Annotated Bibliography

Presented to: Dr. Diane Strode

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# Introduction

The theme that is present amongst the three articles to be annotated is complexity within IT projects. The articles are Living on the Edge: Managing Project Complexity, by Hass; Context-Adaptive Agility: Managing Complexity and Uncertainty, by Little; and finally, Factors that Affect Software Systems Development Project Outcomes: A Survey of Research, by McLeod and MacDonell.

# Theme

Complexity within an IT project is defined as a project or system that is made up of interwoven components that serve various purposes, while also considering any extraneous factors that may affect the project, or that the problem or solution may be difficult to fully comprehend.

Complexity is addressed by Hass (2007) as she presented a Project Complexity Model that is capable of determining the dimensions of complexity of a project through examining the size, complexity and risk of the project.

Complexity is addressed by Little (2005) as he developed a method to determine which best practices a project should utilize based on a four quadrant matrix that quantifies the two most significant attributes to influence a project’s development life cycle, complexity and uncertainty.

Complexity is addressed by Mcleod and MacDonell (2011) as they surveyed four studies between the years of 1996-2006. The focus of the survey was on factors that influence a projects outcome with an interest in empirical analysis, this allowed them to develop a framework that classifies factors in question.

# Reference

Hass, K. B. (2007). Living on the Edge: Managing Project Complexity. *Handbook of Research on Leveraging Risk and Uncertainties for Effective Project Management,* 177-201. https://doi.org/10.4018/978-1-5225-1790-0.ch009

# Summary

### Purpose

Provide a means for businesses to evaluate the level of complexity of their projects.

### Theory Base (if relevant)

### Research Problem and/or Question

Over time businesses have grown into more complex entities due to evolving technology, changing markets and competition across the world. In turn, the systems in use by the business’ have also grown more complex and so, the ability to properly manage new projects that rely on these systems has become increasingly difficult.

### Research Method

The Project Complexity Model contains each of the characteristics of a project including Time/Cost; Team Size; Team Composition; Competing Demands; Problem/Solution Clarity; Stability of Requirements; Strategic Importance, Political Implications and/or Multiple Stakeholders; and finally, Level of Change. The complexity dimensions of these characteristics are described for small, medium and large projects.

### Findings/Key Results

There were no findings or key results as this research has not been implemented practically nor does it provide empirical analysis.

### Major Contributions

In practice, businesses have a well-defined and through method of determining the complexity of their projects, that can be used from startups to corporations.

# Critique

A strength of this research is the level of detail Hass (2007) provided for every project situation that is easy to follow, alongside sub-models that represent terms and methodologies discussed.

Limitations of this research are that it has not been tested in real world projects, so the effectiveness of the Project Complexity Model is purely theoretical. There was no input or examination by other project managers or business analysts to ensure the validity of the Project Complexity Model. Future research was not discussed.

# Future Research

Future research has not been acknowledged by this research.

# Reference

Little, T. (2005). Context-adaptive agility: Managing complexity and uncertainty. *Institute of Electrical and Electronics Engineers Software,* 22(3), 22-35. https://doi.org/10.1109/MS.2005.60

# Summary

### Purpose

Provide a means for businesses to determine which best practices should be utilized for a specific project.

### Theory Base (if relevant)

### Research Problem and/or Question

Practices that are just barely capable of supporting certain projects are unable to support some projects while at the same time being too complicated for other projects.

### Research Method

Research began by examining prior studies about project complexity and agile development, Alistair Cockburn’s Crystal method was the influencing study for this research. The crystal method defined projects by their size and criticality, which Little (2005) thought was lacking as there were many other factors that influenced the management of a project. After analyzing all the influencing factors, uncertainty and complexity were found to be the main characteristics, which served as the basis for their matrix.

### Findings/Key Results

Most of the projects developed at Landmark followed a common pathway along the matrix. They began with low complexity and moderate uncertainty, evolved with further complexity and uncertainty, became highly successful along with high uncertainty and complexity, then over time the complexity and uncertainty would decrease towards the end.

### Major Contributions

The matrix will enable businesses to gain a better understanding of the complexity and uncertainty of their projects while knowing which practices would be best used.

# Critique

Limitations of this research are that all the projects to make use of this matrix were from Landmark and not any outside businesses. The matrix only provides a surface level examination of a project’s complexity and uncertainty. Future research was not discussed.

# Future Research

Future research has not been acknowledged by this research.

# Reference

Mcleod, L., & MacDonell, S, G. (2011). Factors that affect software systems development project outcomes: A survey of research. *Association for Computing Machinery Comput. Surv.,* 43(4), 24:1-24:56. https://doi.org/10.1145/1978802.1978803

# Summary

### Purpose

Survey prior empirical research on factors that influence project outcomes to determine a new method of classifying those factors within a new framework.

### Theory Base (if relevant)

### Research Problem and/or Question

Previous attempts to classify influencing factors on project outcomes in a framework have been lacking in either detail or scope, as the studies have focused on contained areas of a projects development, such as specific groups of influencing factors or types of systems.

### Research Method

Four empirical studies were examined to identify all the factors that served to influence a projects outcome. A table was devised containing each of the factors covered in the four studies, certain factors were not discussed in some of the studies while others overlapped between studies. These factors were then grouped into four categories, people and action; development processes; project content; and institutional context, this served as the basis for the new framework.

### Findings/Key Results

Made deeper sense of the prior research available while acknowledging how this research can be further developed.

### Major Contributions

Provides businesses with a greater understanding of the types of factors that influence a projects outcome. The framework sets a new standard for this field of research.

# Critique

Strengths of the research include the amount of depth given to the influencing factors, the significant amount of references used, as well as constructive criticism from referees. A limitation of the research is that only four studies were analyzed.

# Future Research

An agreement on the use of terminology that define factors that influence project outcomes, along with tools used to measure those factors. Approaching trends that concern influencing factors need to be considered due to rapid substantial changes. Understanding the interconnections of influencing factors, how important people and processes become due to increasingly complex systems development and stakeholder diversity. Recognizing that certain projects are contained within context sensitive settings require a greater focus on the dimensions of development for a software system.

# References

Hass, K. B. (2007). Living on the edge: Managing project complexity. *Handbook of Research on Leveraging Risk and Uncertainties for Effective Project Management*, 177–201. https://doi.org/10.4018/978-1-5225-1790-0.ch009

Little, T. (2005). Context-adaptive agility: Managing complexity and uncertainty. *IEEE Software*, *22*(3), 28–35. https://doi.org/10.1109/MS.2005.60

McLeod, L., & MacDonell, S. G. (2011). Factors that affect software systems development project outcomes: A survey of research. *ACM Comput. Surv.*, *43*(4), 24:1–24:56. https://doi.org/10.1145/1978802.1978803