

2<sup>nd</sup> International Through-life Engineering Services Conference  
Configuration Management Process Capabilities

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**Abstract**

The literature suggests that maturity assessment tools could be successful if based on process capabilities which are the outcomes of critical success factors and barriers to a process. This paper investigate the configuration management process capabilities finalized on the basis of semi-structured interviews with configuration management professionals and analysis of two highly significant studies in the development of configuration management as a researchable topic. The first study investigated the critical success factors for the successful CM development [1] while the other study looked at the identification of barriers to effective CM deployment [2]. The literature suggests that majority of research studies have focussed on the process capability itself, not the success or failure of CM. A list of ten process capabilities are finalized which will provide the necessary foundation to devise and measure a configuration management maturity model.

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Selection and peer-review under responsibility of the International Scientific Committee of the “2nd International Through-life Engineering Services Conference” and the Programme Chair – Ashutosh Tiwari

"Keywords: Configuration Management, Maturity Model, Critical Success Factors, Barriers; Process improvements ;"

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**1. Introduction**

*‘Configuration Management (CM) is a technical and management process applying appropriate resources, processes, and tools to establish and maintain consistency between the product requirements, the product, and associated product configuration information’* [6]. After its inception from defense sectors back in 1950’s, configuration management has got considerable recognition after being part of some major standards of the international organization for standardization (ISO) as a compliance requirement. Configuration management is an integral part of the project life cycle and has great influence on reducing product development time, minimizing through life cost, and enhancing overall product quality [2].

The studies Niazi et al. [15], Fortune and white [7], and Yeo et al. [22], provide baseline guidelines on process maturity. The research of Yeo et al. [22] emphasizes on extracting key capability areas which are mainly based on critical success factors and barriers to a process where as Niazi et al. [15] emphasis on the identification and

measurement of critical success factors and critical barriers to suggest on improvements methodologies. The study Fortune and White [7] suggest the extraction of key capability areas from critical success factors to evolve and mature a particular system or process through a formal system model.

The objective of this research is to integrate CM critical success factors and barriers to finalize the process capabilities which could help in the implementation and development of CM process in organizations. In-depth analysis of the twenty-one critical success factors for the implementation of configuration management [1] and nineteen barriers to configuration management implementation [2] followed by semi-structured interview with configuration management subject specialist helped us to finalize ten process capabilities necessary for the implementation and continuously development of the configuration management process.

**2. Research Methodology**

It is believed that pre-existing body of knowledge plays a vital part in research by providing important information

about the history of particular field and forms the foundation for further research. Some research studies are non-empirical in nature and are based on searching and reviewing the previous literature [11, 21] while others are empirical which involves the collection and analysis of data - quantitative or qualitative [21] and is mostly based on observation or experience [13]. This part of our research is mainly based on semi-structured interview which is part of qualitative research methodology [8] and critical analysis of the available literature especially the studies on critical success factors and barriers in the field. It is also important to note that content analysis is a research method which is used to make valid inferences from a text [14]. Content analysis is the study of recorded human communications, such as books, websites, paintings and laws [3].

### 3. Findings and Discussion

The effective implementation and continuously development of any process needs to define its key process capabilities and have in-depth understanding on how to investigate those capabilities to find the strength of that process.

#### 3.1. Identification of key process capabilities

On the basis of twenty-one critical success factors for configuration management implementation [1], nineteen barriers to CM implementation [2] and semi-structured interviews with configuration management professionals, ten configuration management process capabilities are finalized which are presented below. It is important to note that some capabilities are the composition of multiple factors (rephrased critical success factors or barriers) which are grouped on the basis of their inherent relationships to facilitate while designing the configuration management maturity model.

- Execution Policies
- CM governance
- Process executors
- Resources allocation
- Organizational support
- Effective environment
- Effective communication
- Customer's awareness
- Process control at vendor's premises
- Process transformation

#### 3.2. Key process capabilities in the preview of literature

Following sections describes the importance of each process capabilities and its importance in the preview of literature.

##### 3.2.1. Execution Policies

The capability deals with vision, mission, and implementation policies of configuration management. It is

important for any organization to benchmark their practices with latest international standard(s) [e.g. 6]. The configuration management process is not new to implement where enough literature is available form of standards [e.g. 6], books (e.g. 10, 17, 20] and academic research [e.g. 1, 2, 4, 5] to facilitate the implementation of the process. It is essential to define a checklist to ensure the implementation of the process against any selected standard which should critically emphasize on the selected practices.

##### 3.2.2. Governance

This capability consists of CM organization and CM planning. There is a growing requirement to have centralized body for the governance of CM [2] where CM is often considered a secondary role with only few organizations having senior managers with CM specific responsibilities [5]. The decision on any suitable organization is influenced by many factors such as the size, number, and complexity of projects and the availability of resources [1]. On the other hand, configuration management planning is an important aspect of the process which ensures the implementation of the process [6] by acting as a guiding tool for the process.

##### 3.2.3. Process Executors

This capability deals with effective leadership and configuration management experts having previous experience with a group of competent and committed individuals. The important aspect for any core business processes is its leadership who play a major part in the establishment and continuous development of the process [10]. The leadership is always backed by competent and experience employees to achieve their objectives [1].

##### 3.2.4. Resources Allocation

This process capability deals with human resources and budget, effective CM tool, and professional development. Guess [10] highlighted the importance of resources (both in terms of human and financial) which play a major role in the implementation and continuous development of configuration management process which is still a major issue in configuration management implementation [9]. The other important aspect of this category is to have appropriate software tool which according to have not only increased capabilities of individuals in work but also helped organizations in streamlining their data and information. Thirdly, professional development, which according to is the core issues for any business process management. It is important to note that professionals with configuration management certification and training understand the limitation of the process and plays active role in the effective implementation of the process [2].

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