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Process improvements and proposal for Return of Experience

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ABSTRACT

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Big organizations, especially global ones, often have multiple projects being carried out in parallel at different stages. The increased global competition puts pressure on companies to be more efficient and productive. It is imperative there exist a common knowledge base, which contains the lessons learned and return of experience from previous projects. The thesis is developed by studying the current process for Return of Experience (RoE) in the company. Improvements to the current process and a new process are proposed for using the RoE to better inform future projects and learn from past concerns.

The aim is to create a common base for storing knowledge and lessons learned from project execution and delivery, which is accessible to all teams throughout the company. Lessons learned from one project, such as reasons for deviations and delays, good practices may be applied to future projects. Having the information stored centrally would help in the planning stages. Since the company is also keen on aligning with Continuous Improvement, the thesis will look at incorporating such changes into the process as well.

The thesis involves the study and literature review of what a process is, how to reengineer a Business Process and its management and improvement. Adopting the LEAN methodology has been discussed, too. Interviews performed with employees from various teams involved in the projects, and company internal documentation are the main sources of data. On analysis, the current process' shortcomings were identified and areas for improvement, brought to light.

The thesis examines the current scenario in the company with the help of process improvement theory and provides the context for a methodology that is accessible companywide. Launching a new process is discussed at the end and importance placed on Continuous Improvement. The outcome of the thesis enables the company to educate the employees to the benefits of having a good process for Return of Experience in place.

Key words: return of experience (roe), process, process improvement, process engineering, new process, lessons learned

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ABBREVIATIONS

TAMK	Tampere University of Applied Sciences
6M	Six Months
BDR	Budget Deviation Register
BPM	Business Process Management
BPR	Business Process Re-engineering
CI	Continuous Improvement
FAC	Final Acceptance Certificate
LL	Lessons Learned
NCR	Non-Conformity Reports
PAC	Provisional Acceptance Certificate
PDCA	Plan Do Check Act
PM	Project Manager
RCA	Root Cause Analysis
RoE	Return of Experience
SoD	Summary of Decisions
TQM	Total Quality Management

1 INTRODUCTION

The fast growing and competitive nature of the global market has brought into the spotlight how organizations both big and small, handle operations and stay ahead of their competitors. The increased global competition puts pressure on companies to be more efficient and productive. Additionally, they must develop strategies to integrate their operations, which can be spread across many different locations.(Magal, 2009.)

In big organizations, projects often occur concurrently, spread over the globe in different markets and on different scales. There are times when project managers or members come across a situation that has occurred in previously concluded projects. It is imperative that there exists a companywide knowledge base where experiences form projects are shared and everyone across the organization has access to it. It could be beneficial to use this knowledge in new projects across the company so that the learnings from past projects can be applied.

Process modeling is a leading practice that has been growing in importance for organizations pursuing increased operating efficiencies. Established process-based capabilities become repeatable, training becomes easier, quality is improved, and process outcomes are more reliable. (Long, 2014.) Analysis of business processes is conducted by organizations seeking to improve their operations and improve efficiency. Organizations can benefit a great deal by having clearly defined and documented process models. This helps in developing transparency in the process and gives it a companywide visibility.

Successful process programs are typically ones that have been carefully tailored to the needs of an organization. They are based on the way the organization works—or knows how it should work.(Persse, 2006.) The main target of the thesis is to study the existing process of Return of Experience, study the bottlenecks, suggesting improvements to the existing process and possibly come up with a new process that suits the company.

1.1 Background of the Thesis

The company for which the thesis is being commissioned (hereon referred to as 'Company') – is in Tampere, Finland and operates in the Renewable Energy industry. The company is focused on bringing together technologies and expertise to help solve the toughest power system challenges, accelerating the global transition to a greener, more resilient, and reliable grid. The thesis is to be developed around studying the existing process and suggesting changes or a complete overhaul of the process to Return of Experience in project execution and delivery for the company. The thesis will help the company to utilize the experiences gained from each project after delivery and focus on improving the overall project implementation and delivery solutions to perform better with each project and improve efficiency. Lessons learned from one project may be applied to another, difficulties faced by a certain team may be used to anticipate and forecast similar problems for other teams and in this way the redundancy is reduced, and it provides for a more Lean and efficient way of handling these issues.

1.2 Thesis Objectives and purpose

The objective of the thesis is to help the company, in examining the existing process for return of experience and propose amendments to it and model a new process to establish return of experience process. The existing process of return of experience in the company is still in its nascent stages and is not followed on a regular basis. By suggesting changes and proposing a new process, the communication and involvement of the different teams within the organization will be improved. The various stakeholders are involved in the data collection phase by means of interviews and discussions based on project and commissioning experience, and this will increase their participation towards contributing to the process.

The aim is to create a foundation for the learnings from project experience during execution and delivery to be shared among the different teams within the organ-

ization as well as the various stakeholders such as project managers, commissioning engineers, project team leads, sales managers, bid managers and R&D heads, involved in different phases of the project delivery timeline.

The company wants to utilize the experiences gained from each project after delivery and focus on improving the overall project implementation and delivery solutions to perform better with each project and improve efficiency. The thesis will serve as a study of current process and the company is also open to new processes that might improve this feature. Since the company is also focused on implementing Continuous Improvement and LEAN methodologies in the day-to-day operations, the thesis will also focus on connecting this to return of experience process.

1.3 Research Questions and Scope

The primary objective of the thesis is to analyze and improve the Return of Experience process currently existing in the company. It is thus imperative to define processes, process improvements and process reengineering to understand the concepts.

The main research question of the thesis is:

- How to model and incorporate a process for Return of Experience for organization wide distribution?

The sub-questions that help in answering the main question are:

- What is the existing process in place for return of experience?
- What are the existing bottlenecks in the process, how can it be improved?
- How can a new process be modelled considering the various departments and teams that are part of any project?
- Who are the key stakeholders who are responsible for the return of experience across the organization and are the results getting shared across the board?
- How to get the organization committed into the new process, provide suggestions, and give an implementation plan if possible

1.4 Example of Return of Experience

Considering the recent COVID-19 pandemic, the whole world had to rethink and adapt to the way organizations functioned and people worked. Coming out of the pandemic, a lot of the organizations if not all, adopted the hybrid model of remote and office working. This is in recent times probably the most widely implemented instance of learning from experience and applying it to an existing process.

1.5 Thesis Structure

The thesis consists of 7 chapters and the subsequent six chapters are structured as follows. Chapter 2 introduces the the theoretical world of Process, Process analysis, Business Process Mapping, Reengineering and Process improvements. It explores Lean techniques and continuous improvement methodologies and applying them to processes. Chapter 3 sets the foundation for the research approach and data collection methodology. The questions for interviews with different sets of employees is listed down as part of this chapter. In Chapter 4, the author does a deep dive into the current process of Return of Experience (RoE) in the company. This chapter also includes details about the tools used and how the lessons learned are documented at present. Chapter 5 analyses the data collected from the interviews and presents a concise summary of the results. The chapter also contains information obtained from internal company documents. Chapter 6 focuses on providing answers to the research questions – offering improvements to the current state and proposing a new process that can be implemented. Finally, chapter 7 brings the thesis to a conclusion by discussing the major points of the study and providing recommendations for the future. The Appendices list a template for the minutes of meeting, information about the interviews and a sample of responses collected from the interviews

2 THEORETICAL FRAMEWORK

2.1 Concept of a Process

A process is a collection of activities with the purpose of getting something done. Process according to a dictionary is “a particular course of action intended to achieve a result (synonym: procedure)” or “a series of actions or operations conducing to an end: especially a continuous operation or treatment especially in manufacture” (Merriam-Webster, n.d.)

Processes are customer value-creating activity chains that require resource investments, effective control, and management from the companies in order to fulfil their objectives. Processes are customer value-adding chains of activities that utilize resources. (Martinsuo & Blomqvist,2010.)
Figure 1 illustrates a simplified view of a Process.

Figure 1 Simplified view of a Process

In organizations, there are business processes as well as other processes and a major point of difference is that a business process generates economic profit while the other type of process can be any process. The following types of processes can also be found:

- Core vs. support processes: Core processes are connected to an external customer, while support processes exist to serve the core processes.
- Main vs. sub-processes: Main processes can be divided into several different sub-processes that can be presented hierarchically, on different levels.

- Current vs. target processes: Current processes are the ones currently in use, whereas target processes are the processes as defined by performance objectives. The differences between the two clarify the practical need for process modification. (Martinsuo & Blomqvist, 2010.)

A process is linked to a company's organizational structure through its objectives and the resources it uses. Figure 2 illustrates the apparent relationship between core processes and organizational structure, i.e., a core process may require resources from different functions or business units of the organization. The role of processes in an organizational structure can vary from very essential to purely secondary because a company can also model its operations using methods that are not process-based.(Martinsuo & Blomqvist, 2010)

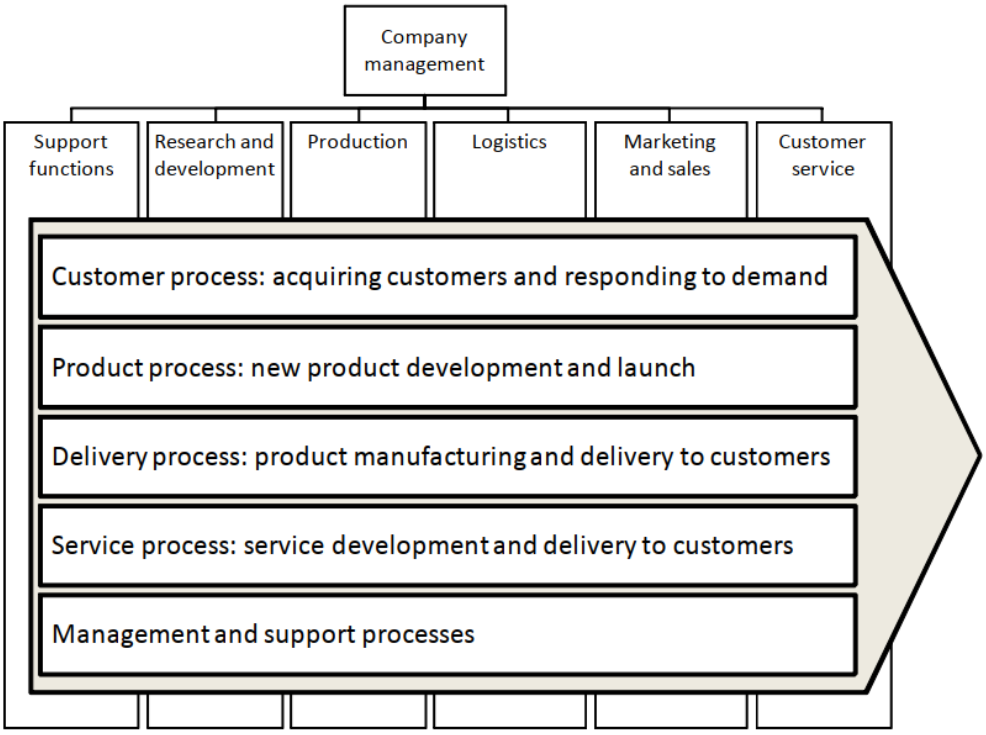


Figure 2 A process architecture and a company's organizational structure (example) (Martinsuo & Blomqvist, 2010)

Patel (2016) states that the importance of customer point of view should be kept in mind when planning processes and developing them. The output for every process should be satisfying the customer requirements. A process is a means for a company to organize its resources and work to accomplish their targets. A

business process is a collection of activities to achieve a certain result for the customer. An activity in the process may include many people and departments to take part in it. (Sharp, 2008.)

2.2 Process Mapping

Visualising the process flow is a part of a methodology called Process mapping. A process map or a process chart is a document that visually captures the flow of the process: inputs and outputs. The process map, places the activities to their locations in the process.(Cooper & Moore, 2013.) What may cause problems for companies, is that process mapping is internal task, but there appears to be no specific department that is usually responsible for creating and maintaining it. It is mostly executed by technical staff but could be considered to be bought as an outsourced service in order to get an unbiased view.(White & Cicmil, 2016.)

Process mapping adds understanding of the processes and enhances communication, and that way can improve transparency and the efficiency of the process (Bowles & Gardiner, 2018).

At its simplest, a process map can describe the basic tasks and activities in a process. It is a valuable tool to identify redundant activities and places for potential improvement in a process.(Boutros, 2016.)

The different shapes represent a different type of an activity. The most basic process symbols are visualised in Figure 3. Understanding these steps gives the opportunity to understand and analyse the process flow.

Symbol	Meaning
	Start or finish
	Activity or process
	Material or information flow (can be shown with different line colors/styles)
	Decision point
	Document
	Information system/data storage
	Inventory
	Data
	Delay

Figure 3 Key Symbols in Process Mapping (Martinsuo & Blomqvist, 2010)

2.3 Process Analysis

A process may not be quite simple or straightforward to explain and study only by using a process map or process chart. It is essential to define a process, analyse it and evaluate its efficiency. Performance analysis is the first step in improvements, and we need to analyse the process performance first before improving on it (Joan et al., 2012).

There are several approaches to analyse a process and measure its efficiency, and in most cases, the problems could come from unknown sources. The existence of a complete process chart or map doesn't guarantee that it has complete functionality. It is quite common for processes to have gaps in the architecture without causing any actual problems. (Sharp, 2008.)

A process can be analysed at multiple levels. To analyse a process, the circumstances to make a change should be analysed, followed by the process level analysis and the outcomes level analysis. (Joan et al., 2012)lists a few questions to improve the analysis:

- Is the change fitting in with the organisation's mission?
- Does management encourage the change?

- Are the people in the company equipped with the right tools to adapt for the change?
- Are support and resources easily available for the employees?
- Are the processes at work helpful to make the improvements?
- Is the existing workflow design efficient and effective?
- Will the change or improvement in process contribute to a boost in approval of stakeholders?
- Will the change make way for a rise in customer (internal or external) satisfaction?

These questions point to a change in the way things are done currently: an improvement in the process. Process improvement is also a case of change management and people need to adapt to newer work procedures or conditions. (Joan et al., 2012.)

Boutros et al (2016) state that Process Improvement provides a framework that will empower continuous improvement, process design, and performance measurement. Some possible gains of process improvement:

- Increase in customer satisfaction
- Efficient operations
- Maintaining the quality
- Reduce in waste
- Reduced costs
- Lesser conflict between teams leading to an improved communication

2.4 Business Process Management (BPM)

Identifying a business process is an important step before getting into optimization. Optimizing a chaotic process or a process in turmoil is not feasible. This leads us to two key parts: reducing operations and improving business performance.

2.4.1 What is BPM

Business process management (BPM) is a methodical approach to management, that focuses on enhancing the organization and the processes within. BPM enables organizations to define their processes, organize their implementation, as well as focus on improving the quality.(Miers, 2006.)

The modern business environment has a complex set of requirements with a requirement on strong competitive advantage in different areas such as lead-times, adaptability to customer needs, costs to name a few. This has given rise to a demand for BPM.(Caputo et al., 2019.)

2.4.2 Objectives of BPM

The main objective of BPM is to align the organization objectives with the processes. A process must be designed so that it helps the organization in achieving its goals. BPM follows the approaches listed here:

- Clear and comprehensive documentation of the processes
- Continuous Improvement of processes
- Applying software tools to help in modelling the process and following up on their optimization. (Miers, 2006.)

2.5 Business Process Re-engineering (BPR)

Business Process Reengineering entails the fundamental redesign of core business processes to achieve remarkable improvements in productivity and quality while delivering more value to the customer (Bain & Company., 2018).

With the advancements being made in the technology sector, such as cloud computing, artificial intelligence, internet of things etc, there is a marked interest from companies to implement digital transformation using BPR to provide the framework. Process improvement can benefit majorly from BPR concepts where increasing the efficiency of core processes leads to improvements in productivity, satisfaction etc.

2.6 Business Process Improvements

Process improvement includes the identifying, analysing, and improving of existing business processes to optimize performance, meet best practice standards and improve quality for customers (White, 2019).

The goal of Process improvement as listed by White (2019):

- Minimizing errors
- Reduction in waste
- Improving productivity
- Streamlining efficiency

2.6.1 Process improvement and development tools

Lean, together with Six Sigma tools drives decision-making and provides a system to quantify the potential for variation, defects, and risk. There are tools and techniques available to facilitate the transformation in organizations to be more sustainable, strategically oriented, and thus be more successful. Process improvements requires a total acceptance from the organization and a commitment to change. Oftentimes these things fail because of the reluctance on part of the organizations to not take the holistic approach that is required to see the change implemented all the way through.

Ownership of processes in an organization is a key role. Processes benefit from ownership at all levels. Having a process owner ensures that there is an action point from the organization and there is an effort in place to carry out the process. Absence of process ownership creates a void in the organization's process structure and might lead to issues such as process not being developed, process not getting any attention from the management etc.(Armistead et al., 1995)

Continuous improvement (CI) is a mindset where the organization wants to look at constantly improving the way things are being done. It is a comprehensive process that consists of different approaches and methods such as Total Quality Management, Six Sigma, Kaizen and Lean.

Figure 4 The CI cycle (Terry, 2022)

2.6.2 Lean Process Improvement Techniques

At the core of it, the philosophy of the Lean approach is to maximize the customer's value, while minimizing the waste in processes (Simon, 2012). The idea of Lean is a way of thinking and acting that needs to pervasive throughout the organization in order to create value for customers while reducing costs.

Six Sigma is a method that enables organizations to improve their business processes by reducing variation in process. Reduction in process fluctuations and increase in performance will lead to a reduced risk and enhance quality. Six sigma views tasks as processes that can be developed by defining, measuring, analysing, and controlling them.

Kaizen is a Japanese concept/business philosophy, referring to continuous improvement. Kaizen involves everyone in the organization from CEO to the employees. It also applies to processes, such as purchasing and logistics that cross organizational boundaries into the supply chain.(Imai, 1986). Kaizen is a comprehensive and holistic philosophy that concentrates on improvements to all parts of an organization. Kaizen can also be applied at a personal level to assist people in improving the way they work by removing waste.

Total Quality Management (TQM) is a universal and organized approach to organizational management, aimed at improving the quality of products and services through continuous improvements by understanding feedback.

Plan Do Check Act (PDCA) philosophy was introduced in the 1950s by Edwards Deming and is based on the scientific method, as developed from the work of Francis Bacon. It is based on principles that reduce errors in the manufacturing or service process, increase customer satisfaction and enhance supply chain management to modernize processes. This cycle is repeated until perfection is achieved. At each step, there is a standardization procedure to prevent repetition, as represented in Figure 5.

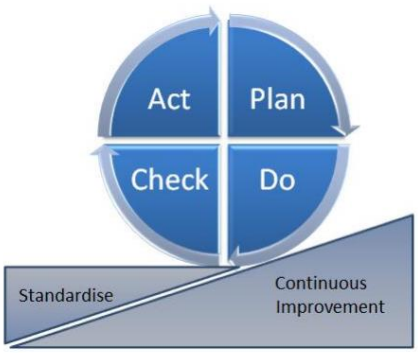


Figure 5 Continuous Improvement (Rother, 2009)

3 METHODOLOGY

3.1 Research Approach

The research is based on a Qualitative research approach. Qualitative research methods are most appropriate in situations where little is known about a phenomenon or when attempts are being made to generate new theories or revise pre-existing theories. Qualitative research is applicable in a situation where the objective is to generate a deep understanding and a profound description of a process. (Grbich, 2013.)

It involves collecting and analysing numerical data for statistical analysis, involves collecting and analysing non-numerical data (e.g., text, video, or audio) to understand concepts, opinions, or experiences. There will be one-on-one interview, interviews with teams (focus groups), case study research and observing of process.

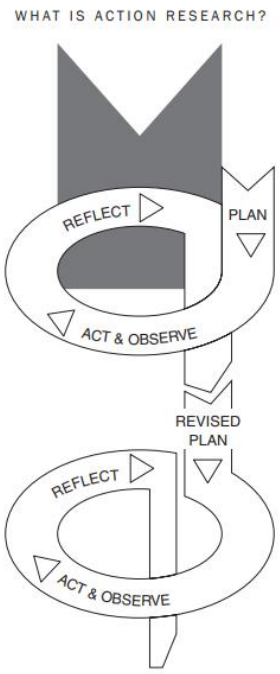


Figure 6 Action Research Spiral (Kemmis, 2014)

Action research is chosen as the research approach. It can be defined as a research method where there is a collaboration link between researchers and participants. It is chosen due to its high level of relevance to business approach,

usability with Qualitative data, and the depth of understanding of the research problem. The key for Action Research comes from the Action Research Spiral consisting of these - Plan to initiate change. Implement the change and observe the process of implementation and consequences. Reflect on processes of change and re-planning. Act and observe and finally Reflect. (Costello, 2003.) The main advantage of Action Research Spiral model (Figure 6) is that with each iteration, there is a possibility to gain more insight and alayxe the phenomenon in depth.

3.2 Data Collection Approach

Interviews act as a source of data which acts as the foundation for setting up the research and provides a profound understanding of the research topic – business process improvement. There is also knowledge that is gained using books, research papers and articles related to the research topic. The process is examined in the current state of existence as it provides knowledge about common practicalities, like the project participants, project duration, how the project has been executed and where the project has taken place. Both, data collected and the understanding of project execution and processes, create the basis of the interview for the project participants.

Data is collected by doing face to face interviews. Interview techniques can be characterized according to both the structure of the interview and the degree of interaction between the interviewer and interviewee. Interview structures depend on whether one seeks a broad range of opinions (unstructured) or a narrow range (structured). In this research, the interview with the higher-level management officials follows a free form of discussion although still within a framework of questions pertaining to the topic, whereas the people directly involved in the project such as design engineers, commissioning engineers, site leaders, answered a set of questions, prepared based on the existing process and their experience and knowledge of RoE in the company.

The purpose of this study is not to find incompetence in the actions and activities of the employees, but to find ways to facilitate the flow of information and ways

of sharing the lessons learned and RoE. Keeping in mind this statement, formulating the questionnaire was an interesting and challenging task as the questions had to reflect the different processes in place among all the different teams involved and in such a way that the right information is collected, and the questions should not prove extraneous. This interview plan allowed for exploration of ideas and improvements that can be put in to use while making the process streamlined and using tools that are common to the whole company.

3.2.1 Level 1 - Questions to be asked for people directly involved in the projects

1. Are you aware of the current process about RoE in the company?
2. How often do you attend RoE meetings? (Do you attend all RoE meetings or only those projects of which you have been a part of?)
3. What do you think can be improved in the current state of recording and documenting RoE across the organization?
4. What are some improvements/implementations you would like to see in the new process?
5. What are the most repeated issues or problems that you or your team has faced while executing a project (Resources, Planning, Schedule, etc)? Do you face the same problem in different projects?
6. What are the issues that caused the biggest negative impact to the project in terms of resources, schedule, etc?
7. Have you taken in any learning from a previous project as input for other projects?
8. Do you have any inputs to other teams that are involved in the project in terms of RoE?

3.2.2 Level 2 – Questions to be asked to upper management

1. Are you familiar with the process in place in the company relating to RoE? How often do you refer to lessons learned or RoE documents from past projects?

2. What are the key takeaways from previous projects that you consider while planning for new projects?
3. What are the usual suspects that you look for when a project does not go according to plan – budget wise, resource wise or schedule wise?
4. How often do you schedule or prepare RoE meetings?
5. What are some points that need to be addressed when improving the current process?

3.3 Data Analysis Approach

Qualitative analysis approaches the research topic or object with an aim to increase the general understanding of the quality and characteristics of the topic. There are a few methods based on the philosophy of science that can used to carry out the analysis. These methods can be broad or narrowly focused depending on the lens of viewing and treating the data. One important feature of qualitative methods is placing an emphasis on the points of view related to expressions, language, the topic's aims, and meanings. (Jyväskylä University, 2021.)

Qualitative and quantitative analysis are for all practical purposes, a pair. While there is more importance and focus on numbers in Quantitative analysis, it is also more statistically aligned and thus clearly different from the Qualitative analysis. It is up to the researcher to choose the one suited best to them based on the research topic and what it aims to achieve. (Jyväskylä University, 2021)

There are two important facets of data that is applicable to all research. The data should be collected from the real world - from situations or people involved in the research topic. Secondly, the data needs to be interpreted in a more abstract way using existing theories of knowledge to explain the findings and to enable interpretations.

Qualitative research favors certain styles of design, collection, and analytic interpretation. The underlying ideology states that, Subjectivity has value (meaning that both the views of the participant and the researcher are to be respected, acknowledged, and incorporated as data). Validity (trustworthiness) is seen as

getting to the truth of the matter, reliability (dependability) is viewed as a sound research design. Power lies predominantly with the researched (who are viewed as being the experts on the research topic). A holistic view is essential (so the structures impacting on the setting such as policies, culture, situation, and context need to be included). Every study is time- and context-bound (so that replication and generalization are unlikely outcomes).The typical stages of Data Analysis are shwon in Figure 7.

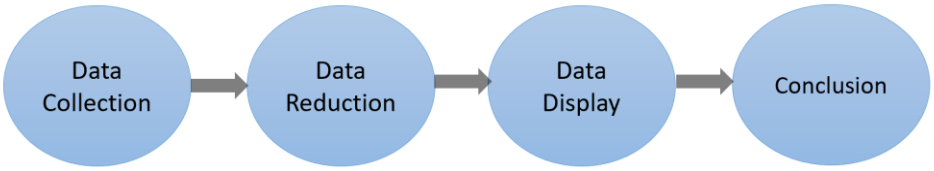


Figure 7 Stages of Data Analysis

Once the data has been collected the next step is to reduce it to the relevant points that are related to the research topic and abstract the data. Data abstraction is a way of manipulating the data so that it takes a presentable form and is the preferred way especially when the data has been collected by interviews. First, the data is classified or codified using themes or keywords relating to a theme. Then the data is ready for abstraction which makes the collected data more readable.

Fundamentally speaking, qualitative research synthesis is an approach that uses qualitative methods to analyse, synthesize and interpret the results from qualitative data (Major, 2012). This helps researchers to not just summarize the data, but also find meaning in it. Qualitative research is appreciated because of its ability to provide depth to the information collected about a particular phenomenon or research topic (Major, 2012). Interpreting the data is the final step in this approach and this adds a layer of knowledge of the studied data on top of the comparisons and aggregation of the data collected. The best way to interpret data for Qualitative research is by using text, rather than numbers or patterns.

4 CURRENT STATE ANALYSIS

The objective of the process in place is to consider return of experience (RoE) and lessons learned (LL) from past projects. This includes all areas of the development and validation of the technical and commercial proposal, engineering, safety, quality, delivery, etc.

A poor RoE leads to repeated mistakes as well as missed business opportunities, and long-term financial inefficiency for the organization. For the user, RoE allows a clear return on the effort and time that has been spent for a given activity, as matters will constantly improve and become easier and more efficient through sharing of experiences. Mistakes can be minimized, and good ideas and actions turned into best practices. (Company, 2019.)

As mentioned earlier in the literature study, a Process takes in an input from a customer and delivers an output to a customer. The customers can be internal or external depending on the process and where it happens. Keeping that in mind, an overall broad categorization for the RoE process can be depicted as shown in figure 8.

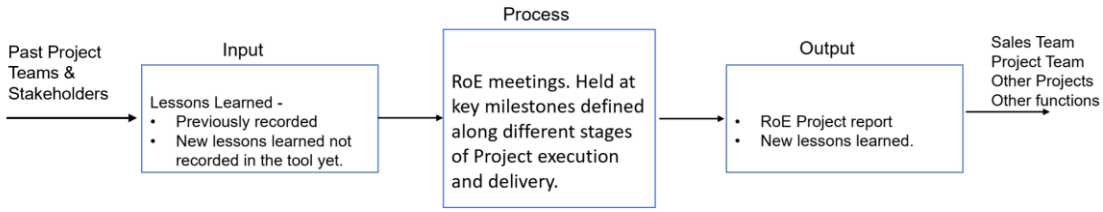


Figure 8 RoE Process in the company

RoE all along the project execution is a permanent mindset. Everyone on the Project shall share their relevant findings and lessons learned along with the project progress using the available tools (Lessons Learned tool by Salesforce) so that it is shared with the business stakeholders as soon as available to the benefit of the full Project community.

Every project has two main stages –
Tender Phase – Where the sales team has to decide whether to bid for a customer project or not; what strategy will be followed and what are the details in the proposal to be included.
Project Execution Phase – Where the project is actually being executed, after customer accepts the proposal and the terms of contract are signed, and work begins on the project.

A list of tools being used in different teams at different stages will help in understanding the current processes in the company.

4.1 Tools Used

Since there are a variety of tools used in the company, it is necessary to know some the main tools used in the RoE and LL process across the teams, as it complements in understanding the process better and gives an idea of the existing setup.

UNIFIER is a tool where the project Budget Deviation Registers (BDR), Risks & Opportunities and Project Reviews are reported and validated. It is also used to store important documents from a RoE meeting such as Minutes of Meeting (MoM) or Summary of Decisions (SoD).

Lessons Learned (LL) Tool from SalesForce is used for recording Customer complaints and Non-conformities in Project (NCP) such as delay in schedule or transport of hardware, resource allocation etc. NCP is something that has a variance from the agreed original in the contract. For example, if the installation of a system was promised to begin on a certain date but got delayed (whatever the reason maybe) it is recorded as NCP.

JIRA is a software tool for tracking issues that allows for bug tracking and agile management. It is used by the software team to list down the different steps in a project as issues. They can be broken down into smaller tasks, used to track bugs and keep track of time and effort used by the project.

Confluence is a web-based corporate wiki that is useful for knowledge sharing and collaboration. This is used by different teams in Engineering (such as Hardware, Software, Mechanical). It is also used to keep track of the processes followed and general documentation about product know-how. JIRA and Confluence both are developed by the same company (Atlassian) and therefore are easy to integrate with each other thus providing for an easy way to track progress of a project's issues from the documentation and update accordingly.

4.2 Tender Phase

In every project, as part of the tender phase, before submitting the bid or proposal to the customer, the Sales team holds a RoE meeting based on the previous projects bids and analyse the lessons learned from previously submitted bids and tenders – both successful and failed ones. This helps when engaging with similar opportunities with the same or different customer. Knowledge of risks and possible mitigation helps to define the best strategy. The Bid Manager is the responsible person or Process leader in this phase of the RoE.

A tender is first considered on the basis that does the company want to participate in the bidding. Once the decision is taken to go for it, the next step is in preparing the proposal or bid and submitting to the customer. Finally, the tender is either "won" or "lost". Lost tenders automatically qualify as a vital source of information for lessons learned and the team can prepare better for subsequent tenders. A "won" tender also has scope for RoE collection and it is imperative that the company keeps doing the things it got right throughout so that it doesn't miss out on future proposals/tenders.

Typically, the sales team gets RoE from previously applied bids on how to assess a deal. On submission of the proposal to customers, the RoE and lessons learned from past projects inform the strategy the sales team wants to go with. At the final phase, of course the team gets past proposals success rate and accordingly prepares for the future.

4.3 Project Execution Phase

Once the project tender has been won, the project execution phase starts and runs till the customer has accepted the project. RoE meetings will be held when the project reaches some key milestones. The Project Manager (PM), as process leader, must initiate the discussion and commit all the necessary project team resources as well as the Sales team. The project execution phase can be broadly divided into two phases – Live phase and Closeout Phase. The Live phase is when the project is ready to be energized. The Closeout phase begins soon after and deals with completing all contractual agreements, handing over operations to the customers. (Company, 2018.)

These key milestones are:

- Six months from Project Initiation (6M RoE)
- RoE before project closure
- RoE after project closure

4.3.1 Six Months RoE

The 6M RoE Review is a milestone to materialize the first return of experience meeting of the project that is held 6 months after the transfer from sales to project execution teams. The choice of “6 months after” corresponds to the end of basic design or to a large progress of engineering works. This can provide sufficient feedback to people who engineer and cost solutions at the tender stage. The goal of this RoE here is to communicate as much information as possible to the sales team which will enable them to do better costing in comparable projects. It is also the output of the RoE to compare and explain the difference between the tender and the actual state after project execution has started. (Company, 2019.)

The inputs for this process include events from the past projects, issues that were faced and a general knowledge of project execution. If there was any previous work done for the same customer, or other customers in the region, that will help

in creating a base for anticipating potential areas of trouble. The need to look at good practices that were implemented in earlier projects is of interest at this phase, as it is always good to keep the good practices continuing.
The objective from the process perspective is to detect points of difference between the forecast and the execution. Analyse the execution data and look at areas of improvement. Use the data to improve efficiency while submitting tenders for future deals.

The outputs of this RoE are the recorded Minutes of Meeting (MoM) document, the relevant lessons learned input in the LL tool. Any deviations such as budget or schedule be noted and shared with the respective teams – finance and planning. The process leader is the Project Manager.

4.3.2 RoE before project closure

The RoE meeting that is held before project closure is done after Provisional Acceptance Certificate (PAC) is obtained from the customer. This RoE is aimed at providing an operational project feedback to capitalize on the experience gained. This review is organized when the customer issues the Provisional Acceptance Certificate (PAC). (Company, 2019.) This is a part of the project execution phase where the project is ready to be energized (end of the Live phase).

The inputs for this phase of the process are pretty much similar to the one in the six months RoE. Every month, the PM holds a project review, detailing the current scenario of the project at that time. These reviews are entered in the UNIFIER tool by the PM. These reviews also act as inputs for this process.

The process objective at this phase is to detect the positive and negative points of the contract execution compared to forecast and analyse project execution data and potential improvement data.

The outputs from this RoE, are primarily the lessons learned that are recorded in the LL tool, the MoM recorded in the UNIFIER tool and capitalization of experience for later projects. The PM leads the process at this phase too.

4.3.3 RoE after project closure

The RoE at project closure is organized when the customer issues the Final Acceptance Certificate (FAC) at the Closeout phase of project execution. The project will be finally closed from the books only when Final Acceptance Certificate (FAC) is issued, all cash is received, all pending issues are solved. Final Closing report is issued, shared, and archived. Close out workshop must be carried out to present major RoE to other Project Teams who are working on similar Projects.(Company X, 2019.)

The inputs for the final RoE are the project closure report, the list of issues or events during project closing phase. Previously recorded lessons learned and project reviews.

The objective of the process is to archive the project issues and make them available throughout the company. Make available the analysis of project execution data and potential improvement data.

The outputs from the final RoE include the MoM document recorded in the UNIFIER tool, relevant RoE topics shared with all the employees and the final closure report from the project. The lessons learned are stored in the LL tool. The PM once again leads this process.

The final closing report is issued and archived. End of project workshop must be carried out to present major RoE to other project teams who are working on similar projects.

4.4 Documenting RoE & LL

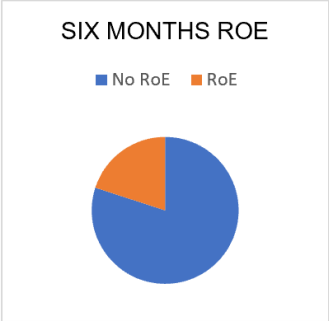
The MoM for RoE meetings is another useful document, and a template is defined. The MoM document needs to record the activities, the overall analysis,

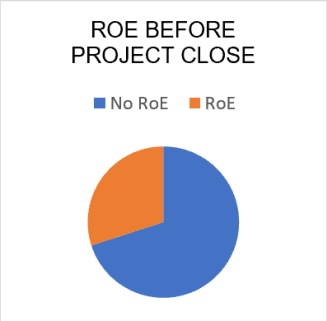
scope of the issue, relevant information to the sales and engineering teams and feedback from the customer. There is also the need to get a detailed view of the issue and to the effect, the Key factors affecting Cost, Delivery, Quality, Safety and Risks & Opportunities are taken down. Suggestions for improvement to each team – Sales, Engineering, Sourcing, Planning, Finance, Project Management, Safety, Quality etc, is also noted down in the document for RoE. Appendix 1 contains a template for a typical MoM document that is used in Project RoE meetings.

4.5 Performance Measurement

Ensure that the RoE Meetings and Lessons Learned are performed and shared in the correct tools at the right time.

RoE Meeting – Ensure that the meeting is performed within 2 weeks of the baseline date mentioned in the Project Planning tool. Based on available data form company documents, the following figure 9 depicts the number of times the different RoE meetings that have been held in 10 projects over the past years. Figure 10 shows the number of RoE meetings that were held within 2 weeks of the baseline date mentioned in the planning of the project.





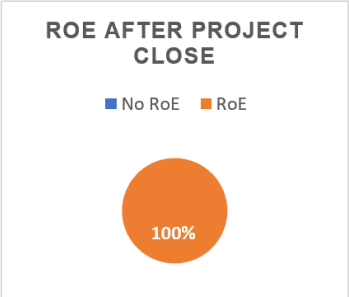


Figure 9 Percentage of RoE meetings (Company, 2022)

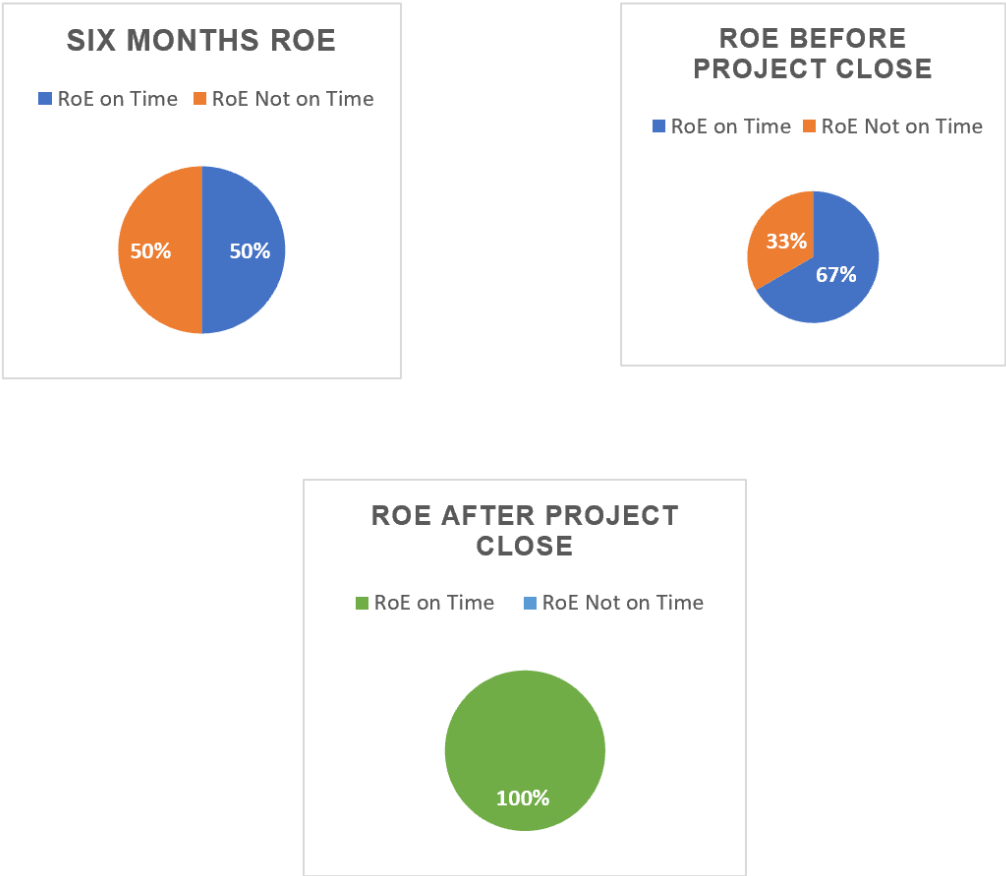


Figure 10 Percentage of RoE meetings held on time (Company, 2022)

Lessons Learned recording – Lessons Learned must be recorded and approved within a year. LL must be approved before it can be available to everyone. This is to ensure that the LL captured is a valid one and the issue captured as lesson warrants its existence. This is also a check to make sure that there are no duplicates as far as LL is concerned.

An examination of the LL tool suggested that while the lessons learned are being input in the tool, there are other tools that are used for the same purpose. This leads to the information being distributed across different tools, and not accessible throughout the organization to all employees.

The examination of the current process has granted a better view of the state of things as they stand in the company. The project execution RoE process, while being a crucial one, is still one that needs refinements and possibly even a new way of doing things. There are several areas for improvement – communication about lessons learned within the organization, gathering all relevant data in one common tool, making the process more accessible to everyone involved – are just a few of the findings from the current state analysis.

One of the other findings from the current process is that the R&D team's inputs are not being considered for the RoE. The R&D team works in tandem with the engineering and project teams and incorporating into the process would lead to more suggestions and improving the efficiency. A further finding was that attention should be given on making the RoE meetings accessible to more employees from all the teams. At present, the engineering team leaders are the key members from their teams, this should be expanded to include more team members as well as employees who are part of the leadership group within engineering but not team leaders.

5 DATA ANALYSIS

Apart from obtaining data from existing documentation and literature online, the data was collected from a set of questions to the employees who are directly involved in projects in different roles such as Design, Engineering, Commissioning etc. Another set of data was collected from employees in the upper management such as Project Managers, Technical Leads, Customer engineers, Sales & Bid Managers etc. This set of questions involved a free-flowing form of discussion based on certain questions, but the questions were set just to act as markers whenever the discussion got out of hand and into areas unrelated to this topic.

The answers to the questions, gave a good insight into the current state of the process of RoE in the company and highlighted issues that need to be addressed, the key ones being creating awareness of this process and the usage of a common tool to share/access the knowledge. Appendix 2 contains the roles and team to which some of the interviewees belong to. As a sample size, only 5 have been chosen to represent people from different teams. Appendices 3 & 4 contain responses from people involved in different stages of the project and again the sample size is limited to 5 each to represent most of the teams.

One more method of collecting data was of course using the documentation available and records/minutes of previously held RoE meetings of completed project. Although the documentation details the process and the steps involved, it still needs improvements in areas of access and awareness.

5.1 Data Analysis – Interview with people in the projects

From the data collected in interviews with the engineering level employees, the level of awareness about the process of RoE needs the utmost priority followed by a common tool or location to store and access lessons learned. There is currently a tool in place, but it remains largely unknown to the employees who are outside of the project management teams. Another area to be kept in mind is the planning and schedule. Following is a breakdown of the responses collected from the interviews, based on topics that assist in achieving the objectives of the study.

Awareness about the current process

Only 20% of the interviewed employees were aware of the process related to RoE despite having attended at least one RoE meeting in the past. This puts the onus on improving the communication within the company and spreading awareness about the process.

Attending RoE meetings

All the interview participants had attended at least one RoE meeting. The frequency of attending the meetings is not the same for all. Members of the R&D team were never involved in the meetings nor were the principal engineering leaders. The employees in engineering teams who were involved in a particular project would attend the final RoE of that project.

Suggestions on needed improvements

The common theme in the response to this question was that there needs to be access to everyone in the company. Currently the RoE focuses on the big issues and the smaller or less important ones are ignored and this needs to improve. There should be a way for documenting and sharing lessons learned from every individual from across the company.

Implementations in the new process

Using a project management tool to track project issues, one which can provide traceability from requirement to validation would enable documentation of the lessons learned. A commonly suggested tool was JIRA which is currently being used in the company to track project related technical issues and is mostly used by the engineering teams.

Most repeated issues

Planning and scheduling appear to be causing the most issues when it comes to projects. Poor planning leads to underestimating the schedules which in turn puts a lot of pressure on the resources. This also causes deviations in costs and disrupts the delivery timelines.

Issues causing the most negative impact

Poor resource planning which again ties into the previous topic about the scheduling and planning was once again the most common answer. There is a common thread of poor planning, which could be improved considering the lessons learned from previous projects were updated and checked to be available for everyone.

Learnings from previous projects

It is important to have a solid plan in place one which has a cover for operating in case of delays caused by schedules or resources. Another important thing to keep in mind is that the resources sent to the customer site need to be specialists and they need to be trained accordingly. At customer sites, resources are limited and thus it is important to keep the RoE and lessons learned updated. Another area to focus on is retaining key employees and not lose them to attrition.

Inputs to other teams concerning RoE

Using a common tool to make the lessons learned accessible and available easily for knowledge sharing. Prepare going to project commissioning sites by reading about the previous lessons learned and RoE details.

5.2 Data Analysis – Interview with people in management

Discussions with the upper management in the form of an open conversation guided by some questions acting as pointers, highlighted the key gap in access, sharing of knowledge, and lessons learned in the company. The area that requires attention is communication within the upper management. As a company-wide requirement, improvement in communication needs to be looked at and with immediacy. The discussions with the Project Managers proved to be highly valuable and gave a perspective that was quite different from the engineers. Following is a summary of the discussion with the project managers and upper management put together under topics that concern the RoE and lessons learned process.

Familiarity with the RoE Process

All interviewees in roles of project managers and above were aware of the process related to RoE in the company and were frequently involved in RoE meetings related to projects. The engineering managers were aware of RoE process but did not have much exposure in attending RoE meetings for projects.

Key takeaways from concluded projects

From the sales team, the main takeaways were looking at the factors that affected the execution of project both positively and negatively such as Scope of Work, execution methodology, milestones, site permits, division of work between various stakeholders including the customers.

The project and engineering managers had a more heads on approach by referring to lesson learned from previous projects, addressing schedules, and planning accordingly. Referring to technical issues such as unique requirements having occurred in a previous project or arranging for alternate ways of procurement in cases with long lead times should also be listed down as RoE.

Frequently repeated project issues

Poor planning and scheduling which in turn affects resources and budgets was the common answer from the management as well. This ties in with the earlier observation that the communication between different departments and stakeholders needs to be improved. There is a high need for respecting and sticking to the schedule.

Scheduling and preparing RoE meetings

The project managers in different teams are all aware of the key milestones of RoE meetings. However, not all the PMs hold these meetings always, due to various contributing factors. Each project has at least 2 of the suggested 3 meetings held, usually one at the beginning and one at the end. Each project undertaken by the company typically lasts anywhere between 2-4 years and in this time, a lot of different teams are working at each stage of the project, and this is one of the factors that influences the frequency and content of RoE meetings.

Project Managers are always on firefighting mode either because of resource issues or schedule related issues and there is always the focus on getting things done related to project delivery that little time is left to spend on RoE. One more factor is that as soon as one project is completed, the PM is assigned to another project and that gives little time to reflect completely on spending time for the RoE.

Engineering team managers on the other hand, hold bi-monthly meetings related to the software, hardware etc, based on the team and maintain the minutes and lessons learned which is accessible to the whole company but awareness again is the issue.

Suggestions for improvements

This was an interesting point to discuss with the participants as they had good suggestions, believe in this process and are eager for this to work because RoE and Lessons Learned are such an integral part of the projects. Consistency, Communication, and Common tools were the most given suggestions from the participants. Documenting the process in detail and updating the baseline documents is also a need of the hour.

Based on the data collected and analysed, there is an existing skeleton of the process for RoE which most of the company follows. However, there are many areas to flesh it out into a well-defined process that can be used an effective communication tool as well and not just an item in the checklist for activities that need to be completed after a project is delivered. Keeping these in mind the next section will go into how we can elevate the existing process to bring everyone to a common platform where knowledge can be shared and accessed easily.

6 AN IMPROVED ROE PROCESS

The lessons-learned process is expected to describe the experiences from successes and failures and embed them into the organisational core for use in future or even currently ongoing projects. The reality is that often these lessons are identified and captured but the problem arises in documentation and accessibility in future projects.

In the case of the Company under study, a major area of improvement is the tools used. The information and knowledge are right now scattered throughout the organization in different teams and different tools buried under organizational processes and access rights to tools. Simplifying the usage of tools or making the tools available and accessible to everyone is of importance.

It is to be noted that the company RoE process defines that everyone on the Project shall share relevant findings and lessons learned along with the project progress using the available tools so that it is shared with the business stakeholders as soon as available to the benefit of the full Project community. While this is required approach, the lessons learned right now is being shared only among the Project Management or higher up management and that too mostly only the “big” ones. Improving this to include lessons learned despite the size of effect on budget or schedule or resources would pave the way to avoiding similar issues in other projects and also act as a marker for things to keep an eye out for during project planning phase. Having the information accessible to everyone regardless of their involvement in the project will spread the knowledge to all departments and increase visibility.

The role of the Project Manager as process leader, is to initiate the discussion and commit all the necessary project team resources. The PM should act as the base for knowledge sharing regarding the project. It is crucial that the PM “Knows their audience” - Members at various levels of the company care about varying degrees of lessons learned. The PM must customize and tailor the reports based on the audience to whom it is being presented. The audience as such can be broadly classified as Management (Upper Management) and Team Members

(engineering teams and support teams). Management stakeholders would likely want to see the big picture view of the scope of a project. They will be interested in things like budget deviations and profit margins, long-term timelines and deadlines, and the project's alignment with other organizational goals. Team members would be interested in the day-to-day operations of a project. They should be given a detailed view of the individual deadlines, both missed and achieved, team effort, say/do ratio, and overall success of the project. In spite of this, there should be availability of and access to each RoE document for any member of the team.

The lessons learned and RoE process is to be treated as a Continuous Improvement process in the company and hence it can be constantly evolving and growing learning from previous hurdles and eliminating pressure points and easing bottlenecks. The CI cycle is used for process improvements as it never stops and there is always room for improvements from the PDCA cycle. Using Lean for process improvements means focusing on creating value for customers. Based on the data collected from the interviews and discussions, and the process documentation, it is areas of improvement have been recognized particularly in the documentation, availability, and accessibility of RoE between teams.

Shifting the spotlight on knowledge sharing, it is important to understand the difference between Data, Information & Knowledge. This is explained by Becerra-Fernandez and Sabherwal (2014)as follows:

- Data is raw facts and useless until it is organized. Data needs to be refined.
- Information is processed, organized, and structured data that needs to be communicated to be understood.
- Knowledge is information that someone can use for a specific purpose.

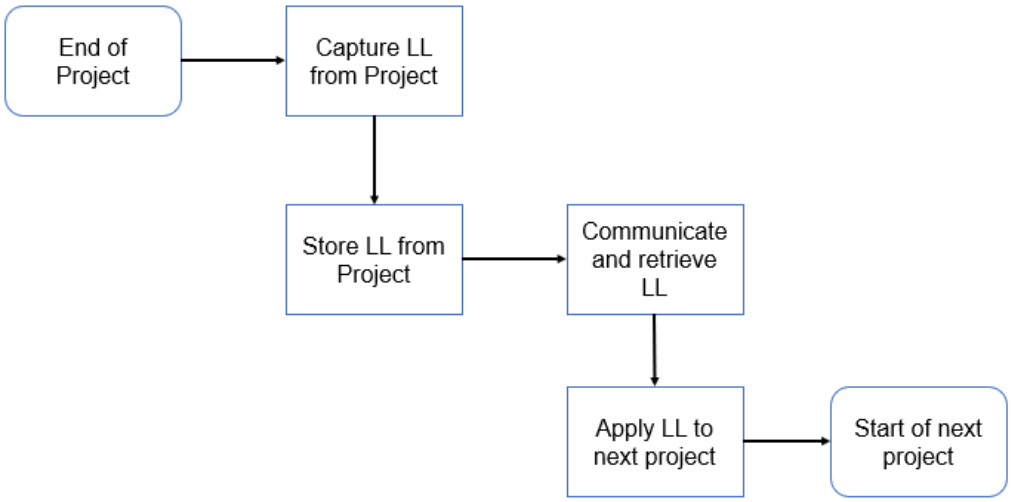


Figure 11 LL & Knowledge Management (Crawford, 2011)

Figure 11 depicts a typical flow of LL in any company and the gap in knowledge management arises when the project teams or project managers are different for each project, as is the case with many big organizations. There will be multiple projects underway at the same time and it is of high importance to keep the LL and RoE from each project on the same place.

Figure 12 shows the current process of RoE in the company from the Tender phase through the project execution phase. All teams are involved in the RoE only in the final stages after the project is delivered to the customer. Different teams prefer different tools and this an area the improvements focus on. Involving the different engineering teams along with the R&D team, combining the documentation in one common tool are among the changes to the new process. The information is distributed across the company in different platforms which makes access an issue. Setting up a new tool to gather the information would be incurring costs to the company in terms of licensing, training for employees and software costs. Using an existing tool for this purpose is ideal because employees already are trained in the existing tools and have knowledge of how to put it to good use.

Project Phase / Roles	Tender Phase RoE	6M RoE	PAC RoE	FAC RoE
Sales Specialist	Conduct RoE with Engineering team leaders and PM.			
Project Manager	Past Projects LL & RoE.	Conduct RoE with Project Team	Conduct RoE with Project Team	RoE with full company.
Engineering Team Leader	Past Projects LL & RoE.			Lessons learned from project
Project Team		RoE & LL from project after 6 months		RoE and lessons learned from project
Output Documents	RoE and LL in tool	LL recorded in LL Tool.	LL Tool. RoE in UNIFIER	LL in tool. RoE in UNIFIER

Figure 12 Current RoE process (Company, 2019)

Moving on to the tools used in the company with respect to RoE and collecting Lessons Learned, there is no coherence in the tools used between teams. Some teams use JIRA (the ticketing and tracking system), some use Confluence (which is like Wikipedia in terms of storing information), some use UNIFIER and some use the Salesforce LL tool. While the PM has the freedom to choose what tool they want to use, it creates a challenging situation for keeping of track of which information is available in which tool.

The reason for using different tools is perhaps due to the fact that each tool gives a different view of the project data. For example, the engineering team will not be interested in the Project Reviews and Project Planning team will not be interested in why a component is suddenly malfunctioning. However, it is all connected internally, and every team has an impact on the other. Thus, it is imperative that although different teams use the tools, they are comfortable or familiar with, it is the duty of the team leads to make sure an overview of the RoE from each of the

teams is maintained regularly and this should be done in a common tool for which everyone has access, such as Confluence.

Tools such as UNIFIER and P6, while addressing specific needs, are not particularly used by everyone involved in the project. In fact, they are mostly used to give higher management a big picture view of things and is not accessible or provides relevant information for people who are below the Project Manager level. This is because it is not in their area of expertise, or it doesn't prove to be of use to them. Engineering teams while concentrating on the technical issues and focusing on the day-to-day activities, see JIRA as the tool for recording day-to-day activities and comments.

The new process will focus on making documents from all teams being more accessible to everyone in the company while making the process more accessible to all and using more common tools to share the required information. The process now considers the inputs from R&D team as well, especially for engineering related issues because R&D team is involved almost throughout the engineering projects. Representation from R&D will prove to be vital and often give a new perspective to the issues and RoE. The improvements/additions in the process are shown within the green arrows in the figure.

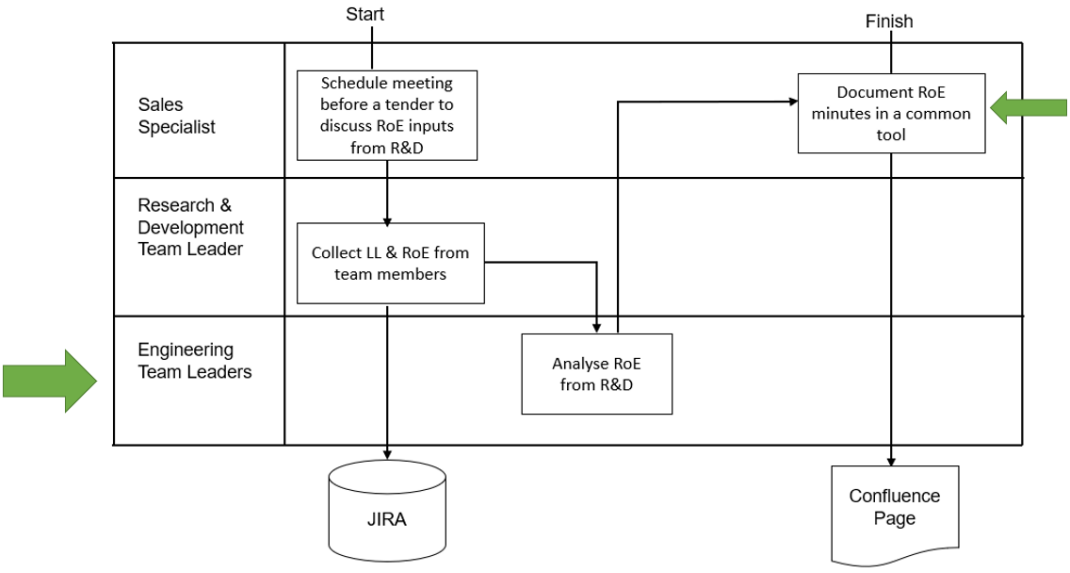


Figure 13 New process Tender stage

The new process adds one RoE meeting for the engineering teams. The team leaders will hold a RoE/LL meeting, once per quarter and discuss the lessons learned and RoE from the technical side, related to projects and otherwise. The team leaders will make an update of this to the other team leads, PMs and upper management. This document will serve as a guideline for issues and good practices that need to be followed in the future in tender phase as well as project execution phase. The process leader for this step would be the team lead, and a document in Confluence shall be updated with latest RoE and LL. Since the process is a new process, the whole figure describing the process is in green to differentiate it from the old process or additions to the existing one.

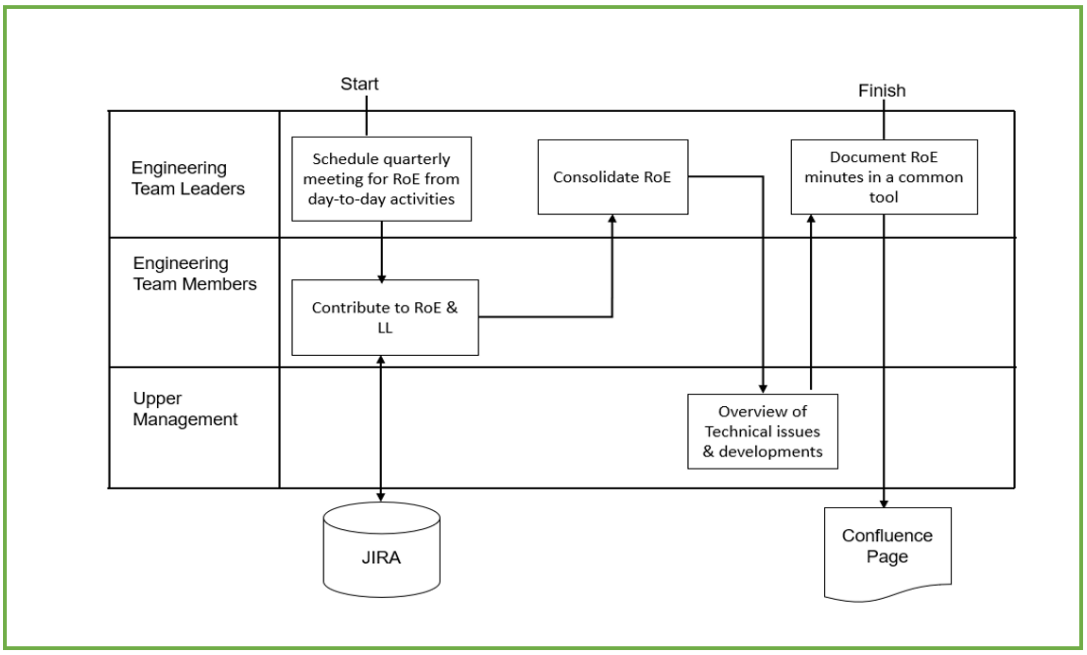


Figure 14 Engineering Team RoE

At the tender stage RoE, there should be more involvement from the engineering teams, and this is something the new process will handle. The involvement of a PM will add value at this stage to ensure that the proposal made to the customer has a well-defined scope of the work, how the work will be divided and who is responsible for which part etc. Earlier planning of project activities leads to earlier detection of risks and thus earlier involvement of all possible stakeholders. The

RoE document at the end of the tender phase should also be stored in Confluence which is accessible for all in the company. This will be undertaken by the Sales specialist who oversees the proposal.

A new process feature is the addition of a RoE meeting at the beginning of the project live phase, after the tender phase RoE has been completed. This RoE will be conducted by the PM of the project, with all team leads and project resources. It will focus on the engineering works related to the project and discuss about RoE and LL from previous projects, engineering-based and technical. The RoE document will be stored in Confluence and made available for all in the company. Since the process is a new process, the whole figure describing the process is in green to differentiate it from the old process or additions to the existing one.

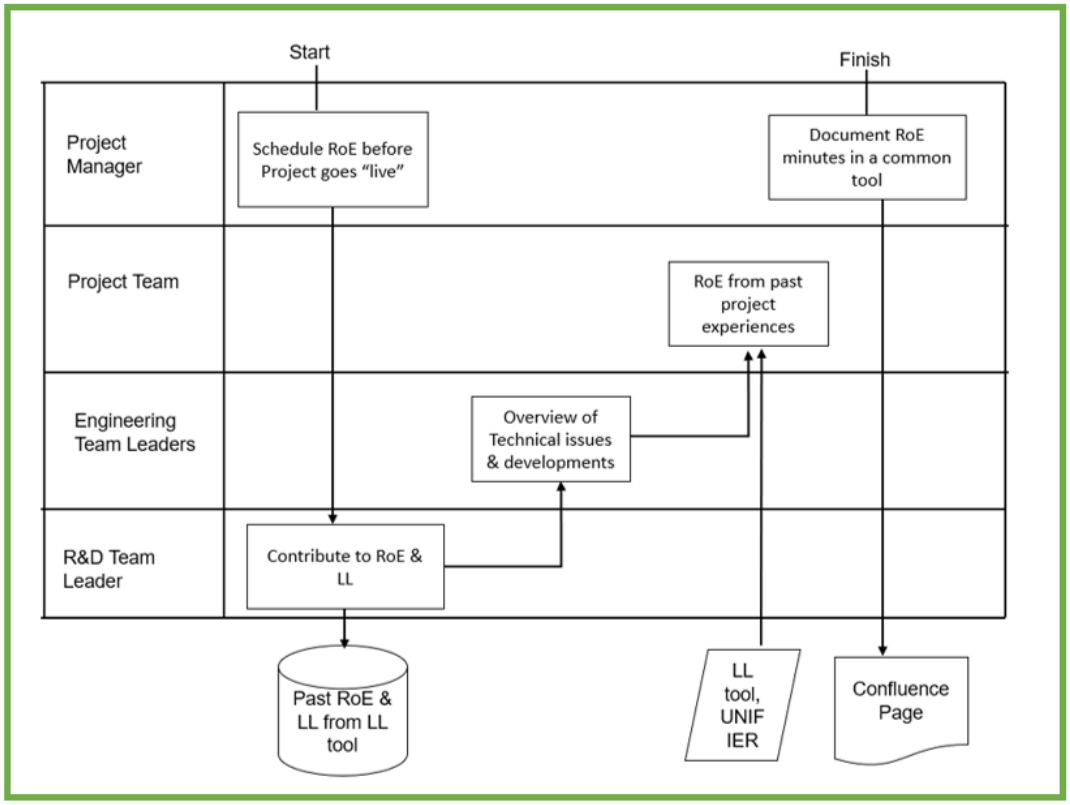


Figure 15 RoE before Live phase

One important factor to consider is that the company is involved in projects of long duration,2-5-year long projects and that is the nature of the industry and work that is being done. With this in mind, it is essential that the team always stays relevant and up to date with the industry. There is also the possibility that

people might move into new roles, get promoted and not be involved in the project anymore, but they still need to be involved in the RoE meetings.

Figure 16 provides an overview of the different roles involved at different stages of the project and their functions with respect to RoE and lessons learned. The green arrows and green boxes indicate the new process and improvements.

Project Phase / Roles	Pre-Tender Phase RoE	Tender Phase RoE	Pre-Live RoE	6M RoE	PAC RoE	FAC RoE
Sales Specialist	Conduct RoE & LL meetings with R&D team	Conduct RoE with Engineering team leaders and PM.				
Project Manager		Past Projects LL & RoE.	Conduct RoE with Project Team	Conduct RoE with Project Team	Conduct RoE with Project Team	RoE with full company.
Engineering Team Leader	Analyse the LL from R&D team.	Past Projects LL & RoE.				Lessons learned from project
R&D Team Leader	Collect LL from team members.					Lessons learned from project
Project Team			Past Projects LL & RoE.	RoE & LL from project after 6 months		RoE and lessons learned from project
Output Documents	Page in Confluence. JIRA Tickets to track issues	LL Tool. Page in Confluence for minutes of meeting	Page in Confluence for minutes of meeting	Page in Confluence for minutes of meeting	Page in Confluence for minutes of meeting	Page in Confluence for minutes of meeting. LL tool to be used by project team to include all LL

Figure 16 New RoE process in different Project Phases

Having all the lessons learned input to the LL tool. The new process stores the documentation of minutes of meeting and key points updated in Confluence, To make searching for previous lessons learned, it has to be stored in a database which can provide for functionalities such as searching for the lessons with key-words. The LL tool has this feature which can be exploited for this purpose. Access is available to all employees to the LL tool; it needs to be communicated to all in the company effectively and a workshop be held for using the tool to get the best out of the LL tool. The onus is on the PM to organize the reviews and keep the documents updated. It should also be communicated that everyone in the company can contribute to the LL tool and the respective changes be approved by the team leaders.

Implementing a new process is a continuous process and with the LEAN nature of work, there should be a cycle of continuous improvement. Feedback should be collected at each step from the right customers of the process and fed back to the improve the inputs and thus the process itself.

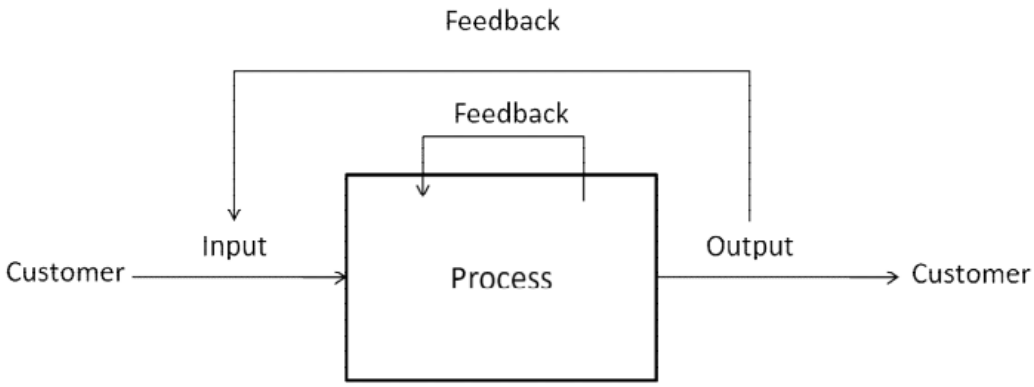


Figure 17 Feedback as part of CI (Martinsuo & Blomqvist, 2010)

Introducing the new process could mean changing/improving the competences of the people involved in the process and adapting accordingly. This can be carried out by giving training, spreading information about the change, process guidelines for each stakeholder and so on. Process launch must be planned and scheduled in advance and if the change is huge, it can even be piloted. (Martinsuo & Blomqvist, 2010.)

Defining a new process and suggesting improvements, alone does not guarantee that a process will succeed. Everyone in the organization must commit to the process and be onboard for the new process to succeed. The company already has Lean principles incorporated in their culture and using the new process to drive the changes. Kaizen is a lean philosophy that is focussed on improving processes by making incremental changes to improve operations, standardize the workflow and increase employee involvement. The PDCA cycle described earlier ties in perfectly with the Kaizen principles and it increases productivity, improves process efficiency. To successfully implement this, there should be a clearly defined roadmap, focus on process developments and ensuring employee commitment.

Launching a new process does not stop with coming up with an idea for the process and visualising it. There must be a plan in place for executing the process and launching it in a way that the change is accepted throughout the company and succeeds. Implementing change is not an easy process and there are several models that can be used by companies such as Lewin's model, Kotter's eight-step model, Cycle of change by Cameron Change Consultancy and many more.

How to launch a new process is one of the research sub-questions and plays an important role in implementing the change. To ensure that the employees are supportive of the changes and improvements, there needs to be a clear and efficient implementation process in place. Implementing a new process is done over a series of steps – Define the objectives clearly, Ask for feedback from employees, Allocate necessary resources, Communicate the implementation process, Identify ownership, Test the improvements, and modify continuously. Following the launch, it is vital to keep the new process information, its deliverables, and the outputs in constant communication to the employees so that they are enthusiastic and supportive of the process.

Preparing for the rollout of the new process, the company needs to make certain that preparation is done well in advance, for company-wide implementation. One way to make sure that happens is to communicate to everyone about the upcoming changes and not just the management. At the end of the day every single employee is going to be impacted by the changes and the new process, Before implementation, there should be an effective plan in place to put the process in use. Having a training plan also helps the employees in gaining a better understanding the process. Use feedback from employees to inform and improve the process and highlight the importance of change.

This study had a specific objective and outcome to improve the RoE process in the case company. The study provides recommendations to the company that should help with improving the process and solving some of the challenges in the company.

7 CONCLUSION & RECOMMENDATIONS

The objective of the thesis was to examine the existing process for return of experience and propose amendments to it and model a new process to establish return of experience process. The main research question of the thesis was - How to model and incorporate a process for Return of Experience for organization wide distribution? Keeping in mind the main research question, the existing process was studied in detail, areas for improvement identified, and new process identified. The current process of RoE was studied, analysed and data was collected by interviewing people who are involved in projects, in upper management and team leaders.

To help achieving the answer for the main research question, the theory of Process, process reengineering and business process management were studied. Lean methods and implementation were explored as the company is following a Lean philosophy. Interview questions were framed based on the theory studied, the current state of the process and standard research methods.

The main research question was divided into sub-questions to ease the implementation of the study. The first sub-question – What is the existing process in place for return of experience? This was answered by studying the current state of the process in the company by going over the internal company documentation. The second research question relates to identifying bottlenecks and improving them. Bottlenecks such as improper planning, distributed documentation and unclear tools were identified from the current state analysis.

The next sub-questions relate to a new process and identifying the stakeholders, and getting the employees committed to the process. This is answered by the new process that was devised, based on the existing one. Key stakeholders such as engineering team leaders, PMs, R&D team leaders were identified. While launching a new process, ensure that the communication is handled across the company to all teams, collect feedback, prepare the employees for the changes – arrange for trainings if required, and finally continuously improve.

Another important area of improvement was using a common tool to bring the information that is scattered around in various tools. Using Confluence to keep a list of all the RoE meetings and key issues was suggested by the author in addition to using the LL tool for storing all lessons learned which provides for faster access to information by searching for keywords (projects, issues, etc). The company needs to raise awareness among the employees about the tool and maybe even hold trainings and workshops.

The new process also places emphasis on getting inputs from the R&D team whose involvement in the projects in relation to RoE goes under the radar. The new process considers the company's alignment with Lean methods and Continuous Improvement and thus be open for feedback and incorporate the feedback from the right customers (both internal and external).

Lessons learned and Return of Experience serve a larger purpose than just being something that is recorded at the end of the project to complete the project. Launching a new process should be handled efficiently and is not to be taken lightly. While launching a new process, ensure that the communication is handled across the company to all teams, collect feedback, prepare the employees for the changes – arrange for trainings if required, and finally continuously improve.

As is the nature of research, the work is constrained by some limitations. The interviews conducted in the thesis contributed to the data analysis and the results are based on different individual perspectives and experiences. Since each project takes anywhere between 2-5 years to complete in the company, there are times when recording all relevant data is missed.

The new process incorporates more work for the PM however it eases the overall process flow because there is now a way for the PM to keep track of RoE throughout the project tenure and not just as a milestone. Constant RoE in engineering teams also keeps everyone in the company updated with latest developments.

Thinking about the future, the Return of Experience should be made part of the organization's DNA and integration of RoE with all steps of project execution and

delivery would be helpful in keeping track of the project. Another improvement area can be using one tool to record schedules, deviations, plans, and lessons learned thereby eliminating the need for different tools and different access issues. There are many things to be learnt from past projects, which can be used to drive the current and future processes and the way things are done in the company.

For future research, it is recommended to have a look at implementing a knowledge management framework and maintaining the knowledge base updated across the company.

The thesis was compiled ethically, following ethical viewpoints while dealing with company documents, while interviewing employees and data confidentiality was maintained. The employees' names aren't mentioned and the answers they gave were paraphrased to reflect the key points. The right to privacy of the employees was preserved.

For an organization to stay competitive, it has to take time to learn what it does right and what goes wrong in its execution. The positives help in maintaining the level of work that is appreciated by the customers and the negatives help in re-examining the priorities and ensure that the company is going on the right path. In accordance with this, processes must evolve, and organizations should always look for areas of improvement. Lessons learned provide an opportunity to improve and commit best practices discovered during the process. The outcome of the thesis provides recommendations on how improvements can be made in the RoE process of the company.

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APPENDICES

Appendix 1. MoM Document Template

Project Return of Experience (RoE) Minutes of Meeting (MoM)

Project Name: Date:

Project Phase: List of Attendees:

Activity	Comments
Overall Analysis	
Summary of Project	
Summary of achievements & deviations	
Feedback about customer	
Detailed Analysis (Key factors that affected)	
Cost	
Delivery	
Quality	
Safety	
Opportunity	
Suggestions for Improvements	
Tendering	
Engineering	
Sourcing	
Planning	
Finance	
Safety	
Project Management	
Others	

Appendix 2. Information about Interviewee demographics

Interviewee names have been left out for confidentiality and their answers have been paraphrased to highlight the key points.

For the Level 1 questions, interview was conducted with 15 people from various departments such as engineering (Software, Hardware, Deign), Commissioning, R&D, etc. To give a representation across all teams, I have listed 5 interviewees and their positions and the answers they gave have been presented in the next Appendix.

Interviewee	Role	Department/Team	Date of Interview
A	Lead Engineer	Software	27 Oct 2022
B	Lead Design Engineer	Design	28 Oct 2022
C	Commissioning Engineer	Project Management	09 Nov 2022
D	Automation Engineer	Hardware	31 Oct 2022
E	R&D Engineer	Research & Development	26 Oct 2022

For Level 2 questions, interview was conducted with 10 people from upper management across teams, engineering team leaders, project managers. Appendix 4 has the answers of 5 of these chosen as representing the diverse teams.

Interviewee	Role	Department/Team	Date of Interview
A	Bid Manager	Sales Team	27 Oct 2022
B	Lead Manager	Project management	28 Oct 2022
C	Lead Project Manager	Project Management	03 Nov 2022
D	Team Leader	Engineering	08 Nov 2022
E	Senior Lead Project Engineer	Technology	10 Nov 2022

Appendix 3. Level 1 Questions asked to people in the project

Question	A	B	C	D	E
Are you aware of the current process about RoE?	No	Yes	Yes	No	No
How often do you attend RoE meetings?	Scarcely	Just one	Project specific	None	Scarcely
What do you think can be improved in the current state of recording and documenting RoE across the organization?	Highlighting the critical information.	All lessons learned should be documented no matter big or small.	Common document storage.	Usage of Confluence to store data rather than email chains.	Access to relevant information and tools
What are some improvements/implementations you would like to see in the new process?	Exposure is required to correct documents.	Using a common tool to track project wide issues.	More meetings relevant to project status.	Information is distributed across tools. It should be brought under one place.	Common tool usage.
What are the most repeated issues or problems that you or your team has faced while executing a project (Resources, Planning, Schedule, etc)? Do you face the same problem in different projects?	Poor workload estimation.	Poor planning.	Poor documentation of procedures related to Software.	Lack of resources.	Some customer requirements were overlooked.
What are the issues that caused the biggest negative impact to the project in terms of resources, schedule, etc?	Overpromising in terms of schedule and resources.	Poor estimation of deliverables.	Lack of specialist resources at project sites.	Lack of understanding and communication with customers.	Underestimating schedule deliverables.
Do you have any inputs to other teams that are involved in the project in terms of RoE?	Promote use of a single tool.	Common document repository.	Go through RoE from past.	No issue is too small to be noted for RoE.	Resource planning needs to improve.

Appendix 4. Level 2 Questions asked to management

Question	A	B	C	D	E
Are you familiar with the RoE process in place in the company?	Yes. It's very helpful when engaging with similar projects.	Yes	Yes	Yes	Don't use the official RoE process but aware of the concept and use it.
What are the key takeaways from previous projects that you consider while planning for new projects?	Division of Work between different stakeholders	Consult previous tenders of similar projects in the region.	Scheduling and costs	Operational and design related improvement.	Take note of the key technical difficulties that were faced in earlier projects.
What are the usual suspects that you look for when a project does not go according to plan – budget wise, resource wise or schedule wise?	Important to have clauses in the contract to allow for time/cost compensation.	Schedule needs to be shown more respect.	Equipment and material budgets.	Resource planning.	Focus on delivering exactly what was promised to the customer.
How often do you schedule or prepare RoE meetings?	Part of every project bid that is submitted.	For every project, 3 RoEs.	Usually at the end of each project. Sometimes 6M and PAC RoE.	After end of each project for sure.	For every project at least once.
What are some points that need to be addressed when improving the current process?	Tender phase RoE should include project managers and engineering leaders too.	Consistency in documenting and communicating.	Common template for all team. One common tool.	Focus more on creating awareness about RoE.	Ease on workload has to enable new learning.