Research Methodology

Critical Literature Analysis

Surafel Lemma Abebe (Ph. D.)

Acknowledgement

The slides are taken from a lecture by Professor Alemayehu Molla.

Outline

- Background

- Systematic vs. free style literature review

- Descriptive vs. analytical approach

- Author centric vs. concept centric literature review

- Qualities of literature review

Course Learning Outcome

- "Draw on the literature in the field, analyse and interpret research evidence published on a topic to establish a suitable research problem/issue or opportunity to explore further" (Course Guide)

Session Objective

- ❖ **Background**
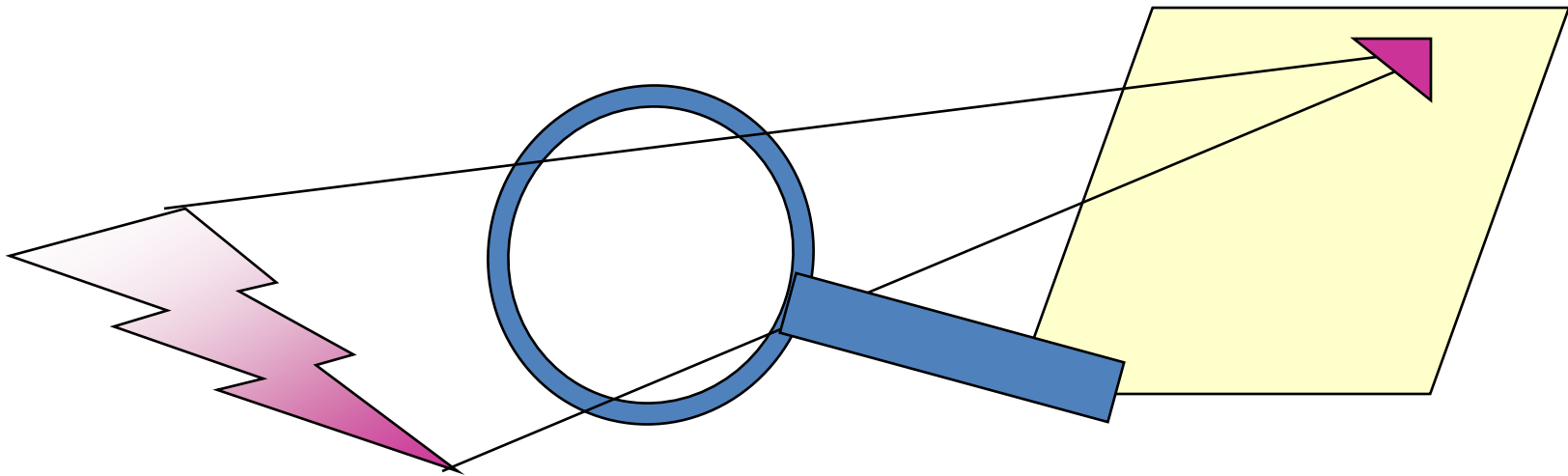- ❖ Systematic vs. free style literature review
- ❖ Descriptive vs. analytical approach
- ❖ Author centric vs. concept centric literature review
- ❖ Qualities of literature review

Research

🖐 Research requires a **phenomenon**, an **observation method**, and an **interpretive scheme(-a)**.

"**This** says **That** is **These**"

Purpose of a literature review
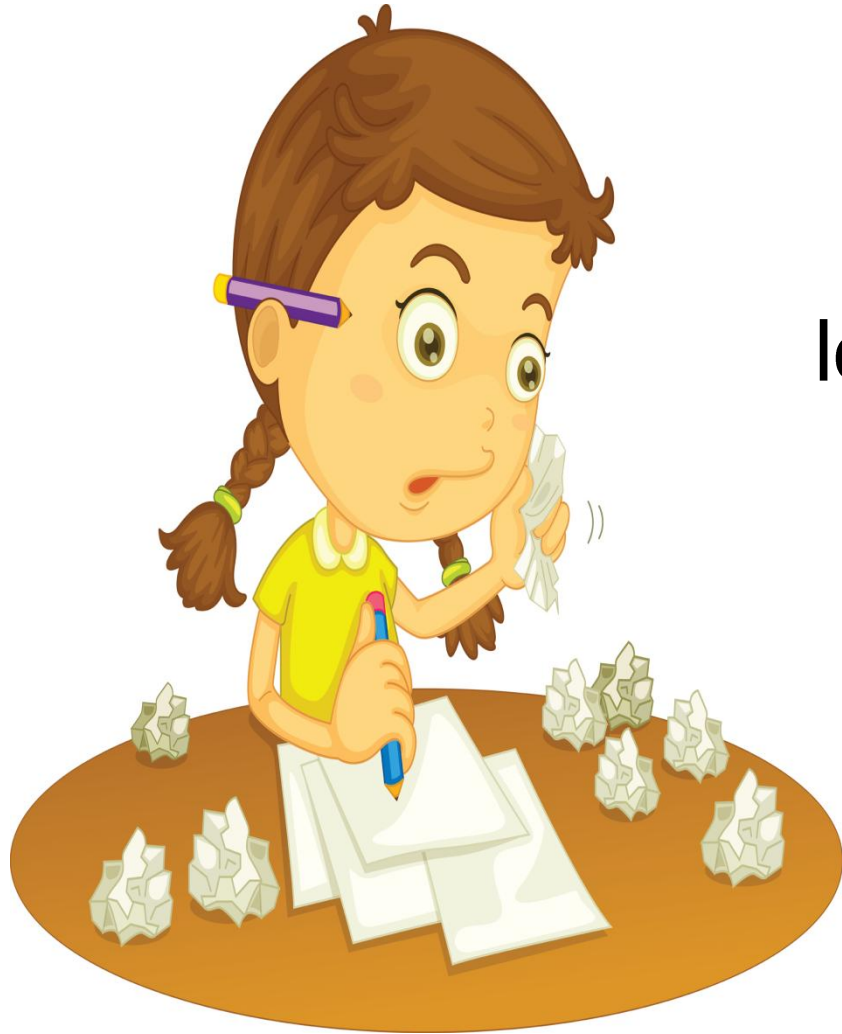
To make my work looks GOOD, I have to make other people's look BAD

Implications of incomplete literature review

Don't reinvent the wheel

Purpose of a literature review

- A review of prior, relevant literature accomplishes several goals
  - essential feature of any academic project
  - shows you are familiar with previous, relevant research
  - creates a firm foundation for advancing knowledge
  - provides background for a topic and explains the motivation for doing a research
  - evaluates the depth and breadth of the research in regards to your topic
  - facilitates "theory" development
  - uncovers areas where research is needed

Exercise 1

- What is the research problem that you wish to address?

- What are the questions?

- Who else have addressed the research problem and questions? What did you learn from these previous literature? How do you intend to build on it and/or challenge it?

Session Objective

❖ **Background**

❖ Systematic vs. free style literature review

❖ Descriptive vs. analytical approach

❖ Author centric vs. concept centric literature review

❖ Qualities of literature review

Systematic literature review

- Prior to undertaking a systematic review it is necessary to confirm the need for such a review
  - Course assignment
  - Research proposal
  - Review article
  - Dissertation/thesis chapter

Systematic literature review

- Systematic reviews
  - start by defining a review protocol that specifies the research question being addressed and the methods that will be used to perform the review
  - are based on a defined search strategy that aims to detect as much of the relevant literature as possible
  - document their search strategy so that readers can assess their rigour and the completeness and repeatability of the process
  - require explicit inclusion and exclusion criteria to assess each potential primary study
  - specify the information to be obtained from each primary study including quality criteria by which to evaluate each primary study
  - a prerequisite for quantitative meta-analysis

Systematic literature review
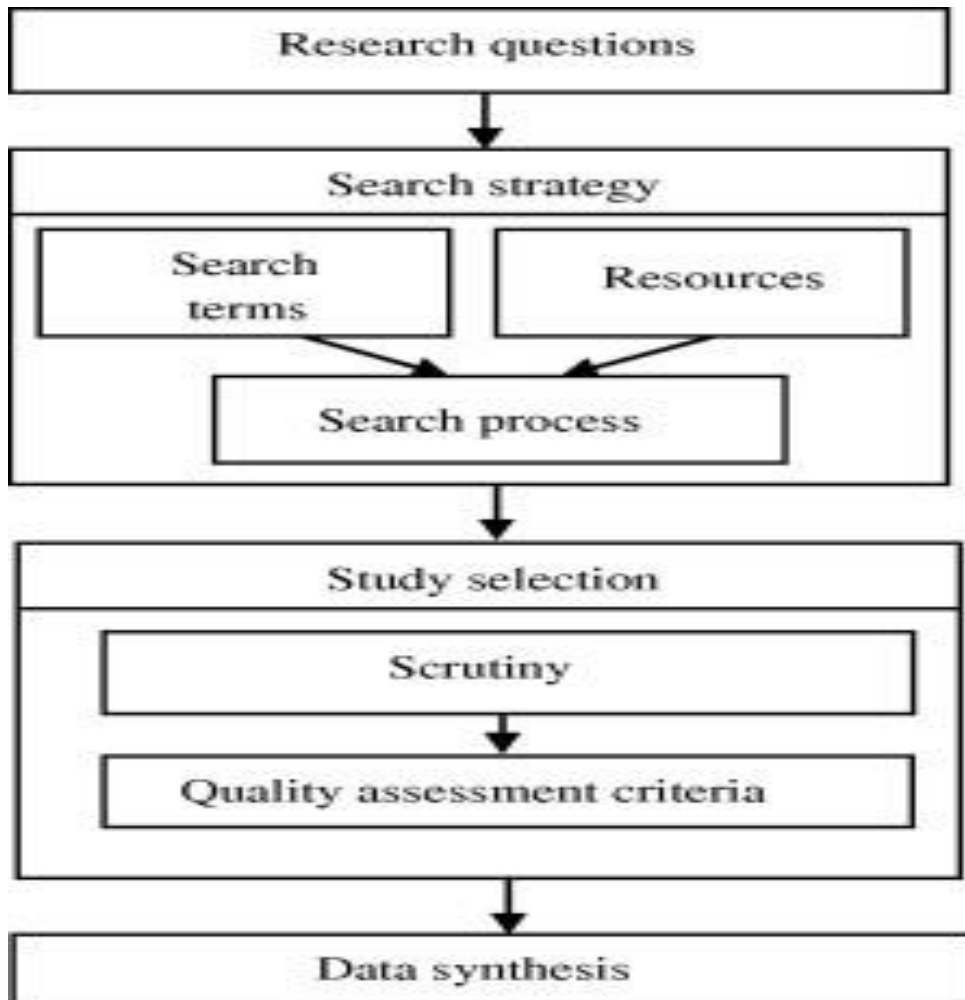
B.A. Kitchenham, S. Charters, Guidelines for Performing Systematic Literature Reviews in Software Engineering, Tech. Rep. EBSE-2007-01, Keele University and University of Durham, 2007.

Systematic literature review
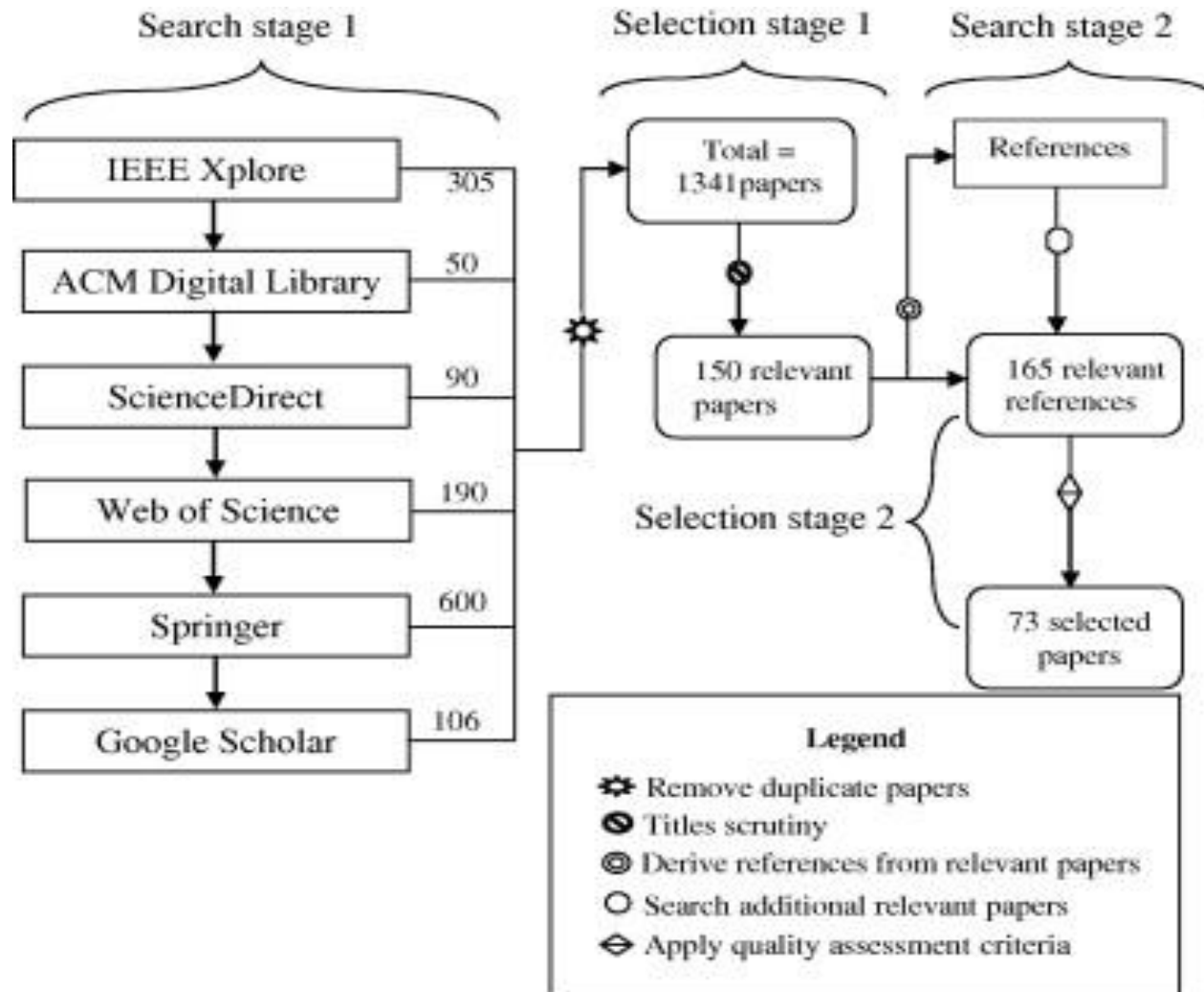
Search stage 1 | Selection stage 1 | Search stage 2

- IEEE Xplore — 305
- ACM Digital Library — 50
- ScienceDirect — 90
- Web of Science — 190
- Springer — 600
- Google Scholar — 106

Total = 1341 papers

150 relevant papers

References

165 relevant references

Selection stage 2

73 selected papers

Legend
- ✿ Remove duplicate papers
- ⊘ Titles scrutiny
- ◎ Derive references from relevant papers
- ○ Search additional relevant papers
- ◇ Apply quality assessment criteria

- Achimugu, P., Selamat, A., Ibrahim, R., & Mahrin, M. N. R. (2014). A systematic literature review of software requirements prioritization research. *Information and software technology*, *56*(6), 568-585.

Systematic literature review: topic vs. journals

- *"Studies of the ...literature have consistently been limited by drawing from a small sample of journals. Even though the [ones] investigated here may have reputations as top journals, that does not excuse an author from investigating all published articles in a field. I just can't see the justification for searching by journal instead of searching by topic across all relevant journals." Webster and Watson (2002)*

Example -Systematic Literature Review

- Trinh-Phuong, T., Molla, A., & Peszynski, K. (2012). Enterprise Systems and Organizational Agility: A Review of the Literature and Conceptual Framework. *Communications of the Association for Information Systems*, **31(1 (Article 8)): 167-193. [ABDC A]**

Example -Systematic Literature Review

- **Question**
  - How do organizations exploit enterprise systems to become and stay agile?
    - with the exception of Mathiassen and Pries-Heje [2006] and Sherehiy, Karwowski, and Layer [2007], which have provided a review of the agility literature in general, there is no systematic review focusing on organizational agility in the IS realm.
    - the concept of IT-enabled organizational agility is recognized in a few previous studies, what this concept actually means and its constituting parts lack definitional clarity.
    - The contribution of IS to businesses' agility in the literature is contentious because of two views of the IS infrastructure: (a) a technical-oriented view that considers IS as complex technical artifacts and (b) a digital platform view that considers IS as a leveragable infrastructure [Sambamurthy et al., 2003; Fichman, 2004]

Example: Systematic Literature Review

- **Search Strategy**
  - To identify relevant articles, we conducted a twelve-year (1998–2010) review of papers published in the top twelve IS journals. These journals are *Decision Support Systems*, *European Journal of Information Systems*, *Information Systems Journal*, *Information Systems Research*, *Journal of Information Technology*, *Journal of Management Information Systems*, *Journal of the Association of Information Systems*, *MIS Quarterly*, *Harvard Business Review*, *Communications of the ACM*, *Communications of the Association for Information Systems,* and *Information and Management*.
  - The reason to choose the highest ranking journals for the pool of data collection is that those journals represent the most advanced and widely-recognized knowledge of the subject among IS researchers [Webster and Watson, 2002].

Example: Systematic Literature Review

- **Inclusion and Exclusion**
    - Because "Agility," "flexibility," and "adaptability" concepts are used interchangeably in the literature [Sherehiy et al., 2007], papers are included if they **contain any of the following concepts in their full text: "organization agility," "organization flexibility," and "organizational adaptability**." Further, papers that contain "enterprise agility" and "business agility" in their keywords were included. **This process resulted in an initial pool of fifty-two papers.**
    - It is noticeable from the literature that information system and information technology concepts are often used interchangeably. **Thus the initial pool of papers was screened for the presence of "information system" or "information technology," either in their abstract or body**. This process has excluded eight papers, **resulting in forty-four papers.**

Example: Systematic Literature Review

- **Inclusion and Exclusion (cntd)**
  - The forty-four papers were further screened in order to determine the extent of engagement of a paper with the concepts of "organizational agility," "organizational flexibility," and "organizational adaptability." Articles that make a passing reference to, and that do not deeply engage with, these concepts were excluded from further analysis. **We have established a "rule of thumb" criteria**: if either of the three concepts appear in an article less than twice, we treat that article as lacking a deep engagement and excluded it from the review. This process excluded ten articles, **resulting in thirty-four relevant papers**.

Example: Systematic Literature Review

- **Quality Assessment**
  - Additional articles were identified following the suggestion from Webster and Watson [2002] that, with each selected article**, we go backwards to** determine the precedence articles that this paper cites, and **go forward by using the Web of Science and Google Scholar** to identify the papers citing this article for comprehensive coverage of the topic. This process **identified fifteen extra journal, conference, and book chapter articles which were not published in the high-ranking journals but do discuss the impact of information systems on organizational agility**.
  - The findings show that, although there is some research on IS and OA [Overby et al., 2006; Sambamurthy et al., 2003; Swafford, Ghosh, and Murthy, 2008], there are only eight academically published papers on ES and OA [Davis, 2005; Gattiker, Chen, and Goodhue, 2005; Goodhue et al., 2009; Ignatiadis and Nandhakumar, 2007; MacKinnon et al., 2008; Newell, Wagner, and David, 2007; Seethamraju, 2009; Seethamraju and Seethamraju, 2009].

Example: Systematic Literature Review

- **Analysis**
  - THE CONCEPT OF ORGANIZATIONAL AGILITY IN IS RESEARCH
  - PERSPECTIVES ON ORGANIZATIONAL AGILITY AND INFORMATION SYSTEMS
    - **IS Facilitates Organizational Agility**
    - **IS Inhibits Organizational Agility**
    - **The Neutral View of IS and Organizational Agility**
  - ENTERPRISE SYSTEMS AND ORGANIZATIONAL AGILITY
    - **Enterprise Systems Facilitate Organizational Agility**
    - **Enterprise Systems Inhibit Organizational Agility**
    - **The Neutral View of Enterprise Systems and Organizational Agility**

Example: Systematic Literature Review
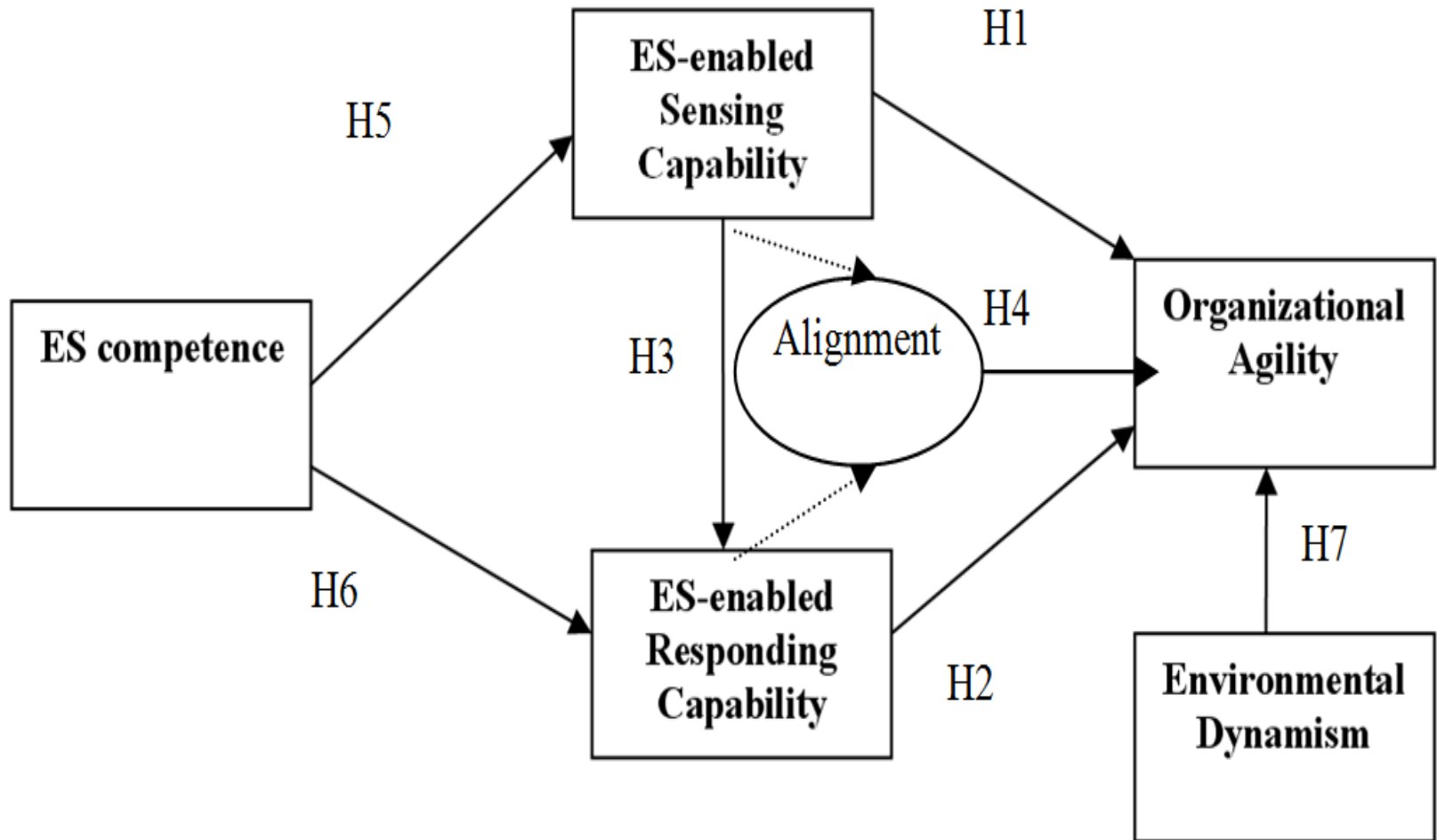
A Conceptual Framework Linking Enterprise Systems to Organizational Agility

Free Style Literature Review

- No clearly defined methodology
- The results of the literature can not be scrutinised for bias as there was no methodology followed
- No clear inclusion and exclusion criteria
- Very hard to publish
- Typically found in most PhD/MSc theses chapters

Exercise 2

- Identify a literature review article in your research area
- Does it satisfy the protocol for systematic/structured literature review?
  - What are the review objectives?
  - What were the research questions?
  - What search strategy was followed?
  - What were the criteria for inclusion and exclusion?
  - How was quality assessed?
  - What conclusion was drawn?

Session Objective

- ❖ **Background**
- ❖ Systematic vs. free style literature review
- ❖ Descriptive vs. analytical approach
- ❖ Author centric vs. concept centric literature review
- ❖ Qualities of literature review

Descriptive approach

Literature Analysis Skills

ANALYSIS	Select, differentiate, break up	Dissecting data into their constituent part.
SYNTHESIS	Integrate, combine, formulate, reorganize	Rearranging the elements derived from analysis to identify relationship.
COMPREHENSION	Understand, distinguish, explain	Interpreting & distinguishing between different types of data , theory & argument to describe the substance of an idea
KNOWLEDGE	Define, classify, describe	Describing the principles, uses, & function of rules, method, etc.
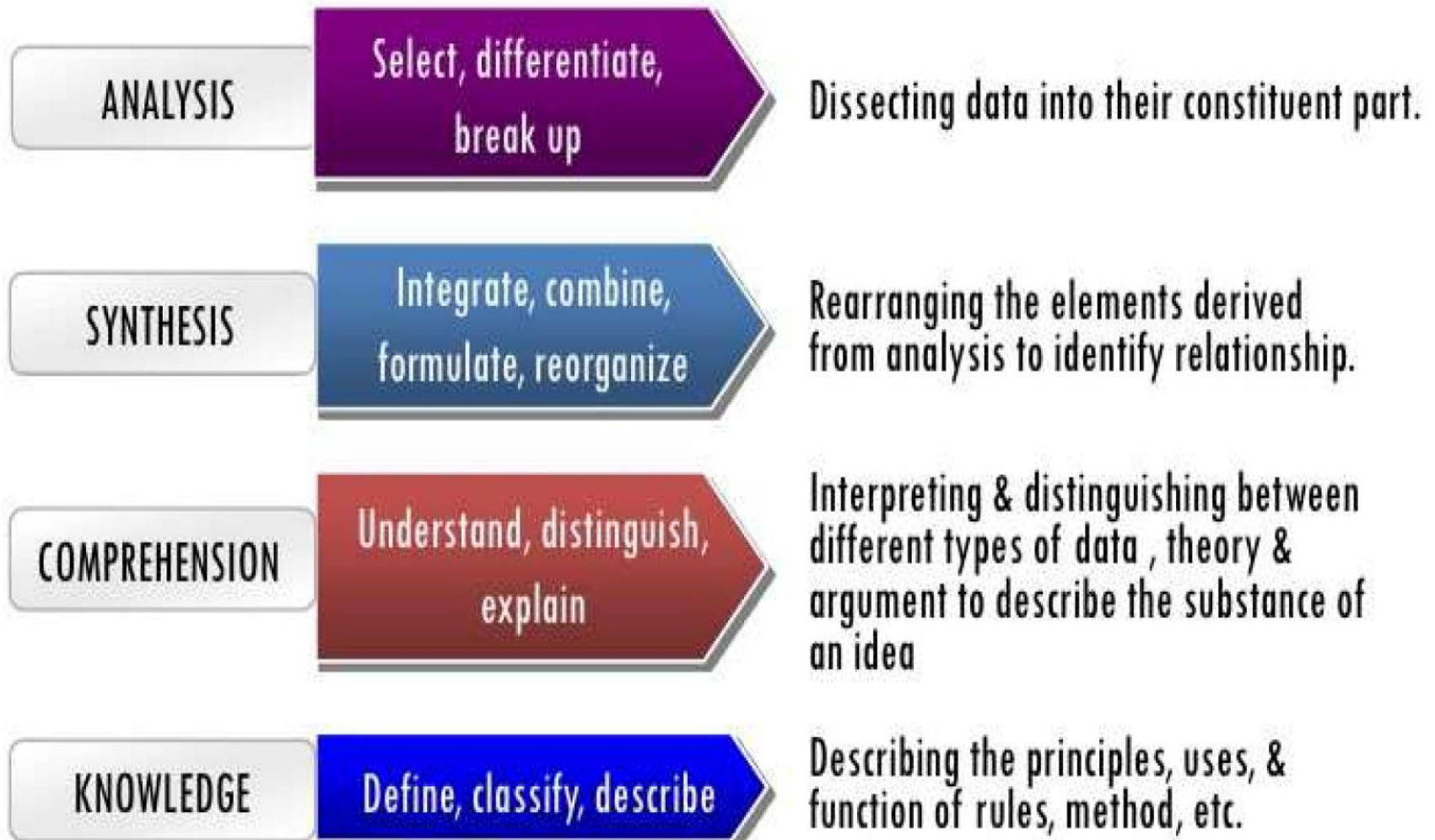
Critical vs Descriptive Analysis

Descriptive	Critical analytical
States what happened	Identifies the significance
States what something is like	Evaluates strengths and weaknesses
States the order in which things happen	Makes reasoned judgement
Says how to do something	Argues the case according to the evidence
Explains what a theory says	Shows why something is relevant or suitable
Explains how something works	Indicates why something will work
Notes the method used	Identifies whether something is appropriate or suitable
Says when something occurred	Identifies why the timing is importance
Lists details	Evaluates the relative significance of details
Gives information	Draws conclusion
Gives the story so far	Weighs one piece of information against the other

(Martelli and Greener, 2015,p 33)

Descriptive approach

- Literature review that produces a mind-numbing lists of citations and findings that resemble a phone book.

- Lots of numbers, but not much plot

    – *"73 Primary studies were selected from the search processes. Out of these studies; 13 were journal articles, 35 were conference papers and 8 were workshop papers. Furthermore, contributions from symposiums as well as IEEE bulletins were 2 each while the total number of book chapters amounted to 13."*

Categories for analysis and comparison

- A strong literature review examines each work on its own and in relation to other works by
  - identifying and then analysing them with regards to a number of different research aspects and ideas
  - Here are some possible categories to use for comparison and analysis
    - topic
    - argument
    - results found and conclusions
    - methods
    - theoretical approach

Questions for analysing a single publication

- What is the argument? Is it logically developed? Is it well defended?
- What kind of research is presented? What are the methods used?
- Is each argument or point based on relevant research?
  - If not, why?
- What theoretical approach does the author adopt? Does it allow the researcher to make convincing points and draw convincing conclusions? Are the author's biases and presuppositions openly presented, or do you have to identify them indirectly? If so, why?
- Overall, how convincing is the argument? Are the conclusions relevant to the field of study?

Questions for comparing publications

- What are the main arguments?
  - Do the authors make similar or different arguments? Are some arguments more convincing than others?
- How has research been conducted in the literature? How extensive has it been?
  - What kinds of data have been presented? How pertinent are they? Are there sufficient amounts of data?
- What are the different types of methodologies used?
  - How well do they work? Is one methodology more effective than others? Why?
- What are the different theoretical frameworks or approaches used?
  - What do they allow the authors to do? How well do they work? Is one approach more effective than others? Why?
- Overall, is one work more convincing than others?
  - Why? Or are the works you have compared too different to evaluate against each other?

Critical Review Checklist

Evaluating whether your literature review is critical?

- Have you shown how your research question relates to previous research reviewed?

- Have you assessed the strengths and weaknesses of the previous research reviewed?

- Have you been objective in your discussion and assessment of other people's research?

- Have you included references to research that is counter to your own opinion?

- Have you distinguished clearly between facts and opinions?

Critical Review Checklist

- Have you made reasoned judgements about the value and relevance of others' research to your own?

- Have you justified clearly your own ideas?

- Have you highlighted those areas where new research (yours!) is needed to provide fresh insights and taken these into account in your arguments? In particular:
  - Where there are inconsistencies in current knowledge and understanding?
  - Where there are omissions or bias in published research?
  - Where research findings need to be tested further?
  - Where evidence is lacking, inconclusive, contradictory or limited?

- Have you justified your arguments by referencing correctly published research?

Exercise 3: Develop a protocol for a systematic literature review

- Take your research question from the first exercise and modify, if necessary, for the purpose of conducting a systematic literature review

- Develop a search strategy

- Specify inclusion and exclusion criteria to assess each study

- Define how you would assess quality

Session Objective

❖ **Background**

❖ Systematic vs. free style literature review

❖ Descriptive vs. analytical approach

❖ Author centric vs. concept centric literature review

❖ Qualities of literature review

Concept vs Author Centric

- A literature review is concept-centric.
- Concepts determine the organizing framework of a review.

Table 1. Approaches to Literature Reviews	
Concept-centric	**Author-centric**
Concept X … [author A, author B, …] Concept Y … [author A, author C, …]	Author A … concept X, concept Y, … Author B … concept X, concept W, …

- Some authors take an author-centric approach and essentially present a summary of the relevant articles.
- Author centric method fails to synthesize the literature

Webster and Watson, 2002, p XVI

Concept vs Author Centric

- "To make the transition from author- to concept-centric, compile a concept matrix as you read each article (Table 2)

- When your reading is complete, synthesize the literature by discussing each identified concept.

- Before commencing this step, take some time to develop a logical approach to grouping and presenting the key concepts you have uncovered."

Table 2. Concept Matrix	Concepts				
Articles	A	B	C	D	...
1		✖	✖		✖
2	✖	✖			
...			✖	✖	

Webster and Watson, 2002, p XVII

Concept vs Author Centric

- "You might need to add a further dimension to the concept matrix to handle the unit of analysis (Table 3)".

- Some concepts might have "different meanings when considered from the organizational, group, individual, and cognitive utterance levels.

- Isolating concepts by unit of analysis should result in a crisper review because it is easier to detect when you let a concept stray outside the scope of its domain."

Table 3. Concept Matrix Augmented with Units of Analysis

Articles	Concepts														
	A			B			C			D			...		
Unit of analysis	O	G	I	O	G	I	O	G	I	O	G	I	O	G	I
1					✖				✖						✖
2	✖				✖	✖		✖							
...								✖	✖			✖			

Legend: O (organizational), G (group), I (individual)

How to write a literature review

- There are several steps toward writing a literature review:
  - Synthesize and evaluate information
    - Highlighting agreements and disagreements among authors
  - Identify the main ideas of the literature
  - Identify the main argument of the literature review
  - Organize the main points of the literature review
  - Write literature review

Organise the main points of the literature review

- After identifying the main ideas that need to be presented in the literature review, you will organize them
  - in such a way as to support the main argument
- A well-organized literature review presents the relevant aspects of the topic in a coherent order that leads readers to understand the context and significance of your research question and project
- As you organize the ideas for writing, keep track of the supporting ideas, examples, and sources that you will be using for each point

Exercise 4

- Identify at least 3 articles based on the protocol developed in exercise 3

- Create a concept matrix to prepare for literature review

Session Objective

❖ **Background**

❖ Systematic vs. free style literature review

❖ Descriptive vs. analytical approach

❖ Author centric vs. concept centric literature review

❖ Qualities of literature review

Qualities of Literature Review in a PhD/MSc

- Provides a **<u>COMPREHENSIVE</u>** if not exhaustive, coverage of the literature in the area.

- Identifies **<u>MAJOR THEMES</u>** or **<u>PERSPECTIVES</u>** in the area of the literature that is being reviewed.

- Provides the **<u>STATUS</u>** (theoretical, empirical, methodological, issues covered, etc) of the research area.

- Should be **<u>PURPOSEFUL</u>**, that is, there needs to be a clear purpose and a clear take away in terms of the research being undertaken from each section of the review.

- Well-argued points with **<u>SYNTHESIS AND ANALYSIS</u>**. It should be more than a summary and should go beyond "what".

- A logical **<u>FLOW</u>** in terms of the ideas being discussed so much so that one section feels incomplete without the other section.

- Requires a very good and adequately detailed **SUMMARY AND CONCLUSION** that places the current research within the existing body of knowledge.

Qualities of Literature Review in a PhD/MSc

- Tone
  - "A successful literature review constructively informs the reader about what has been learned. "
  - In contrast to specific and critical reviews of individual papers, tell the reader what patterns you are seeing in the literature"
  - Do not be overly negative
  - Give due respect to the work of previous scholars

Webster and Watson, 2002, p XVIII

Qualities of Literature Review

- Tense
  - No consensus wether to use present or past tense
  - Present tense is used for relating what other authors say and for discussing the literature, theoretical concepts, methods, etc.
    - *In her article on IT innovation , Ross stipulates that ….*
  - In addition, use the present tense when you present your observations on the literature
    - *However, on the important question of sourcing e-procurement suppliers in the public sector, Jones remains silent*
  - Past tense is used for recounting events, results found, etc.
    - *Jones and Green conducted experiments over a ten-year period. They determined that it was not possible to consider logistics management without incorporating IT into it*

Literature Analysis Summary
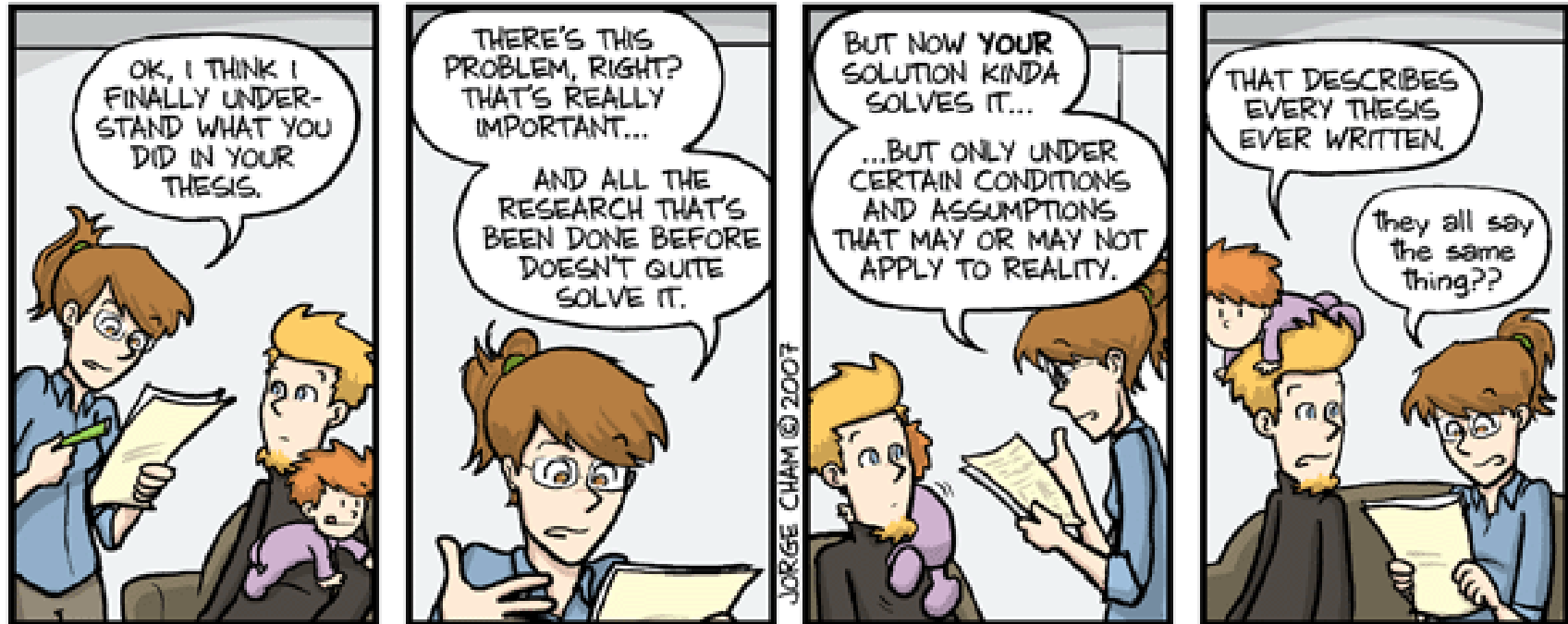
Literature Analysis Summary

- Outlines the state of critical discussion on the research problem.
- Analytical survey of previous research and writing on a problem in a discipline or field of study.
- Performs a number of functions.
  - Acknowledge briefly the relevant contributions of previous studies, and any related theories or interpretations within the problem area.
  - Provide a critique of previous studies
  - Provide an argument about the previous secondary material which also indicates the place of their own proposed work.
- The literature review is a significant component of both the thesis proposal and the final thesis.
- It is not an annotated list of all the books and articles that you have read on, or think relevant to, the research problem.
- It is not simply a review of different schools of thought or divisions of opinion over a problem.

Exercise 5

- Convert the concept matrix you created in exercise 4 into at least one paragraph of writing

- Example (slide 52 concept Matrix)
  - *" A number of factors have been identified as antecedents of IS-related absorptive capacity, including organisational support and commitment (Park et al., 2007; Hu et al., 2012), corporate culture (Harrington & Guimaraes, 2005) and knowledge sharing and co-ordination processes (e.g. IT-business communication) (Roberts et al., 2012). Other antecedents include pre-existing related knowledge, information trading, and knowledge brokering and inter-organisational knowledge transfer (Malhotra et al., 2005; Lindgren et al., 2008; Lyengar et al., 2015)."*

References

- Achimugu, P., Selamat, A., Ibrahim, R., & Mahrin, M. N. R. (2014). A systematic literature review of software requirements prioritization research. *Information and software technology*, *56*(6), 568-585.

- Cooper, V., & **Molla**, A. (2016). Information systems absorptive capacity for environmentally driven IS-enabled transformation. *Information Systems Journal (ISJ)*. Online: 18 APR 2016 at http://onlinelibrary.wiley.com/doi/10.1111/isj.12109/full

- Kumar, R. (2012), Research Methodology a step by step guide for beginners, SAGE Publications, Singapore

- Trinh-Phuong, T., Molla, A., & Peszynski, K. (2012). Enterprise Systems and Organizational Agility: A Review of the Literature and Conceptual Framework. *Communications of the Association for Information Systems*, **31(1 (Article 8)): 167-193.**

- Oshodin, O., Molla, A., & Ong, C. E (2016) An Information Systems Perspective on Digital Currencies: A Systematic Literature Review, *Proceedings of the 27th Australasian Conference on Information Systems*, Dec 3- 5, 2016, Wollongong, Australia, https://business.uow.edu.au/content/groups/public/@web/@bus/documents/doc/uow223938.pdf

- Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future: Writing a literature review. *MIS quarterly*, 26(2), xiii-xxiii.

Doing Your Literature Review
Traditional and Systematic Techniques

Jill K. Jesson with Lydia Matheson and Fiona M. Lacey

THE LITERATURE REVIEW
SIX STEPS TO SUCCESS
2 EDITION

LAWRENCE A. MACHI
BRENDA T. McEVOY

SYSTEMATIC APPROACHES to a SUCCESSFUL LITERATURE REVIEW

Andrew Booth
Diana Papaioannou
Anthea Sutton