

Chapter 1 Introduction

Meeting a project's requirements defines the success of software development project. Failing to manage requirements decreases the probability of meeting these requirements. In CMMI, the process area RD (Requirements Development) provides a set of goals, practices, and related features to develop customer and product requirements, and the process area REQM (Requirements Management) is to help establishing and appraising the quality of requirements management. The RUP is a software engineering process that shows a set of so-called "best practices" to apply during the software development process.

This paper addresses the requirement issues in software development, in order to meet the RD and REQM goals in CMMI. The study proposes an integrated requirement management framework, called IREQM, tailored from the requirements workflow in RUP. A CMMI support system, to implement IREQM is established to facilitate the REQM and RD activities during the software development process. Finally, a self-appraisal checklist is used to evaluate the compliance of the IREQM framework and its implementation to the CMMI model.

1.1 Research Background and Motivation

Sometimes requirements are ambiguous and hard to express clearly in words. As time goes on or the context changes, customers will also change their minds. The changing requirement therefore brings a difficult problem to the development team and the customer. Furthermore, the project may lose control in requirements tracking because there are many sources of requirements, which sometimes will involve various groups in the project. Since outsourcing has become the major trend of software development, the difficulties of requirements communicating or tracking is also increased inevitably.

A recent study presents that the most significant contributors to project failure relate to requirements (Standish Group, 1994 and 1997). Effective requirements management can help the software development process to ensure a high-quality software development and management process. The success of managing requirements usually means that all the customer needs are documented and clearly understood, a standard process of requirement changing is built, and the progress or budget is under control. Managing requirements change includes such activities as establishing a baseline, determining which dependencies are important to trace, establishing traceability between related items, and implementing change control (Rational Software Corporation, 2003). So all the software development projects need requirement management to ensure a high-quality software development and

management process, especially in an outsourcing environment.

In CMMI, the process area RD (Requirements Development) provides a set of goals, practices, and related features to develop customer and product requirements, and the process area REQM (Requirements Management) is to help establishing and appraising the quality of requirements management. The RD in CMMI maturity level 3 is derived from Software Product Engineering in CMM level 3, and the REQM is constant from CMM level 2. Some literatures claim that RUP can help to reach CMM level 2 and 3 (Rational Software Corporation, 2000b). The relationship between CMMI and RUP are therefore deserved to be investigated.

1.2 Research Method

There are a series of research methods in MIS, including Prototyping, Methodology, Theory Development, Concept Formulation, Empirical Laboratory Test, Empirical Real-World Test, Survey, Case study and Truth (Scott-Morton, 1984). Another set includes Case study, Survey Research Method, Experimental Research Method, Modeling, System Representation, and Meta-Research (Liang, 1997). This study is conducted by the Concept Formulation and System Representation method to develop a systematic process for tailoring the RUP process framework to deal with the requirements issues in the software development process.

1.3 Research Objectives

On account of the research motivation, this thesis addresses the requirement issues in software development, in order to meet the RD and REQM goals in CMMI to help establishing and appraising the quality of requirements management. The study intends to propose an IREM (Integrated Requirement Management Framework) to institutionalize REQM and RD processes tailored for the practitioners with respect to requirements workflow in RUP. Additionally, based on the above integrated process, a CMMI support system, called *AutoREQM*, is built on IBM Rational tools to facilitate the REQM and RD activities during the software development process.

1.4 Thesis Organization

This thesis consists of six chapters:

Chapter 1 Introduction

Chapter 2 Literature Review

Chapter 3 The Integrated Requirement Managements Requirement Framework (IREQM)

Chapter 4 IREQM Framework Implementation-*AutoREQM* Prototype

Chapter 5 CMMI Self-Appraisal

Chapter 6 Conclusions and Future Research.

Based on the research motivation and objectives, the research process flowchart is illustrated in Figure 1.

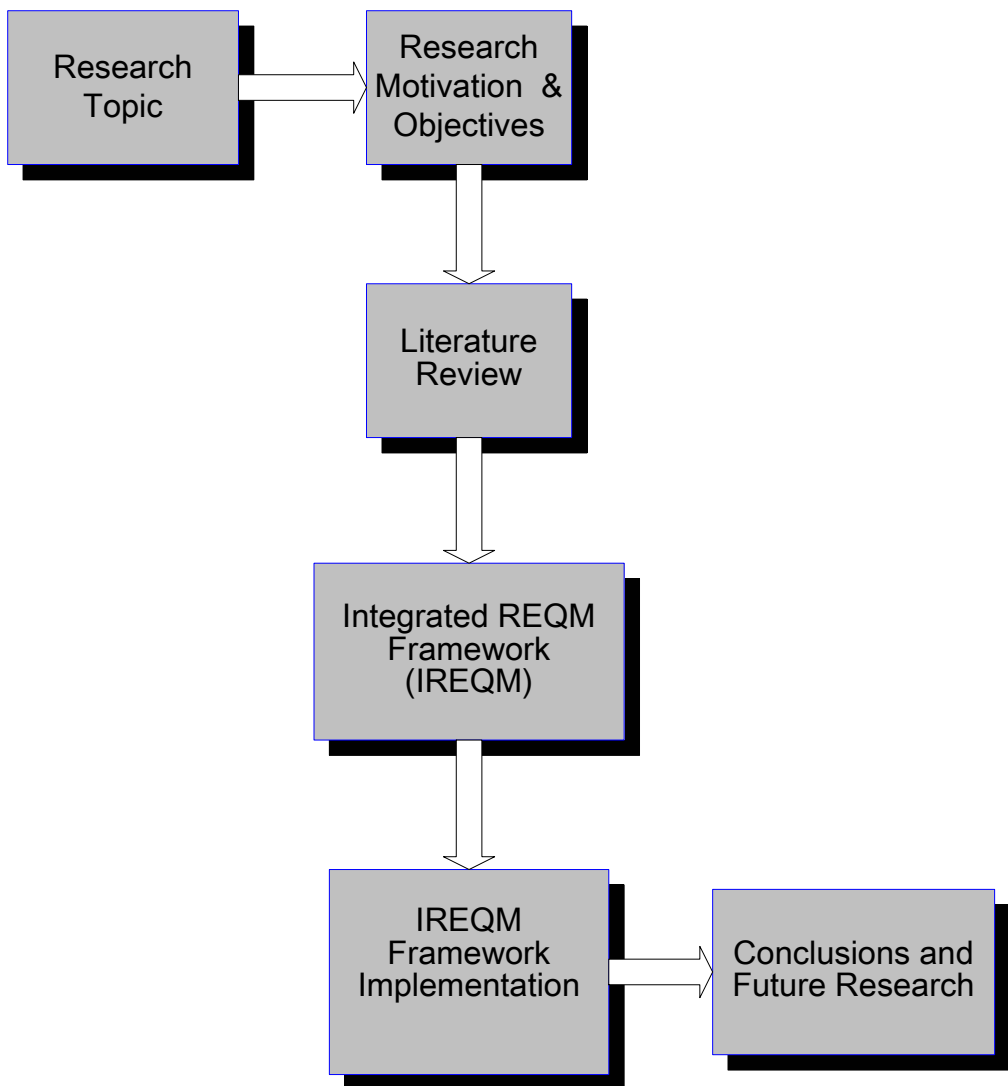


Figure 1 The Research Process