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

Thesis submitted by

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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:


2. “What Is Project Complexity; Past, current and future”. International Journal of Project Management, accepted and forthcomig.(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)
Chapter 1: What is project and project management? Exploring the basics

Chapter 2: Research Design

Chapter 3: Review of modern history on Project Complexity

Chapter 4: Commonalities and differences between dominant perspectives

Chapter 5: Project Complexity Factors

Chapter 6: Discussion and Conclusion

Figure 1. Overall structure of the thesis