



CRITICAL SUCCESS FACTORS OF DEFENCE EQUIPMENT PROJECTS

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Abstract

The objective of this study is to define the critical success factors of defence equipment projects in Finnish Defence Forces. The main critical success factors are identified in the literature and empirical data is collected by conducting interviews. Therefore, the critical success factors are determined by theory, SWOT-analysis and findings of the interview process.

The results of this study show that the most important critical success factors of defence equipment projects are the following: personnel involved in the project, flexible working environment, well-defined project demands, detailed and updated project plans, documentation, a good project manager, realistic and clear objectives and support from superiors, sufficient resources and efficient use of resources.

Key words: *critical success factors, success criteria, project, defence.*

JEL code: L30

Introduction

Since the 1960s, researchers have been trying to identify which factors lead to project failure or success (Cooke-Davies 2002). Most of the literature has focused on the private sector, whereas studies on the public sector have been limited. Identifying and examining a project's success factors is important for the evaluation and effectiveness of different projects in the private and public sectors (Neilomo & Uusi-Rauva 2005).

Since the 1980s, the public sector has used various measurements of performance regarding organisations and projects. The reason behind this was the need for reduction in project expenses and increase in quantity and quality of services (Arnaboldi et al. 2004). Since the end of the cold war, the European Defence Forces have been changing compared to other departments of the public sector. The defence budgets have been declining and the recent era of austerity together with the unrest in Ukraine have not changed this trend (Lehtonen & Isojärvi 2015). Finland has launched the biggest defence equipment project that will replace the F/A-18 Hornet multirole combat aircraft in the next decade. Likewise, the Finnish Navy has started a project named "Fleet 2020" that will include four new frigates. The estimated cost of these two defence projects is 7-11 billion euros. Consequently, the defence equipment projects can worth billions of euros; therefore successful management is the key for delivering efficient and cost-effective projects, especially when budgets are declining but performance demands are increasing. The defence equipment projects' success is crucial in an era of decreasing budgets, where nations and governments carefully decide on the allocation of financial resources.

Objectives

This paper focuses on the critical success factors of the Finnish Defence Forces' equipment projects. Identifying a project's critical success factors is vital for the understanding of why defence equipment projects may fail or succeed. The critical success factors are also important for the management of project-related performance. Effective management depends on the comprehension of these fundamental factors that can be responsible for the success or failure of a project. The main research question is: which are the critical success factors of the

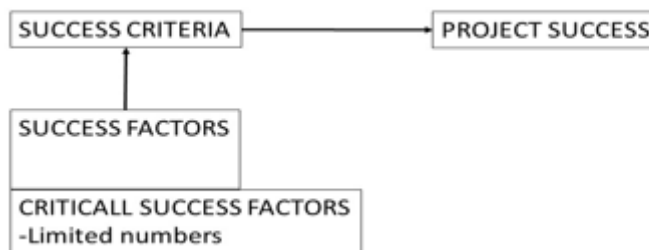


Finnish Defence Forces' equipment projects? The secondary research questions are: 1) which factors of equipment projects lead to failure or success? 2) What is the overall situation of the defence equipment projects?

Critical success factors

Early research on the success criteria suggests that the main success factors are based on the so-called 'iron triangle or golden triangle of time, cost and quality' (Atkinson 1999; Westerveld 2003). However, more recently, researchers have found that a project's success is far more complex. There are more potential factors that can be identified. Project management research indicates that it is impossible to have a universal checklist of success criteria. Success factors will be variable in every project (Westerveld 2003; Wateridge 1998). Each project has a number of variables and each project is unique.

There is often some confusion in relation to the terms: *success criteria*, *success factors* and *critical success factors*. *Success criteria* are used to measure the success, whilst *success factors* are the set of circumstances or facts that contribute to a project's outcome. Success factors are the influential forces responsible for failure or success. *Critical success factors* are part of the success factors (Belassi & Tukel 1996). The number of critical success factors should be limited (Fortune & White 2006). Critical success factors include various areas where good performance and skilled management are necessary to ensure the achievement of a project's goals (Fortune & White 2006).



Source: author's construction based on literature (Lim & Mohamed 1999 and Belassi & Tukel 1996).

Figure 1. Modified presentation of critical success factors, success factors and success criteria.

There is a long tradition of measuring and observing financial success factors such as profitability and cost. However, some studies on critical factors have also identified several non-financial aspects (Kaplan & Norton 1996; Neely et al. 2000; Toivanen 2001). Many of these critical factors are tangible and physical, like amounts and volumes, whereas non-financial factors like employee satisfaction, a skilled manager and support from superiors can be described as intangible and non-physical (Lönqvist 2004). The literature on project management and success, such as success factors and critical success factors is extensive. Fortune and White



(2004) identified 63 publications on critical success factors and outlined 27 different critical success factors in their research. Other scholars found 10 different critical success factors (Wateridge 1998), whereas Pinto & Slevin (1989) identified 12 and Gunathilaka et al. (2013) 21 critical success factors.

Table 1.

Critical success factors in literature			
Fortune and White 2004*	Wateridge 1998	Pinto and Slevin 1989	Gunathilaka 2013*
Support from senior management	Meets user requirements	Top management support	Effective project team formation
Clear realistic objectives	Achieves purpose	Client consultation	Effective communication
Strong/detailed plan kept up to date	Meets time	Personnel recruitment	Top management support
Good communication/feedback	Meets budget	Technical tasks	Allocation of sufficient resources
User involvement	Meets quality	Client acceptance	Clearly defined goals and objectives
Skilled/suitable qualified team	Happy users	Monitoring and feedback	The level of technology
Effective change management	Commercial success	Communication	Financial stability & adequate funding
Competent project manager	Happy sponsor	Trouble-shooting	Projects manager competence
Sound basis for project	Happy team	Characteristics of the project leader	Project monitor and feedback
Well allocated resources	Others	Power and politics	Motivation and incentives
Good leadership		Environment events	Established budget and monitoring
Realistic schedule		Urgency	Clients consultation and involvement

*12 most common critical success factors

Source: Author construction

Methods

In-depth interviews of participants who have worked in different levels of defence equipment projects were conducted. All twelve interviews were representative of the Finnish Defence Forces. Seven of the participants were working as project officers on three different equipment projects. These project officers were using at least 50% of their overall work time on equipment projects. Some of them were having 80 days of annual traveling associated with equipment projects. Five participants were either managers or project owners. Project managers and owners were using 70% of their work time on projects. Interviews were conducted during the summer of 2006. Due to the Finnish Defence Forces security rules, the interviews and results could not be published earlier. Likewise, due to confidentiality, the names or positions of the respondents were anonymised. The interviews were semi-structured and this enabled the



interviewer to pursue interesting comments and themes as they emerged during the interview. All interviews were recorded, transcripts were coded and then analysed.

Results

The data derived from the interviews contributed to the formulation of the SWOT matrix. SWOT is an acronym for “Strengths, Weaknesses, Opportunities and Threats.” The purpose of the SWOT matrix is to gather, analyze and evaluate information (Piercy, N. & Giles, W. 1989). A matrix, in this paper, is produced in order to get a better understanding of the overall situation of defence equipment projects in Finnish Defence Forces.

Table 2

SWOT matrix of defence equipment projects

<p>Strengths</p> <ul style="list-style-type: none"> Commitment of personnel Limited key personnel Mutual understanding of project goals Capable project manager Meaningful project Operational user requirements Project group cohesion Freedom of work 	<p>Weaknesses</p> <ul style="list-style-type: none"> Schedule Purchasing a product in an “under development” phase Funding Email management Unrealistic expectations Project manager becomes negotiator
<p>Opportunities</p> <ul style="list-style-type: none"> Co-operation with participants Organizational support (defence forces) Recognized risks Fast and solid decisions Improved working technics 	<p>Threats</p> <ul style="list-style-type: none"> Project does not fulfil the requirements Change of requirements Change of funding Changing personnel Political guidance Collaboration among team members

Source: Author construction

Several interviewees mentioned that the operational user requirements and the successful definition of demands were vital factors of a projects’ success. In practice this means that the operational user is taking part in field tests where requirements and demands can be identified, discussed and improved. Additionally, the involvement of limited key personnel was thought more appropriate for flexible project management and less bureaucracy. According to the interviewees this contributed to a better project performance. Participants considered defence equipment projects as an opportunity to improve both individual and team level project-related techniques and processes. The reason was that the nature of defence projects is distinctive and pre-existing success factors need to adapt to new projects. According to the interviewees the main limitations were restricted resources and time requirements. In particular, due to limited resources, in some cases it is not possible to conduct all the steps of the assessment process. Consequently, the project may not fulfil all the necessary requirements. Likewise, in relation to time, in some cases a product is bought prematurely. This may result in operational problems that may hamper the performance of its operational use and therefore it may not be suitable for



future operational tasks. In some other cases, the main cause of failure is the fluctuating requirements during the formulation of a project.

Another factor that emerged during the interview process was political agenda. Political agenda may favour the selection of certain products over others, for example due to budget limitations in public spending, even if they do not meet all the necessary criteria. This was an interesting finding that has not been frequently identified in the prevailing literature (Pinto and Slevin, 1989; Morris and Hugh, 1986). This could be due to the fact that it is a characteristic of defence equipment and public projects.

Table 3.

Success and failure of defence equipment projects

Successful equipment project	Failed equipment project
Balanced financial resources Realistic user requirements Good project management Good co-operation among project officers and clear responsibilities Core project group with personal responsibilities Documentation Clear and realistic schedule Identified risks and preparation Updated project plans Meaningful project Systematic project evaluation and guidance	Alternating project officers Too many experts in a project group Political guidance Not using official documents for management Inflexible project management Bureaucracy Lack of support from superiors Project officer's passive working attitude Project not fulfilling operational user requirements Schedule and budget determine the project

Source: Author construction

Several participants suggested that a balanced budget and a tailored timetable are necessary elements for the successful completion of a project. Lack of time and budget limitations can cause a tenuous testing phase, whereas a frequent turnover of personnel, such as project officers and project managers, can delay the completion of a project. Likewise, a large project team can cause further delays due to the lack of necessary progress. A skilled project manager with leadership and management skills is important in creating a productive atmosphere with well-defined responsibilities. During the interviews, project managers and owners also mentioned email management. In practice this means that management is done by emails instead of official documents. If people change work, the project team cannot have access to individual email accounts that contain information on work orders or project-related documentation. This can cause difficulties in relation to information management as important information may be lost or delayed.

A framework of critical success factors of defence equipment projects

This section outlines a framework of critical success factors derived from the literature. These factors correspond to the findings of the interviews and offer further insights of success factors in relation to defence equipment projects. In the previous section the SWOT-matrix identified various potential success or failure factors. In this framework, the aim is to outline the most important critical success factors. Therefore, ten critical success factors are chosen. These



are divided into four different categories: project team, quality performance, leadership and resources (Figure 2).

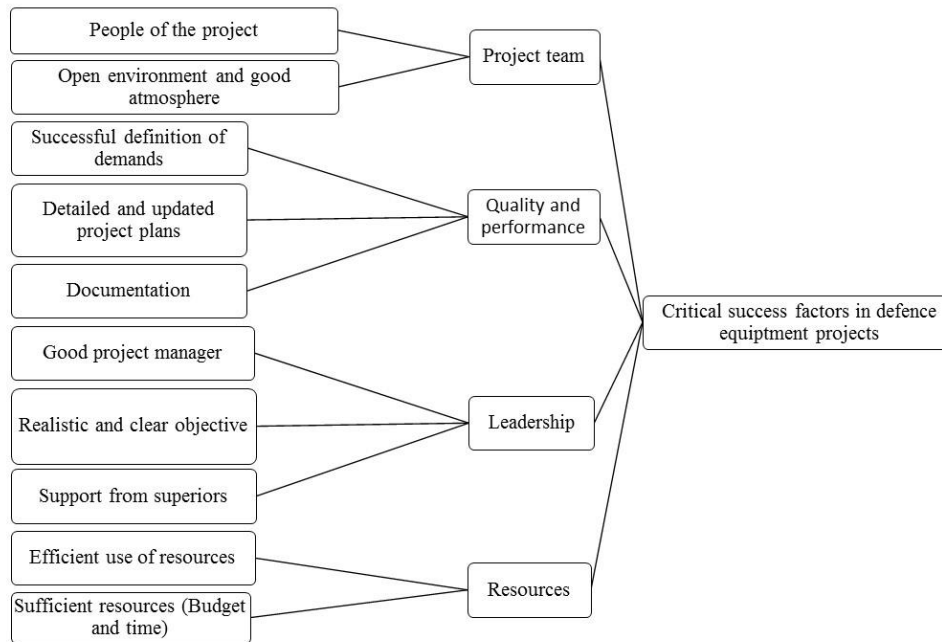


Figure 2. Critical success factors of defence equipment projects

Source: Author construction

For example, the project team is the category responsible for the completion of a project. Sink (1985) refers to the quality of the working environment as the main determining factor of a company's performance, whereas Belassi and Tukul (1996) together with other scholars (Lönnqvist 2004; Fortune & White 2005; Collins & Baccarini 2004) recognize that a team's performance determines a project's success or failure. Every participant in the interview process has identified the importance of the project team within a good working environment. Furthermore, well-defined project demands together with detailed and updated project planning and documentation are important elements of the quality and performance category (Sink 1985, Fortune & White 2004 and Cooke-Davies 2002). The successful identification of project-related demands is in line with the customer needs, since the main objective of every project is to satisfy the requirements of the customer (Pinto & Slevin 1989; Fortune & White 2005; Lönnqvist 2004). In terms of leadership, identifying realistic goals (Lönnqvist 2004), having support from superiors and high-level project performance are recognized as factors of success (Fortune & White 2004; Collins et al 2004; Belassi & Tukul 1996). Finally, the resources category is divided into sufficient resources (time and money) and efficient use of resources, which are well documented in project management studies (Kaplan & Norton 1996; Atkinson 1999; Wateridge 1998; Fortune and White 2005).



Conclusions

This study, conducted in 2006, examined the critical success factors of Finnish Defence Forces' equipment projects. The qualitative findings derived from the participation of project officers, project managers and project owners indicate that factors such as: project personnel, open working environment with good atmosphere, a successful definition of demands, detailed and updated project plans, documentation, a good project manager, realistic and clear objectives, support from superiors, efficient use of resources and sufficient resources are critical success factors of defence equipment projects. Critical success factors can be divided into four main categories: project team, quality and performance, leadership and resources.

The overall situation of equipment projects in Finnish Defence Forces is satisfactory. The main strengths of these projects are intangible like project team cohesion and commitment, whereas the main weaknesses are tangible like budget and schedule. Potential improvements are primarily intangible like co-operation among the team members and improvement of work-related technics. Possible threats to success are both tangible and intangible. Possible threats involve a change in budget and project requirements as well as frequent personnel turnover together with intervention of third parties.

In conclusion, future research should develop the reported findings into a more sophisticated model adapted to defence equipment projects. Furthermore, a ten year follow-up study could explore the current situation of Finnish Defence Forces' equipment projects. Finally, additional studies need to focus on the assessment and improvement of the performance of defence equipment projects.

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