



Exploring project complexities and their problems: a critical review of the literature

Thesis submitted by

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Table of Contents

Statement of Originality/ Thesis Declaration.....	V
Acknowledgment	VI
PROLOGUE: OVERALL INTRODUCTION OF THIS WORK	VII
Chapter 1 -	
What is project and project management? Exploring the basics	1
Abstract.....	1
1.1. Change management	2
1.2. Project.....	4
1.2.1. Literal meaning of the project	4
1.2.2. Project definition	4
1.3. Comparison between the Project and Operations	6
1.4. Paradox between System, System of System and Project.....	8
1.5. Concept of the project management.....	10
1.5.1. Approaches to project management	12
1.5.2. Project life cycle	13
1.5.3. Project management processes.....	16
1.5.4. Initiating the Project	17
1.6. Differences between Traditional Project and Complex Project.....	20
1.7. Defining Complexity in the Context of Project Management.....	22
1.8. Conclusion.....	24
Chapter 2 -	
Research Design.....	26
Abstract.....	26
2.1. Aims/Objectives of the research.....	27
2.2. Research questions	27
2.3. Research motivation	27
2.4. Significance/ Contribution to the discipline.....	28
2.5. Theoretical framework	28
2.6. Research Process	29
2.7. Research Philosophy	30
2.8. Systematic Literature Review	31
2.8.1. Search terms	32

2.8.2. Databases searched	32
2.8.3. Inclusion/exclusion criteria	33
2.9. Conclusion.....	35
Chapter 3 -	
Review of modern history on Project Complexity	36
Abstract.....	36
3.1. Introduction	37
3.2. Historical Development of Project Complexity.....	39
3.3. Project Complexity definition	47
3.4. Conclusion.....	51
Chapter 4 -	
Commonalities and differences between dominant perspectives	52
Abstract.....	52
4.1. The Project Management Institute (PMI) view.....	53
4.2. The System of Systems (SoS) view	55
4.3. The complexity theories view	56
4.4. Conclusion.....	57
Chapter 5 -	
Project Complexity Factors	58
Abstract.....	58
5.1. Project complexity factors (PMI Classification)	59
5.2. Project complexity factors (SoS Classification)	73
5.3. Selected Major Project complexity factors.....	81
5.4. Conclusion.....	85
Chapter 6 -	
Conclusion; a proposal for PhD.....	86
6.1. Complex Projects Governance: developing a social networking approach with trust building and cultural aspects	87
References	92
Appendix I	104
Decision matrix based on Fuzzy SAW	104
Appendix II	110
list of the most relevant academic (peer reviewed) and industry journals on Project Management presented by Australian Institute of Project Management	110

List of tables

TABLE 1-1. DIFFERENTIATING OF SYSTEM, SYSTEM OF SYSTEMS AND PROJECT ADAPTED FROM BOARDMAN & SAUSER (2006)	9
TABLE 3-1. MOST CITED DIFFERENT PROJECT COMPLEXITY DEFINITIONS IN THE LITERATURE	49
TABLE 5-1. FACTORS CONTRIBUTING TO PROJECT CONTENT COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	60
TABLE 5-2. FACTORS CONTRIBUTING TO PROJECT CONTEXT COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	63
TABLE 5-3. FACTORS CONTRIBUTING TO PROJECT ORGANISATIONAL COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	65
TABLE 5-4. FACTORS CONTRIBUTING TO PROJECT INTERDEPENDENCIES COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	66
TABLE 5-5. FACTORS CONTRIBUTING TO PROJECT TECHNOLOGICAL COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	67
TABLE 5-6. FACTORS CONTRIBUTING TO PROJECT INFORMATIONAL COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	68
TABLE 5-7. FACTORS CONTRIBUTING TO PROJECT'S PRODUCTS/SERVICES COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	69
TABLE 5-8. FACTORS CONTRIBUTING TO PROJECT'S CLIENT COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	70
TABLE 5-9. FACTORS CONTRIBUTING TO PROJECT EXTENAL ENVIRONMENT COMPLEXITY BASED ON PROCESS APPROACH (SOURCE: AUTHORS)	71
TABLE 5-10. PROJECT COMPLEXITY FACTORS BASED ON SOS VIEW (SOURCE: AUTHORS)	77
TABLE 5-11. IMPORTANCE WEIGHT OF CRITERIA ACCORDING TO TFN ADAPTED FROM LIN, LIAO, & CHANG (2010)	81
TABLE 5-12. COMPLEXITY FACTOR SCORING SYSTEM (SOURCE: AUTHORS)	82
TABLE 5- EXAMPLE OF DEFUZZIFICATION PHASE	83
TABLE I. FSAW DECISION MATRIX ACCORDING TO THE TOP AUTHORS CRITERIA (SOURCE: AUTHORS)	104
TABLE II. MOST RELEVANT ACADEMIC (PEER REVIEWED) AND INDUSTRY JOURNALS ON PROJECT MANAGEMENT ADAPTED BY AIPM	110

List of Figures

- FIGURE 1. OVERALL STRUCTURE OF THE THESIS IX
- FIGURE 1-1. SOME DIFFERENCES BETWEEN TRADITIONAL PROJECT AND COMPLEX PROJECT ADAPTED FROM (GOROD, 2014) 21
- FIGURE 1-2. A TYPOLOGY OF PROJECTS ADAPTED FROM GOROD, GANDHI, SAUSER, & BOARDMAN (2008). 24
- FIGURE 2-1. RESEARCH THEORETICAL FRAMEWORK 29
- FIGURE 2-2. RESEARCH PROCESS CHART 30
- FIGURE 2-3. SYSTEMATIC REVIEW STEPS ADAPTED BY THE AUSTRALIAN NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL GUIDELINES 31
- FIGURE 2-4. VENN DIAGRAM FOR SEARCH KEYWORDS ABOUT PROJECT COMPLEXITY (SOURCE: AUTHORS) 32
- FIGURE 2-5. SAMPLE SECTION CRITERIA 34
- FIGURE 2-6. STAGES OF THE STUDY SELECTION PROCESS 34
- FIGURE 3-1. PERCENTAGE OF DIFFERENT PROJECTS IN THE LITERATURE REVIEW 37
- FIGURE 3-2. MILESTONES OF PROJECT COMPLEXITY HISTORY (SOURCE: AUTHORS) 38
- FIGURE 3-3. HISTOGRAM ANALYSIS FOR PROJECT COMPLEXITY DEVELOPMENT 38
- FIGURE 4-1. DIFFERENT TYPES OF PROJECTS BY CYNEFIN FRAMEWORK ADOPTED FROM SNOWDEN & BOONE (2007) 54
- FIGURE 4-2. DIFFERENT CHARACTERISTICS OF COMPLEX PROJECTS IN THREE SCHOOLS OF THOUGHT (SOURCE: AUTHORS) 57
- FIGURE 5-1. PROJECT COMPLEXITY FACTORS FRAMEWORK BASED ON PROCESS APPROACH (SOURCE: AUTHORS)..... 59
- FIGURE 5-2. PERCENTAGE OF PROJECT COMPLEXITY DIMENSIONS BASED ON NUMBER OF FACTORS (SOURCE: AUTHORS) 72
- FIGURE 5-3. PROJECT CHARACTERISTICS AND THEIR PARADOX ADAPTED FROM (SAUSER ET AL., 2009) 74
- FIGURE 5-4. A TYPOLOGY OF PROJECTS ADAPTED FROM (IRELAND ET AL., 2013) 75
- FIGURE 5-5. DRIVERS OF PROJECT COMPLEXITY BASED ON SOS VIEW (SOURCE: AUTHORS)..... 76
- FIGURE 5-6. PROJECT COMPLEXITY FACTORS ACCORDING TO NUMBER OF CITATIONS REPRESENTED BY PUBLISHED VIEW 80
- FIGURE 5-7. TOP TEN PROJECT COMPLEXITY FACTORS ACCORDING TO THE DIFFERENT CRITERIA (SOURCE: AUTHORS)..... 84
- FIGURE 6-1. MOST PROJECT COMPLEXITY FACTORS ADAPTED FROM PMI’S PULSE OF THE PROFESSION™ IN-DEPTH REPORT (PMI, 2013B) 88

Statement of Originality/ Thesis Declaration

I certify that this work contains no material which has been accepted for the award of any other degree or diploma in my name, in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission in my name, for any other degree or diploma in any university or other tertiary institution without the prior approval of the University of Adelaide and where applicable, any partner institution responsible for the joint-award of this degree.

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Javad Bakhshi

Date

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PROLOGUE: OVERALL INTRODUCTION OF THIS WORK

It is hard to imagine any simple projects in today's emergence behaviour world. There is varying degrees of complexity in all types of projects. This is evident in the early definition of complexity, which is defined as an entity which consists of many varied interrelated parts and elements such as tasks, components, and interdependence (Hornby & Wehmeier 1995). Thus, every practical project in the world contains a degree of complexity. Complexity is one of the most important and controversial topics in many disciplines, project management included. Interestingly, however, there is no universally accepted definition of complexity (Ireland, 2013). Stephen Hawking has mentioned correctly "I think that the next century (21st) will be the century of complexity." Project Management Institute (PMI) also has concentrated on that recently. "Complexity is not going away and will only increase. Ultimately, how organizations anticipate, comprehend and navigate complexity determines their successes and failures" (PMI 2013a, p. 5). Complex systems display numerous different behaviours. Self-organisation and the emergent properties of them are often counter-intuitive. As a result, opportunities for external or top-down control are very limited (Helbing 2013). This is because of their diverse components' properties and interactions without simple cause-effect relationships. Based on this, "complexity is the inability to predict the behaviour of a system due to large numbers of constituent parts within the system and dense relationships among them" (Sheard & Mostashari, 2012, p. 11).

Although there is extensive research in this area, there is still a lack of understanding on what exactly project complexity is. Accordingly, the purpose of this research is to clarify the epistemology of project complexity and the implication of this definition for complex project management, considering different schools of thought. Thus, the main purpose of this paper is seeking out what factors make a complex project while considering different perspectives. Given the research main aim, this research seeks to answer the following questions:

Q1: What is project complexity and why are some projects complex?

Q2: What factors contribute to project complexity considering different schools of thought?

To answer the research questions above, first of all, we have conducted an in-depth systematic literature review to define complexity in the context of project management. The analysis period is more than 25 years from 1990 to 2015, and covers key developments in project complexity. Then, selected publications have been analysed. Finally three dominant perspectives construct a project complexity framework: the Project Management Institute (PMI) view, the System of Systems view and the complexity theories view. The structural of this thesis has been shown in figure 1.

Publications by the Author since beginning this work:

1. *“Exploring project complexities: a critical review of the literature”*. In *Proceedings of Australian Institute of Project Management Conference, At WREST POINT CONVENTION CENTRE, HOBART, AUSTRALIA, 11 Oct 2015 - 14 Oct 2015. (Chapter 3 and 5)*

2. *“What Is Project Complexity; Past, current and future”*. *International Journal of Project Management, accepted and forthcoming.(Chapter 3, 4 and 5)*

3. *“Selected major complexity factors to understand project complexities”*. *International Journal of Managing Projects in Business, Ready to submit. (Chapter 5)*

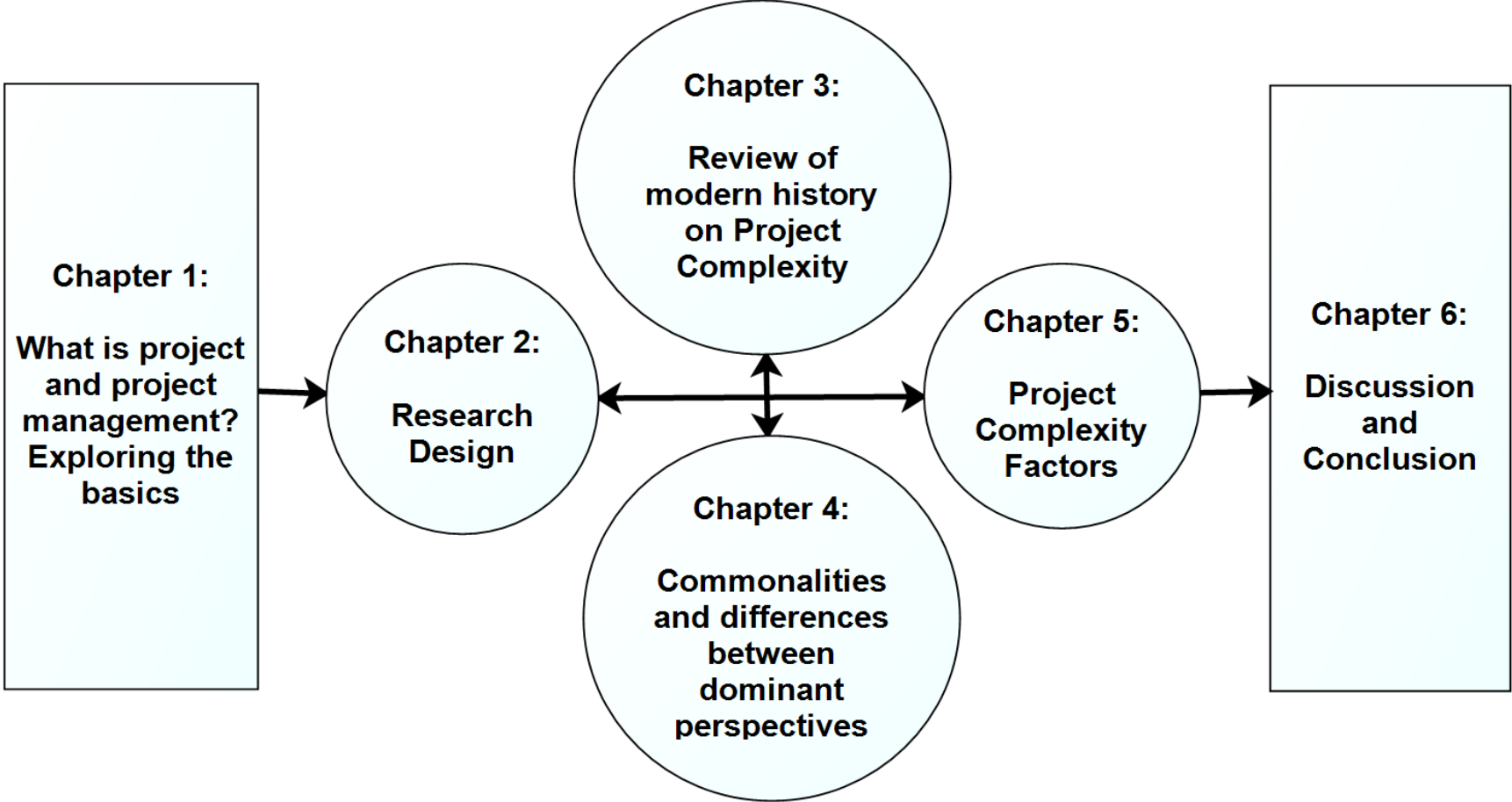


Figure 1. Overall structure of the thesis