platform.
2. Antony believes and hopes that the new research opportunities will serve as a trigger for additional research works in the field of pedagogy as well as for further improvement in teaching methods in the university. As mentioned before, MOOC development is a process that requires the teacher to rethink the course syllabus, the way contents is delivered to students, etc. As soon as sufficient number of MOOCs will be offered by the university, Antony plans to promote an evaluation research work on MOOC-based learning and teaching processes.

13.4 Conclusion

As can be seen in this chapter, the *MERge* model fits for kinds of roles in the academia that traditionally are considered administrative. By carrying out these roles within the *MERge* model, both the individuals and the university benefit.

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Chapter 14
Academia: Administrative Staff–Research

This chapter examines the meta-profession of research from the perspective of the administrative staff of an academic institution. This role is usually called a lab manager or a chief engineer/scientists and is usually carried out by a scientist or an engineer, whose role is to be in charge of the ongoing work that takes place in the lab.

In most cases, this role is performed under the responsibility of a faculty member in a specific faculty. The faculty member decides on priorities, directions, and topics to be researched in the lab, raises funds for research, supervises his or her graduate students in the lab, and so on. However, the lab manager is responsible for the ongoing operation of the lab. This role description clearly emphasizes the importance of managerial skills for its performance. As the following examples show, the other two meta-professions—research and education—are also required, in addition, of course, to the disciplinary knowledge, on which the *MERge* model is based.

14.1 Analysis of the Lab Manager Role Within the *MERge* Model

Here is a role description of a lab manager that shows the relevant of the three aspects of the *MERge* model. It is an authentic ad, published by the Technion's Faculty of Education in Science and Technology for The Neurocognitive Center for Reading, Literacy and Language Development, whose primary researcher is Dr. Tzipi Horowitz–Kraus.[1]

First, the lab's activities are described: "The Neurocognitive Center for Reading, Literacy and Language Development focuses on establishing the neural circuits underlie reading development in children using a variety of neuroimaging

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[1] Presented here with Dr. Tzipi Horowitz–Kraus' permission

techniques. The center focuses on prevention, characterization and intervention of reading difficulties due to either neurologic or environmental sources. We are also interested in characterizing the neural basis for typical language and reading development."

Then, the following list of the role responsibilities is presented. The responsibility categorization shows the need for disciplinary knowledge (i.e., the professional knowledge), as well as some expertise in the three meta-professions of the *MERge* model. The order of the responsibilities is kept almost identical to that presented in the published ad. We omit several items due to their irrelevance for our context.

First, the role's professional requirements are described:

- Maintaining the labs IRBs
- Setting up the MRI, EEG, and other neuroimaging and neurocognitive facilities

Second, the responsibilities that reflect the accomplishment of the research meta-profession are outlined:

- Design and perform experiments, record, and analyze data.

  – Follow established research protocols.
  – Understand the scientific principles involved in the research.
  – Apply those principles to troubleshoot and modify procedures and techniques when appropriate.
  – Maintain accurate and detailed records of all laboratory work and experiments.
  – Analyze data and perform statistical and graphical data analysis.
  – Design and execute daily laboratory experiments in coordination with senior laboratory personnel.
  – Apply standard protocols to specific experiments.
  – Assist[2] in training postdoctoral fellows, graduate students, and junior laboratory personnel in laboratory techniques and equipment.
  – Direct undergraduate trainees in simple, well-established procedures.
  – Maintain an active role in laboratory's meetings, presentations, and publications.
  – Contribute material for reports, publications, journal articles, and abstracts.

- Development of research methods:

  – Utilize internal and external resources to reproduce, evaluate, research, and improve techniques, bring in new techniques or modify existing techniques, and evaluate innovative techniques.
  – Troubleshoot and correct erroneous results or problems with laboratory equipment.

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[2]The following two responsibilities are directly related to the education meta-profession required from the job. However, we left them in their original place to reflect (a) the mutual relationships between the three meta-professions and (b) the fact that these responsibilities can also be seen as research-oriented activities.

The requirements related to the management meta-profession are grouped in this ad under lab administration:

- **Lab administration:**
  - Maintain inventory of laboratory supplies and equipment.
  - Operate standard laboratory equipment. Willing and able to assist in daily operations of the laboratory including answering phone, maintaining lab supplies, organization, and cleanliness.
  - Maintain optimal protocol and assay accuracy by conducting regular quality checks. Provide appropriate safety monitoring checks as assigned.

In addition to the two education-related responsibilities presented under the research meta-profession, the education meta-profession is reflected in the following responsibilities grouped under leadership:

- **Leadership**:
  - May act as a mentor to more junior staff, serve as the contact for resolution of complex issues, and provide education, guidance, and work direction.
  - May provide input and feedback to managers on hiring decisions, professional development, and performance management.

Finally, the professional knowledge is highlighted once again under the "Required" category:

Required:

- PhD and at least 1 year of experience working full time in an independent research capacity
- or equivalent combination of education and experience in a designated and nationally recognized research environment evidenced by contributions to the peer-reviewed literature
- Experience with laboratory procedures, including instrumentation, quantitative skills, and neuroimaging
- Experience working with children in a neuroimaging environment

This example demonstrates very clearly the expression of the disciplinary knowledge as well as the meta-professional knowledge in management, education, and research required in order to accomplish successfully the role of a lab manager.

14.2   The Education Meta-profession in the Lab Manager Role

The expression of the management and research meta-professions in the lab manager role are driven directly from the role definition: the word lab indicates the research meta-profession and the word manager points at the management meta-profession.

As the above role description indicates, the education meta-profession gets also some attention in this role definition. In this section, we elaborate on the meta-profession of education in the lab manager role to highlight the tight connections between the three meta-professions—management, education, and research.

For this purpose, we describe several *education*-related activities that a lab manager can perform within the lab and beyond, in addition to the expected activities required from them as part of the role description (e.g., in the above example: directs undergraduate trainees in simple, well-established procedures).

First, lab managers can teach courses on the topic researched in their labs. In fact, based on the close familiarity of lab managers with the research topics explored in the lab they manage, these courses have the potential to be the most updated courses on the said topic. Furthermore, in these courses, new ideas for research can come up, and excellent graduate students can be identified as potential researchers for the lab. Since in many cases lab managers hold a PhD degree, they are also qualified administratively for a teaching position at the university.

Second, guiding students in capstone project course[3] is a common activity that lab managers carry out as part of their role, especially in science and engineering departments. Here, beyond the close familiarity of the lab manager with the research theme and topics explored in the lab, it is necessary that the lab manager will acquire pedagogical knowledge related to project-based learning.[4]

Third, a lab manager in the academia, who is exposed to the most cutting-edge research and development in the field, can teach courses in the *industry* on the topics explored in his or her lab. By doing so, he or she fosters informally technology transfer[5] between academia and industry.

Fourth, a lab manager can mentor new lab manager's works either in his or her field or related fields. Such activity can be broadened and includes the establishment of a forum of lab managers, who mutually contribute to the other forum members' knowledge and jointly foster the development of interdisciplinary knowledge and projects.

Finally, lab managers can host school pupils who are interested in the topics researched in the lab. In such cases, the lab manager can act as the corporate social responsibility (CSR)[6] representative of the faculty in which the lab is located.

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[3] See http://edglossary.org/capstone-project/

[4] Project-based learning research: annotated bibliography: http://www.edutopia.org/pbl-research-annotated-bibliography. See also Chap. 8.

[5] See Chap. 5.

[6] See Chap. 6.

Part V
First/Public Sector

- Chapter 15: Management
  - Head of a new authority for privacy and data protection in the Ministry of Justice office
- Chapter 16: Education
  - Head of the educational committee of a rural village's council
- Chapter 17: Research
  - The Chief Scientists forum in the Israeli government

First sector refers to a public service which is "provided by the government to people living within its jurisdiction, either directly (through the public sector) or by financing provision of services."[1] In the three chapters of this section of this Brief, we explore the *MERge* model by three role performances in the first/public sector and demonstrate the model implication by the role definition and performance.

Chapter 15 analyzes from the *MERge* perspective the case of the head of a new authority for privacy and data protection in a local Ministry of Justice focusing on the establishment process of the authority. The analysis shows how the *MERge* model helps achieve the goals and addresses challenges, which a manager in the public sector may face.

Keywords: *MERge* model, Professional development, Career planning, First sector, Public sector, Management, Education, research, Authority for privacy and data protection, Ministry of Justice

Chapter 16 presents the *MERge* model in the context of educational activities conducted under the responsibility of a local council of a rural village. This case illustrates the *MERge* model by the synergy created between three influential roles: (a)

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[1] *Source*: https://en.wikipedia.org/wiki/Public_service#cite_note-1

a mayor; (b) a council that puts education as one of its three top priorities, and (c) one of the council members who is in charge of the education committee in the city council. In this case, we illustrate how a well-established educational aspect is not sufficient for fostering an educational vision; rather, the managerial and research aspects of the *MERge* model should also be considered.

Chapter 17 presents the case of the Chief Scientists forum in the Israeli government. We analyze the CSO (chief scientist officer) forum activities within the framework of the *MERge* model and show that defining education as the common goal of all CSO offices may promote national goals. We also present the importance of managerial and research aspects in the role of the CSOs.

Chapter 15
First Sector: Management

During the decade of 1980, there was a move in OECD countries toward what was lately defined as "NPM[1]—New Public Management" (Hood, 1995).[2] The social background for this change process was "the pressure to become more efficient and effective, so as to reduce their demands on taxpayers, while maintaining the volume and quality of services supplied to the public" (Brignall & Modell, 2000). Obviously, these demands should be addressed by a shift in the management methods used in the public sector. As part of this challenge, the public sector should adjust itself to other worldwide economic changes, e.g., the emergence of information economy where "most of the economy, and the central nature of work, is involved in creating, processing, communicating, using, and evaluating information" (Rice, MacCreadie, & Chang, 2001). These two major challenges – NPM and the shift to information economy – are at the background of the case study presented in this chapter: the case of the establishment of a new authority for privacy and data protection in a local Ministry of Justice. We analyze the establishment process of this authority from the *MERge* perspective, showing how the model helps achieve NPM goals and meet challenges emerged by the information economy.

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[1] NPM refers to "…a management/development system that is utilized in companies, agencies and countries in their entirety. This system emphasizes the concept that ideas used in the private sector must be successful in the public sector" (Wikipedia: https://en.wikipedia.org/wiki/New_public_management).

[2] Hood (1995) defines seven dimensions of change with which NPM is associated, such as greater use within the public sector of management practices, more explicit and measurable standards of performance, and attempts to control public organizations according to preset output measures.

15.1   The Authority for Privacy and Data Protection

Information economies use extensively personal information. A tremendous amount of information exists in the world and it is growing rapidly (Cukier, 2010). Personal information, gathered by all kinds of technological tools over the Internet and mobile devices, forms a significant portion of the information.

The technology enables what is known as "behavioral profiling": data collection about a single entity in order to characterize behavioral patterns for the sake of supplying personalized services by commercialized bodies that seek to increase revenues (Castelluccia, 2012) as well as for personalizing medical treatment. Obviously, behavioral profiling can serve other purposes which may harm privacy (Cukier, 2010).

This chapter describes the Authority for Privacy and Data Protection in a developed western country. The main goal of the authority is to protect citizens' personal information by promoting legislation that supports privacy protection and enforcement of these laws.

In the following paragraphs, we present the process of establishing the new authority from the *MERge* perspective. In addition to the challenges that arose from the shift to NPL, information economy, and privacy issues, the head of the authority faced the challenge of building a new authority in the Ministry of Justice. These challenges mainly emphasize the managerial aspect; however, in this case study, we also present the contribution of the education and research aspects to the role of a manger in the first sector.

15.2   Management

As the head of the authority, Victor had to lead the initiative of building a new authority that deals with a new discipline in the Ministry of Justice of his country. From the managerial perspective, we focus on three issues:

1. Determining the nature and the leading concept(s) of the new authority;
2. Identifying and grabbing opportunities that promote and contribute to the establishment of the new authority;
3. Employing the right people.

15.2.1   Determining the Nature and the Leading Concept(s) of the New Authority

Establishing a new unit/organization entails the definition of the goals and the nature of the organization. Based on the analysis of the authority's needs and goals, Victor and his staff defined the concept of the authority in a way that provides it an enforcement power. They realized that in order to protect the citizens' privacy rights in their own society and economy, it is crucial that the authority would have enforcement power.

15.2.2   Identifying and Grabbing Opportunities

As a new manager at the Ministry of Justice, Victor decided to examine every meeting request, invitation, and connection with other parties as an opportunity rather than as a burden. One of these opportunities was an invitation to participate in a meeting in the Ministry of Foreign Affairs. In this meeting, he learned about the general idea of ENP—European Neighborhood Policy: "Through its European Neighborhood Policy (ENP), the EU works with its southern and eastern neighbors to achieve the closest possible political association and the greatest possible degree of economic integration. This goal builds on common interests and on values—democracy, the rule of law, respect for human rights, and social cohesion. The ENP is a key part of the European Union's foreign policy."[3] Victor understood that membership in the ENP may promote international relations as well as fund-raising and volunteered to be the first to join the initiative.

Through this initiative, Victor learned about the concept of "twinning projects" which is the "instrument for institutional cooperation between Public Administrations of EU Member States (MS) and of beneficiary countries (BC)."[4] Victor took the strategic decision to join the twinning project. Thus, he demonstrated a managerial decision that enabled the authority to receive services and guidance from the best international experts without spending financial resources. This decision served the educational and research aspects of the *MERge* model as well, as is further discussed below.

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[3] *Source*: http://eeas.europa.eu/enp/

[4] *Source*: http://ec.europa.eu/enlargement/tenders/twinning/index_en.htm

15.2.3   Employing the Right People

As mentioned in Chap. 3—Management—two of the most essential managerial skills are decision-making and motivating other people. In the spirit of Collins (2001), hiring experts to the new authority was therefore a success key factor. However, hiring experts to work in the public sector might be difficult, since salary rates are relatively low in comparison to the private sector. The managerial challenge was to hire self-motivated talented employees who are willing to join the new initiative with enthusiasm. Victor interviewed candidates from the Ministry of Justice and, in addition, invested efforts in hiring people from outside the Ministry of Justice, that is, from the private sector. He wanted to create a balance of employees, who, on the one hand, have the relevant professional experience from the Ministry of Justice, together with employees who bring different spirit than that of the public sector, on the other.

Eventually, Victor recruited a group of highly devoted practitioners who were committed to the authority, the new initiative, and himself as the manager; therefore, Victor could motivate them.

15.3   Education

As mentioned above, Victor's decision to join the twinning project was a strategic step from a managerial point of view. However, as it turned out, it had also several educational implications. Specifically, the membership in the twinning project enabled:

– Victor's team to participate in professional seminars and conferences with the MS parties;
– Mentoring meetings with the MS experts;
– Visits to other well-established Data Protection European Authorities;
– A direct channel communication between the authority's managers and the European colleagues for future consultant and cooperation.

Thus, the twinning project served as a training process that established the professional knowledge baseline of the authority staff. Specifically, the authority's employees, who did not have any experience in privacy and data protection subjects, went through a project-based learning (PBL)[5] process guided by leading European experts.

In addition to the participation in the twinning project, Victor decided to foster a culture of a learning organization. He established a routine of weekly presentations by the employees. Specifically, each Thursday, one employee presents a movie related to privacy, data protection, or another relevant issue. In the presentation, the

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[5] See Chap. 16.

employee explains the connection to the authority activities and adds a new perspective of the presented issue/subject open for discussion. This way, learning processes are fostered both during the preparation process of the presentation (by the presenter) and by all the other employees, who get the opportunity to be exposed on a weekly basis to a new perspective of their day-to-day professional routines.

15.4   Research

The process of choosing the MS for the twinning project was managed as a tender. The authority received several proposals from potential MS and it had to choose the best proposal that fits its goals.

In order to be able to examine the proposals, Victor carried out several research activities to learn about the potential MS with which he will eventually cooperate. Specifically, he examined which MS has the relevant experience in term of several factors:

- Same governance system (which has a direct influence on privacy laws);
- Years of experience as a data protection authority;
- Reputation of having excellent data protection experts;
- An MS that will be willing to cooperate with other MSs from another countries (in order to gain a wide perspective on international data protection aspects);
- Logistics issues, such as geographical distance.

When Victor received the proposals, he had already gained a comprehensive information basis about the different MSs. Thus, the research work supported his managerial decision in choosing the MSs.

Eventually, the Ministry of Justice, represented by this Authority, has gained from the European directive an European recognition for adequacy regarding data protection.[6]

15.5   Summary

The process described in this chapter involved all *MERge* aspects and demonstrated the *MERge* model's fitness for managerial roles in the first sector as well. In general, it is proposed that this management style should be adopted in order to ensure sustainability of quality and learning organization culture that fits the demands of NPM in the information economics.

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[6] See the European directive on the protection of individuals with regard to the processing of personal data and the free movement of such data: https://www.dataprotection.ie/docs/EU-Directive-95-46-EC/89.htm

We conclude by mentioning public health organizations. It is an illustrative example of a managerial issue in public sector organizations since many managers in the healthcare system have a medical background, rather than management or education background (Gardiner, 2011). Therefore, while the *research* aspect is inherently rooted within the role of managers of medical organization, the *MERge* model proposes that these managers should continuously *learn management* practices.

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Chapter 16
First Sector: Education

This chapter presents the *MERge* model in the context of educational activities conducted under the responsibility of a local council of a rural village. This case illustrates the *MERge* model by the synergy between three entities: (a) a mayor with a well-defined vision; (b) a council that believes that the local authority should provide it's residents with the best services, where education is one of the top three priorities; and (c) one of the council members who is in charge of the education committee of the city council.

The mayor, who has only recently been elected to his first term as the mayor of this village, knew that despite his more than 30 years of experience as a senior commander in the army, he could not be the expert of all aspects included in his role. Like the case of the mayor of Madison in 1983, he decided to produce a culture of quality in the council and "drive out fear and license more workers to solve problems" (Sensenbrenner, 1991). Accordingly, one of the managerial actions he carried out was to revive the professional council committees. The education committee is the focus of this chapter, specifically, Nancy—the head of this committee.

Nancy is a mother of three children, who are 4, 8, and 16 years old. She is deeply involved in the local education system both as a mother of three children, and as an expert in parents training-guiding parents how to deal with challenges associated with raising kids.

The elected mayor asked Nancy to join his party, to serve as a council member, and to lead the education committee. Nancy agreed to join.

Nancy's first step was to define the essence of the committee's activities. Education committees in a governing authority may have different flavors, pending on many factors, such as the local government system and the authority level which the committee serves (e.g., the country level, a city, or a town).

Here are two examples of committees that operate on the country level. The education committee of the UK parliament defines its role as follows: "The Education Committee monitors the policy, administration and spending of the Department for Education and its associated arms length bodies, including

Ofsted."[1,2] The US House Education and the Workforce Committee also serves as a monitoring committee that "oversees programs that affect hundreds of millions of Americans—from school teachers and small business owners to students and retirees."[3] These examples represent possible natures of this kind of committees.

In comparison, our case study deals with an education committee of a small scale, and Nancy had to decide whether to lead a monitor committee that only monitors the council education department or rather to lead a proactive committee that also initiates educational activities. Nancy chose to establish a committee with the later orientation; that is, to lead a committee that will be a source for educational initiatives and will proactively promote local educational issues that fit the council's agenda.

We now turn to analyze Nancy's actions in this educational role in the context of the *MERge* model, including its management, education, and research aspects. As we shall see, Nancy did not succeed in all these aspects, a fact that directly influenced the committee's impact and highlighted the potential contribution of the *MERge* model to the accomplishment of Nancy's role. In general, this case stressed the suitability of the *MERge* model also in the context of educational roles in the public sector.

16.1   Analysis of the Role of Education Committee Head from the Management Perspective

Nancy's role can be perceived as a *managerial* role since she was chosen to lead and to head the committee. However, we perceive this role as an educational role since the committee and Nancy herself are not in the position of a formal decision and policy maker.

The first goal was to build the village education vision for the next 5 years. For this purpose, Nancy gathered the first meeting of the committee. She invited more than 50 people from the village to participate in the first committee meeting. Among the invitees were the local schools' principals and teachers, kindergarten teachers, local residents who work in the field of education, and other residents who are interested in the local education activities.

From the *managerial* perspective, Nancy successfully fostered engagement among the group members by the implementation of three entrepreneurial government principles (Osborne, 1993):

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[1] The UK parliament education committee: http://www.parliament.uk/business/committees/committees-a-z/commons-select/education-committee/role/

[2] Ofsted is the Office for Standards in Education, Children's Services and Skills: https://www.gov.uk/government/organisations/ofsted/about

[3] The US House Education and the Workforce Committee: http://edworkforce.house.gov/committee/welcomemessage.htm

1. **Mission driven**: The committee must act in conformity with the local council rules but, unlike other departments in the council, was not limited in defining its goals and mission. The stronger drive of the committee was the establishment and promotion of the village educational vision.
2. **Community owned**: The control of the local education department services was transferred from the bureaucracy to the community. The community representatives in the committee had an equal opportunity to affect the council educational agenda. This opportunity empowered the local community, fostered its high involvement and engagement, and gained the community's trust and commitment.
3. **Results oriented**: Traditional public institutions focus almost exclusively on inputs. By establishing the committee in the above-described way, Nancy placed the focus on the *results*, instead of being a committee that monitors the education department and its affiliated organizations (schools, kindergartens, etc.) and depends on their activities. As the input of its activities, the committee focused on the outcomes of its mission.

From the managerial perspective, Nancy succeeds in motivating people to act and in fostering the local community engagement. She also inspires the agile spirit as is described in Sect. 6.1 of this Brief: "transparency and trust, and role definitions that inspire responsibility and accountability for the project success form all team members." Specifically, transparency and trust are built in the activity of the committee and each member has a role definition.

However, these actions are not sufficient in order to create and maintain a feasible and sustainable committee involvement. Within two months after the first meeting of the committee, almost half of the members left the committee. Nancy needs a managerial tool—a mechanism that will ensure a continuous activity. She lacks the managerial experience and knowledge needed to manage an activity that is largely based on volunteers' motivation.

16.2   Analysis of the Role of Education Committee Head from the Education Perspective

From the *educational* perspective, Nancy implements teaching and mentoring methods in the facilitation of the committee's activities. The definition process of the village education vision was similar to that of a project-based learning (PBL) process. Just like in a PBL process, where students are motivated to pursue solution to problems by implementing investigation methods—collect and analyze data, design solution alternatives, and communicate their solution (Blumenfeld et al., 1991)—the committee members went through a PBL process. They worked on defining the village education vision, a real-life problem, by collecting data with the help of outsourcing services that conducted survey among the village citizens, asking what should be the main themes of the village education vision. They also

analyzed the data, debated about it in the committee forum, communicated different alternatives for the vision, and sketched a draft of the vision. As can be seen, this process is guided by essential features of PBL (Blumenfeld et al., 1991).

Specifically, Nancy's experience as a parent–trainer helped her in this process. She acted as an instructor who guides the committee members. She applied PBL-oriented teaching methods in fostering the committee activities, and accordingly, the committee members experienced a learning process, which was characterized by knowledge sharing and open planning sessions. Although the committee included educational experts, such as schools' principals and teachers and professional experts (people from the community) in learning content design, university professors, and managers from the education sectors, the atmosphere in the committee meeting established a learning process (as opposed to the case of seeking the help of experts, who are presented as the authority of knowledge and as the providers of the right solutions).

16.3   Analysis of the Role of Education Committee Head from the Research Perspective

The committee activity lacks *research* aspects. Although, as mentioned, the vision definition process was supported by data gathered by a citizen survey, it was *not* conducted by common research methods but, rather, as a tool for getting answers for specific (mainly demographic) questions. As a result, the survey findings were not used effectively and a clear vision of what the public thinks about the educational vision of the village was not identified. Research practices would enable Nancy to harness the efforts invested in the data collection and to use it more efficiently.

Had Nancy been aware of research qualities, she would probably put much more effort in building a questionnaire that would support the goal of getting the citizens' wishes and thoughts with respect to the council education vision, including a deep and thorough data analysis process. She would probably also collect data with additional tools, e.g., interviews and observations in the schools.

Another aspect of research that was missed in this case is a literature review. This stage, which provides the theoretical baseline and enables to refine the research questions—the vision in this case—could have exposed Nancy to what has already been done in such cases in other places in the world and guided the committee members in more constructive directions.

As a result, the committee actively promoted the implementation of the vision but faces the challenge of establishing its activity as a sustainable process.

16.4 Conclusion

From the *MERge* model perspective, it is clear that just a well-established educational aspect is not sufficient for fostering an educational vision. Although several managerial aspects were manifested in this case, the lack of tools for managing a group of a volunteer-based initiative led to instability in the committee activities.

To address these managerial problems, the head of the committee should have adopted a managerial strategy that would help her get the most out of the volunteers without being dependent on them. Several principles could have been implemented as part of this strategy:

1. **Work plan/activities types.** The committee's work plan should have included two types of clearly defined activities: activities that are based on volunteers and activities that are based on outsourcing services and/or on the council's relevant employees.
2. **Work plan/time planning.** The time planning should have taken into consideration the fact the volunteers have time constraints; therefore, the activities that are based on volunteers should have been coordinated by them. Time slots for these activities should be short and should not harm the volunteers' commitment to their work, families, etc.
3. **Different groups of volunteers.** A classification of the volunteers according to their level of commitment would allow Nancy to use this resource more efficiently. Instead of harnessing all the volunteers all the time, such a classification would have helped Nancy decide who to approach when she needs a specific help. This way she could avoid giving some volunteers the feeling that the demand is too intensive, a feeling that eventually led them to decide to quit their involvement in this volunteering activity. In other words, balancing the workload between volunteers would have helped keeping them in the project without giving them bad or a feling of free–riders, if they could not participate intensively in the accomplishment of all tasks.
4. **Map the volunteers' skills.** Another crucial managerial action is using the human capital in a way that fits people' skills and desires. This strategy may enhance work efficiency and foster volunteers' sense of satisfaction. For example, in order to address the problems related to the research aspect, Nancy could assign one of the volunteers, who has research skills and experience, to suggest a research plan for the data collection and analysis.

In conclusion, from the *MERge* perspective, it is clear that management, education, and research aspects are crucial for the creation of sustainable solutions in the first sector also in topics related to educational subjects.

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Chapter 17
First Sector: Research

In Chap. 8 of this Brief, we explored connections between research and innovation in the industry. We mentioned two primary research tasks that are carried out in the industry: development of new products and carrying out applied research in scientific or technological fields, which may facilitate future product development. Research and development (R&D) departments are responsible for these tasks and are usually managed by a chief scientist officer (CSO).

In this chapter, we explore the CSO position in the first sector. Specifically, we analyze the chief scientists' forum in the Israeli government. We base our analysis on the forum 2013 annual report. Since the report is written in Hebrew, quotes from it are translated for the analysis presented here.

17.1 The Forum and the Chief Scientists

In Israel, each ministry office—Ministry of Health, Ministry of Education, Ministry of Agriculture, etc.—as well as other governmental units, such as the Central Bureau of Statistics, has a CSO. The main role of the CSOs in these offices is to promote and lead the office's involvement in research activities related to its discipline. Specifically, CSOs promote research works by "calls for research proposals," funding, international cooperation, relevant regulations that support research projects, etc.

All CSOs are members of the chief scientists' forum. The head of the forum is the CSO of the Ministry of Science, Technology and Space. The main role of the forum is to coordinate the government offices' research programs and to promote R&D governmental programs. Accordingly, the work of this forum focuses on activities related to the CSOs' role in the public sector as policy makers related to scientific R&D activities.

In what follows, we analyze the forum activities within the *MERge* model.

17.2 Management

In 2014, when the forum's 2013 report was discussed, it turned out that the forum did not achieve its goals. At that time (June 2014), when a decline in R&D activities was observed, Mr. Yaakov Peri, the Minister of Science, Technology and Space, who was in charge of the forum, expressed his concerns and dissatisfaction from the forum's work and achievements. He also stated that the cooperation between the CSOs from the different offices did not meet the expectations.

From the managerial point of view, the forum needed a manager who will lead the forum proactively, although each CSO is associated to a different office.

From the managerial aspects, the challenges are:

- For the minister, to allocate time resources in order to express his support and accountability for the CSOs' work
- For the head of the forum, the main activities should focus on:
    - Motivating the other CSOs from the other offices, even though he or she is not their direct manager in the public sector
    - Setting new working standards and routines that promote and enable cooperation of CSOs from different offices

17.3 Education

There are many educational methodologies to create a "learning organization"; however, in this case specifically, because it deals with the public sector, we assert that the most important thing is to define education as one of the goals of the forum. Specifically, the forum can promote education in several ways, such as:

- A declaration that education is the common ground of all offices. Not only it creates and fosters the basis for cooperation between the different offices, but also promotes R&D activities.
- A presentation of education as a driving force for R&D activities as it is presented in NASA statement: "NASA's journeys into air and space have deepened humankind's understanding of the universe, advanced technology breakthroughs, enhanced air travel safety and security, and expanded the frontiers of scientific research. **These accomplishments share a common genesis: education.**"[1] In other words, this quote indicates that education promotes research.

Approaching education as the common goal of all CSO offices may enable the head of the forum to establish a shared target that fosters cooperation and collaboration between the different offices, enhances a common discourse and terminology, and, consequently, promotes a national goal.

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[1] *Source*: https://www.nasa.gov/offices/education/programs/gen_overview.html; our emphasis is added.

17.4   Research

The 2013 forum report describes the need for well-established, quality and financially wise, governmental research institutes, as a tool to preserve scientific and technological achievements. Similarly to the industry, research institutes in the first sectors conceive their main goals in a variety of ways; many of them refer to connections between research activities and the role of research in fostering economic prosperity by different means, such as technology transfer and research results which are supplied to policy makers as a foundation for decision-making processes.

Accordingly, managers in CSO offices should make decisions based on evidence-based research but, in some cases, do not have resources, capabilities, and qualified team to conduct methodological research. Therefore, external research institutes, such as SNI—the Samuel Neaman Institute for National Policy Research, Taub Center—as well as other research organizations, provide the CSOs their needs. We present two such research institutes which are Non-Profit Non-Geverment Organizations (NGOs).

17.4.1   The Samuel Neaman Institute for National Policy Research: SNI

The "Samuel Neaman Institute for National Policy Research" (SNI) is an independent public–policy research institute, established in 1978 to assist in the search for solutions to national problems in science and technology, education, economy and industry, and social development."[2] The vision of SNI is "To promote informed national decisions in Israel through research and analysis of well-established information."[3]

The SNI is not a policy-making institute, but rather a research non-profit NGO; accordingly, its research team members are professional in their field with research qualifications. SNI research activities include publication of research conducted in various fields (such as science, technology, industry, economy, and human capital), study days, seminars, and participation of its researchers in conferences in Israel and abroad. Outcomes of the research activities serve managers in the government, industry, and academia as a decision-making tool. One illustrative example is the Ultra-orthodox (U-O) Integration Project[4] whose target is to explore and promote the integration of the Israeli ultra-orthodox population in the country's economy. Fortunately, the project recommendations strongly influence policy makers and leaders in the ultra-orthodox community in Israel.

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[2] *Source*: http://www.neaman.org.il/en/

[3] *Source*: http://www.neaman.org.il/about

[4] See: http://www.neaman.org.il/Neaman2011/Templates/showpage.asp?DBID=1&LNGID=1&TMID=580&FID=964&IID=811

17.4.2   Taub Center

The "Taub Center for Social Policy Studies in Israel" is another example of a research institute whose mission is "conducting high-quality, impartial research on socioeconomic conditions in Israel." It "develops innovative, equitable and practical options for macro public policies that advance the well-being of Israelis. The Center strives to influence public policy through direct communications with policy makers and by enriching the public debate that accompanies the decision making process."[5]

As can be seen, SNI and Taub Center, as non-profit NGOs independent research institutes, support the research component of the *MERge* model in governmental institutions.

17.5   Summary

Analysis of the CSO forum within the *MERge* model framework clearly reveals that managerial challenges in the first sector are very prevalent. Specifically, it is clear that the CSOs are aware of the research aspects but need some managerial guidance to be able to implement research practices in their daily roles as CSOs. Moreover, we assert that education should be the common thread between CSOs that work at the same organization.

Recently, an ad for the role of CSO was published in the Israeli press. It seeks a chief scientist for the Office of Public Security[6] and illustrates very vividly the appropriateness of the *MERge* model for this role. Specifically, the ad refers to all components of the *MERge* model:

- Managerial aspects of the role, e.g., manage and operate a pool of researchers and external advisors who support and carry out research works, manage the scientific publication of these research works, and follow up work plans and existing projects).
- Educational aspects of the role, e.g., representation of the office in professional and scientific fora in Israel and abroad
- Research aspects of the role, e.g., initiation and coordination of research works, and development of research methodologies as well as their integration in the public security systems.

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[5] *Source*: http://taubcenter.org.il/mission-vision-2/

[6] See http://mops.gov.il/About/Tenders/Pages/KK_ChiefScientist_7.12.15.aspx

Part VI
Epilogue

In the following two chapters that conclude this Brief, we focus on the implementation of the *MERge* model from two perspectives.

Chapter 18 describes possible implications of the *MERge* model for academic and industrial training. We divide this chapter into four sections:

- Undergraduate programs
- Graduate studies and professional development programs
- Academic staff: faculty members, administrative staff, adjuncts, and researchers
- Industrial professional development programs

Keywords: *MERge* model, Professional development, Career planning, Management, Education, Research, Undergraduate programs, Graduate studies, Academic staff, Faculty members, Administrative staff, Adjunct lecturers, Researchers, Industrial professional development programs

Chapter 19 provides readers with a practical toolkit to implement the *MERge* model in an iterative process based on four stages: Pre-*MERge* Analysis, Implementation, Evaluation, and Ongoing *MERge*.

Keywords: *MERge* model, Professional development, Career planning, Management, Education, Research, Toolkit, *MERge*-analysis, *MERge*-implementation, *MERge*-evaluation

Chapter 18
Implications of the *MERge* Model for Academic and Beyond–Academic Education

So far, we illustrate the suitability of the *MERge* model for the public sector, industry, and the academia. Based on our arguments related to the suitability of the *MERge* model for these sectors, the question that should be asked is: how can practitioners in these sectors be prepared for the implementation of the *MERge* model? To answer this question, in this chapter, we present possible implications of the *MERge* model for academic and industrial training. We divide this chapter into four sections:

– Undergraduate programs
– Graduate studies and professional development programs
– Academic staff: faculty members, administrative staff, adjuncts, and researchers
– Industrial professional development programs

In more details, we analyze undergraduate studies, MBA programs, teacher certification programs, and graduate studies. We argue that most of them tend to emphasize either one of the components of the *MERge* model or none of them. For example, MBA programs emphasize the management component; teacher certification programs emphasize the education aspect; and graduate studies emphasize the research facet. We also examine possible application of the *MERge* model for academic faculty members training, which is sometimes neglected, as well as training and development programs in the industry for managers and employees. Preliminary thoughts about the subjects were published in Hazzan (2015).

As was illustrated in previous chapters, we suggest that in all these programs and frameworks, components of the *MERge* model should be integrated. The rational is simple: management, education, and research skills are important in all sectors since:

1. It is impossible to predict one's professional path.
2. The common tendency exists today to develop several careers.

3. As has been illustrated in the Brief, *MERge* skills are important also for the navigation itself between careers. Accordingly, students may gain some benefit from their exposure to the elements of the *MERge* model in some format earlier in their studies.

We note that for all our suggestion with respect to the teaching of the *MERge* model, it is recommended to integrate hands-on, active-learning teaching methods (e.g., real-life problem/project-based learning, peer teaching, and reflection) and, as much as possible, to avoid lecturing about it. This suggestion results from the fact that such topics are better learned and encapsulated when they are based on learners' experience.

18.1   Implications of the *MERge* Model for Undergraduate Studies

In this section, we present the implications of the *MERge* model in higher education by exploring undergraduate studies. Since one of the *MERge* model working assumptions is that in order to implement the *MERge* model, one has to gain first some profession, we relate only to academic degrees that educate toward a profession that enables the graduate students to get a job related to this profession, e.g., engineers[1] and social workers.

In most cases, undergraduate education consists of the theoretical components of the discipline: science, engineering, law, etc. Indeed, this content is important and essential as the basis of the profession. However, if the *MERge* perspective is adopted, the three meta-profession can be expressed in these programs as well. The components of the *MERge* model can be presented in a variety of ways:

- As a theory i.e., a course(s) on management, education, and research
- By applying the active learning approach when students actually apply the *MERge* model and reflect on their action)
- By combining the teaching of theory with the application of the *MERge* model in the context of specific actions and/or a project

The approach which fosters students' application of the *MERge* model in context has several advantages.

Consider, for example, the integration of the *MERge* mode as part of a capstone course which students develop in their last year of engineering studies. In this course, students develop a project in teams by implementing what they have learned

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[1] Jim Plummer, Dean of Stanford School of Engineering, presents a similar idea in the context of science and engineering undergraduate education, which he calls T-shaped people. The vertical part of the T refers to "depth of knowledge" in a technical discipline, and the horizontal part of the T shape refers to the "breadth of knowledge about entrepreneurship, creativity, and innovation." See his talk on *Educating Engineers and Scientists For The 21st Century* talk in JUNBA 2013 on January 11, 2013: http://www.junba.org/images/junba2013photo/slide0102_plummer.pdf.

in previous year and, if needed, learn new material needed for the project development. Sometimes, the project is developed for a specific customer; sometimes, the project requirements are defined by the lectures.

The teamwork components clearly require the inclusion of the management component of the *MERge* model. It is expressed in the form of time management, role definition, task allocation, integration, budget (if available), and leadership. If a customer is involved, the management component includes also the relations with the customer. Since the students develop a project in which they should solve an open, real-life problem, find relevant information, share knowledge, use the knowledge they learned in the disciplinary courses, and integrate knowledge from different resources. The education component of the *MERge* model has a major role as well. Finally, the research component of the *MERge* model becomes relevant in such projects since:

1. The kind of problems on which the student work in capstone courses usually have more than one solution, and therefore, the relevant advantages of each option should be explored.
2. The product developed in these courses should be tested and work properly. For this purpose, the students should design experiments that indicate if the project meets the requirements and works properly. Sometimes, in such exploration processes, beyond the problem-solving process, students find new discoveries.

Another way to promote the *MERge* model in undergraduate education is by offering students a course which fosters reflection on their industry experience (if they work in parallel to their studies). In this course, students can bring managerial, educational, and research challenges they experience in their work and, in the course, in a facilitated reflective process, are guided on how to tackle them.[2]

A more condense format for the introduction of the *MERge* model is in one lecture in which the model principles are presented, and for each component, one practice is illustrated. For example, for management, time management is discussed; for education, the reflection skill is practiced; and for research, the skill of interviewing is demonstrated.

We conclude by noting the relevance of the *MERge* model especially for science and engineering professions, since "Engineering is the application of mathematics, empirical evidence and scientific, economic, social, and practical knowledge in order to invent, design, build, maintain, research, and improve structures, machines, tools, systems, components, materials, and processes."[3] As can be seen, the professional practices integrated in engineering processes call for a natural integration of the *MERge* model in such processes.

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[2] The following quote is taken from a student's reflection who participated in the development process of a huge project carried out as part of a capstone course. It is the second year in which she participated in the project. Note her use of manage, educate, and research: "Another responsibility that I havein the project is to *manage*, create, and present the business presentation. […] This role feels a bit more like a *management* position because I will need to advise throughout the project – almost as a project manager. […] It will be my job to be a teacher for them [new members] and help *educate* the new members, such as Shon who asked me a few questions on how to build an effective Business presentation. I will [also] be an integral part of their *research*."

[3] *Source*: https://en.wikipedia.org/wiki/Engineering

Table 18.1 Postgraduate programs' emphasis of the *MERge* components

MERge component	Management	Education	Research
Regular graduate studies who write a research thesis			+
MBA	+		
Teaching certificate		+	

18.2   Implications of the *MERge* Model for Graduate Studies and Professional Development Graduate Programs

Regular graduate students do research and become experts in research; MBA programs are expert in management; and graduates of teaching certificate program are expert in education. Table 18.1 shows the current emphasis of each program.

In what follows we present possible ways to integrate the *MERge* model in these programs. In addition, we present the result of a survey we conducted at the Technion – Israel Institute of Technology which highlights students' awareness of the potential contribution of the components of the *MERge* model for their future professional development.

18.2.1   MBA Programs

An examination of MBA programs reveals that, not surprisingly, in most cases, the management component of the *MERge* model is mainly (and sometimes, solely) addressed. However, if the *MERge* perspective is adopted, it is just natural to add to these programs the education and research components of the model. As has been illustrated so far in this Brief, such skills are important whether the MBA graduates work in industry, first sector, or academia. As in the case of undergraduate programs, there are several ways to integrate all components of the *MERge* model in MBA programs. We lay out one option.

Since MBA students usually work in the industry, academia, or the public sector in parallel to their studies, they can be asked to focus on their workplace. Specifically, students can be offered to analyze their job from the *MERge* perspective and to identify situations in which managerial, education, and research aspects can be implemented. Then, they can be asked to implement the *MERge* perspective and explain if—and if yes—how managerial orientation, educational and learning processes, and research practices can contribute and benefit their role accomplishments. Finally, students present their *MERge*-based analysis of their organizational role in front of their classmates to increase knowledge sharing between different roles and workplaces. Such experience may improve job performance and satisfaction as well as presentation skills.

18.2.2 *Teacher Certification Programs*

Teacher certification programs provide the certificate to teach in the formal education system of a country. It is studied in parallel to an undergraduate degree or after graduation. Naturally, teacher certification programs emphasize the education component of *MERge*. However, recently, more and more programs integrate into their curriculum an action research (Darling-Hammond, 2006; Lewin, 1946) component, which requires prospective teachers (or practitioners, in general) to examine their teaching (or professional, in general) processes in order to keep improving their performance. Action research is based on an iterative process that enables to adjust and check each small change in the work process. Such changes reflect the working assumption that a practitioner can keep improving his or her professional work in all stages of the career development.

The *MERge* model proposes that teacher preparation programs should contain also some management component. The managerial approach can be applied in educational settings in a similar way to that of the dual-ladder promotion process[4] offered in industry. In the education system, it means that one can be promoted either in the hierarchal administrative track (e.g., as a school principal, or in the high school system, as a coordinator of a subject) or in the professional track, as an expert in teaching the subject(s) he or she teaches or in some other educational aspect (e.g., teaching methods, evaluation, online teaching, etc.).

The usability of the management component of the *MERge* model in the administrative path in the educational system is clear and straightforward. Therefore, we briefly elaborate on the usability of the management component of the *MERge* model in the case of a teacher who seeks promotion in the professional track and aspire, for example, to manage the development of new learning material, educate and mentor new teachers, or research new teaching ideas he or she has developed. The *MERge* model proposes a new profile for these teachers, which is based on *MERging* managerial, educational, and research knowledge. We note that this perspective is useful also in each single lesson, where a teacher must manage the time, educate the pupils, and research the learning and teaching process. This perspective, we believe, may have direct application for teacher training programs where frequently the education component of *MERge* is (sometimes solely) emphasized.

An introductory exposure to a management perspective of the teaching profession may hint the prospective teachers the wide range of opportunities available in the education system which invites varied ways of expression of diverse teacher population. Clearly, when one wishes to pursue a career in a specific direction, additional training program is needed. Nevertheless, this exposure may increase the prospective teachers' awareness for the option to consider a long-term planning of their professional development in the education system in a way that their contribution to the system will be meaningful in additional ways.

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[4] The dual-ladder promotion process is a metaphor for job promotion, which means that one can be promoted either in the administrative track or in the professional one.

The *Views* program presented in Chap. 9 (management aspect of faculty members) partially reflects the realization that students' previous managerial experience in the industry is highly relevant for the teaching profession as well.

18.2.3   Graduate Studies

The target of graduate studies is to practice the research skill in order to be professional researchers, who contribute to the humanity's knowledge. The Master's degree aims at practicing the research skill; in doctoral studies, students apply this skill and perform an innovative research. Both degrees are carried out by the supervision of a professor who has already gained research experience. The research is summarized in a thesis and/or is published in a professional journal in order to disseminate the research new findings.

In recent years, a different kind of Master' degree is offered, whose aim is to broaden practitioners' professional knowledge and to enable them to gain new skills, whose importance is acknowledged in the twenty-first century. In these degrees, learners do not perform a research study. An MBA program is an example for such a study program.

From the *MERge* model perspective, we argue that students, who chose in the research thesis path, should also gain also some education and management skills. The rationale is simple and is based on all the previous chapters presented in this Brief—these skills are important both for the process of thesis development and writing and for the navigation in one's professional development route after the thesis is completed.

In general, we argue that no matter what kind of a graduate degree one learns, graduate students should learn additional skills that promote practitioners' competitive advantages in the workplace. Similar messages are sent by other scholars as well. For example, Marcia McNutt, on her 16 May 2014 *Science*' EDITORIAL, Think Outside the Lab, *Think Outside the Lab*, argues that "According to an NSF survey, in 2008 only 16 % of Ph.D.'s in science, engineering, and health fields held positions in academia within 3 years of earning a doctorate. Prospects for employment can be improved, however, for STEM Ph.D.'s who make a concerted effort to learn about positions outside the lab and prepare themselves for alternative paths."

Holly Else, in her Honesty about Academic Jobs column, published in *Inside Higher Ed* on December 19, 2014, suggests that: "Universities should have a "proper dialogue" with Ph.D. students from the start about the fact that they are "not walking into a job for life." This view is further strengthened by Dame Athene Donald, head of a Royal Society working group, that published new guidelines—*Doctoral Students' Career Expectations: Principles and Responsibilities*[5]—for doctoral candidate development. The guidelines give a clear statement about the

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[5] See https://royalsociety.org/~/media/policy/projects/doctoral-students/doctoral-students-career-expectations-principles-responsibilities.pdf

role of universities in managing the expectations of junior scientists at a time when competition for academic jobs has never been fiercer. According to the document, students should also take responsibility for establishing and managing their own career expectations.

Universities acknowledge this new line of thoughts and provide different programs to accomplish it. For example, Cornell University offers the BEST (Broadening Experiences in Scientific Training) program[6] aiming at "Rethinking training for Cornell STEM graduate (Ph.D.) students and postdoctoral scholars… why? Because a majority of us will end up working beyond academia. It's time to rethink, retrain, and be ready for tomorrow's careers."

18.2.3.1   Technion Workshops for the Expansion of Employment Opportunities Within the *MERge* Framework[7]

Similar to Cornell BEST program, the Technion (the institute of the authors of this Brief) initiated a set of workshops that exposed graduate students to the three meta-profession of the *MERge* model. In this subsection we describe this initiative.

We first approached the Technion graduate students as well as alumni of the graduate school from the last 10 years, in order to identify their needs and desire for additional opportunities in the job market. As it turns out, the graduate students are aware of the need to include the *MERge* meta-professions in their education. The survey was conducted in September 2014 in collaboration with the Technion graduate school and management.

Questionnaires were distributed to the following populations: current master students (345 responses), current doctoral students (317 responses), and alumni (219 responses). See Table 18.2. Students and alumni from all Technion faculties answered the questionnaire, more or less, proportionally to the faculty size at the Technion. It delivers the message that the topic is relevant for all Technion graduate students and alumni.

Student and alumni's preferences with respect to the topics that should further be learned during the graduate studies are presented in Table 18.3. We can see that:

- The topics that get the top ranks by all populations (**bold4 top lines**) are project management, entrepreneurships, soft skills, and economy.

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[6] http://www.best.cornell.edu/index.cfm/page/index.htm

[7] This section is written in collaboration with Associate Professor Ayelet Baram–Tsabari, from the Technion Faculty of Education in Science and Technology. Associate Professor Ayelet Baram–Tsabari's background consists of academic research in the fields of science education, science communication, and the active communication of science in the mass media. In the field of science education, she researched ways in which students' interest in science can be identified and incorporated into the formal biology curriculum. In the field of science communication, she explored public interest in science. In both areas, she applied educational data-mining techniques to develop a bottom-up approach to studying students' and public's interest in science, in contrary to the traditional top-down surveys.

Table 18.2 Response and response rate to the survey on the expansion of employment opportunities

Population	Sent to	Answered	Response rate (%)
Masters students (with/without thesis)	2542	345	13.5
Doctoral students	1049 Before candidacy exam: 182 After candidacy exam: 867	317	30.2
Graduate from the past 10 years (for whom the Technion has an updated mail)	2896	219	7.5

Table 18.3 Students and alumni's interest in workshop topics

	M.A.	M.A. (%)	Ph.D.	Ph.D. (%)	Alumni	Alumni (%)
Project management	**207**	**60**	**180**	**57**	**140**	**64**
Entrepreneurship	**204**	**59**	**142**	**45**	**96**	**44**
Soft skills (written and verbal communication, interpersonal communication, negotiations)	**141**	**41**	**125**	**39**	**132**	**60**
Economy	**146**	**42**	**119**	**38**	**68**	**31**
Career planning and management	141	41	132	42	102	47
Policy decision-making related to science and engineering	123	36	113	36	81	37
Education in science and technology (academic and high school teaching, training in the industry)	92	27	92	29	52	24
Science communication (mass media, museums, new media, public relations)	40	12	52	16	19	9
Sustainability	57	17	36	11	21	10
Other	25	7	17	5	20	9

- Alumni's rank of the topic soft skills is higher than the other two populations' rank of this topic. This fact reflects the alumni's understanding of the importance of such skills in professional workplaces.

As can be seen, the offered workshops represent the *MERge* meta-components: management (e.g., project management), education (e.g., education in science and technology), and research (e.g., policy decision-making related to science and engineering).

Both students and alumni proposed many ideas related to how they wish to learn these topics, such as:

- A course that combines all topics
- Mini projects
- Workshops in the semester break

These results clearly indicate the need to broaden the employment opportunities of graduate students also for Technion's students, who are very attractive in the Israeli and international science and technology job market.

In addition to the above ranking, the graduate students were asked to answer the question whether they currently work in research. It turns out that only 28 % work in a research in an academic institution, while 18 % do research in their work but not in an academic institute; in addition, about half of them, 47 %, do not do research at all, 6 % (14) chose the 'other' option in this question, and two did not answer it. These answers also reflect the relevance of the *MERge* model in general and our initiative in particular for the Technion graduate students.

Accordingly, in March 2015, the Technion provided its graduate students workshops in four topics: project management (53 students participated), entrepreneurship (38 students participated), soft skills (27 students participated), and science communication (8 students participated).[8] We note that (a) students from all Technion faculties participated in the workshops: science, engineering, medicine, architecture, and education; and (b) the number of students who participated in each workshop reflects the interest rate presented in Table 18.3.

After the workshops, we asked the participants' feedback with respect to two topics: their recommendation for the participation in the workshops (Table 18.4) and their estimation with respect to current and future potential contribution of what they learned in the workshop (Table 18.5).

While the results presented in Table 18.4 do not reflect students' high satisfaction, the results presented in Table 18.5, which refers to students' estimation about the immediate and future contribution of the workshops to their professional development, are more encouraging.

Specifically:

Table 18.4 Students' recommendations about the workshops

Workshops	Project management (%)	Entrepreneurship (%)	Soft skills (%)	Science communication (%)
Highly recommended	13	**39**	**29**	**75**
Recommended	**38**	28	6	12.5
Neutral	25	22	**29**	12.5
Not recommended	13	11	**29**	0
Not recommended at all	13	0	6	0

[8] See http://edu.technion.ac.il/free_page.php?id=50 (in Hebrew)

Table 18.5 Students' estimations of current and future potential contribution of the workshops

Workshops	Project management		Entrepreneurship		Soft skills		Science communication	
	Today (%)	In the future (%)	Today (%)	In the future (%)	Today (%)	In the future (%)	Today (%)	In the future (%)
Highly contributed	**0**	**19**	**11**	**17**	**12**	**24**	*37.5*	*50*
Contributed	**25**	**38**	**22**	**61**	18	18	*12.5*	*50*
Neutral	50	19	28	17	29	29	50	0
Almost no contribution	6	13	39	6	29	18	0	0
Did not contribute at all	19	13	0		12	12	0	0

- With respect to the topics of project management, entrepreneurship, and soft skills while the students do not see their *current* potential contribution to their professional development, they do see their potential contribution to their *future* professional development (**bold font**).
- At the same time, with respect to the science communication workshop, the participants see its potential contribution both to their *current and future* of professional development (*italic font*).

We also asked the students to share with us any additional thought they have with respect to this initiative. Their responses deliver several messages:

- Opportunities for tightening connections and collaborations of students from different faculties with joint interest should be created.
- Connections with the industry:
  - Connections with the **industry** should be tightened.
  - **Research skills should be considered as an advantage for future careers, not as a barrier**.
  - The Technion should foster the integration of its graduate students in the industry in order to further contribute to the Israeli economy.
  - Without skills that enable practitioners to navigate their professional development in the job market, the most advanced knowledge gained in a research work is neither sufficient nor relevant.
  - Collaboration paths with the industry should be integrated more intensively in the graduate studies by:
    - Joint projects
    - Acquaintance with future workplaces
    - Exploration of different career development paths
    - Practicum in the industry or on the job training

Once again, these responses demonstrate students' awareness to the importance of their exposure to the job market in the industry during their graduate studies and

their realization of the need to collaborate with the industry as soon as possible in order to exhaust the potential contribution of their research skills in their future workplaces. It can be argued that students realize (even unconsciously) the role of the components of the *MERge* model in their future professional development.

18.3 Implications of the MERge Model for Academic Staff: Faculty Members, Administrative Staff, Adjuncts, and Researchers

In Chaps. 9–14, we showed the relevance of the *MERge* model to academic, administrative, and research staff who work in academic institutions. Accordingly, in this section, we address possible training programs for each group.

18.3.1 Faculty Members' Training

The main role of academic faculty members is to do research in order to promote new findings and development. However, in many cases, faculty members carry out also managerial and educational roles. The first one is expressed, for example, in dean or department head roles (Chap. 9); the second one is more common is teaching, which is an activity that most faculty member perform from their first day in the university (Chap. 10). However, while faculty members are trained intensively for their research part of their job in their PhD studies, the managerial and educational roles are, in most cases, neglected, and faculty members are required to manage and teach without any appropriate training.[9]

We propose to integrate a professional development training for faculty members in order to acknowledge the relevance and potential contribution of management and education skills for their professional development in general and research activities in particular. Here are several optional topics for workshops that deliver this message:

- Supervision of graduate students in a way that includes beyond the research supervision, guidance related to career opportunities outside the university in which research skills are important.
- Writing and accomplishing the Broader Impacts section required in research proposal (see, e.g., https://tomprof.stanford.edu/posting/1425). In such workshops, both educational and management skills should be addressed.
- Action research to be integrated in faculty members' teaching.
- Managing the research lab.

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[9] The column Preparing Professors to Teach (https://tomprof.stanford.edu/posting/1055) addresses this phenomenon by presenting the increasing popularity of teach certificate programs for PhD graduate students interested in academic careers.

On a higher level, workshop for senior academic members, who hold managerial roles in the university, can be facilitated. One example is a workshop for new deans who usually start their position without proper preparation and face many managerial challenges from the first day in office, especially if they wish to lead an organizational change. If experienced deans facilitate such workshops, knowledge sharing is fostered in the university and job accomplishments may be improved.

18.3.2   Administrative Staff, Adjuncts, and Researchers' Training

The main challenge delivered in this section is to connect administrative staff, adjuncts, and researchers to the main role of the university—foster research and create and disseminate new knowledge. This role of the university is accomplished by research and education, which are the main duties of academic faculty members. Unfortunately, in many cases, administrative staffs, adjuncts, and lab researchers are not actively involved in pursuing this vision of the university while, at the same time, they hold a main and central role in its success.

We propose to bridge the gaps between these groups who work in the university by enabling each group to bring its strengths and, at the same time, learn from the other groups. Specifically:

- Administrative staff can bring its managerial skills and ask for improvements from its clients: researchers and faculty members.
- Lab researchers can teach about their research topics and research methods, while the other groups explore how they can use these topics. For example, adjuncts can use this knowledge in courses they teach.
- Adjuncts can tell about their teaching experience and about the interests of the new student generations.
- Faculty members can use all the above skills and apply new ways for the promotion of their own management, education, and research skills.

Since each university has its own organizational culture, we do not delve here into the details. However, the message is clear: each university gains the management, education, and research skills integrated in the *MERge* model; we suggest increasing the awareness to the relevance of these skills by knowledge-sharing mechanisms in a way that fits the purpose and culture of the university.

18.4   Implications of the *MERge* Model for Industrial Training and Development

Three main forms of training and development exist in the industry:

- In-house training: Many big enough companies have training and development departments. In order to foster knowledge sharing within the company, when

programs are organized by these departments, the company employees some-
times train other employees, for which education skills are required.

Another form of in-house training that recently emerges is the establishment
of professional training programs based on MOOCs provided by top universities
around the world. MOOC-based professional training enables organization to
overcome the on-site training limitations.

- Outsourcing: Companies of all sizes order courses on topics for which in-house
  knowledge does not exist or is insufficient.
- Associations which deal with training about topics related to industrial training:
  Training and development organizations exist which provide management and
  education programs (e.g., Association for Talent Development https://www.
  td.org/).

In all cases, we would suggest to examine the suitability of the *MERge* model as
an additional way for the organization of training programs.

We end this section by proposing an interactive format for the presentation of the
MERge model. In this format, the lecturer, together with the learners, analyzes by
the *MERge* components one or more activities that learners perform as part of their
profession. This way, the lecturer is not just lecturing about the *MERge* model but
rather enables the learners, in a relatively short time, to experience the meaning of
the implementation of the *MERge* model in real-life situations. Such an experience
is especially effective when a group of practitioners, whose profession is (more or
less) the same, learn together, analyze their professional activities, and share their
perspectives with respect to their job performance.

For example, our colleague, Michael Reitman,[10] VP, Engineering and R&D at
PTC Israel, proposes to utilize the *MERge* model as a method to deal with *complex
initiatives and loosely formulated tasks* which are largely addressed in the indus-
try.[11] As a rule, it is not easy to find well-defined methods to approach such task, and
the quality of the solution mostly depends on personal skills, intuition, and toolset
of the practitioner that deal with it. Reitman proposes that using the *MERge* model
allows observing the initiative or task from different perspectives:

- The management view helps identify internal structure and relationships as well
  as systematize and organize information, objectives, and processes based on
  various criteria.
- The education view is about diving into the components of the system, as they
  are being systematized, and learning what is unique or general in each
  component.
- The research view implies search for general trends vs. exceptional cases, for
  unnecessary relationships vs. missing ones, and for any distortions in the man-
  agement view or for holes in the education view.

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[10] See Reitman' LinkedIn profile at https://www.linkedin.com/in/michaelreitman.

[11] Presented here with Reitman's permission

Reitman further proposes that such high-level decomposition allows developing formalized techniques to be applied in different *MERge* views in order to iteratively converge to an optimal solution of a complex initiative or a loosely defined task.

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Chapter 19
The *MERge* Toolkit for Managers, Educators, and Researchers

In this Brief, we presented and illustrated the *MERge* model for professional development in the following sectors: industry, academia, and the first sector.

To illustrate the importance and necessity of the model, we presented in the different chapters of the Brief case studies, each one representing the intersection between two aspects: (1) the sectors (industry, academia, first sector) (2) and the meta-profession (management, education, research), as illustrated in Table 19.1.

We analyzed each case by the three meta-professions comprising the *MERge* model—management, education, and research—and illustrated how the model implementation may improve results and performance.

In most cases, the main person described in the case study was not aware of the three meta-professions, even when they were implemented. As we argued in previous chapters, being aware of the *MERge* model and its different aspects may assist one in his or her professional life.

In this chapter, we provide a practical toolkit for the implementation of the *MERge* model in your organization by four mains phases:

1. **Pre-*MERge* Analysis**: As the first stage, it is important to gain, within the framework of the *MERge* model, a clear picture of the current situation that needs to be evaluated. This evaluation can be done on two different levels:

   (a) *The personal level*: On this level, one should define his or her role and/or evaluate his or her performance as a manager, an educator, or a researcher.
   (b) *The organizational level:* On this level, the evaluation refers to an organizational entity, which can be either a unit in the organization, specific project, task, etc.

2. **Implementation**: Based on the analysis phase, one should set the goals and work plan for the implementation of the *MERge* model.
3. **Evaluation**: Based on the goals set at the implementation phase, he or she should evaluate whether the goals have been achieved.

Table 19.1 Case studies described in this brief

	Management	Education	Research
Industry	a. Team or project leaders b. Managers of the organization's corporate social responsibility (CSR) activities	a. Training and development departments b. Engineer who is *not* part of the training and development department	R&D (research and development) departments
Academia			
Faculty members	A dean who led a change process by following Kotter's model for organizational change	a. A lecturer who wishes to redesign a course he or she teaches and, in parallel, carries out an action research to support this change process b. A dean who wishes to foster a campus wide program in which teams of students from different faculties develop a joint project c. A dean of an engineering faculty who invites alumni of the faculty to teach at the faculty advanced engineering courses which reflect the newest trends and developments in the field	Application of management and education practices in the research lab
Administrative staff	Administrative project manager of an academic international educational initiative	Administrative manager in a European public research university who promotes teaching and learning by MOOCs	The role of a lab manager or a chief engineer/scientist, whose role is to be in charge of the ongoing work that takes place in the lab
First sector	Head of a new authority for privacy and data protection in the ministry of justice office	Head of the educational committee of a rural village's council	The chief scientists forum in the Israeli government

4. **Ongoing *MERge* practices**: This is a continuous phase, which is not defined within a specific period of time. Rather, this phase is defined as a routine ongoing daily implementation of *MERge* practices. In practice, it means that he or she is aware of and implements the three aspects of the *MERge* model—management, education, and research—in his or her professional life, including evaluation of performances and improvement if needed.

19.1 Analysis Phase

The analysis phase is important since it raises the practitioner's awareness to possible factors that affect or influence his or her professional performance. The outcomes of this phase serve as a baseline for the implementation phase.

As a part of the process of designing the *MERge* analysis tool, we distribute a short survey to a mailing list in social sciences, in order to get a preliminary insight from the *MERge* perspective of how people perceive their job performance. Out of 30 responses, 24 are from the academia. Table 19.2 presents the answers of this group to the question: what percentage of your work do you invest in management, education, and research practices? Through this chapter, we will use these findings to demonstrate the use of the toolkit on the organization level.

Readership of this Brief is invited to analyze and to clarify their perception of two important points of views:

1. **The perceived point of view**: In the above example, Table 19.2 will help managers in the academia to understand *how the people in their unit perceive their role*. We can clearly see in Table 19.2 that the majority of the responders invest 20–40 % of their role performance in management and education and 40–60 % of their role performance in research practices. As a manager, one should ask few questions:

   (a) Do the findings represent a situation that need to be checked and, if needed, changed?
   (b) Do my employees should be guided to focus on a specific aspect of the *MERge* model?

2. **Perceived vs. actual situation point of view**: As a manager, the analysis should move to the next step, that is, analysis of gaps between the perceived vs. actual situation point of view. The perceived situation is the situation as is described by the employees from their point of view. The actual situation reflects the categorization from the organization's point of view. As a manager, one should choose

Table 19.2 Practitioners' assessment of their role performance within the *MERge* framework

	What percentage of your work do you invest in management practices?	What percentage of your work do you invest in education practices?	What percentage of your work do you invest in research practices?
0–20 %	5		3
20–40 %	15	11	7
40–60 %	4	5	8
60–80 %		6	5
80–100 %		2	1

several employees and analyze with them the meaning of the findings. Here are possible questions to be asked:

(a) Please describe management activities related to your role.
(b) Please describe education activities related to your role.
(c) Please describe research activities related to your role.

One may find out, for example, that people perceive some actions as management activities, hence, perceived situation, while these actions are clearly not managerial ones, hence, actual situation. For example, in our survey, we asked our responders the following question,

"If applicable, can you please describe management activities related to your role?" and got several answers, such as purchase of equipment, that indicate this conception.

As a manager, awareness and understanding of the current situation as well as identification of gaps exist between the perceived, and actual situation are important for several reasons, such as:

• Achievement of the organization goals.
• Focusing the employees' attention to their personal roles, responsibilities, and goals will help them both feel satisfied with their jobs and create the desired value for the organization.
• Identification of potential growth opportunities.

The same analysis process of the three main steps (asking questions, mapping answers as is presented in Table 19.2, and analyzing the results) can be carried out both on the personal level by each practitioner and on the organizational level by different managerial role holders.

19.2 Implementation

Based on the analysis phase, one should set the goals and the work plan for the implementation of the *MERge* model. Going back to our example, since almost the same portion is dedicated to management, education, and research practices, it might mean that each aspect does not get the needed attention, efforts, and resources. From the organizational point of view, the goal might be to change the portion dedicated to each aspect according to the organization orientation and the role holder. As a manager, you should take the right action to adjust the time dedication accordingly. Such actions might be:

1. Change role definitions.
2. Change working procedures.
3. Allocate more/less resources.
4. Focus the employees' attention to specific tasks.
5. Locate new opportunities.

The actions on which you decide should be part of a comprehensive work plan that includes tasks, milestones, resources, and timeline.

Once again, the same implementation process can be applied for both the organization and the personal level.

19.3   Evaluation

Based on the goals set at the Implementation phase, the practitioner should evaluate whether the goals have been achieved. Evaluation is a crucial phase and therefore should be done in a constructive way. Since in this process, one examines and judges accomplishment and goals achievement, this process should integrate constructed methods (Patton, 1990). Evaluation might be based on qualitative and/or quantitative methods, pending on the goals. Since evaluation is part of a structured research process, by carrying it out, as a manager, one implements research practices of the *MERge* model.

Going back to our example, an evaluation process will entail asking the same[1] questions again after the implementation phase:

1. Which of the following roles describes your main role in your organization?
2. Please rate the importance you attribute to management practices in your work.
3. What percentage of your work do you invest in management practices?
4. Please rate the importance you attribute to education practices in your work.
5. What percentage of your work do you invest in education practices?
6. Please rate the importance you attribute to research practices in your work.
7. What percentage of your work do you invest in research practices?
8. If applicable, can you please describe management activities related to your role?
9. If applicable, can you please describe education activities related to your role?
10. If applicable, can you please describe research activities related to your role?
11. In your opinion, is it important and needed for your role to expand your knowledge and experience in the following areas (management, education, research)?
12. Can you please explain your answer to the previous question?
13. If you have any additional thoughts, please share them.

This set of questions enables to evaluate by the *MERge* model the personal or the organization progress toward the set goals.

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[1] In Table 19.2 we presented answers to one question from the mentioned survey. In this section, we present the complete list of the 13 questions included in the survey.

19.4   Ongoing *MERge* Practices

This phase is not defined by beginning and end, but as a routine ongoing daily implementation of *MERge* practices, which means that one is aware of and implement the three aspects of the *MERge* model—management, education, and research in his or her professional life.

The ongoing implementation of the *MERge* practices should take place in many ways. The following example illustrates how it might be implemented as a routine task of the organization. All organizations deal with recruiting and hiring processes of new employees, where role definition and interviews of potential candidates are part of this process. Ongoing implementation of *MERge* practices entails the following:

1. Include in the role definition the specific description of all *MERge* practices and the portion of each one in a specific role.
2. According to the role definition, in the interview, ask candidates the relevant questions with respect to the *MERge* elements. These questions help evaluate the relevance of the candidate's skills to the job. Questions such as the following ones can be asked:

   (a) Please describe management/education/research practices you applied in your previous jobs.
   (b) Please describe your skills related to management/education/research.
       In order to evaluate the candidate's understanding of the job scope and importance, similar questions to the question asked in the previous phases can be asked, such as:
   (c) Please rate, in a scale of 1–5, the importance you attribute to management/education/research practices in this specific job, as you understand it.

19.5   Summary

In this chapter, we presented a practical way for using the *MERge* model as a toolkit. Clearly, this toolkit can serve in many cases and disciplines, as is illustrated by the two examples presented here: (a) the small survey we conducted as part of the development process of this model (and by doing so, implemented the research aspect of the model) and (b) using the *MERge* model as a tool in recruitment processes. These practices can be implemented both on the personal and the organizational levels in different manners, e.g., by individuals from the organization or by professional *MERge* experts from other organizations.

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