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Degree Project at Master Level

CRITICAL SUCCESS FACTOR FOR THE IMPLEMENTATION OF INFORMATION SYSTEM IN AN ORGANISATION

CASE OF WARTSILA

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Abstract

Information system projects are gaining immense popularity among the manufacturing organisations across the globe. Due to the challenges associated with the information system project management with the manufacturing organisation, organisations have started focusing on technology-oriented solutions such as Information system (IS) projects. However, the success or failure of these projects is ultimately dependent on a range of critical success factors. The purpose of the research was to investigate the Critical Success Factors (CSF) in an Information System (IS) project using the case of Wartsila, a manufacturing organisation operating in marine and energy sector. For this purpose, a qualitative research method was adopted with semi-structured interviews carried out with the IT manager, the Integration Manager (Int. M), and the project teams involved in the project. Thematic analysis, which was chosen as the appropriate data analysis method, assisted in the identification of several codes that were categorized and finally guided to the extraction of seven (7) key themes. A conceptual framework was drawn from the secondary literature review containing CSF within the two major categories such as subjective and objective CSFs. The set of subjective CSFs included project management and team member, commitment and management support, training, change management perceptions, communication, and project planning and management. On the other side, the set of objective CSFs included the process of redesigning, technological difficulties in system design, costs, time engineering, and quality. These literature-based factors were simultaneously analysed by the responses of the interviewees, ultimately ending up in the development of a modified and comprehensive framework for the manufacturing organisation. The findings revealed the significance of subjective factor in shaping the accomplishment of objective factors, drive the project towards the success. These findings have further recommended the need for culturally sensitive 'training' and integration of formal and informal 'communication' methods for the success of the projects in the manufacturing organisations.

Keywords

Critical Success Factor(CSF), Project planning , Change management , IS project, Commitment and Management Support , Redesigning of Process.

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Abbreviations

CSF	Critical Success Factors
IS	Information System
ERP	Enterprise Resource Planning
CRM	Customer Relationship Management
PDMS	Product Data Management System
Int.M	Integration Manager
IM	Information Management
SEM	Structural Equation Modeling

1 Introduction

This chapter endeavours to introduce the research topic chosen for the current investigation and justifies the chosen field of study.

The field of information technology is gaining maturity and high momentum among the business organisations, in pursuance of cost-cutting initiatives and survival efforts (Smuts et al, 2013). The constantly increasing competitiveness is ultimately adding to the bulk of data and information resources for the business organisation on a daily basis. Consequently, the responsibilities of the managers have also increased towards the efficient management and secure storage of data to avoid leakage. Simultaneously, the business organisations require a rapid response to the new and emerging technologies for staying sustainable and competitive (Edwita et al, 2017). These data management and storage needs are the critical evolutionary point for Information Systems (IS). Business organisations have started investing a large percentage of their budgets in introducing both online as well as offline information system (S. Lee, 2007) within the organisation to ensure a smooth transition in exchange of data within the internal as well as external stakeholders. Regardless of the nature or industry of the organisations, almost every small to medium and large-scale businesses are adopting up to certain extent IS for the data management of their manufacturing and service activities (Morris, 2013). For this purpose, almost every organisation needs to have a distinct IS department.

However, the outputs of organisations costly investments made in IS projects do not turn out into expected outcomes. Many of the organisations fail to produce the expected results in effective data management and data storage through the IS systems (Lin et al, 2015). Despite, the indispensability of the information technology industry for every business sector, ultimately stresses the organisations to continue their integration with the information technology industry. Pressures are also exerted for the development of relatively user-friendly and convenient systems. These organisations are also under the intense pressure to develop such ideas mechanisms, which are capable of contributing to the overall productivity and profitability of the business at the end (Barry et al, 2008). However, to attain such objectives, it is highly critical that IS systems are implemented using an efficient and practical implementation strategy, along with complete guidance to the employees. Both academic researchers, as well as practical analysis, have confirmed implementation of IS as a tedious and challenging task for the organisation, specifically when implemented without focusing on the appropriate and critical factors. An appropriate set of skills and capabilities among those involved in the IS implementation along with the technical resources is highly necessary for maintaining a balance between business Information Systems (Dua et al, 2012 ; Edwita et al, 2017).

In a similar context, the current investigation has focused on addressing the range of critical success factors associated with the implementation of information system within the chosen business organisation, ranging from personnel to technical level issues. The focus of the

investigation is to identify the challenges associated with the implementation of an IS project for a manufacturing organisation operating within the energy and marine industry.

1.1 Research Setting

Wartsila is selected as a case company for the current research. The selected organisation is a Finnish corporation operating within the manufacturing industry of the country since 1834. Wartsila has been offering power products and solutions to the global customers in 70 different countries. The business of the company is categorised into three main divisions such as power services, power solution and power plants (Wartsila, 2018). With such an extensive range of offerings, the organisation has also developed large customers markets across the globe. Currently, the business operations are carried out by approximately 17,000 employees, ultimately increasing the responsibilities of the strategic management towards the management of personnel as well as data and information. Hence, for the management of such a high-level information exchange and information management, Wartsila has created an in-house base information management system, functioning with the core responsibilities of handling the process related issues and the information technologies (Wartsila, 2018). The whole company has shown a constant progress in the last ten years, so the IM (Information Management) division has also gained much popularity. The current Information Management department is also responsible for the introduction of the new applications or systems for the improvement of information handling and obsoletes the previously used systems in the organisation. In contrary, previously an Enterprise Resource Planning (ERP) system was introduced in Wartsila in 2002 called as WE SAP project (Wartsila, 2018). Previously, Customer Relationship Management (CRM)system was also started in 2007 for the sales management and database. However, there were no appropriate policies for the employees for management of system with contemporary needs. Therefore, it is necessary to assess the all-encompassing IM project's effectiveness in driving the current needs.

The core duties of the Information Management (IM) of Wartsila is to perform all the tasks related to business information including the organising, evaluation and processing the reports that are associated with the information technology in the organisation. Wartsila IM is responsible for providing all sorts of services within the internal departments of the company. Wartsila IM is a recently founded company whereas the global Information Management Company was established in 2003. Before the Wartsila IM, the entire tasks related to information technology, was separately performed by the assigned individual in each department. The whole company has shown a constant progress in the last ten years, so the IM division has also gained much popularity. There is a requirement for the global management in the company for organising various tasks and applications, so the Information Management approach includes developing criteria for the establishment of global management in the whole company. Its tasks also include the streamlining of the information globally. The previous ERP project revolved around the implementation of the ERP system in the company and taking considerable initiative to guide the employees through its manual usage. An immense amount of efforts and costs were invested in a huge project. The implementation of the complete project ended in 2007 preceded by the implementation of the same

project in the new location of Wartsila divisions. This project was on high priority needed and as the Chief Information Officer realised its requirement of the global management of information in the organisation, he took a quick decision and invested a handsome amount in this project. Another recent system is known as the CRM system also started in 2007 for the sales management and database and was successfully ended in 2009 (Wartsila, 2018). It is to be noted that CRM was introduced mainly due to the increase the sales production and the application of maintaining the database was the secondary task. The third project was based on a Product Data Management System project (PDMS). There is several another information system related projects is in progress and some are yet to be introduced. A proper guideline has also been created for the development of IM related projects so that a common policy can be followed in all the projects. These guidelines assist the IT professionals in the successful implementation of the applications and are a means of communicating the best policies. These guidelines are not yet shared with the interviewees, but they will be communicated to them in the future by conducting all types of information system projects. In order to improvise the project a process called Quality and Testing project is used which aims in the restructuring of the applications or functional processes after testing the quality of the project. In Wartsila, the word 'deployment' is used to refer the process of implementing the system in the company after its quality testing by the professionals and it is considered as the last stage according to the new policies of the Wartsila IM project guidelines (Wartsila, 2018).

1.2 Topic Justification

The problem driving the current investigation stems from the challenging and unsatisfactory performances associated with the new IS in large organisations and the resulting failure. One of the reasons behind such ill-reputed position of IS in most of the companies is the likely negligence of the management team in recognising the associated challenges. They often neglect the need to focus on critical success factors for the effective implementation of Information Systems within such a large-scale organisation (Dua et al, 2012 ; Edwita et al, 2017). The case company, Wartsila will help in assessing this key problem effectively. Even though the new IS has been used for a long time the company has not been able to reap the expected outcomes.

It is highly necessary for the large-scale organisations like Wartsila to keep incorporating the emerging information technology within its business operations, with an aim to update its Information Systems through subsequent IS projects. Managing the constantly emerging data and information from the marine and energy markets is itself a challenging task for the IS management. However, due to the non-supportive attitudes of the staff and employees, along with the absence of adequate technical resources and capabilities, these challenges further double (Wartsila, 2018). On the other side, extensive literature is available focusing on the need for highlighting wide-ranging critical success factors affecting the development of the information system in any organisation (Brown et al, 2007; Dong et al , 2004). The researchers in this literature have highlighted personnel-related as well as process-related factors contributing vitally in shaping up the successful Information Systems, capable of delivering the expected outcomes. Generally, organisations gave importance to the quantitative factors in identifying the relative success factors

responsible for optimising the performance (Blecker, 2007; Dong et al, 2004; Smuts and Merwe, 2016; Edwita et al, 2017).

The findings of the investigation are expected to have significant theoretical and practical contributions for future researchers as well as practitioners in the relevant study field since none of the existed studies has investigated CSF associated with marine and energy sectors' organisations specifically. Hence, this research aims to identify critical success factors needed to avoid implementation challenges in IS projects of such organisations worldwide and to provide an effective addition to the existing academic literature. Furthermore, the investigation is expected to propose suggestions that will improve the current situation of IS projects at Wartsila. Therefore, the practical recommendations made at the end of the investigation would be a unique contribution towards the better implementation of the future IS projects in the given company.

1.3 Purpose Statement and Research Question

Therefore, the purpose of current investigation inclines to discuss the case of Wartsila's implementation of IS project, with an aim to highlight the challenges faced by the IS management impeding the activities of turning out the IS project investments into visible performance improvements, profitability and success for the business organisation. The main aim of the investigation is to evade the identified challenges for the future IS projects in Wartsila. To seek the solution to the identified research problem, the main research question is developed, the answer to which would drive towards appropriate research conclusions.

Reseacr Question: What critical success factors contribute to the effective implementation of an IS project?

The primary research question attempts to discuss the case of Wartsila information system, in order to identify the critical success factors experienced by the IT management during the implementation of IS projects within the organisation.

1.4 Research Aim and Objectives

The main purpose of the research is to investigate the critical success factors associated with the effective implementation of IS project, through the analysis of Wartsila's paradigm. The set of following research objectives further supports the successful accomplishment of the research aim.

- To identify a range of critical success factors responsible for the effective implementation of large IS projects in manufacturing organization and specifically in a marine industry.
- To identify and analyse the case of Wartsila information system, the challenges and issues associated with the implementation of IS projects from the perspective of IT specialists.

1.5 Scope and Limitations of Study

One of the major limitations of the current investigation is associated with the scope restricted to the Wartsila organisation. Consequently, the findings of the investigation can be generalised to the organisations operating within the energy and marine markets. Furthermore, the findings can only be used for understanding the challenges and critical success factors associated with the implementation of IS project and not for investigation factors responsible for operational

performance failures. Due to the qualitative nature of the investigation, the case of Wartsila has been analysed using the interviews from IS specialists only and no other secondary reports and resources about the company.

1.6 Thesis Organisation

The remaining part of the dissertation is categorised into five distinct chapters as described in Figure 1 of Master Thesis Organisation.

Chapter Two: Literature Review focuses on the comprehensive and critical review of the findings of existing studies discussing the critical success factors in the implementation of information system in general.

Chapter Three: Methodology provides justification of the research perspective, approach, and strategy selected for the data collection and data analysis in the current investigation.

Chapter Four: Empirical Findings presents the results of interviews gathered from the IT specialists to analyse the case of Wartsila's IS projects and critical success factors associated with implementation.

Chapter Five: Discussion The chapter presents the discussion of findings while relating the primary data findings to the secondary literature. The discussion is based on research questions.

Chapter Six: Conclusions and Recommendations present the summary of key insights gathered from the cross relation between the primary interviews and literature data, in the form of an appropriate conclusion. The chapter also includes recommendations for future studies and practitioners.
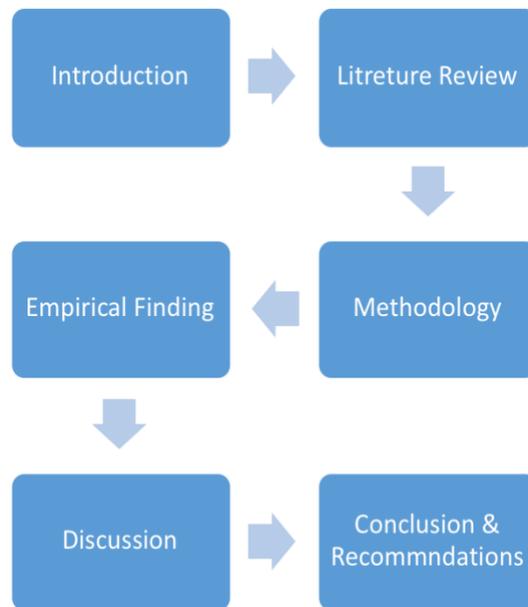
Figure 1. Master Thesis Organization

2 Literature Review

The chapter presents a critical and comprehensive review of the existing studies to identify the theoretical conceptualisation of the different critical success factors considered in implementing IS in general. Additionally, a wide-ranging review of the empirical research findings is incorporated to examine the relationship between the critical success factors and successful change management within the global manufacturing industries. The theoretical framework developed in the chapter would further help in the development of an effective and appropriate research methodology for this investigation.

2.1 Characteristics and Implementation of Information System

A wide array of literature is available in defining information system, its diversified characteristics and a successful implementation strategy needed. According to Rahman, (2014, p. 40), "is defined as a set of interrelated components that collect (retrieve), process, store, and distribute information to support decision-making and organisational control". Shim, (2000) has presented similar perspective earlier stating information system as a computerised system, engaged in the process of facts and production of outcomes in the form of information, through information processing cycle. The cycle itself is comprised of four key operations associated with the input, process, output, and storage of information. Researchers have mutually agreed to the importance of information system as a mode to track and capture the raw data from the internal and external environments of the business, for manipulating, refining, and processing such as raw data into meaningful information (Chaterjee, 2010). In conjunction with this role of the information system, strategic management defined IS as the system capable of modifying the existing processes, products, and services of the organisation and ultimately changing the manner of competition for the business within the relevant industry (Magyar et al, 2007).

However, besides defining the significance of the information system for the organisations, academic researchers have also confirmed the need to have an effective implementation strategy for driving success. Magyar et al, (2007) have highlighted the need to have a logical connectivity between the two key components of the IS in the implementation strategy such as multiple users in multiple content categories. According to the researcher, an effective IS possesses characteristics such as distinctiveness, compatibility with the organisational work environment, time-saving, cost-effective, and capable of manipulating symbols in the raw data using the process of thinking to drive meaning from the computer-based data interaction of the user (NAP, 2016). However, for different types of organisations working with different types of data and people, the characteristics of IS and the implementation strategy may differ, and so the critical success factors behind such projects. It is therefore recognised as significant in the academic research, to adopt and implement an IS after evaluating the environment, social factors and personal abilities before implementing IS (NAP, 2016 ; Helfert, 2011). In a similar context, Helfert, (2011) identified the need to integrate the characteristics of the organisational performance and expected outcomes within a compatible IS system, to make it work effectively. It is, therefore, one of the most

significant characteristics of the IS to improve the organisational performance through the information synergies and information efficiencies (Helfert, 2011).

In a similar context, the current research tends to investigate the critical success factors necessary in designing such implementation strategy as well as the execution of strategy for the manufacturing sector organisation. The next section of the literature review discusses the range of CSF indicated by the existing researchers in the context of information system projects.

2.2 Critical Success Factors for Information System Projects

Undoubtedly, past academic researchers, as well as analytical practitioners in the field of information system, have been regarding the significance of a range of important factors, while considering the information system development projects. One of such studies conducted by Edwita et al, (2017) have offered a systematic literature review while categorising the CSF in the development of information system projects into five categories such as people, project, organisation, knowledge and expertise. Additionally, all of these five critical success factors are ultimately driven and supported by several sub-items simultaneously. According to the researchers, without any of these five components, the organisation is unable to develop an information system, unable to satisfy the needs of the organisations and to prevent failure during the execution of the developed projects (Edwita et al, 2017). Kaur and Aggrawal, (2013) have also acknowledged the significance of the selection criteria used by the business organisations for driving their critical success factors associated with the development of information system projects. Mainly, the criteria for selecting CSF are based on their contribution in innovating the business process and playing a vital role in the diversified change process for dealing with the information. Different researchers have highlighted the importance of different criteria in measuring the success of the information system projects. Ika, (2009) has revealed that the significance of project management components such as time, cost, schedule, and quality as effective ways for setting out criteria to select critical success factors in IS projects. However, the criteria are more driven towards the quantitative and measurable elements.

On the other side, Kaur and Aggrawal, (2013) described that the critical success factors associated with the success of information system development and implementation are of a hierarchical nature, and therefore can be assessed through the evaluation of numerous different factors including qualitative factors and quantitative ones. They further added that these critical factors are based on the differences in the business surrounding, individual level efforts, and the project's scope. For this reason, both the human resource factors as well as technical factors are considered as the critical success factors within an organisation attempting to develop and implement an IT infrastructure. Review of the manufacturing sector organisations and their efforts in the development of information systems can further assist in understanding the case of Wartsila. In discussing the framework application in construction and manufacturing enterprises, Kaur and Aggrawal, (2013) have identified that information system organisations are more dependent on the human resource factors relative to the planning and implementation factors. According to the researchers, human resource factors help in stabilising, constant improvements, and performance

apprising, within the manufacturing organisations. According to Haider, (2008) implementation of an information system is essential for the acquisition and management of the qualitative data and information. Consequently, for the successful development and implementation of the information systems with a manufacturing environment, it is highly necessary to start the life-cycle management with the creation of definitions and descriptions of assets. Therefore, during the development of information systems, IT management needs to align the IS framework for the organisational competitiveness and responsiveness. For the different global organisations, IT managers need to engage in the evaluation and assessment of the project success to be included in the CSF for the implementation of Information System. Researchers Al-Mashari et al, (2003) has added this critical factor in the ERP projects. In the evaluation process of the project, it is necessary to consider both intangible and tangible advantageous. The research study of Mabert et al, (2003) indicated that those companies who can measure the performance of the project could increase the success rate. However, it is highly critical to understand that the business organizations need to have potentials for predicting the success of the information system, and such productions contributed vitally as one of the critical success factors for the organisations. The potentials of measuring and predicting Information Systems (IS) success is highly crucial for the manufacturing organizations. In a similar context, while investigating the Critical Success Factors for the Implementation of Supply Chain Management Information System through Structural Equation Modelling (SEM) Approach, Seth et al, (2015) have identified the critical effectiveness of the cost and quality as well as the responsiveness of the system. In discussing the case of the mobile industry manufacturing, the researchers exhibited that managing Information Systems in these industries is to have strong controls on the data management in order to meet the requirements of the customers and other stakeholders in the supply chain. The researchers further categorised the success factors and organisational, technical, inter-organisational human resource factors. The analysis of all these factors revealed their association with the identified subjective and process and objective CSFs up to a greater extent.

Additionally, (Edwita et al, 2017) explained the significance of subjective perceptions of the users and stakeholder groups as an important component in evaluating the success of the IS projects. Edwita et al, (2017) categorisation has justified the need to separate non-personnel and personnel factors from each other in order to understand the set of controllable factors and the ones, which are not in the control of project managers and teams. Project management success, in theory, is mainly conceptualised and measured in subjective and process and objective CSFs. Such categorisation substantiates the difference in meanings associated with different success factors for different people. On one hand, where technical views are necessary to create a strong interface between the contractor, consultant, client organisation, and other parties, on the other side, project outcomes are also dependent on responsible attitude and knowledge of the project personnel. Therefore, subjective and objective categorisation of the CSF for IS project management for current analysis was identified as quite feasible (Edwita et al , 2017; Kaur and Aggrawal, 2013).

2.2.1 Subjective CSF (Critical Success Factors)

2.2.1.1 Project manager and team members

The people-based categorisation of CSF involved in the development of IS project is not a new phenomenon in the IT field of research. The role of project manager and the team members involved in such projects is prioritised in many of the studies, due to their centralised contribution in planning, shaping, and implementing the effective in an organisation (Brown et al , 2007). Biehl, (2007) has defined the importance of project manager and team members' role in the successful development of the information system projects. According to the researchers, such a role can be measured by focusing on to what extent such individuals are capable of understanding the objectives and goals during the initial phases of the project. Concentrating on their understanding can assist in defining whether they are favourably or adversely affecting the success of the IS projects. In a similar context, Aziz and Salleh, (2011) have argued the need to consider the variations within the cultures and units of different people. Loonam and McDonagh, (2007) have also substantiated the effectiveness of people performance with the ideas project in determining the level of success is when the team members are responsive to the desired tasks associated with the different phases of ideas project, they are capable of attaining their goals more effectively. Additionally, the level of performance associated with the required expertise and experience between the manager as well as group members engage in such projects. For this reason, researchers have highlighted the need to assess the gap between the actual expertise and the desired expertise in determining the contribution of the people factor within the critical success of the IS projects.

2.2.1.2 Commitment and management support

Secondly, the commitment and support of the management are also considered as one of the most critical subjective factors behind the success of IS projects. Aziz and Salleh, (2011) have explained the importance of active participation of the top management in order to drive effective deployment of the information system. According to them, the development of such a system is highly dependent on the management support in sharing information with the users, providing advice, and recommending improvements needed. Siddiqui et al, (2004) have explained the management support as a most cited CSF in the information system literature (Loonam and McDonagh, 2007; Brown et al, 2007; Aziz and Salleh, 2011). According to most of the researchers, management contributed vitally in developing commitment and confidence among the team. Consequently, the extent to waste the top management is able to support their teams during the development and implementation of information system can be major through the policy enforced for solving problems arising during different IS phases, mainly during planning and execution. Siddiqui et al, (2004) have further extended the discussion to the leadership in driving motivation among the people towards change resistance, as implementing information system in an organisation refers to a significant change in existing approaches of selecting, managing, and storing information.

2.2.1.3 Training
Another subjective CSF identified in the ideas literature is related with the training problems, according to the researchers due to which, severe project failures are reported frequently (Sharma et al, 2007; Aziz and Salleh, 2011). Researcher Sharma et al, (2007) have highlighted the extent to which effective training can help in succeeding within the development and implementation of the information system, by focusing on two factors. However, the extent to which training contributes is also dependent on the need of different kinds of training in the projects such as technology-related or task dependent. For this reason, many researchers have argued on the varying differences in the types of training required for reaching towards the critical success area. Aziz and Salleh, (2011) have offered a significant contribution in defining the provision of training is the most critical element associated with it determining the success of failure level within the system implementation. According to them, the most effective duration for the training is a three-day formal training period. Likewise, the training source is also recognised as vital in determining the critical success of IS project. In a similar context, training offered by the IT department is considered as an effective factor (Tse and Choy, 2005). Furthermore, the training requirements need to be inconsistent with the requirements of the industry as well as the type of training methods used should be consistent with the needs of a specific IS project (Williams and Williams, 2007).

2.2.1.4 Prevailing Change Management Perceptions
Furthermore, Koutsouris and Lazakidou, (2014) have recognised the significance of change management as the most prominent critical factor involved in the success of the information system projects within an organisation. According to Aziz and Salleh, (2011), change resistance contributed vitally to the failure of such projects and therefore the project manager's ability to deal with such resistance through the introduction of new appealing ways of performing activities is vital in understanding the situation. Chrusciel and Field, (2003) have also substantiated the significance of willingness to change as critical is dealing with the user resistance and need for user acceptance, specifically at the starting stage. Biehl, (2007) has also regraded the significance of taking account of the change dynamics in setting out the effective transformation of the existing information frameworks and systems. Furthermore, the academic literature has also gone on the need to understand the type of the industry and the nature of change, new ideas system is bringing within the organisation, for determining the success or failure of the project (Williams and Williams, 2007). This point is highly critical for analysing the primary data investigation in the case study of Wartsila, presuming that the nature of change management and change resistance is critically differing in the manufacturing sector related to the other industries.

2.2.1.5 Communication
Moreover, communication is also considered the key critical success factors are involved in the development and implementation of the information system within an organisation. Both the IT as well as business management literature have confirmed the importance of communication in driving effective interaction between the different stakeholders involved in such projects including internal as well as external people (Williams and Williams, 2007). According to Williams and

Williams, (2007) the lack of effective communication can bring significant problems for the management and therefore it is highly necessary to adopt an effective approach to the communication.

Laudon and Laudon, (2016) have also described the extreme use of the Internet and communication technologies as factors critically obtained in enhancing the significance of the information system. Researchers have identified the need for having a constant, efficient, and alert system in order to help the internal as well as external stakeholders receiving and responding to the relevant project communication effectively. According to Aziz and Salleh, (2011) the nature of the information system projects is relatively complicated and cross disciplinary and therefore any failure in effective communication can lead to the severe threat for the success of such projects within an organisation. Researchers in context hair critically acknowledged the need of having formal and informal communication among the project team members in order to implement the project phases according to the expectations in a realistic manner. Additionally, in arguing the effectiveness of communication. Pooley et al, (2013) have also regarded that communication can only be critically successful factor for the ideas project when the flow of information communication is initiated from top management and is free-flowing to all levels of the people involved (Dong et al, 2004).

In a similar context, existing researchers have also cost on the range of communication approaches and methods in driving effective communication with the ideas projects. For them, integration of the online and off-line communication methods can assist in achieving better project objectives and goals in a timely manner. Aziz and Salleh, (2011) have substantiated the use of electronic mails, meeting, telephone, and memorandum, as vital in order to respond to the changing environmental needs and demands. Mainly, formal communication methods are not needed in the business frequently, as they are periodically used when needed. Ongoing communication using informal channels is therefore highly critical.

2.2.1.6 Project planning and management
Planning and information system project is also crucial in determining the level of success and failure for such projects. Wognum et al, (2004) have emphasised on the fact that we planning management can word are deteriorating outcome at the different phases of the project. Effective plan and can assist in transferring functional as well as technical level knowledge to the different stakeholders, with respect to project activities from start to closure. Al-Mashari et al, (2003) have also substantiated the need to consider the planning and clarifies a clear vision, objectives, and goals in front of the stakeholders as well as team members. Salminen, (2000) by focusing on planning elements, management can identify the extent to which their plans are able to communicate about the roles and responsibilities of the individuals involved in such projects.

Subsequent to the review of existing literature and study is describing the subjective critical success factors involved in the development of the information system, the next section of the chapter critically reviews the findings from the objective perspective.

2.2.2 Objective CSF (Critical Success Factors)

Objective critical success factors are also highlighted with an academic literature, describing the need for measuring the subcomponents included in the project. The review is also focused on the way these objective CSF can be measured through their sub-components, for subsequently determining their contribution to the success or failure of the information system projects.

2.2.2.1 Process redesigning

One of the qualitative elements involved in the information system projects is associated with the business process re-engineering, which assesses the organisation in gaining improved processes in terms of speed, quality, and service execution. In a similar context, Loonam and McDonagh, (2007) have identified the need to consider the compatibility between the business processes as well as the expected information system, requiring both to be aligned in conjunction with each other. Abdolvand et al, (2008) have also admitted the importance of setting out effective guidelines for the practical methods associated with the alignment of business processes with the information system in a step-by-step approach including steps like concentrate, originate, program, transform, implement and evaluate. Likewise, Motwani et al, (1998) have offered the framework for assessing the alignment between the business process and information systems i.e. process identification, analysis, redesign, and implementation. For this reason, a project lifecycle excluding any of these stages from the approach can result in disastrous consequences. Researchers have further added that in business organizations, business processes and information systems processing independently often result in a mismatch (Camero and Green, 2012). Therefore, the technology model adopted for the development and implementation of the information system should be inconsistent with the process and analysis approach selected for such deployment.

2.2.2.2 Technological difficulties in system design

Furthermore, the second objective CSF highlighted in the literature review is associated with the technological difficulties, which are generally indispensable for such projects. Blecker, (2007) has emphasised on the customisation needs as a challenging element for meeting the users' needs. Extensive literature is present emphasising the need to comply with the user needs to drive effective users' experience. The design of the system needs to be aligned with the users' requirements to make it easier and convenient for use. Extra attention is required on design elements, to be united with the functionality risk factors. Tiwana and Keil, (2006) have significantly identified the sub-elements identified in it such as technical knowledge, customer involvement, volatility requirements, previous practices associated with project management, project complexity and the methodological fit.

2.2.2.3 Costs

Cost of the project is one of the critical success factors, quantitatively measured in every information technology related project. The changing costs of the emerging technologies can have significant impacts on the overall situation (Yeo, 2002; Benamati and Rajkumar, 2002; Smuts and Merwe, 2016). According to Benamati and Rajkumar, (2002), cost needs to be aligned with the

budget for the project i.e. accurate project budgeting and cost estimation at project initiation. Smuts and Merwe, (2016) further emphasised the need to integrate the business process and information system in order to optimise the cost of the projects. Researchers have mutually agreed that it is highly critical for the current business and technological environment, that all the projects are responsive to the cost-cutting initiatives of the organisations. In most of the organisations, where the management is focusing on the adoption and implementation of an information system for cutting down their existing cost, they would not bear any additional cost incurred on the information systems within the organisation (D'Atri and Saccà, 2009; Morris, 2013). In contrary, the organisations deteriorating the quality of the information system for the sake of reducing project cost are also not able to achieve the success in their information system projects despite reduced cost initiatives. Evidence from the literature has suggested that the desired benefits from IS can only be achieved by focusing on the different success factors in integration with each other (Ferreira and Kuniyoshi, 2015).

2.2.2.4 Time and scheduling
Likewise, among the measurable elements and critical success factors, time and scheduling of the information system projects also contribute vitally. IS projects like other information technology projects are required to be completed within the predefined timeframe (Thi and Swierczek, 2010). Any delay in the development and implementation it can cause severe challenges for the business management. Furthermore, the academic researchers did not focus on completion of the information system project within the stated deadline but also emphasised on the need to allocate appropriate time for the different activities and tasks of the projects (Aneesha and Haridharan, 2017; Horine, 2012; Basu, 2016). According to them, the appropriate time is needed for refining the plan for the subsequent stages based on knowledge and experience. Smuts et al, (2013) have specifically pointed out on the need for scheduling within the organisations where information systems are developed for migrating their existing data information sent to the technology-based infrastructure. In such projects, a specific time allocation is required to assess the environmental readiness for the transition of data from the existing framework to the new one. The well-resourced structure is necessary to contain the fast forward approach. The process needs to be designed to understand scheduling as the key element, whether the information system is developed in-house or is outsourced (Smuts, et al., 2013).

2.2.2.5 Quality
Likewise, project quality is also one of the significant factors determining the success of IS project. Measurement of quality of the project is necessary to ensure project development within the scope. According to Kaur and Aggrawa, (2013) quality position itself among the key components of the project for the development of the information system. Fan, (2010) has categorised quality into service, information, as well as system quality, each of which is highly necessary for the user satisfaction. In discussing the effectiveness of the project quality as a critical success factor, (Fan, 2010) has also suggested considering different elements leading towards the qualitative

performance of the information system developed, among which usability and portability were recognised as key indicators of enhanced or deteriorated quality.

Subsequent to the review of the subjective and objective critical success factors associated with the development of information system, the next section of the literature review presents a critical analysis of the empirical findings from global manufacturing industries. Table 1 given below illustrates the summary of the literature findings, which would assist in the development of a conceptual framework for the investigation of the Wartsila case company.

Table 1. Summary of Literature Findings

Subjective Critical Success Factors	Objective Critical Success Factors
Project manager and team member (Brown et al, 2007) (Biehl,2007) (Aziz and Salleh, 2011) (Loonam and McDonagh, 2007)	Process redesigning (Loonam and McDonagh, 2007) .(Abdolvand etl 2008). (Likewise, Motwani et al, 1998). (Camero and Green 2012).
Commitment and management support (Aziz and Salleh, 2011) (Siddiqui et al, 2004) (Soja, 2006) (Loonam and McDonagh, 2007) (Brown et al, 2007)	Technological difficulties in system design (Blecker, 2007) (Tiwana and Keil, 2006)
Training (Sharma et al, 2007) (Aziz and Salleh, 2011) (Tse and Choy, 2005) (Williams and Williams, 2007)	Costs (Benamati and Rajkumar, 2002) (Yeo, 2002,) (Benamati and Rajkumar 2002 , (Smuts and Merwe 2016) (Smuts et al, 2013)
Prevailing change management perceptions (Koutsouris and Lazakidou, 2014) (Aziz and Salleh, 2011) (Chrusciel and Field, 2003) (Biehl, 2007) (Williams and Williams, 2007)	Time and scheduling (Smuts et al, 2013) (Aneesha and Haridharan, 2017; Horine, 2012; Basu, 2016) (Thi and Swierczek, 2010)
Communication (Williams and Williams, 2007) (Laudon and Laudon, 2016)	Quality (Kaur and Aggrawal, 2013) (Fan, 2010)

(Aziz and Salleh, 2011) (Prasad et al, 2010) (Pooley et al, 2013) (Dong et al, 2004) (Aziz and Salleh, 2011)	
Project planning and management (Wognum et al, 2004) (Al-Mashari et al, 2003) (Salminen, 2000)	

2.3 Conceptual Framework

Based on the literature review, Figure 2 below highlights the conceptual framework designed to investigate CSF in the development of an information system at Wartsila is comprised of the need to research subjective, process, and critical success factors.
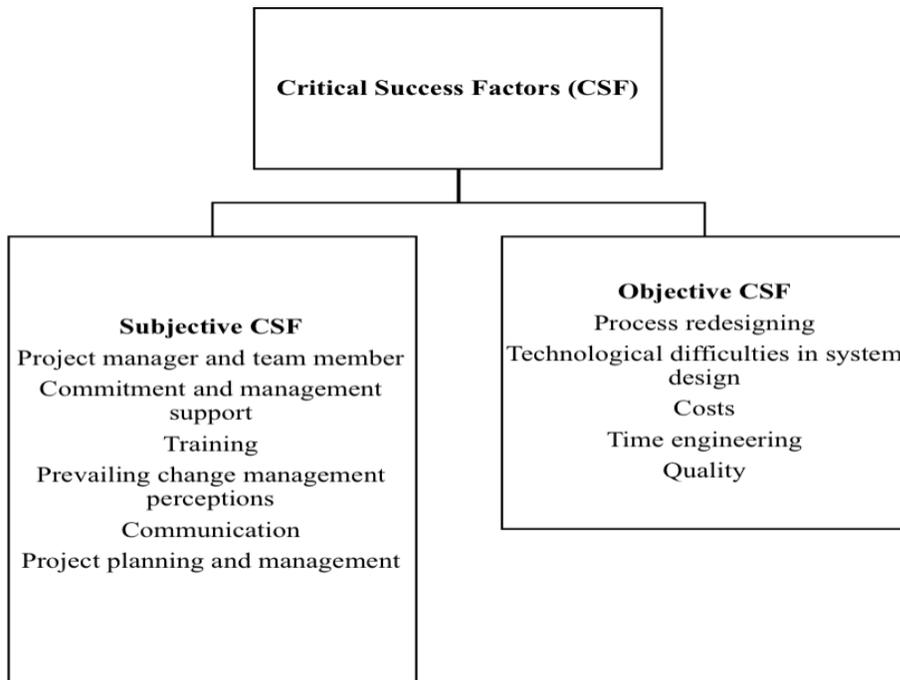
Figure 2. Conceptual Framework

2.4 Summary of Literature

The review of a range of academic literature highlighting the subjective and objective critical success factors, the characteristics of the information system, and discussion on the global study's findings of the manufacturing firms' information system, have helped in the development of the conceptual framework for Wartsila. Critical examination of the literature materials has further

informed about the need to consider the different manufacturing sector surrounding, individual expectations and working process, in designing compatible and user-friendly information system. The set of critical success factors identified from the review has offered great insight into the need to evaluate processes, internal information handling, customers, and other requirements. The next chapter of the research discusses research methodology.

3 Research Methodology

The chapter presents the research methodology for the investigation of the research aim and objectives stated in chapter 1 i.e. to investigate the critical success factors for the development of information system in a manufacturing organisation (Wartsila).

Selecting an appropriate research methodology and justifying the selection of the different components are highly crucial aspects for making meaning out from the data collected from different sources (Kumar, 2010). Lichtman (2013) has offered great insights about the development of an effective methodology for the qualitative research while considering the process and challenges involved in such researches. Extracting out key concepts from the data, using the process of coding, sifting, sorting and identifying themes, is highly necessary for the successful accomplishment of the research aim and for driving towards an appropriate conclusion (Flick, 2011). The current investigation is focused on the case of a manufacturing organisation, Wartsila, and analysis of its information system. For this reason, it is highly necessary for the researcher to utilise legitimate ways of dealing with the data in order to make out sense from it.

3.1 Philosophical Tradition

Epistemology and ontology are two different manners for studying a research phenomenon, where epistemology is defined as a 'science of being' by connecting it with human potentials to observe and possess knowledge. On the other side, ontology refers to a belief system, which focuses on the human reality independent of human subjects in establishing a fact (Bryman and Bell, 2015). The objective and subjective natures of these two research sciences allow the researchers to opt for the most relevant one according to the appropriate aim and objectives.

Epistemology was addressed in this IS study for its consideration on human cognition. Simultaneously, three different paradigms are guided by the epistemology such as positivism, interpretivism, and critical perspectives. Positivism assumes reality as an object, capable of being examined through measurable properties. In contrary, interpretivism assumes reality as a socially constructed phenomenon, potentially capable of being modified based on variable human interpretations. The third perspective, critical assumes reality as a historically constructed phenomenon, produced by the earlier people.

The first key decision in devising an effective methodological framework was related with the choice of the philosophical tradition, which ultimately guides the researchers' stands in investigating the critical success factors associated with information system development for a manufacturing organisation. Among the three types of philosophical traditions available i.e. interpretivism was selected due to its consistency with the qualitative focus of the research (Lichtman, 2013). Interpretive research paradigm has helped social science researchers in investigating and interpreting the human perceptions and actions within organisational and social context (Willis et al, 2007; Blaikie and Priest, 2017).

3.2 Methodological Approach

Creswell and Clark, (2011) highlight three major categories of methodological approaches such as quantitative qualitative and mixed approaches. Quantitative approach refers to one that focuses on investigating a natural phenomenon through a statistical approach, while a mixed approach refers to the integration of qualitative and quantitative research approaches, selected when cross-referenced findings are needed. The mixed approach combines the strengths and weaknesses of two approaches for producing significant results (Creswell and Clark, 2011; Blaikie and Priest, 2017).

In order to maintain consistency and compatibility between the philosophical tradition and the methodological approach, a qualitative approach was selected for this research (Richey and Klein, 2014; Bergman, 2008). A qualitative approach was helpful in extracting the relevant data information from the experiences of the workforce, who had already encountered and interacted with the critical success factors in the development of an information system (Bergman, 2008). Such an approach is highly feasible for the studies looking after the experiences, motivations, perceptions, and feelings of the research participants. According to Lichtman, (2013) the qualitative approach focuses on inductive strategy, which further assists in taking into account the generalized pour into consideration and assessing the specific findings using it. Unlike the quantitative approach, the data in the qualitative approach is not numerical therefore is subjected to be at high risk of losing the meaning as perceived by the original researchers of the data. To align the interpretation according to the respondents' views, researchers need to play a critical role.

3.3 Data Collection Methods

The primary data was mainly collected through the interviews. The purpose of the interviews was to gather the projections of the employees of Wartsila about the most vital success factors the process of the information system projects. The primary investigation helped collecting the experiences and learned points together for reaching towards an appropriate conclusion.

3.3.1 Interview Administration

The researcher conducted the interviews week 11 to week 14 from the 15 of March to the 5 of April 2018, 15:00 PM to 16: 00 PM in which the focus was towards the experience of Information System. Employees selected in the information system projects at Wartsila organization were selected for the interviews. The respondents were selected for the interviews purposefully to ensure that only those individuals are selected for the interviews are deemed as the appropriate person (possessing the desired information needed). Table 2 identifies the educational background and experience of the employees working in the information system projects to certain the visibility of the sample group chosen. Gathering findings from the IT staff were expected to assist in substantiating the range of significant critical success factors considered in the deployment and implementation of the information system within the chosen organization. The online interview was conducted using Skype platform were helpful in maintaining physical as well as the communication with the respondents throughout the interview process. The ongoing connectivity

further helped in maintaining the continuous relationship between the interviewer and interviewees, thus allowing each of them to share their emerging opinions and perceptions with the others simultaneously. However, due to time constraints and complexities involved in the data collection process, the interviewer noted only three points down during the interviews only. The full interviews were not recorded due to the time required in transcription.

Table 2. Participant Details

Participants	Working Role	Years of Experience within the IS projects
Participant A	IS Project Manager	7
Participant B	Head of IT Operations	4.25
Participant C	IS Project Quality Controller	3
Participant D	IS project team member	3
Participant E	IS project team member	2
Participant F	IM Managers	2.75
Participant G	IM Managers	5
Participant H	IM Managers	5.5

Semi-structured qualitative interviews were carried out using an integrated set of open-ended and close-ended questions. Set of objective and subjective critical success factors extracted from the review of the literature were used to investigate the employees of Wartsila. The use of same critical success factors was in comparing and contrasting the findings of the literature reviewed with the primary respondents. Additionally, the interview process did provide the opportunity to interviewees for sharing any other specific critical success factor, not included in the literature list, which they consider as highly critical for the development and implementation of information system within their organization. Hence, the main purpose of the qualitative interviews was to substantiate as well as to upgrade the list of critical success factors and to identify how the people in real time practical situations prioritize these factors.

Additionally, a set of eight key questions were included in the interview session, where each interview session lasted for 30 minutes. Participants were prior informed about the process and any risk associated with the involvement in the research process. Participants were also asked about their individual experiences and difficulties faced during the deployment of the information system within their organisation.

3.4 Ethical Compliance

Additionally, ethical compliance was considered as a critical component in the qualitative interviews due to the involvement of the private respondents. It was critically considered to avoid any kind of physical or emotional harm to the participants, during and after the research process

(Saunders et al, 2015). Convenient time slots were decided for the Skype interviews, in order to ensure that respondents can share as much as information in a friendly environment, without any coercion or pressure. Participants will ensure that their private and personal information such as name and contact details would not be shared with any person not directly involved in the research process (Bryman and Bell, 2015). Additionally, such information formerly discarded after the successful completion of the project. Skype interviews were also conducted in the private room, having no interference from the third individual to avoid distraction. Despite acquiring prior permission from the interviewees and their organisation authority, respondents were given the opportunity to withdraw from the research process at any time upon their discretion (Saunders et al, 2015). It was highly necessary to ensure voluntary participation without pressure. Consequently, participants were asked to sign a written informed consent is an evidence of their voluntary participation. Ethical compliance was also pursued in the data analysis to ensure that the originality of the findings is maintained and the real meaning of the interviewees' responses is not lost while noting the important significant findings during the interview process (Bryman, 2016). For this purpose, key points were rechecked with each of the participants after the interview session is over.

3.5 Data Analysis Technique

Besides, selection of an appropriate reasoning method was essential for the analysis of data. Two alternative methods of reasoning is available in social science investigations i.e. inductive reasoning and deductive reasoning (Creswell and Clark, 2011; Chambliss and Schutt, 2006). Inductive reasoning is more about making a broad generalisation from specific observations or other data gathering approach in contrary, deductive reasoning is about reaching toward specific observations using broad generalisations. In the inductive reasoning, researchers conclude by testing the available data by testing it against already existing theoretical aspects, while in deductive reasoning, researchers attempt to develop a new theory (Chambliss and Schutt, 2006). For this IS-based research project, the inductive reasoning was chosen, through which set of subjective and objective critical success factors for development and implementation of an IS project was formed through the critical review of literature sources in chapter 2. The extracted set of CSF has been used to assess the case of Wartsila. Through the evaluation of primary respondents' interpretations about CSF in IS project at Wartsila, the research has highlighted the similarities and differences in the shared meanings, language and considerations of the different IS project people involved in its development and implementation (Cargan, 2007). As depicted in Figure 3, selection of an appropriate and feasibility analysis method was also necessary for maintaining reliability and validity of the primary data findings and for drawing appropriate conclusions. For this reason, out of four analytic approaches such as thematic analysis, structural analysis, dialogic, performance analysis, and visual analysis, thematic analysis was chosen as the main data analysis technique (Lichtman, 2013, p. 256), following these given steps in the research of (Lichtman, 2013):

- Identification of codes from frequently highlighted words and terms

- Redundancy removal from the list of initial coding
- Codes categorisation
- Alteration of initial lists
- Identification of appropriate categories and sub-categories
- Extracting themes from different categories based on the addressed concept
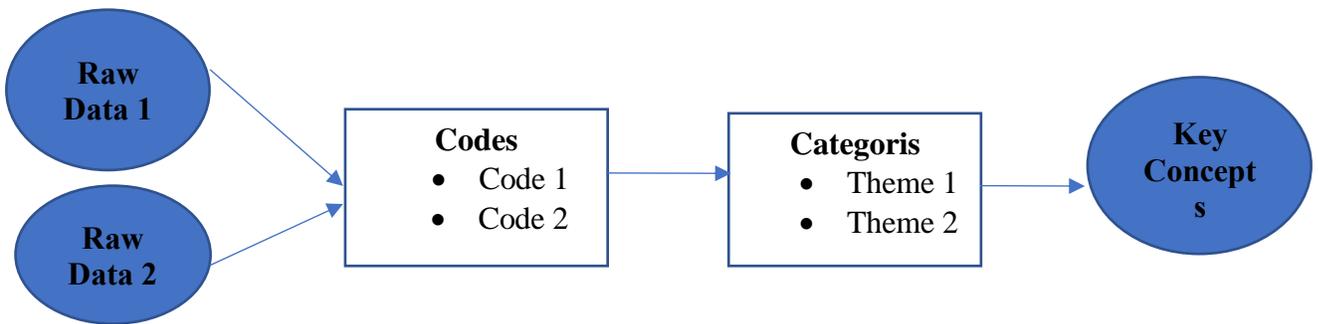
Figure 3. example of the analysis process

3.6 Reliability and Validity of the Research

Reliability and validity are the two important methodological components, essential for preserving the credibility of the research findings (Saunders et al, 2015). It is extremely significant to have valid and reliable results, which can only be obtained through the consistent methodological framework and appropriate and related research methods. Validity refers to the stability of the beliefs concluded at the end of the research (Kirk et al, 1986). It helps the researcher in understanding that whether the findings are capable of reflecting what they intend to reflect. On the other side, reliability refers to the consistency in research methods, which can easily be replicated by the future researchers for investigating the similar phenomena in different contexts. In this IS research, reliability and validity of the research was ascertained through carrying out interviews from the comparative analysis (Thyer, 2010; Dalcher and Brodie, 2007) of the six participants' transcripts to avoid any bias. The transcribed results have further confirmed the participants for increasing the credibility. Additionally, the participants having narrow to the broad range of experience within the IS project were included in the investigation.

3.7 Conclusion

The above-mentioned methodological framework has the potentials for the successful accomplishment of the research aim of this IS project through the identification of critical success factors involved in the development and implementation of information system projects at Wartsila. The choice of qualitative research methodology is justified in this chapter with the defined paradigm, reasoning, approach, data collection, and data analysis, next chapter presents the findings of the interviews.

4 Empirical Results

The chapter presents the findings of interviews gathered from the IS project personnel at Wartsila. The findings of the interviews are presented and categorised into seven themes/concepts as listed below The findings of the interview will be used for assessing the subjective and objective CSF identified in the literature review in the discussion chapter.

Sixty-nine codes were extracted from the eight interview transcripts, which were categorised into 36 thirty-six categories of CSF, emerging into seven themes as summarised in below given table at the end in Appendix.

- Management, Planning and Progress related to Project
- IS Project Organisation
- Cooperation from Partners' Organisation
- Factors Related to Business Division
- The commitment of Customer and Management
- Technical Issues in the Project and Design of System
- Management Issues related to Organisational Change

4.1 Theme 1 # Management, Planning and Progress related to Project

Effective project management has been identified as the critical and essential component for the success of information system projects in literature. However, all the 8 participants at Wartsila did not identify it as significant, and might not have declared it if it was not asked. Despite the participants have already experienced working in several IS projects i.e. enterprise resource planning (ERP), customer relationship management (CRM), and product data management system (PDMS), yet participants were not aware of the appropriate planning and management concepts associated with an information system development Project in the organisation.

Participants A responded: "*I believe that in a technological environment, the roles of project HR for planning and management have shifted to technologies*".

Participants B responded: "*We are significantly highlighted to learn from the previous projects and implement these to the future ones, but due to lack of clear direction for the software development project, we are unable to implement our lessons*".

Participants G responded: "*I think that project managers need to discuss the previously the lesson during the planning and management of projects*"

During the interviews, it was clear that although the rates of success for IS projects are higher at Wartsila (indicated by respondents D, E, F) yet the management and planning processes are not in line with the standards. Respondents further shared that due to the changes occurring in the business environment after every new IS project, it is not practical for their company to evaluate the progress of IS.

Participants H responded: "*The reality is that we are required to focus on practising requirements collection merely and later implementing such requirements for the development of software or system.*

Participants C responded: *Consequently, there is zero preparation for contingent situations without any description of roles and responsibilities of the in times of crisis*".

4.2 Theme 2 # IS Project Organisation

Furthermore, other critical success factors identified by the respondents were related with the project organisation. There was a mutual agreement among the participants about the resource challenges associated with an unbalanced distribution to the different team members in IS project.

Participants A responded: *"Steering committee is allocated to many resources, which is unjustifiable for others"*

Participants C responded: "*Lack of human resource or few resources can be attributed as the biggest reason behind the failure of big projects*"

The interview findings further highlighted discrepancies in the responses of different interviewees related to the effects of few resources on the project success. Some of them believed that few resources could be sufficient for the production of quality work, while some of them disagreed with it.

Participants F responded: "*In my opinion, quality of work is more important compared to the number of people working on the project*"

Participants H responded: "*Skills and knowledge of people are dominant CSF*"

In addition, four of the respondents (participants B, D, E, and G) did highlight that existing knowledge and experience between the project team are not sufficient for the success, as these need to be updated through continuous training and integration of communication among members.

4.3 Theme 3 # Cooperation from Partners' Organisation

Findings of the interviewees did inform about the significance of cooperation from partner organisations for the success or failure in IS project. Despite integrating consultants in the projects, partners' cooperation has been difficult for Wartsila due to several reasons such as lack of understanding (participants A and D), low expectations defined (participants G and H), absence of benchmarking (participants C, E, and F), and increased reliance on outsourcing for coding (participants B, E, F, and D).

Participants C responded: "*Wartsila did not set a benchmark which is highly necessary for the success of the IS projects*".

Participants B responded: "*I think that Wartsila should reduce the level of outsourcing should consider performing coding and all the tasks*"

Participants G responded: "*We should start expecting more from our partners and should consider the expansion of partners group for the different projects rather relying on few*".

4.4 Theme 4 # Factors Related with Business Division

Similarly, lack of integration between the information management system and the other business divisions at Wartsila was also identified as one of the biggest reasons behind the failure of IS project. The main problems highlighted include lack of mutual understanding, lack of knowledge about working of the business divisions, communication gap, lack of consideration for applications used during the planning and lack of appropriate resources needed. The findings informed that Int. M managers have to pursue the rules and orders made by the divisions, which are without specific descriptions of expectations.

Participants A responded: "*Currently, there is a communication gap between the divisions and IS project managers*".

Participants E responded: "*Actually, IS projects, as well as other staffs of the organisation, are unaware of the actual reason for the company's existence*".

Participants F responded: "*The planning approach lacks practicability about the applications usage*".

Participants H responded: "*We have to blindly follow the orders of divisions, from where empty helpdesk emails are being sent*".

4.5 Theme 5 # Commitment of Customer and Management

Another significant team highlighted from the responses was related to a commitment between customers' and management. Under this theme, interviewees highlighted two significant elements such as complexity involved in understanding the customer's expectations (Participants A, B, D, F, H) and identification of the relationship between the customers' expectation and allocation of financial resources (Participants A to H). According to all the respondents, the customers are also responsible for the project failures.

Participants A responded: "*Commitment of management is highly essential for directing the users towards the new project*".

Participants B responded: "*Users are not offered training by the managers*".

Participants G responded: "*Managers are impacting the attitude of the users, by not clarifying the expectations needed for their project involvement*".

4.6 Theme 6 # Technical Issues in the Project and Design of System

Moreover, interviewee respondents had highlighted the list of technical issues related to the success or failure of the IS projects. For all the eight participants, compatibility between the information system and other organisational system is highly necessary for the successful development and implementation (Participants A to H). However, within their organisation, such technical factor is significantly absent within the large projects.

Participants A responded: "*We have often encountered instances showing no integration between IS systems and other systems when it former went live*".

Participants C responded: "*Lack of understanding among the partners regarding the integration and techniques for such integration contributes to project failures*".

Participants D responded: "*I believe that the complexity of the style system makes it difficult for the users to understand that to understand and integrate*".

Participants F responded: "*Degree of customization is highly necessary for IS projects*".

4.7 Theme 7 # Management Issues related to Organisational Change

The last theme endeavoured to highlight the interviewees' views about the impacts of organisational change and project management for such a change in the success or failure of the IS projects. Few of the interviewees did share the significance of increasing awareness and knowledge about the change management on the increased likelihood of projects' success.

Participants B responded: "*Project management is about change management and change management about how we are dealing with people*"

Participants C responded: "*Project manager and team members need to understand the significance of formal and informal communication in integrating every minor to major changes within the project effectively*".

Participants D responded: "*Project managers need to prepare for the change resistance during the planning phase of new projects*"

Participants F responded: "*Training of the end user can be used as a critical factor for the success*".

4.8 Overview of CSF identified by Interviewees

The results gathered from the empirical study are summarised in Table 3 below based on seven themes. These interview findings would help in assessing the IS project CSF at Wartsila with the set of objective and subjective CSF identified within the literature.

Table 3. Summary of Codes and Categories gathered from the empirical study

Themes	Categories
Management, Planning and Progress related to Project	Roles of project HR Management Lack of clear directions Inability or lack of desire to learn from previous lessons Non-alignment of project planning and management with standards Lack of focus on prior information collection Preparation for contingent situations for crisis
IS Project Organisation	Resource challenges (Lack of HR) Unbalanced resource distribution The relationship among the quality of work and resources Skills and knowledge of people Insufficient current knowledge and information

Cooperation from Partners' Organisation	Lack of understanding Low expectations defined the absence of benchmarking Increased reliance on outsourcing for coding
Factors Related to Business Division	Lack of mutual understanding lack of knowledge about working of the business divisions communication gap lack of consideration for application usage during the lack of appropriate resources required an awareness of staff related with the actual reason behind the company's existence
The commitment of Customer and Management	The complexity involved in understanding the customer's expectations identification of the relationship between the customers' expectations allocation of financial resources lack of management's commitment lack of users training
Technical Issues in the Project and Design of System	Compatibility issues Non-integrated IS system and other systems lack of understanding among the partners degree of customisation
Management Issues related to Organisational Change	Impacts of organisational change and project management Formal and informal communication Lack of preparation for change resistance Lack of training

5 Discussion

The chapter presents the discussion of the findings relating to the literature in order to answer the Research Question.

Research Question : What critical success factors contribute to the effective implementation of IS project?

5.1 Subjective CSF in IS projects

The outcomes gathered from the secondary literature have informed of six key themes from the literature under the subjective category. For a plethora of researchers in literature, the "roles of project manager and the team members" (Brown et al, 2007; Biehl, 2007) contribute significantly to the success or failure of the information system projects. In contrary, the Wartsila IS projects lack appropriate project planning and management (theme 1). Empirical findings did not mention the significance of cultural differences among the members unlike (Aziz and Salleh, 2011). Furthermore, respondents from Wartsila did indicate that the workforce of their organisation is unable to understand the basic reason behind the company's existence (theme 4), where (Loonam and McDonagh, 2007) argued on critical significance of the people's performances and responses towards the desired task associated with the different projects' phases. The situation at Wartsila is quite opposite to what is required as it shows a huge gap between the desired performances and the actual performances.

For the second subjective CSF highlighted in the literature, "Commitment and Management Support", Wartsila people did show considerable agreement. Theme 5 indicates that although the respondents consider commitment as an important success factor for the success of the IS project (theme 5), the practical projects did not indicate the existence of commitment at Wartsila. In contrary, secondary literature has identified management support as the most cited CSF in the information system literature (Aziz and Salleh, 2011; Siddiqui et al, 2004; Brown et al, 2007). However, the empirical findings have informed about the reasons behind lack of management support, commitment within the case organisation is according to the management, and project teams are unable to understand the customers' expectation due to the complexities involved. These findings have further informed about the mutual consensus and significance of the contribution made on both sides within the IS projects. The practical attitudes of the managers within the organisation are unsatisfactory, which are negatively driving the service attitude towards the project. Both the academic literature as well as empirical findings have informed about the importance of shared commitment at every phase of information system projects such as planning, execution, change management, information management and others.

For the third subjective CSF "Training", a considerable agreement was received between the primary data findings. Almost all the researchers have the impact of training on the success of the IS projects. However, it is critical to identify that the interviewees identified training as an independent factor considered in their organisation for the project management. Instead, training was discussed under different themes, for different CSF categories. For example, theme 2 of

project organisation identifies the need for continuous training. Theme 5 indicated lack of training not offered to the users as one of the critical success factors behind the Information System projects. Theme 7 stated training as necessary for the management issues associated with the organisational change.

These findings have informed that Wartsila has considered training as a distinct part of the IS project, which is considerably considered as an important factor behind severe project failures (Sharma et al, 2007; Aziz and Salleh, 2011; Sharma et al, 2007). Drawing from the literature, project managers at Wartsila needs to consider the significance of recognising the different kinds of training in IS projects such as task-dependent and technology-oriented training during the development and implementation projects. Wartsila needs to take account of the appropriate suggestions required for formal and informal training and training duration highlighted in the academic literature (Tse and Choy, 2005). Williams and Williams, (2007) further indicate the significance of consistency between the training methods and industry requirements.

Prevailing change management perceptions are also considered as vital within both the academic literature as well as empirical findings. Both contained separate discussion on the theme. Koutsouris and Lazakidou, (2014) have confirmed the importance of change management in dealing with the change resistance, and the resulting success or failure of the project. Aziz and Salleh, (2011) and Chrusciel and Field, (2003) have reported the critical importance of change willingness as vital for tackling user resistance, and the need for users' acceptance. In contrary, within the case organisation, although the project managers focused on the change management as a critical factor they did not consider the relative importance of integrating the user requirements, industry type, and nature of change in order to devise a change management strategy for the organisation. It can be analysed that the nature of change in the manufacturing industry is quite different as the sector is highly dependent on the use of advanced technologies, which makes change management as domineering for the manufacturing organisation. For dealing with the input and output configurations, which are modifying with every change, manufacturing companies need to have a structured and comprehensive change management system in place (Wartsila, 2018). Management of change is highly indispensable for Wartsila due to its core production business of technological products and solutions for the global customers. Development of products for the marine and energy markets requires great skill and efforts from the people working in the organisation. In this context, project managers at Wartsila need to consider the significance of a change management strategy within the organisation development and implementation of the information system projects effectively.

Communication has been identified as a critical factor within the literature as well as empirical findings. Williams and Williams, (2007) and Laudon and Laudon, (2016) have informed that both the formal and informal communication as well as the communication driving from the emerging technologies should be integrated within the IT projects in order to successfully accomplish the research aim and objectives. Aziz and Salleh, (2011) did add to the findings including that free flow of information from all the levels is highly necessary to deal with the expectations of different project members and stakeholders in a realistic manner. Failure of effective communication,

therefore, indicates a severe threat for the success of IS projects. However, communication within the case company appears to be in agreement with the findings of (Pooley et al, 2013) have stated that communication can only be critical when the flow of information is from the top management without any distinction from them. Ongoing communication through informal channels is not considered at Wartsila. Due to which, this key point was also highlighted by the project management considerably under theme 7. Project people are aware of the significance of communication for each minor to major level change within the IS-related projects. However, like secondary data researchers, people at Wartsila have not focused on communication in a way it should be considered. Lack of cooperation among the team members, lack of commitment between the partners in the management as well as other issues associated with change management and planning and assessment of the project outcomes are associated with the inappropriate communication or communication through inappropriate channels. From these findings, it can be implying that training is necessary for the project members at Wartsila for engaging them into a different type of communications, in order to enhance cooperation commitment and support for dealing with different types of vehicles.

Another subjective CSF highlighted in literature was 'Project planning and management', where theme 1 of the empirical findings also focused on it specifically. These findings have confirmed project planning and management as the heart of a project life cycle, as it helps the managers in dealing with time, cost, quality and schedule aspects of the project.

Additionally, from the analysis of the empirical findings it was identified that respondents from the Wartsila have also identified some of the subjective aspects, which were not covered in the literature, is specifically such as cooperation from partners' organisation. It can be depicted that most of the literature has focused on the role of internal people such as project managers, project contractors and project team members in understanding the critical success factors associated with IS project. On the other side, empirical investigations did indicate the critical role of other people external to the organisation such as partners. Interviewees for Wartsila have identified that project managers expect low from the partners due to which organisation partners are unable to understand the project specifications and their contributions within it. The more significant points gathered during the empirical findings were related with the need to have a benchmark, redefine expectations, and in this understanding between the project organisation and the partner organisation for obtaining the desired results. These findings have also informed about the lessons associated with outsourcing the project parts. Wartsila needs to reduce their dependency over the others and try to perform all the tasks in-house, specifically for coding. This would assist in creating the culture of learning and development in the organisation. However, this does not mean that no outsourcing should be considered within the company but it should be reduced from over-reliance to an acceptable level. The specifications are more visible for the internal people relative to the external ones.

Moreover, the empirical study has also informed about the people-related or subjective factors associated with the understanding of the project management about the working of the business divisions. Currently Wartsila, the orders and decisions are made by the divisions are informed to

the project people, without any expectation description in a clear manner. The information systems at the company need to be aligned with the requirements of the power services, power solution and power plants (Wartsila, 2018).

After discussing the cross -related findings associated with the subjective critical success factors involved in information system projects at the Wartsila, the next section of the chapter discusses objective CSF.

5.2 Objective CSF in IS projects

The findings of the secondary data have informed about five key objective success factors, and the Wartsila people highlighted not all of these distinctly. Under theme 7, only 'technical difficulties' were reported in the interview transcripts. Technical issues in the project and system design were identified as highly crucial for the IS project at Wartsila. Lacking project's focus to meet these technical issues ends up in project failure. One of the major issues considered in the case company is related with the technical difficulties associated with the compatibility between information system and other organisational systems. Currently, the IS system at Wartsila appears to be highly complex and consequently difficult to be understood by the system users. This was one of the critical aspects associated with the successful development and implementation of the organisational system. The organisations need to encounter the technical difficulties related to the large projects. These issues can only be solved with a critical approach. Analysis of the organisation revealed that business has to consider all the technicalities besides compatibility for tackling the issue. It is worthy to indicate that procedural issues and difficulties can also form technical issues for the manufacturing organisation like Wartsila; the practical and techniques-based issues along with the technology-related concerns mutually form the technical side.

The second theme 'Process redesigning' was associated with the improvements needed to enhance the speed, quality, and service execution. People at Wartsila are not completely aware of the need to integrate the business processes with the expected information system, alongside the compatibility between the IS system and the other business systems. Loonam and McDonagh, (2007) in contrary have informed that there is a need to integrate the two aspects for the success of IS project. The analysis of secondary data findings have informed further about the guidelines need to be pursued for a step-by-step approach such as concentrate, originate, program, transform, implement and evaluate. Furthermore, Wartsila can also adopt the framework offered by Motwani et al, (1998) including steps such as process identification, analysis, redesign, and implementation. It can be stated that without complete knowledge of the process re-engineering design, IS project people at Wartsila are unable to complete the project lifecycle effectively with mismatched business processes.

The third theme is related with the 'Technological difficulties in system design' persistently highlighted with the academic literature but not covered in the empirical finding under a separate heading. These results imply that probably, the project people in the IS projects at Wartsila are unable to differentiate between the technological and technical aspects. In contrary, academic researchers with the literature have specifically identified technological difficulty in system design

as the critical success factor (Blecker, 2007; Tiwana and Keil, 2006). One of the major concerns highlighted the Wartsila organisation was associated with the nonalignment of the system design with the users' requirements, which is the focal point of the past academic researchers. In a position, organisations need to understand the significance of aligning the sub-elements of the technical difficulties such as knowledge, customer environment, volatility, previous practices, project complexity, and methodological fit for the project management. Probably, "customization" as indicated within the empirical research findings, is recognised as the vital factors behind the success of IS project.

Fourth objective critical success factor was related with 'Costs' was given significant importance within the literature studies (Yeo, 2002; Benamati and Rajkumar, 2002; Smuts and Merwe, 2016) however, the primary respondents did not emphasise on the financial matters or the costs-related attributes significantly. The eight participants and the theme5, "commitment of customers and management" indicated the importance of cost in allocating financial resources according to the customers' expectations within the IS projects. According to the project people at Wartsila, cost related failure are mainly the outcome of lack of customers' commitment towards an IS project. It can be depicted that for the Wartsila, the organisation needs to adopt novel business technologies in order to align their production according to the changing market needs and processes. For this reason, changing the cost of the emerging technology has significant effects on the overall information system projects of the company too. However, the findings further informed the project people at Wartsila to consider the effects of a reduced cost on the quality of the information system along with the budget cut. This is so because in many organisation, as evidenced by the secondary data, IS project managers become too much focused on the cost deterioration that they overlook sacrificed quality altogether in their decision-making process.

Fifth objective CSF is "Time engineering" because the completion of the project on time plays a vital role in the resulting success or failure of the IS projects. The schedule is one of the components of the project management literature as stated in the triad. In contrary to the secondary literature, project people Wartsila did not consider time as a significant aspect as their interviewee transcripts have not discussed the 'term' specifically. Only one of the project member has pointed out towards the need to have contingency-based approach while planning to prepare for the crisis time (under theme 1). It can be examined that time is one of the vital factors due to the ever-changing technological environment in the global market. For this reason, any organisation unable to meet the timeline is unable to cope up with the expectations and needs of the ever-changing business environment. However, the project is completed within the specified period only when the activities are allocated within appropriate time slots for each phase. Likewise, the academic literature has also confirmed that scheduling is also essential because the information system projects required carrying out environmental analysis prior developing and implementing a specific project (Aneesha and Haridharan, 2017; Thi and Swierczek, 2010). Without scheduling, no project can achieve considerable outcomes, both for in-house activities and for outsourcing activities, as well as for both (Smuts et al, 2013).

Lastly, the sixth objective CSF identified in the literature was 'Quality', where academic researchers have categorised project quality into service information and system quality. According to the researchers, each of the quality aspects is highly essential for the user satisfaction with the information system projects (Kaur and Aggrawal, 2013; Fan, 2010). Among the two major qualitative performance factors indicated in the literature include usability and portability, which were not highlighted by the project people at Wartsila significantly. However, the interviewees did highlight the critical role played by the project resources in affecting the project quality. According to some of them, lack of resources in some IS projects play a dominant role in the declined production of quality work, while some other believed that quality of work can be achieved with few resources when applied significantly. For this purpose, consideration on project quality is required to be created at the stage of project organisation (theme 2). Participants have seen it as an additional and essential feature of the project.

5.3 Discussion Overview and Reflections

The discussion has indicated people-related or human resource based factors as shared critical success factors in the information system projects management in general, as well as specifically for the manufacturing organisation. The concepts developed during the project were compared with the primary interviews and literature data findings only, and the personal understanding was not used to influence the perceptions and experiences of the project people. Informants were therefore not restricted to share their perceptions under specific subjective and objective categories rather they were asked generally share the key CSF they prioritize in the IS projects.

The role and contributions of the different people in IS projects such as project manager, IM manager, project team, a partner organisation, allowed the organisations for the cost-effective, quality-focused, scheduled, and scope-oriented IS projects. The comprehensive list of CSF gathered from the lit review was enhanced further while integrating the interviewees' findings and the suggestions offered by them for increasing the success rates of there is projects. The factors identified in this study can inform both the project managers as well as the users of the Wartsila about the set of key success factors to be integrated into there IS project development and implementation.

Project manager and the team appeared to be the most critical success factors in dealing with the other subjective factors and objective aspects. Without them, other project parties and stakeholders are unable to share project resources efficiently and communicate vitally and cooperate with each other at different phases of the project life cycle. Consequently, the skills and competencies of the project manager and team should be aligned according to the new and emerging changes. Training can allow adequate performances and can assist in talking change management and resistance to new changes in IS projects. Communication sessions among the project team and business divisions are highly crucial for reducing the impacts associated with a lack of understanding among them.

Technical details seemed to be the most critical success factors in the objective CSF category. Alignment of IS project with the system design to ensure compatibility, customisation, portability

and usability of the project for the system users and assessment of the current system specifications for integrating it with the emerging technologies. Furthermore, balanced allocation of resources must be considered among the different project team members such as steering committee, partners, contractors, consultants, and others.

The next chapter presents the research conclusion and research recommendations.

6 Conclusion and Recommendations

The chapter presents the summary of the key insights gathered from the earlier chapters in the form of an appropriate conclusion. Additionally, the chapter also incorporates contribution, authors' contribution, and the path towards future research.

6.1 Conclusions

The research aimed to identify and investigate the critical success factors (CSF) associated with the development and implementation of information security project within a manufacturing organisation. The analysis was carried out through the case study of Wartsila. For this purpose, two research objectives were developed in the introduction chapter.

- To identify a range of critical success factors responsible for the effective implementation of large IS projects in manufacturing organization and specifically in a marine industry.

- To identify and analyse the case of Wartsila information system, the challenges and issues associated with the implementation of IS projects from the perspective of IT specialists.

Identification of the critical success factors in information system projects has always been a significant focal point and an extraordinary concerning research topic among the project management literature. The current investigation aimed to address the categorization of the critical success factors in IS project into subjective CSF and objective CSF. Both people-related CSF and the technical factors-related CSFs play a vital role in planning, managing, decision-making and other aspects related with the IS project. Information system projects are highly critical for the organisations to store and manage the complex and sensitive data information about their business and stakeholders. For this reason, the success of these projects ultimately contributes to the overall success of the organisation. Through the extensive examination of the range of academic studies and literature along with the Wartsila information system, the study successfully identified the list of key success factors involved in IS projects at manufacturing organisation.

By integrating the persons in the semi-structured interviews, those who have experience in the development and implementation of IS projects at Wartsila, the answer to the key research question was searched. The qualitative research methodology was adopted for identifying a range of critical success factors (CSF) under seven (7) themes extracted from the interviews. The results revealed that manufacturing organisations due to their vulnerability to the emerging technologies and ever-changing business environment have two encounters severe challenges associated with the different types of human resources in IT projects.

Based on the conceptual framework and the summary of interview transcripts, Table 4 below summarises both the subjective, and objective factors that were identified having significant

impacts on the success or failure of the projects such as project manager and team, project management.

Table 4. Summarise CSF's in the Subjective and Objective CSF

Subjective Factors	Objective Factors
- Roles of project HR - Management - Lack of clear directions - Inability or lack of desire to learn from previous lessons - Lack of focus on prior information collection - Preparation for contingent situations for crisis - Resource challenges (Lack of HR) - Unbalanced resource distribution - Insufficient skills and current knowledge and information - Lack of understanding - Low expectations defined - Absence of benchmarking - Increased reliance on outsourcing for coding - Lack of mutual understanding - Lack of knowledge about working of the business divisions - Communication gap - Lack of consideration for application usage during the planning - Lack of appropriate resources required - Lack of awareness of staff related with the actual reason behind the company's existence - Lack of management's commitment - Lack of users training - Lack of understanding among the partners - Impacts of organisational change and project management	Non-alignment of project planning and management with standards The relationship among the quality of work and resources The complexity involved in understanding the customer's expectations financial resources Compatibility issues Non-integrated IS system and other systems degree of customisation

| • Formal and informal communication
• Lack of preparation for change resistance | |

However, several discrepancies were identified in the responses of the primary participants, as they did not focus specifically on the cultural differences, lack of management support, cost, time, and quality in different project life cycles such as planning, execution, implementation, and change management. The research findings have suggested that the Wartsila needs to integrate the user requirements, industry type, nature of change and other cultural elements in setting out the training programmes for the development of skills and competencies for the IS project managers and teams. The study has also informed about the need to integrate formal and informal communication processes within the highest project in order to share knowledge and understanding among the different stakeholders. Hence, the findings have updated about the significance of subjective and human resource related factors as critical in shaping the direction of objective CSF as well as in the overall development and implementation of IS project.

6.2 Contribution

The dissertation has effectively assisted in identifying the CSF for the IS project in the manufacturing organisation. Perspectives of the project people such as project managers, project experts, integration managers, chief office IT and others from the manufacturing organization, can assist in success and failure of an IT project. CSF has been a wide area for investigation. Manufacturing organisations are showing increased trends while moving towards the management of information using IS. The study has informed that although the international manufacturing companies have started recognising the need of developing and implementing Information Systems, yet there is a gap in their understanding related with the key factors needed for their success. The research has stashed in detail the subjective and objective critical success factors required within a manufacturing organisation for increasing the success of their style is projects. The findings of the investigation are of great support and use for the Wartsila, in the context of their future IS projects. They would be able to modify their internal and external factors associated with the implementation of IS projects, through the integration of different project people such as project managers, project team, partners' organisation, stakeholders.

6.3 Future Research

In the future, this research study can be further explored through the inclusion of the project parties in the investigation, specifically which are external to the organisation such as partner organisation, consultants, contractors, to assess how which CSF is critical for the IS projects in the manufacturing organisations for themselves. Additionally, the future research can be carried out by focusing on the IS project users such as people from business divisions who are the key recipients of such project. Perspectives of the other stakeholders would assist in substantiating the significance of the set of CSF for the other manufacturing organisations too, operating in another

sector than energy and marine. Likewise, comparative analysis of the two manufacturing organisations such as Wartsila and one other organisation in the same industry can assist in the accomplishment of research aim and objectives.

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Appendices

Appendix A- Interview Guide

Purpose: To acquire the basic knowledge of the person's capability and about the hands-on experience of Information System deployment

The answers of 1-6 questions will decide who will be selected for the interview session. Questions 7-8 will work as the initial opening questions of the interview.

1. What is your name and specify your current position?
2. This question comprises information of IS project:

Mention the name of the project/application/system

Timeline of the project

Mention the number of users

Business units involved in the project

Business components that were included in the IS project

3. Define your position and responsibilities assigned to you during the project.

4. What were the stages in the IS project (if not all the stages) that you worked in? Kindly check the guidelines mentioned in the Wartsila IM project. The link is given below:

https://cdn.wartsila.com/docs/default-source/product-files/engines/ms-engine/product-guide-o-e-w26.pdf?sfvrsn=13

5. In how many business units you were involved where you actually contributed to the deployment activity of the IS project?

6. Mention the deployment duties of various legal units by responding to the below questions. You can select any business unit but try not to choose the units homogeneous cases of deployment where you have actually contributed in the deployment activity. (If you have covered all the business units, which have contributed in the deployment phase of the project, then you can create a whole chapter to describe all the units but, in that scenario, kindly mention it below here.)

Please mention additional comments and explanation to the answers especially where you are asked to give your answer as per scale.

Name of legal unit 1:

The "difficulty level" of the deployment in the business unit

End users of the selected business unit

Shortly describe the IT expertise of the end users. (How confidently and frequently they handle IT skills. How often do they use a computer in their daily tasks? Was their work limited to only some applications or they were proper IT professionals?)

A brief description of the information system that the end users were previously using (What was the previous status of the system, was it new or familiar to the users?)

Name all the previously replaced systems in the unit.

Mention through the scale the change and improvement in the unit due to the IS project: visible improvement-some improvement-almost no visible improvement

Mention through the scale the amount of altered resistance: visible resistance-some resistance-almost no visible resistance

b) The pace of the deployment success in the business unit

The approximate acceptance rate of the new IS project according to you: completely accepted-accepted-modest acceptance-no acceptance

Did the timeline was followed according to the scheduled scope?

Did the budget target was achieved in the project meeting the objected deployment?

The end success results according to your opinion on the scale: incredibly successful-successful-moderate success-not at all successful

c) Provide some additional comments about the overall experience of the deployment case of this particular unit defining the reasons for example the difficulties faced during the project, the motivational commitment of the team and the improvement in the unit due to the new Information system, discuss the impacts and acceptance upon the reviews of the users.

7. In your opinion define any three success factors that have assisted in the deployment of the IS project? Also, describe the reasons along with the factors?

8. Additional explanations or your personal thoughts on this survey?

Appendix B: Initial interview questions focusing the experience of IS project

Note: The questions may vary depending on the individual's experience and the features of the IS project.

1. Specify the IS projects in which you have contributed and what was your core responsibility in the projects?

2. Describe your working experience with regard to IS deployment activity.

3. Ask some questions on particular projects based on the answers to the questionnaire.

4. Critical success factors/ difficulties faced during the projects/ probability of risks and failures in the IS deployment of the project.
You specified
………….
………….
………….
      b. What made the CSF realised in a concrete way? In what scenario does it prove that it matters? How critical is this case (extremely critical-critical-not at all critical) and also specify the reason? What was the reality to handle the WE SAP project?
5. The candidate's views on the importance of the following subjects:
Project management
Strategic management
Communication skills
What do you understand by the term CM and what do you know about Wärtsilä IM? How do you think that this project could be more improved?
Workforce commitment
Technological scenarios
6. Evaluation of the success of the project:
a. Is it appropriate to implement in the Wartsila?
b. How could it be implemented? What will be the impacts?

7. Can you connect the Information management with the departments of the Wartsila functions?

8. What should be improved in the Wartsila Information Management functions?

Appendix C - Consent to Participate in Research Study

Title/Topic*:* CRITICAL SUCCESS FACTOR FOR THE IMPLEMENTATION OF INFORMATION SYSTEM IN AN ORGANISATION – CASE OF WARTSILA
Date: March - April 2018
Contact information to the researchers
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Purpose of Study:

To find the critical success factor for the implementation of information system in case of Wartsila organization .

Procedures:

30- 45 minutes email or one on one interview in person or by communication platform (Skype) for further clarification. A one on one interview will be held if the participants prefer this method.

Risk and Benefits:

The questionnaires pose no potential risk to the subjects. After the session is finished, participants will receive a description of the objectives and procedures, and can request a copy of the data analysis. This experience will be of great educational and enrich acknowledge of what factors are involved in the implementation of Office 365 in the organization.

Confidentiality:

All information collected will remain anonymous and confidential at all times and remain solely the property of the university.

Right of Refuse:

At any point in the study, participants may refuse to continue. Participants may quit or change their mind about being in the study even after it has commenced.

 Questions:
At any point in time should you have questions please do not hesitate to ask. If at a later time any questions should arise. You will be given a copy of this form.

Signature

Participant :_____

Date :

Signature

Researcher : Mohammad Zaid

Date :

Appendix D Summary of Codes and Categories

S.No	Examples from transcripts	Participants	Codes	Categories	Themes
1	*I believe that in a technological environment, the roles of project HR for planning and management have shifted to technologies*	A	Planning, Management, Technology Focus	Roles of project HR Management	Management, Planning and Progress related to Project
2	*But due to lack of clear direction for the software development project, we are unable to implement our lessons*	B	Lesson, Direction	Lack of clear directions	
3	*We are significantly highlighted to learn from the previous projects*	B	Learning	Inability or lack of desire to learn from previous lessons	
4	*Management and planning processes are not in line with the standards*	D, E, F	Standards, Alignment	Non-alignment of project planning and management with standards	
5	I think that project managers need to discuss the previously the lesson during the planning and management of projects, The reality is that we are required to focus on practicing requirements collection merely and later implementing such requirements for the development of software or system.	C, H	Development, Requirements, Collection	Lack of focus on prior information collection	
6	Consequently, there is zero preparation for contingent situations without any description of roles and responsibilities of the in times of crisis	c	Contingency, Lack Of Role, Zero Preparation	Preparation for contingent situations for crisis	
7	*no resources*	C, A	Lack, Resource Deficiency	Resource challenges (Lack of HR)	IS Project Organization
8	Steering committee is allocated to many resources, which is unjustifiable for others, Lack of human resource or few resources can be attributed as the biggest reason behind the failure of big projects	A, C	Unjustified Distribution, Lack Of Human Resources	Unbalanced resource distribution	
9	In my opinion, quality of work is more important compared to the number of people working on the project	F	Work Quality, Project People	The relationship among the quality of work and resources	
10	*Skills and knowledge of people are dominant CSF*	H	Skills, Knowledge	Skills and knowledge of people	
11	knowledge and experience between the project team are not sufficient for the success	B, D, G, E	Knowledge, Experience, Success	Insufficient current knowledge and information	

12	lack of understanding	A, D	Understanding, Knowledge	Lack of understanding	Cooperation from Partners' Organisation
13	low expectations defined	G, H	Expectation	Low expectations defined	
14	absence of benchmarking, Wartsila did not set a benchmark which is highly necessary for the success of the IS projects	C, E, F	Benchmarking	the absence of benchmarking	
15	We should start expecting more from our partners and should consider the expansion of partners group for the different projects rather relying on few	G	Increase Expectations, Expansion, New Partners	Partners' expansion	
16	increased reliance on outsourcing for coding, I think that Wartsila should reduce the level of outsourcing should consider performing coding and all the tasks	B, E, F, D	Level Of Outsourcing, Task Coding	Increased reliance on outsourcing for coding	
17	*The planning approach lacks practicability about the applications usage".*	F	Practicalibity	Lack of mutual understanding	Factors Related to Business Division
18	We have to blindly follow the orders of divisions, from where empty helpdesk emails are being sent	H	Empty Help Desk, Blind Follow, No Understanding	lack of knowledge about working of the business divisions	
19	*Currently, there is a communication gap between the divisions and IS project managers*	A	High Communication Gap	communication gap	
20	*No focus on application use*	D	Application Use, Low Focus	lack of consideration for application usage during the	
21	*lack of resources*	D	Resource Deficiency, Lack Of Resources	lack of appropriate resources required	
22	*Actually, IS projects, as well as other staffs of the organisation, are unaware of the actual reason for the company's existence*	E	Unaware Of Actual Reason	an awareness of staff related with the actual reason behind the company's existence	
23	complexity involved in understanding the customer's expectations	A, B, D, H, F	Complexity, Understanding, Expectation Deficiency	The complexity involved in understanding the customer's expectations	
24	Need for relationship development	B, H	Relationship Development	identification of the relationship between the customers' expectations	The commitment of Customer and Management
25	Allocation of resources	G	No Resources	allocation of financial resources	

26	*Managers are impacting the attitude of the users, by not clarifying the expectations needed for their project involvement*	G	Behaviours, Attitudes, Project Involvement	lack of management's commitment	
27	*Commitment of management is highly essential for directing the users towards the new project, Users are not offered training by the managers*	A, H	Lack Of Training, Lack Of Appropriate Tarining	lack of users training	
28	compatibility between the information system and other organisational system is highly necessary	A, B, C, D, E, F ,G, H	Compatibility	Compatibility issues	
29	*We have often encountered instances showing no integration between IS systems and other systems when it former went live*	A	Integration, Connectivty, Link Between IS And Other Systems	Non-integrated IS system and other systems	Technical Issues in the Project and Design of System
30	*Lack of understanding among the partners regarding the integration and techniques for such integration contributes to project failures*	C	Lack Of Understanding	lack of understanding among the partners	
31	*Degree of customization is highly necessary for IS projects*	F	Customisation	degree of customisation	
32	*I believe that the complexity of the style system makes it difficult for the users to understand that to understand and integrate*	D	Complexity, Difficulty	Complexity	
33	*Project management is about change management and change management about how we are dealing with people*	B	Change, Issues In Dealing People	Impacts of organisational change and project management	
34	*Project manager and team members need to understand the significance of formal and informal communication in integrating every minor to major changes within the project effectively*	C	Formal Communicatio n, Informal Communicatio n, Effective Change Interaction	Formal and informal communication	Management Issues related to Organisational Change
35	*Project managers need to prepare for the change resistance during the planning phase of new projects*	D	Change Resistance, Change Preparation	Lack of preparation for change resistance	
36	*Training of the end user can be used as a critical factor for the success*	F	Training	Lack of training	