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Developing an Operating Model in Managed Service

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After this thesis research adventure, writing this part is highly gratifying. The journey to complete the master's degree Programme was delightful and exciting, which equipped me with industrial management expertise and the ability to apply it to business challenges.

This journey wouldn't be successful without the humble persons around me. First, I would like to thank my instructor and department manager from the case engineering company, who guided me along this journey by providing the tools, equipment, participants for interviews and documents needed to complete this thesis report. I want to thank all the participants who took part during the interviews and provided their ideas and views from the case engineering company.

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This thesis focuses on developing an operating model in a managed service for the case engineering company. The case engineering company wants to bring back its consultants from the customer premises to its premises. The case company has a challenge in managing the resources and executing the service package project.

The research methodology for this thesis is qualitative research, design research. The design research was conducted in four-stage. First: current state analysis by interviewing the key stakeholders, second: a conceptual framework from the existing relevant literature research, third: developing an initial proposal from the current state analysis, conceptual framework and interviewing key stakeholders and fourth validating the initial proposal.

The initial proposal of an operating model was presented for validation. The final operating model was produced through a validation process, which describes the participant's position, roles and responsibilities to execute the tasks in logical process order.

This thesis's final proposed operating model will offer the participants a guideline from initiation to execution of the service package, resource management at a general level. The outcome will influence the case company's working culture and provides an additional tool to the case engineering company.

Keywords	Operating model, resource management

Contents

1 Introduction

Today, almost every market is global, and every global company wants to expand its business. In manufacturing industries, companies are focusing their resources on researching and developing the product to be competitive. Therefore, they lack support in some business areas. Many companies are in a shortage of funds and resources, and to reduce the cost, outsourcing a fragment of the project or whole project to engineering consultancy has become common. An engineering consultancy company that has identified the manufacturing industry's need strives to fill the gap by supplying resources. An engineering consultancy company wants to expand its business areas by assisting and providing different engineering services to manufacturing companies.

The case company is an engineering consultancy company that wants to remain a competitive leader in the market and wants to reach its annual growth target, which is ambitious. The company has identified a high potential growth from its business strategy in a new market segment to achieve its business goal. It has realised that it has difficulties in its latest market segment, which needs to be dealt with urgently. The tool and instrument are required for the operating model to determine the new market segment's obstacle, which is very challenging. The customer needs to be satisfied with every aspect, including financially, productively and proving its proficiency and competent efficiency in its resources.

The case company has identified it does not have an operating model. Department managers, sales managers and other key stakeholders are relying on a personal relationship to get projects. The current working process needs to be developed for gearing organic growth to meet the business target and business challenges. The goal of the model to be developed in this thesis is to improve the competitiveness and free up manufacturing company resources to utilise their time and energy on strategically important functions effectively and efficiently, which creates competitive advantages to both the case company and customers.

The primary objective of this thesis is to build an operating model in managed services. In managed service, the customer buys the results of the project rather than resources. This project's report would be focusing on offering the service solution by exploring the case company resources and apparatus to the manufacturing industry, which is a win-win approach for both customer and the case engineering company.

1.1 Business Context

Finnish engineers identified the demand of the manufacturing industry, which needed expert engineers a few decades ago. Today, the case company is a Finland based market leader, employing talented engineers and specialists worldwide. It is a progressive global engineering consulting company that supplies its expert engineering resources for technology industries. Therefore, most of the customers are global machinery and equipment manufacturing industry. The case company's services and products range from supplying engineering personnel, software products, and technology products to complete the customer project's solution. The case company provides individual expert personnel or personnel in a team for its customer's task while the complete solution delivers its project.

The case company is widening its business areas, and its resources are becoming expert in the business area of manufacturing industries. It has an ambitious strategy whereby it wants to create customer value together with the customer. The case company wants to sense the customer pain by applying its expertise competence to unlock the dilemma of a customer project and to nourish competitive customer business. Instead of supplying resources, service solution is a crucial element that associates various technologies, high-tech engineering apparatuses and techniques, and versatile, resourceful expertise to solve its complications. It also wants to boost customer value. The case company has much knowledge, expertise and world-class equipment, but it doesn't have appropriate media to associate with the customer to exploit its resources. The case company is also unaware of customer demand, and thus, it needs to bond strongly with the customer to identify and retrieve the customer need. Then, it can propose its service solution to customers.

1.2 Business Challenge, Objective and Outcome

The case engineering company supplies its resources to its customer, which does not generate more significant revenue to reach the annual growth target. The case engineering company resources work for its customer on an hourly basis in the customer premises. When the case engineering company employee is at customer premises, the case engineering company manager is not responsible for its result. The customer exploits the resources competence as much as they need under their supervision. If the customer ends its contract with the case engineering company, the resources return to the case

engineering company premises without a task. The case engineering company wants to divert its business and operating environment into managed services to challenge this situation. The managed service means the results are delivered under the responsibility of the case engineering company. In the managed service, the employee executes daily tasks at their home premises, and at the same time, managers can supervise their employee. The case engineering company has implemented the managed services strategy, but it wants to increase its market share because there is a higher potential to generate its targeted revenue.

This study proposes an operating model enabling remotely managed service delivery with those mentioned above in an account. The outcome is the operating model.

1.3 Thesis Outline

There are seven sections, which are the main structure of this thesis report. Section 1 introduces the case engineering company. This part further elaborates the business context, business challenge, objective and outcome. Section 2 consists of a project plan that describes the research design research approach consisting of a flowchart of the project steps and executing a data plan. Section 3 illustrates the analysis of the current operating model in the resource supplying business of the case engineering company. This section elaborates on the overview of the data stage, detailed description of the current operating model, analysis of workforce management related challenges in the current operating model. Section 4 describes the best practice of building a remote service delivery operating model found in the existing knowledge or relevant literature that conceptualises the framework of the possible operating model for the case engineering company. Section 5 describes the proposal for the developed operating model, which enables remote delivery of managed services. It further describes the developed main module based on the case engineering company's collected data and conceptual framework from existing knowledge. Section 6 reports the key stakeholders' feedback for the proposed operating model and its validation with improvements. Finally, section 7 summarises the thesis report, evaluating project trustworthiness and validation with the recommendation for implementing the new operating model project.

2 Project Plan

This section discusses the research methodology, research design, and data collection strategy.

2.1 Research Approach

The research principle is to research and discover new things, whether to improve scientific research theory through articles and literature or to solve an industry's urgent issue. A report needs to assemble evidence and explanations of the data collection methods. Systemically, collecting evidence, compiling data from the relevant sources and systematically interpreting it with a clear purpose. The data can be collected applying two ways, through basic research or applied research. Basic research debates on existing scientific theory knowledge to develop the new result. Implementing the outcome is less prioritised as the findings have narrow scope while applied research methods solve the immediate challenge and complication; the result is prioritised to implement practically. (Saunders M. 2009).

Research methods can be further elaborated into quantitative and qualitative research. Quantitative research methods are broadly conducted in a massive numerical structure. The outcome of the research, i.e. the effectiveness and trustworthiness, are tested through statistical metrics. On the other hand, qualitative research methods are applied to understand and spot an organisation's subjective dilemma. This method dives beneath to analyse the case and reveals the present position rather than just providing theoretical proof. (Harindran A., Chandra V. 2017). According to Kananen (2017), Individual data collection methods or a hybrid of quantitative and qualitative data collection methods (i.e. mixed methodology) are applied to export the output in applied research methods. Kananen further argues, the applied research method can be approached in two different methods, i.e. (i) case study and (ii) applied action research. The applied action research method has the fundamental principle that cannot be eliminated, i.e. identifying and determining an organisation's current issues, collecting data and validating from the stakeholders, and implementing the report's findings. (Kananen, 2017:20-25).

The case engineering company in this thesis has a challenge in its operating system. There is an urgent need to improve the existing model further or develop an alternative operating model. This report aims to identify the challenge in the operating model and

propose the solution. After finding the solution, the report is presented to the case engineering company's key stakeholders for validation and implementation. Thus, applied action research based on the qualitative data collection method suited best and was chosen as the methodology for this thesis. The following sub-section shows the design structure of this thesis.

2.2 Research Design

The research design structure reports the methods of collecting data as input and serving the result as output. The study is conducted in five different stages: objective, current state analysis, conceptual framework, proposing a developed operating model, feedback and validation of proposal.

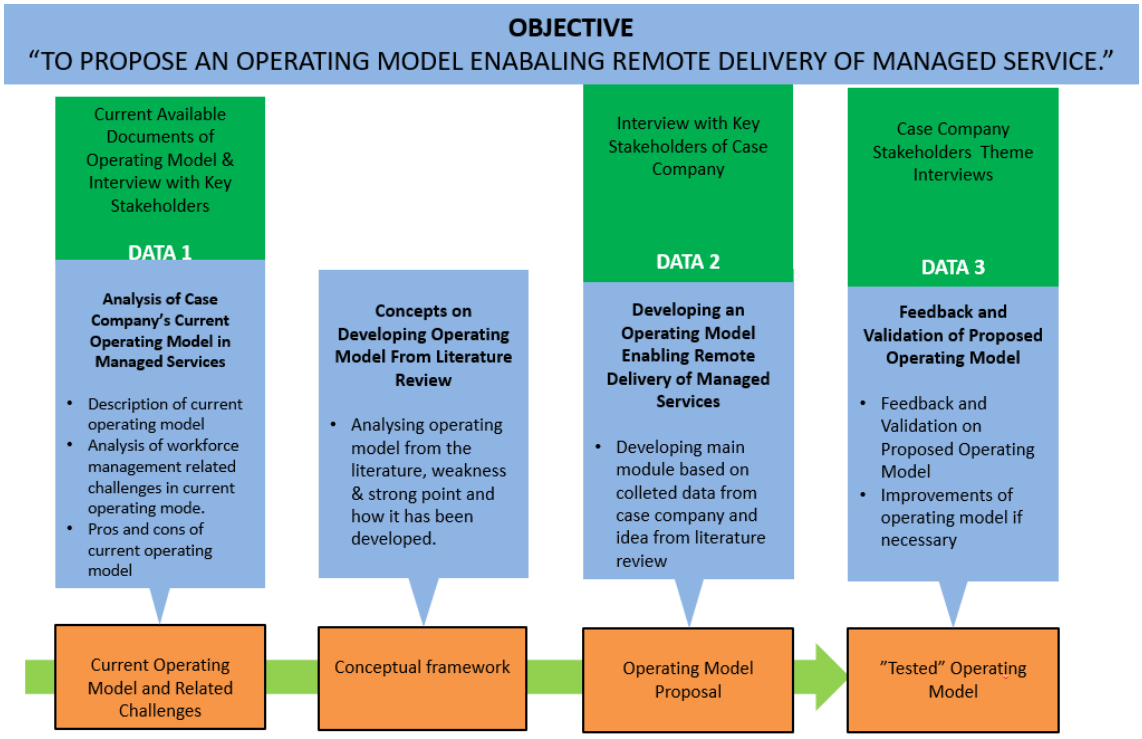

Figure 1. Research Design

Figure 1 illustrates the project's progressive report in five different stages: the data collection method and its progressive outcome.

In the first stage, the case engineering company's current issue is identified, which is this report's objective. The key issue was proposed to the Department Manager of the case engineering company. Department Manager further discussed this with the director of

the department and other key stakeholders. Therefore, the objective was approved as an urgent key issue that needs to be addressed instantly.

The second stage is current state analysis. It examines the existing knowledge of key stakeholders and the current operating model in managed services. The research is mainly focused on the ongoing practice and function of the operating model in managed services. The analysis aims to explore the pros and cons of the existing operating model's function, valuable data for the fourth stage, "developing an operating model ".

The third stage reviews the best practice of the relevant scientific researched articles, works of literature, Industrial journals, and business operation-related written resources. The purpose is to find out the way of practising its operating model in the business organisation. It will build the idea and conceptual framework of the operating model and outputs the essential data, which will be the foundation for the fourth stage to build "an operating mode".

The raw data are collected from the case engineering company's current operating method and scientific literature, articles, books, and other relevant sources in the fourth stage. The conceptual framework from theory builds a strong foundation on the best practice of the operating model. Simultaneously, the case engineering company's current analysis stands and rebuilds the foundation of the conceptual framework to formulate and introduce an infantry "operating model".

Stage five is "testing operating model". The initial proposal of the developed operating model from the fourth stage is presented to the key stakeholders. The key stakeholders are the director of the Department and the Department Manager. Feedback is collected and inserted to stage four to produce a delicate and precise operating model qualified for the case engineering company's validation and implementation.

2.3 Data Collection and Analysis

The data collection process is divided into three steps. The first set of data is compiled during the current state analysis, the second set is compiled during the first stage of the proposed model, and the third set of data is collected from feedback from key stakeholders.

Table 1. Data collection plan

DATA PLAN					
	CONTENT	SOURCE	INFORMANT	TIMING	OUTCOME
DATA 1 Analysis of Case Company Current Operating Model in Managed Services	- Description of Current Operating Business Model - Pros and Cons of Current Operating Model	- Case Company Current Operating Model from Available Documents - Interview with Key Account Stakeholders	- Director, Engineering Service Development - 3 Department Manager - SVP, Global Sales - Director, Service Solution	JANUARY	– Operating Model and Related Challenges
DATA 2 Developing an Operating Model Enabling Remote Delivery of Managed Services	- Developing an Operating Model Module by Module	- Stakeholder 1 to 1 theme interviews	- Key Department Manager - Key Account Supervisor	MARCH	- New Developed Operating Model
DATA 3 Stakeholders Feedback on Proposed Operating Model	- Feedback from the Keys Stakeholders - Improvement on Developed and Proposed Operating Model	- Key Account Stakeholders 1 to 1 theme Interviews	- Director of Department - Key Account Department Manager	APRIL	- Validation on Developed Operating Model

Table 1 shows the details of data collection and the position of an informant in the case organisation. Data 1 is extracted from the face-to-face interviews and the case engineering company's internal documents. Table 2 below illustrates the detailed data collection methods for the documentation and time duration.

Table 2. Details of interviews and discussions in Data1-3

	Participants / role	**Data type**	**Topic, description**	**Date, length**	**Documented as**
	Data 1, for the Current state analysis (Section 3)				
1	Respondent 1: Department Manager	Face to face Interview	Understanding Current Operating Model	21st Jan 2020, 1.23 hours	Field notes and recording
2	Respondent 2: Department Manager	Face to face Interview	Understanding Current Operating Model	28th Jan 2020, 60min	Field notes and recording
3	Respondent 3: Department Manager	Face-to-face Interview	Understanding Current Operating Model	28th Jan 2020, 60min	Field notes and recording
4	Respondent 4:	Face-to-face Interview	Understanding Current Operating Model on Managed Services	29th Jan 2020, 60min	Field notes and recording

	Director, Engineering Service Development				
5	Respondent 5: SVP, Global Sales	Face-to-face Interview	Understanding Current Operating Model on Managed Services	22nd Jan 2020, 55min	Field notes and recording
6	Respondent 6: Director, Service Solution	Teams Meeting	Understanding Current Operating Model on Managed Services	19th Jan 2020, 61min	Field notes and recording
	Data 2, for Proposal building				
7	Participant 7: Department Manager	Teams Meeting	Proposal building	20th April 2021 1 hr	Field notes
8	Participant 8: Department Manager	Teams meeting	Proposal building	23rd April 2021 1hr	Field notes
9	Participant 9: Department Manager	Teams meeting	Proposal building	28th April 2021 1hr	Field notes
	Data 3, from Validation				
10	Participant 9: Director of the regional department	Teams meeting	Validation, evaluation of the Proposal	6th May 2021 1hr	Field notes and recording
11	Participant10: Department Manager	Teams meeting	Validation, evaluation of the Proposal	6th May 2021 1hr	Field notes and recording

Qualitative data for this thesis project were collected in three distinct rounds, as indicated in Table 2. Data 1 was collected in the first phase to conduct a current state analysis of the supplier. The data was collected through face-to-face meetings, online meeting in teams, and existing operating process document in the supplier intranet SharePoint. Some of the interviewed stakeholders are directly involved in their daily task, and some in developing the key process. The purpose is to gather the information and key elements transacted to execute the current operating model.

Data 2 was collected during the proposal's initial development period. The first proposal was developed from the current state analysis Data 1 and the existing literature review presented to the key stakeholder through team meetings. During the teams meeting, the feedback from the informant was taken into consideration to develop a furthermore practical level of an operating model. In the second step, furthermore, a teams meeting was conducted to co-create the fine practical level of the initial proposal.

After collecting Data 2, the initial proposal for the operating model was built. The proposal was presented to the regional director and department manager to collect Data 3, who has a broad knowledge of the department operation. During Data 3, a teams meeting was held to present the initial proposal to get feedback and validation on the initial proposal.

Other than face to face interview and online meeting, Data 1 were analysed using thematic analysis from the available confined documents. The listed documents in the Table 3 were the determined documents analysed for the current state analysis extracted from the internal document database.

Table 3. Internal documents used in the current state analysis, Data 1

	Name of the document	**Number of pages/other content**	**Description**
A	Key Account Management Process Description	17 pages	How we work, process description
B	Key Account Management Process Description	6 Slides	Key activities with key customer
C	Outsourcing Process	21 pages	Process Description

As seen from Table 3, this study also analysed several internal documents. The primary documents included key account management process description and outsourcing process. The records were analysed for the current state analysis, Data collection 1, to gather the current operating model information, identifying its critical methodology.

The operating model's current state's collected data is analysed in the next step, exploring the current key operating process.

3 Current State Analysis

This section outlines the collected data and findings from the interviews and internal confined documents. This section aims to describe the data collection methodology, key stakeholder participants' views, and their responsibilities to outperform the current operating process and explore the key stakeholders' interaction during daily work.

3.1 Overview of the Current State Analysis Stage

Three phases were used to undertake the present situation study. The first phase involved conducting interviews with important stakeholders. The selected key stakeholder was the case engineering company participants based on their roles to ensure that the investigation has a purpose with this report's objective. The study was carried in the process of recruitment, resourcing and sales areas of the company. The five participants were interviewed face to face, while one Interview was conducted in online teams. The meetings duration was between 55 minutes to 83 minutes. All the interviewees were provided with a beforehand questionnaire to ensure the interview result delivers the current state.

In the second phase, the Interview was documented as field notes and recording. One of the tapes was transcribed into field notes. This section has provided the key process of the current state of operation. Appendix 1 was utilised as the theme interview.

In the third phase, internal confined qualitative data were used from the case engineering company's intranet database to retrieve and evaluate the interview field notes and recordings' relevance. This phase has outlined the key areas in the process that need to be developed to propose the new approach. This phase has ensured the data collected in phase two has relevance.

The following figure2 shows the current operating model flow process of curriculum vitae (CV) business based on Data1. Each element of figure2 is described below after the flow chart.

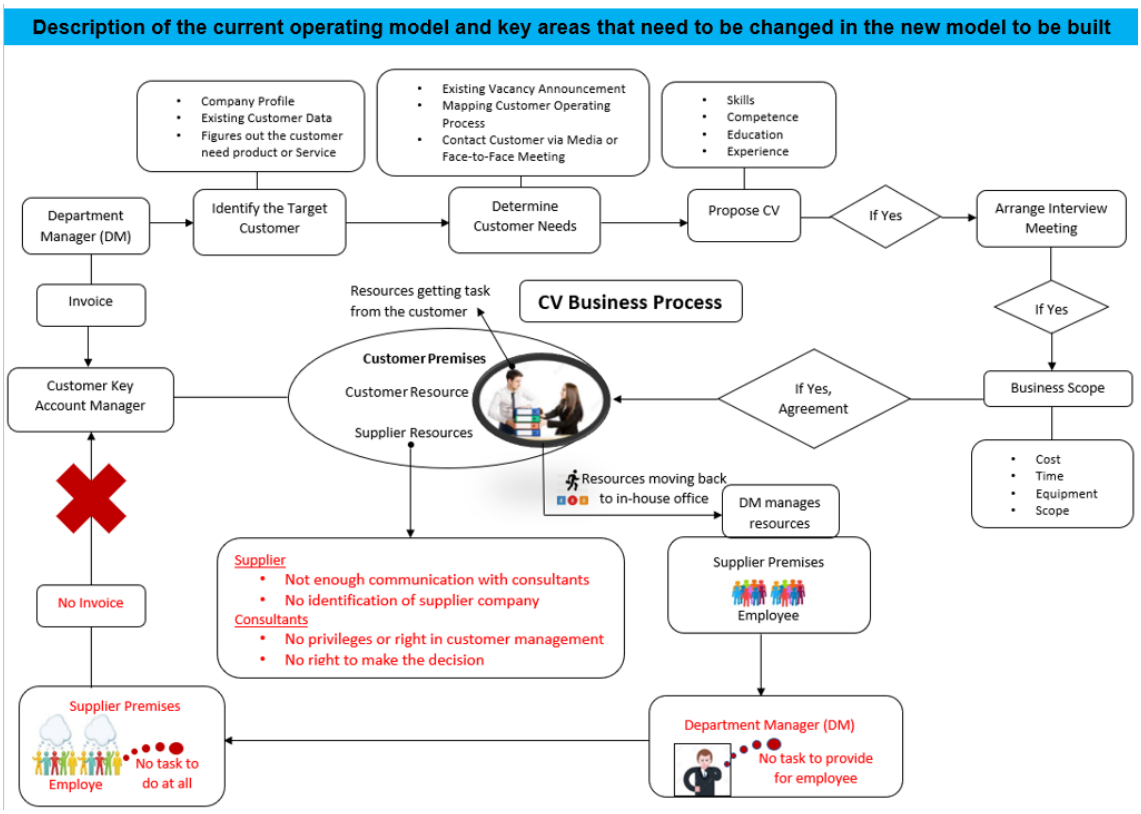

Figure 2. CV Business Process of the case engineering company

3.2 Department Manager

The department manager of the case engineering company is the main key stakeholder. The department manager initiates and administrates several employees to ensure employees have a task. The department manager also acts as a human resource administrator and trains or hires consultant to meet the customer demand. The department manager supplies the resources to solve the issues of the customer. The department manager monitors all of the employees under his/her supervision and ensures each employee has met the company's objectives and goals.

3.3 Identifying the Target Customer

The case engineering company's business supplies resources to the end customer in engineering, embedded system, software and digitalisation. The supplier identifies the target customer and the need of the customer. Several customers may need different roles or the same roles, or one customer may lack several resources with different positions or with the same roles. Each case needs to be identified as a unique task and

should address individually to satisfy the target customer. The target customer can be identified through its vast existing customer data to retain the business relationship or regain the customer. The target customer is grouped with preferences that share similar activities in the business area. According to Hughes, the RMF analysis method is a helpful tool that excels in customer purchasing behaviour and needs. The customers are arranged in three different segments by their consumption nature. They are Recency I – the customer's most recent purchase, Frequency (F) – the number of times the customer has purchased and Monetary (M) – how much the customer has created monetary value (Hughes, 1994). This method differentiates customer nature and benefits the supplier to analyse the marketing procedure. The case engineering company department managers are the principal sales representative. Their technique and proficiency deviate from identifying the target customer.

3.4 Determining the Customer Needs

The customers are not large, as B2B sales are significantly small, but the transaction occurs in a large unit. A small number of customers doesn't mean it is easy to handle the situation. It is very hectic and challenging to understand the company culture in manufacturing/technology. In B2C, one can buy several products. Still, in B2B service sales, several buying representatives from one company can purchase a single product, which results in the complication in buying sequence. Another factor is that the individuals from the supplier and the customer can vary in educational background and may come from different working experiences. Thus, the supplier struggles to understand the company culture and identify the customer's need. The customer can seek one role, and the supplier may purpose with unmatched roles and skills. The supplier needs to carefully communicate, understand the customer's need, and analyse it very carefully. To eliminate the error, the supplier has existing customer data to produce the customer journey map. The customer journey map and operating process of the customer assist in pinpointing the customer's needs, and the demand of the consultant can be spotted. Face to face meeting is another efficient practice that supports solving the communication gap, misunderstanding. Once the face to face meeting or meeting via media is held, the supplier receives the customer's request, and additional information about the requirement is clarified. Sometimes, there can be a time limit for the supplier that the supplier needs to propose a suitable consultant within a short period of customer request. Therefore, it clears the essential requirements of the roles and time limit.

3.5 Proposing Curriculum Vitae (CV)

The customers are in shortage of enough in-house expert who leads the organisation to fail to implement a successful project. Therefore, the customer request about the roles and need of the consultant to the supplier. The case engineering company receives a request from the customer, and they analyse the requirement of the positions. The case engineering company search for a suitable candidate either from the in-house or from the consultant's network or by announcing the vacancy. The case engineering company selects the best-qualified candidate and offers consultant competencies, skills, education, and experiences. Usually, the case engineering company provides a single consultant CV with complete confidence that the customer won't decline. But sometimes, the case engineering company propose several consultant's CV for a single position if the position is like middle management. The case engineering company does so because there may be more opportunities to offer more CV under the key stakeholder regime. Introducing several consultant CV makes it easier for the customer to select the high competence consultant from many proposed consultants.

3.6 Arranging a meeting

If the customer approves the consultant CV, the department manager from a supplier and key stakeholder agrees on a face to face meeting. Mostly, the interview meeting is held on the customer premises sometimes, and it can also be in the supplier premises. The purpose of a meeting is to test the consultant personality, strength, competencies, skills and others as written in the consultant's CV. If the consultant fails in the Interview, and the supplier may get some extra time to provide an alternate candidate or sometimes the supplier may lose the business opportunity. The customer may have chosen several suppliers searching for a single consultant, which does competitive business within several suppliers. Several supplier's consultants are competing for one position. Such a competitive business may force to lose the opportunity for the case engineering company. The case engineering company has maintained its strategy intelligently while selecting the consultant, so the consultant is awarded the position, and the case engineering company is awarded a business opportunity.

3.7 Business Scope

After the interview, the customer takes a few days to weeks to decide on the consultants. If the customer approves the proposed consultant, then the process moves forward with the business scope. The business scope is determined with time, cost, equipment and scope description. The customer should define the time frame, so the supplier knows how many hours the consultant will work for the customer assignment. The defined cost will provide information to the customer and the supplier about the consultant's hourly or monthly rate. The equipment element represents responsible for providing the necessary equipment like computer, software, machinery equipment. If the supplier provides the essential equipment and software, the supplier may charge an additional invoice. If the customer disagrees with the extra invoice's proposal, they need to find a reasonable cost, or the customer needs to provide equipment. All the elements of the business scope are defined according to the rules and regulations.

3.8 Agreement

After defining and agreeing on the business scope, the agreement paper is signed by both parties. The process ends after purchasing the consultant from the supplier. The consultant starts his/her job at customer premises within the defined time. The customer takes care of the consultant management, supervise the consultant to work on the task and exploits the consultant's skills and competencies in their projects. The consultant continues to work until the agreed end time with the customer. There could be a continuation of the agreement if the customer finds the consultant job is effective and enough assignment is available for the consultant.

3.9 Key Findings from the Current State Analysis

The case engineering company has hired the consultant, and the consultant has worked for the case engineering company's customer. It has thousands of consultants scattered all over the customer premises. The department manager from the case engineering company does not have control and management over the scattered consultants. The case engineering company want all the scattered consultant to be in-house premises so the department manager can manage their consultant.

When the consultant is in the customer house, there is insufficient communication between the case engineering company's manager and consultant. If necessary, they communicate with each other, focusing on the issues that need to be solved; otherwise, they don't have friendly contact with each other. Then some of the consultants have felt that they belong to the customer rather than a mother company. The consultant works in the customer house; they still don't have privileges in the management if something needs to be changed in the system, software, management, etc. Mostly, the consultant is not allowed to participate in the decision-making meeting. The case engineering company has realised that they don't have identification when the consultants are at the customer premises.

Usually, the case engineering company has hired and signed the contract paper with the consultant as a permanent consultant. The consultant works in the customer house, and when the customer does not have enough assignment, they decline the current agreement. Then the consultant returns to the mother company, and the case engineering company cannot send an invoice to the customer. But the case engineering company still needs to pay a salary to the consultant; though, the consultant does not have a task to do. Therefore, the case engineering company steering team has shifted the business paradigm from CV business to managed services. Now, the case engineering company wants the consultant to work in-house. As the

case engineering company is a consultant supplier, they must find the consultant's task to work from the mother company.

In the next step, the operating model's conceptual framework is explored through the existing scientific literature, which generally provides the idea to develop the new operating model.

4 Existing Knowledge / Best Practice on Operating Model in Managed Service

This section explores building the operating model from existing literature, articles, and academic books. The selected works of literature have the instruction and provide a concept in building an operating model.

4.1 Service

4.1.1 Introduction of Engineering Service Business

Over the years, the trend in engineering service has steadily increased. The service business is mainly supported by emerging technologies that help information transmission across nations and new business strategies that include outsourcing due to the growing number of organisational activities. According to Karina et al. (2010), most engineering services were generated by a few nations, with the United States being the primary export supplier. Currently, many developing countries have begun to offer such services, and today, in the globalised world economy, engineering services are being supplied from almost all parts of the world (Karina, Penny, and Gary, 2010:15-20).

Process transformation may no longer be optional in today's world because of business landscapes' complex and dynamic nature. Currently, firms need to maintain a good competitive standard, and those that fail to retain such an opportunity may find their institution at a disadvantage compared to leading-edge organisations. To prevent unnecessary time and resources loss, firms that attempt to improve process transformation require a more focused methodology and approach.

Such a methodology is PLT (Process Led transformation); this holistic approach enables competitive advantage through targeted objective intervention and active process management. PLT (Process Led Transformation) is outcome-driven, issued-based, and process led to address and diagnose enterprise-large execution challenges and offer value. Process Led Transformation (PLT) advantages are better realised when managed in a holistic end-to-end manner. Process transformation initiatives may fail in several organisations due to the absence of a core process organisation. Still, if staffed with individuals who possess the required expertise, success can drive the transformation (Parikh and Joshi, 2005:1042-1061). Process improvement is often sought when the challenges are

evident instead of being implemented towards a determined future end-state. There are no sufficient potentials to keep the transformation process on track in several other cases where a more strategic and complete transformation approach occurs. A business service can address these problems. But a single service provider's system can be critical to transforming a long-term success with low risk. (Zhang, Gregory and Neely, 2016:42-43). Managed Services is outsourcing daily management responsibilities as a strategic approach and method of improving operations.

As many companies reach outsourcing services, they mainly realise that external service providers offer additional value-added services. The company has found the service provider is more responsive, flexible to implement, provides quality service. It is easy and quick to access the skilled technical staff with the proper expertise, the better optional scheme for/of using technology to enhance business activities and functions, and far lesser challenges when managing internal political and organisational problems (Quinn and Hilmer, 1994). In the 90s, according to McCarthy (1996:1217), the significant reasons why a company considers outsourcing are as follows:

- Consultant supplier allows the company to rebuild and promote plans, generates enough time to become more effective, saves cost and increases efficiencies.
- Outsourcing enables firms' resources to focus on their core business objective.
- Outsourcing certainly reduces costs over the long term.
- Replicating the tools and technology is expensive for the companies to purchase or rent while it is needed.
- Firms need to improve the level of service provided to their employees' benefit plans by increasing the accessibility and consistency of information.

The engineering service landscape has evolved substantially over the past decades. Companies are steadily getting competitive and attempting to expand their global footprint. To develop or gain a competitive advantage, the firm concentrates more on its core values and activities. For a firm to cope, there should be an increased focus on reducing cost, which leads to the introduction of outsourcing strategies. Organisations are expecting to be lean, agile, and have a steady improvement. As a result, firms' lookout to outsource engineering services to their captive counterparts or managed engineering service providers that offer a considerable cost advantage. It may be due to the lack of infrastructure, maturity, and resource capabilities available to the firm.

Currently, engineering service providers have changed substantially, spreading the product life cycle from new product development and design to value engineering to engineering analytics. Engineering service providers and companies are looking for business models that can substitute conventional staff augmentation models. Concurrently, the business model ought to be flexible and respond efficiently to technological change. The following chapter provides insight into the operating model's conceptual framework of managed engineering services, the Services, Organizational Design, Tool and Technology, People Management and Performance Management Process.

4.1.2 Engineering Service

The Engineering Services provide experienced expertise in consulting and proven solution to an organisation while decreasing overall cost. The success is based on various key factors like; extensive software tools portfolio, global experience, local viewpoint, unbiased independent advice, and recognising every company's unique aspect. Engineering services aim to maximise return on investment and expand companies' networks, enabling the company to retain market leadership and offer real value for its customers.

Engineering Service companies are global outsourcing companies with management consulting, technological, and engineering services, with an estimated million individuals serving as esteemed clients worldwide. An engineering service company offer a high-quality service in a cost-effective, professional, and timely manner and look forward to a lasting long-term relationship. They are passionate about the services they render and are entirely devoted to providing unique and genuine value for the company's each step of the way (Zhang, Gregory and Neely, 2016:80-94). Engineering Services offer a wide range of engineering services for industrial operations domestically and internationally. They specialise in all engineering, process development and improvement, and performance engineering management. Engineering experts are invited to the business to employ, design, commission, assess, advise, develop systems and plans, and offer staff training to ensure safety, effectiveness, and efficiency in business operations.

Global engineering services can draw business and technical expertise for working with worldwide customers in the broad industrial sectors to meet a particular asset or manufacturing management difficulty. It provides expert advice, consultancy, engineering de-

sign services, project services, project management or ongoing maintenance, and operation support. The familiarity and innovation approach with the best practices ensure an effective and fast response. Innovative technology enables the service to add unique value to every assignment stage, especially the beginning phase. No matter the challenge, the chances of which engineering services must have come before are high-installing and designing new plants and accomplishing a world-class standard very fast. Also, getting more from previously established facilities without any new significant investment, new market adaptation, and the regularised condition is an additional engineering service. The demands differ from company to company, business to business, and from nation to nation. However, they have often acknowledged similarities (Karina, Penny, and Gary, 2010:15-20).

Engineering service is centred on securing results. Its strength could be found in its personnel and international experience, which offers a suitable solution to leading companies worldwide. These are affirmed by the technologies and methodologies demonstrated in engineering services (Dhillion, 2002).

Furthermore, engineering services approaches focus on fast, sustainable value realisation through a solid emphasis on operational and process efficiency and a closer business activity coalition throughout the transformation. It offers the flexibility and scalability of several services cost-effectively; captures and identifies synergies amongst several enhancement initiatives. With its extensive PLT (Process-Led Transformation) services and solid expertise, engineering services provide consistent, low-cost, and high-quality services. The vast array of engineering services offerings ranges from process modelling and definitions to managing process performance on an ongoing basis to rendering and delivering services (Heisig and Clarkson, 2014:10-15). The global and comprehensive workforce enables deployment in engagements and lower cost by performing substantial services from the developing countries. Engineering service has broad expertise in cost-effective process-driven transformation by supplementing engineering services capabilities supported by using accelerators, technology, and mature assets, which can mean fast value realisation for their clients.

4.1.3 Service Performance Measures

Services are ‘processes’ rather than ‘things’ since they do not have taste, fragrance, feelings and visibility. Due to the intangibility of services, many logistical activities cannot

be deployed to the supply chains process. The traditional function of “agent,” in which firms were primarily concerned with a cost advantage, has transformed into the role of service providers. To strategically improve their competitiveness, service providers must ensure competency-based service delivery (Lacity et al., 2008; Kedia and Lahiri, 2007:13-34), (Baltacioglu et al., 2007:105-124). Thus, control of service outsourcing processes (or intangibles) such as contact intensity and frequency, communication, and conflict resolution capabilities may be necessary to ensure a long-term collaboration.

Performance indicators indicate how well the various competitive priorities integrate into the operational strategy as implemented (Suarez et al., 1996:223-240). Effective performance measurements for service sectors involve moving away from manufacturing efficiency toward those that capture crucial success elements connected to customer-initiated needs (Abernethy and Lillis, 1995:241-258).

However, in today’s dynamic environment, service operations managers require relevant and specific inputs to make sound judgements. Non-financial measurements contribute to performance improvement in these scenarios by focusing on causes rather than consequences. As a result, managers are motivated to maximise performance on the tasks for which they are responsible (Hayes et al., 1988). The operational strategy’s dimensions must be incorporated into the performance measurement system to optimise performance (Sampson, 1996:601-621).

It is necessary to consider the service performance reference model to develop a supply chain management (SCM). Fitzgerald et al. (1991) propose six distinct characteristics of service performance from those used in manufacturing:

1. Competence:
    - The capacity of new client acquisition
    - Customer retention

2. Economic Viability:
    - Asset turnover
    - Cost control of labour and capital
    - Revenue generated per serving

3. Adaptiveness:
    - Over time, incorporate flexibility in term of volume, delivery speed, and specification into service design
    - Long-term application of level design
    - Part-time and ad hoc staffing
    - Demand smoothing using pricing and promotion strategies

4. Resource Management:
    - The effective use of facilities, equipment, and personnel.

5. Creativity:
    - Measuring the success of the innovation process and the invention itself.

6. Service Quality Assurance:
    - Relationship between customer and organisation
    - The establishment of unambiguous customer expectations
    - Evaluation of customer satisfaction (Fitzgerald et al., 1991).

4.1.4 Customer Service

Business practitioners argue that excellent customer service means consistently checking with the customer that they are happy with its services (Darlington 2018:10-20). Furthermore, customer service is the company function where all its claims, values and mission are tested (Dixon et al., 2013:20-30). According to Dixon (2013), the company's customer service's actual test is when something goes wrong for the customer when a problem or issue comes up. The customer needs the company's help to come up with the solution. When the customer needs help, the customer service team is called upon, and the team's job is to return the customer to a neutral state, to the state that the customer was before the problem occurred (Dixon et al., 2013). However, Dixon et al. (2013) argue that the purpose is not to delight the customer but to reduce the customer's effort to solve the problem. Additionally, customer service's role is to increase loyalty by mitigating disloyalty with actions that minimise customer effort (Dixon et al., 2013:20-30).

In addition to minimising customer effort, the company needs a customer service team's complaint-solving process. Goodman (2009:50-60) included the DIRFT-model, a complaint solving approach that aims to minimise the number of problems for the customer during their journey with the company by completing the task correctly the first time. In the model, the complaint solving process is described. It includes the following steps:

1. reacting to individual consumers,
2. identifying reasons for displeasure,
3. analysing the underlying cause,
4. solving the problem,
5. asking for feedback on prevention,
6. improving the service quality.

The process begins with an effective response to the customers' questions and concerns, and then it identifies the actual cause of dissatisfaction. The next step is the essential problem-solving stage, followed up by feedback on how the problem solving worked and prevented the issue. The process ends with the service quality improvement step, which feeds the required data to relevant parties to prevent or proactively deal with the problems.

4.1.5 Adaptability of service

Flexibility as a competitive advantage continues to lack a precise definition. Flexibility is a nebulous word in service firms since not all service flexibility characteristics have been identified. After all, resilience is widely recognised as a beneficial instrument for enhancing a firm's competitive position, particularly when it comes to technology adoption and implementation decision-making (Alvarez Gil, 1994:109-128).

In this context, service flexibility refers to the ability to rapidly integrate new designs and services into the service delivery system, to alter capacity rapidly, to customise services, to respond to changes in the service mix rapidly, and to rapidly respond to changes in client delivery timelines (Suarez et al., 1996:223-240). Thus, the primary goal of service flexibility is to optimise the time and quantity of resource allocations required to finish a process to prevent consuming an excessive amount of human and material resources that are not needed (Duclos et al., 1995:36-52).

Customer engagement and customisation imply a degree of adaptability to the characteristics of services, such as the fact that the primary input flow is information. At the same time, material handling is a less critical role (Adler, 1988). Nowadays, consumers have increased expectations of firms that provide essential services. This reality necessitates the development of a fresh and different perspective on service flexibility. Apart from that, service sector process equipment is significantly reliant on information technology. Personnel adaptation and flexibility must be prioritised, as employees provide a higher level of service than equipment does in manufacturing firms (Harvey et al., 1997:29-45).

Because information technology and people flexibility are inextricably linked and dependent on one another, they can be viewed as their whole (Daniel, 2003). On the other hand, electronic data interchange (EDI) and information technologies (Its) enable service organisations to increase their market reach without incurring major investment expenses. Harvey et al. (1997:29–45) established a model of service flexibility based on this notion. Technology is responsible for minimising unpredictability in the following dimensions: volume, time and location, demand and customer. Due to the widespread deployment of information technology in the service sector, process re-engineering is more viable in in-service delivery systems than manufacturing systems. Additionally, service businesses can turn their delivery systems into self-service delivery systems by actively involving clients (Daniel, 2003). The intended delivery method simplifies and facilitates flexible application, mainly when the customer develops service delivery systems, such as those used by manufacturing organisations for high-cost training.

4.2 Tools and Technology

4.2.1 Tools and Systems for Process Execution

By and large, operational models are designed to manage tools, i.e., to address specific process components. Certain tools are meant to make project planning more exact, coordination easier, lead times shorter, knowledge transfer more effective, and quality assurance sufficient. Such project management models attempt to make sense of an incomprehensible world, and formal models give a common vocabulary for interpreting ‘chaos’ (Engwall et al., 2005:427-439). Project operational models, from an engineering standpoint, portray a collection of technological issues. While these project management

models address technology challenges, formal models communicate stated best practices that improve job productivity (Engwall et al., 2005:427-439). These models appear to be able to accommodate distinct stages of the process. The models are only applicable if their users interpret them correctly and apply them within their conceptual frameworks.

Additionally, the same model can be applied in several different ways. Nonetheless, it has been proven that models are used to facilitate communication within and between projects and give standard models and concepts (Engwall et al., 2005:427-439). As a result, displaying a point of view in a model helps promote collaboration and critical thinking. Said they steer a conversation toward a specific issue from a particular vantage point. Models are not static; they evolve during their use and interpretation through their integration and development. Numerous authors have referred to the following operational model tools as being used by service firms.

4.2.2 On-Demand Workplace (ODW)

Businesses are striving to shorten market cycles, increase customer satisfaction, increase revenue, maintain a competitive edge, and efficiently respond to new issues in the fast-paced, constantly changing, on-demand environment. And, while seeking to reduce operating costs and overhead, be quick to respond to changes in the business environment.

The ODW provides employees with the tools necessary to do their duties successfully, increasing productivity while decreasing costs (IBM, 2004:315-325). Nonetheless, due to the limitations of current organisational structures, it cannot leverage fully and realises the benefits of IT transformation for a global firm. Parallel organisational structure transformation is required, similar to the change of IT systems via service-oriented architecture (SOA) and on-demand efforts (Galbraith, 1994;2000: 20-45). IT systems have evolved from being only tools and accelerators to being an integral element of corporate operations. This newly created entity must be incorporated into the proposed structural design. According to Drucker (1999:250-260), the business concerns of the twenty-first century can be overcome by the application of the SOA paradigm to organisational change. An SOA-based service's essential qualities are its abstraction levels, a transparent, fully described contractual interface, and ease of discovery and invocation. Ad-

ditional service composition and choreography might be employed to create more intricate services with equal essential attributes. These services are delivered with a strong emphasis on contractual compliance, are managed and executed in a scalable and resilient information technology environment and are administered in line with governing norms and service-level agreements (SLAs). When applied to organisational structure, the SOA metaphor naturally implies the concept of critical tasks and activities as service units. Each team performs a specific service and is focused on a particular activity or task. A chain of services from various organisations may be structured to accomplish higher-level tasks or economic objectives. The services teams and their core skills are listed on an internal bulletin board located within the ODW. Additionally, the governing policies and procedures that govern their engagement are published (IBM, 2014:10-18).

Identifying such unique services inside a large firm may necessitate the formation of various teams and related specialised services. Effective orchestration and coordination of these teams would be required. To support these virtualised services, a fabric for collaboration and coordination would need to be established. It is delivered through a logical ESB (Enterprise Service Bus) that leverages the capabilities of ODW tools in conjunction with well-defined service engagement and communication channels (Bieberstein et al., 2005:691-708).

4.2.3 The Supply-Chain Operation References (SCOR) framework

SCOR is a testing tool that assists managers in developing and managing supply chain operations at the organisational strategic and operational levels. It can be used as a reference point for comparing diverse supply networks across various industries. SCOR does this by standardising supply chain activities into the five high-level processes described below:

1 Plan: Balance overall average supply to decide the best course of action for sourcing, production and delivery.
2 Source: Acquisition processes for meeting demand.
3 Make: Operation that results in the completion of products.
4 Deliver: Processes that result in the manufacture of final commodities to satisfy demand.
5 Return: The processes of transferring products from the downstream to the upstream phases of the supply chain.

Each high-level process is separated into three levels to analytically identify strategic, tactical, and operational actions that support supply chain operations. Additionally, the model considers and integrates the operations of a business's suppliers and consumers, providing a holistic perspective of the supply chain. Once a supply chain has been mapped using the SCOR tool, it is possible to evaluate the standardised procedures using specified metrics. The toolkit emphasises industry-wide best practices for optimising performance in standardised processes (Mihalis, 2011:346-361).

4.2.4 Service Directory Tool

The service directory tool (SDT) is a standards-based application that enables the standardised specification and publication of all company services. Additionally, critical characteristics of the services, such as service delivery assurances, sample outputs or references, current stakeholders and team members, and ratings, are appropriately documented. The rating can be used by a potential stakeholder (such as a CEO) to differentiate between services and make orchestration decisions. When a service is created, the meta-data for rating is defined. The service type would determine metadata classification for functional (e.g., component testing service, such as test report quality, defect discovery rate, or test intervals) and non-functional items (e.g., turnaround time or reliability). The overall service rating is calculated using the weighted average of the subtracting data (derived at service creation time and fine-tuned regularly). The service's users and stakeholders provide input and populate the rating values on a transaction-by-transaction basis, utilising the SDT's autonomic capabilities. When higher-level services, such as departmental services, are active, the ratings are propagated to the respective team services.

Additionally, the rating data can be cascaded upstream to elicit critical metrics for measuring departmental or business unit performance and efficiency, providing senior executives with an organisation's "pulse." The SDT enables anyone to browse and acquire information about services and extend and descend from higher-level services (Bieberstein et al., 2005:691-708). Access rights are influenced by roles, authorisation levels, and privacy rules.

4.2.5 Asset directory tool

Services respond with work products and assets when activated (for example, product binaries, architectural blueprints, best practices, and technical papers). At each level, the work products are turned into polished and reusable assets. The asset directory tool organises and publicises these reusable content and work items (ADT). Their service agents offer guidance to asset-producing service teams regarding reusability. Other services may send repeated requests to ADT links, which may be responded to. Stakeholder service teams are directed to search the ADT for relevant assets before initiating asset-producing activities to avoid duplication of communication. The COB may be able to implement this asset-request matching function (Collaboration-And-Orchestration Bus). Both sensitive and non-confidential intellectual capital is housed at the ADT. On extranets and customer-relationship portals, non-confidential and shared assets can be advertised. Access permissions and controls are used to protect confidential assets (Bieberstein et al., 2005:691-708).

4.2.6 Employee directory tool

The employee directory tool (EDT) is crucial in an on-demand environment. Individuals have a limited amount of time to adapt and adjust to team dynamics, as teams are constantly formed and coordinated to accomplish corporate objectives. The EDT maintains a database of all employees. Employees can use the EDT to share personal and professional information such as experience and credentials, prior and current roles and responsibilities, comprehensive contact information, personal calendars and schedules, reporting structures, accomplishments, linked contact information (direct formal and informal relationships with other employees), photographs, and unique “blogs” (Weblog consist-ing of frequently updated chronological entries on a particular topic). While most information is accessible to the public, an employee may restrict private and personal data access. The EDT’s primary objective is to present a human face for team members and facilitate virtual collaboration for a remote team (Bieberstein et al., 2005:691-708). Employees can use EDT and the ODW collaboration tools to establish formally and informally contacts necessary for effective teamwork and personal growth.

4.2.7 Technology

Throughout the many stages of service systems engineering, a diverse range of technologies must be used to design the hardware, software, information systems, and technology infrastructure components. Additionally, the organisation's modelling, definition, design, processes, and data structures are necessary for an end-to-end perspective of the service system (Ricardo et al., 2012:420-427).

An engineering team will require access to modern technologies and offer support in maintaining a competitive edge. Modern technology cost high for technological adoption, over-worked IT staff, and the high number of specialised tools needed for digital transformation. We live in a product-innovative world. Thus, an organisation will need to reap the benefits of modern technology.

The engineering services offered to firms provide firms with a wide range of features, technologies, and tools to manage the engineering business. The software programs often entail project management and planning, scheduling, resource allocation, budget management, control tools, document management and cost forecasting, quality management and administrative functions. Software platforms may be utilised for employee-client or employee-employee collaboration and communication. In addition to architectural frameworks, business process management (BPM) encompasses various process management scenarios for coordinating people and technology. Business process management includes multiple activities, including sequential workflow, straight-through processing, case management, content lifecycle management, collaborative process work, and value chain participation (Ricardo et al., 2012:420-427).

Model-Based Systems Engineering (MBSE), Model-Driven Architectures (MDA), Model-Oriented Systems Engineering (MOSES), and other techniques are frequently used to build information technology and technologies on a logical (functional), behavioural (operational), and physical level. UML, UML2.0, and SysML are commonly used to depict operational scenarios, modes of operation use cases, and entity relationships through Requirement, Structural, Behavior, and Parametric diagrams (Ricardo et al., 2012:420-427).

There are many benefits to utilising engineering management software. They include:

- The software ensures easier collaboration occur in multiple departments, more so when tasks overlap. It is essential as it provides every team member is on track regarding the objectives to be met.
- It's ideal for improving customer communication. Clients are quickly updated on a project's progress, providing feedback and receiving an automated transmission from the project team.
- Tracking projects using scheduling systems ensure deadlines are met and that resources and time are managed flawlessly. This sort of software offers tools, making it easy to know the progress of the project.
- Managing a budget is challenging in engineering. The software helps project managers in staying on cost and ensuring the funding is met
- The software ensures contracts and documents are added to the database and e-filing is accurate.

4.3 Management Process

4.3.1 Workforce Planning

Time is a widely used and universal metric for evaluating performance. In workflow systems, it can be defined as the total time required to convert a set of inputs to outputs. Typically, a time-based approach requires businesses to provide the highest value possible as rapidly as possible. A speedier workflow execution time enables quicker creation of new items, giving you a competitive advantage because you can get your items to market sooner. Additionally, by reducing the time required to accomplish a series of tasks inside a workflow process, a company can be more responsive to the needs of its consumers. As a result, improving the workforce management system to include time-based process execution is critical. (Cardoso et al., 2002:274-285).

Executives frequently indicate in surveys that human capital is one of their most precious assets, yet they struggle to convert that human resources into a competitive edge. However, several companies have recently worked to address this issue. IBM, for instance, developed "Opti Match" at its Watson Research Center to match employees to Global Business Services projects. Hewlett Packard has also implemented a new staff planning and scheduling system at its Palo Alto Laboratories (Hargaden and Ryan, 2015:578-

590). These technologies were developed to assist corporations in accomplishing specific objectives, such as streamlining the labour assignment process. It's similar to staff scheduling and rostering in the mass services and service shop categories.

Mostly in-service business, workforce planning includes workforce planning or redeployment, which involves arranging employee work schedules to match client demand (Ernst, Jiang, Krish-nanmoorthy and Sier, 2004:3-27). Additionally, engineering consulting organisations examine the task assignment procedure. In contrast to mass service or service shop environments, engineering consulting firms "concentrate completely on knowledge generation through the addition of value to data in their transformation operations." (Brennan, 2006:98-107).

Innovation in experience and understanding industries results from collecting the relevant knowledge and information at the right time to face novel, complicated situations. It is well accepted that the prominence of a strong team leader in information exchange hampers innovation. In knowledge-intensive work, workflow and problem-solving networks are frequently dynamic, moving as new projects require various types of information and abilities. As new obstacles or opportunities arise, the set of relationships upon which one is now relying for information may prove less valuable than those with previously unknown group members who may have information pertinent to the new tasks at hand. When individuals know who to contact for knowledge and information essential to a new endeavour, a network can augment their capacity to overcome new challenges. As a result, team leaders who are more aware of their team members' capabilities should be more likely to link the appropriate persons in the proper time when unique challenges develop (Jan et al., 2008:269-286).

4.3.2 Leadership

Process management effectively attains the success ladder; leadership determines if the ladder is leaning against the right wall. Leadership entails charting a course and organising an organisation around process improvement initiatives. Academic research has continually affirmed that senior executive leadership is required for a process management system to function well and is the driving force behind these initiatives (Flynn, Schroeder, & Sakakibara, 1995). Senior management commitment should be the starting point for improvement processes since they construct the organisational mechanisms

that design and manufacture products. The influence of leadership on process management ultimately influences knowledge generation. (Linderman et al., 2010:689-719).

Members of an engineering design team are obligated to exchange information about their work. In a recent study, Kratzer et al. (2006) illustrate that managing workflow networks can foster creativity in innovation teams. Two components have a significant role in determining this structure. First, the job breakdown and the interfaces that result from it necessitate team member swaps. Second, the team leader's coordination skills enable him or her to link or disconnect team members for administrative needs. Throughout innovation trajectories, this structure inexorably alters and adapts to shifting difficulties and tasks. Team leaders have a dual purpose in workflow networks. Team leaders serve as coordinators, monitoring the workflow and making required modifications or interventions. On the other hand, team leaders must be closely involved in the workflow to monitor job progress and manage the team (Jan et al., 2008:269-286).

As previously stated, team leaders serve as gatekeepers, bridging the divide between internally and externally communications systems. Thus, leaders can maintain a central position within their internal networks while maintaining several contacts with different technical design teams. The degree to which team leaders are related to other groups reflects their external centrality or ability to cross boundaries. Boundary bridging has long been recognised as a factor in how information enters organisations. The degree to which one is aware of another's competence or comprehends what another knows is related to one's propensity to seek knowledge from that individual.

On the other hand, highly specialised skill is distributed throughout the group with an engineering design team. No member can monitor every area of expertise of his or her colleagues. Team leaders who are aware of the distribution of knowledge and experience within the team, on the other hand, may manage the team in such a way that the relevant individuals exchange knowledge and information at the appropriate time. As previously said, team members who are more aware of the diverse abilities available within a network are more positioned to act effectively when new challenges necessitate specialised knowledge (Jan et al., 2008:269-286).

4.3.3 Management of Knowledge and Knowledge Management Systems

Knowledge management and knowledge management systems Implementing knowledge management in engineering is fraught with difficulties, including short supply times, organisational culture, a lack of standardised work processes, and limited financial resources. More precisely, these constraints manifest as a lack of managerial support, employee resistance to knowledge sharing, an insufficient IT infrastructure, a lack of a real-time integrated database, and an insufficient financial flow (Carrillo, Chi-nowsky 2006:2-10). During the execution, evaluation, and reinforcement stages of knowledge management, the control points for KMS are the system's usability and effectiveness, the number of knowledge objects, progress reports, user satisfaction, the number of knowledge object applications, the number of knowledge object usages, appraisals, review mechanisms, portal maintenance, and process tuning (Chang and Li 2007:479-493). As a result, engineering is a project-based profession, which complicates the knowledge transfer process (Tserng, Lin 2004:781-802; Lin et al. 2006; Tserng et al. 2010:332-344). Additionally, it demands knowledge management and experience extension. Thus, a fundamental subject is a process through which implicit information becomes explicit knowledge. Engineering consulting firms are highly knowledge-intensive enterprises burdened with planning, designing, and supervising construction projects (Mortazavi 2010:13-30; Ding et al. 2011). The majority of knowledge assets are conceptually preserved in the minds of senior engineers or are documented in copious amounts. Historically, information was obtained through the reading of papers or oral discussions amongst personnel. However, the loss of capability caused by the resignation of senior engineers can result in a loss of competitive edge (Yu et al. 2009:430-440, 2012; Ding et al. 2011; Lin, Lee 2012). As a result, increasing engineering productivity and mitigating the effects of personnel attrition are critical. Knowledge management activities encompass the processes of creating, capturing, storing, sharing, and reusing knowledge. These processes are crucial to the competitiveness of engineering consulting firms.

4.3.4 Process Performance Management

There are extensive surveys conducted in many companies worldwide with more than 250,000 staff over the past thirty years. The surveys point to employee commitment, and happiness is dependent on several simple practices. Kativar& Khalid (2014) state research findings dictate that adequate human resources capital adds almost 47% to a shareholder's value.

Many SMBs or SMEs (Small & medium-sized businesses or enterprises) find it challenging to make proactive management. The emphasis lies on achieving stability and increasing revenue. With a growing business, it is essential to improve staff engagement, loyalty, and productivity. Here, performance management shows significant differences between an enterprise experiencing sustained growth and one with momentum falters. An organization knows the role played by performance management but often conduct it in an impromptu manner. Such a technique will be helpful when dealing with few employees. With many employees, a formal process is needed. Consistent staff feedback is essential for a larger organization to succeed. Engineering services provide organizations with an approach that improves performance (David and Joe, 2013:37-42).

Generally, performance management entails communicating with staff on the organization's expectations, ensuring their actions and goals align with company strategies. It focuses on the effective management of individuals & teams for improved organizational performance. The technique is strategic (looking into broad issues & vision) and integrated (linking all business aspects). Performance management entails (Cornerstone, 2017:3-27):

- Individual targets
- Training and learning
- Development & improvement plans
- Annual feedback and reviews
- Objective recognition and rewards

CIPD (Chartered Institute of Personnel and Development) state that there are considerable benefits to be reaped by a business through performance management (Cornerstone, 2017:3-27). They include:

- Improved staff morale
- Consumer satisfaction
- Assisting in employee progress
- Staff empowerment and loyalty
- Increased engagement.

A common misconception dictates performance management refer to yearly reviews. Reviews can be viewed as a part of an extensive management process. Performance management, generally, is a universal procedure. Well-developed strategies assist organizations and employees by:

- Informing them on the necessary things an organization aims to achieve
- Arming organization and employees with essential skills
- Communicating responsibilities of an individual employee in the accomplishment of objectives
- Informing staff on what the organization expects of them
- Supporting employees in developing their skills and managing challenges

4.3.5 Work Execution Nature

The introduction of performance management strategies in an organization is essential for organizational maturity. Considerable benefits are reaped when this is gotten right through staff and business engagement. By implementing various steps, employees reap massive benefits to grow them personally and professionally. On learning new competencies, skills and recognizing the investment an organization is making, they become productive, reflecting company performance. An organization using an ad hoc technique in management is less successful. An organization that does not integrate feedback and performance practices in management programs has lower performance improvements and high employee turnover and dissatisfaction. Performance turnover provides a business with the chance to improve and refine development activities. Various solutions and challenges are essential in the development of performance management strategies. Engineering Services offer practical guidelines for SMEs incorporating performance management in the long-run growth plan. Based on research, case studies and experience, the advised integrating management into the organization's workflow (Cornerstone, 2017:3-27) are the following steps:

1. Establishing Enterprise Case in Managing Performance
2. A Customized Performance Management Procedure
3. Implementation of Effective Stakeholders Reviews
4. Building Processes that Adapt to Evolving Enterprises
5. Understanding and Analyzing the Impacts of the strategy
6. Utilizing the Ideal Technologies for your Organization

The above steps aim at providing clarity and insights to an organization preparing for the implementation of performance management in an enterprise. This paper identifies major setbacks faced by an organization when introducing employee performance management and offers practical steps in developing ideal strategies for overcoming challenges.

4.3.6 Information Flow Across a Work Procedure (Establishing Enterprise Case in Managing Performance)

On introducing performance management in an organization, some resistance might be encountered from employees and senior managers. Typically, colleagues' express concerns on:

- Company lacking resources and time
- Additional behaviour control
- Offering little to no ROI

Combatting perceptions require preparation and patience. One needs to understand perspectives and views and challenge the convictions with conviction. Performance management points to overwhelming research confirming its effectiveness. For an organization to overcome the setbacks, Engineering Services build concrete business cases outlining the impact of utilizing performance management in organizations.
Solution: Building solid business scenarios

Building enterprise scenario based on an organization's skill, whether the case is presented as a report or slideshow (Cornerstone, 2017:3-27). The chapters be included are:

- The Problem: It entails identifying major performance hitches that the enterprise fac. Does an organization have high employee turnover? Do workers underperform regularly? Is there productivity? Are the utilized procedures constantly improved? Problem identification is necessary in presenting a business case. There should be a clear and concise message on overcoming the problem identified.
- Communicating using Numbers: In performance management, analyzing expected outcomes and costs using ROI is essential. Implementing performance management strategies incurs costs, making it necessary to present clear ideas on baseline outcomes. Delivering a precise figure outlines expected gains for a company and the likely time for it to happen. For instance, what does a 5% productivity improvement imply in a financial year?
- Engaging employee across and outside the enterprise. Speaking to peers from the subordinate to management ensures all are engaged in meeting goals.

4.3.7 Implementation of Effective Stakeholders Reviews

Performance reviews are vital in judging management and thinking about how to implement strategies. Good reviews empower staff, boosting their careers as negative reviews affect performance, morale, and engagement

Solution: Ensuring effective reviews

Many enterprises will use inappropriate approaches to annual reviews. Staff might view it as stressful and a timewaster. It needs to change. An effective way to employee reviews should:

a) They are encouraging regular feedbacks the entire year. It ensures employees' annual reviews are surprising. Managed services regularly tell staff their performance as they relate to targets.
b) Decide on a suitable review type for the enterprise. When a review is conducted, the choice depends on the enterprise's most accurate action in costs and time. Review types include:
    - Self-appraisals where employees will rate their performance based on define targets
    - Manager reviews where line managers provide feedback
    - Multi-ratter assessments: It's the broader review in which feedback is provided by customers, colleagues, and line managers for a more profound view
c) Provide concise and clear targets and outcomes for organizations. It entails aligning behaviours and trends with enterprise goals. Progress is measured against objectives based on measures and concrete examples, ensuring animosity or personal liking doesn't interfere with fairness.

4.4 People Management

4.4.1 Management Techniques

Organizational culture mainly influences the management style that portrays when conducting a project. The management style illustrated is shaped by social dynamics, local culture, customs, project, team members, skills, and project managers' personality. Organizational Leadership management styles can be categorized (Cherry, 2006:30-45) as:

- Laissez-faire
- Democratic
- Paternalistic
- Authoritarian/Autocratic

4.4.2 Autocratic

In this management style, all decisions are made by a service company. Decision-making and information are left to the senior management of the company. The company's workforce/employees are expected to accomplish various tasks and objectives to meet its goals. Downward communication, from leaders to subordinate staff, is involved in the authoritarian management style. Individual control frequently referred to as authoritarian leadership, is characterised by total autonomy through all outcomes and minimal participation by group members. Autocratic leaders typically make decisions based on their ideas and judgments and rarely solicit advice from followers. Autocratic leadership entails a group's authoritarian rule (Cherry, 2006:30-45).

From an employee's viewpoint, it results in reduced motivation (Ebrahim, 2018:13-25). A primary advantage of using this technique is an organization's direction remains constant as decisions are similar, projecting a well-managed and confident organization. However, team members will highly rely on project management, making supervision a necessity.

4.4.3 Paternalistic

A paternalistic style of management is one in which the manager places equal weight on the interests of the employees and the firm. Communication is downward in a paternalistic management style, and feedback and questioning authority on superior and group cohesion are lacking (Francis and Ekaette, 2016:51-61).

In this case, the manager will make decisions with employees' ideal interests at heart rather than an organization's interests. It explains most decisions made to team members, ensuring leisure and social needs are met. It helps in balancing the lack of motivation resulting from authoritarian management technique. In this technique, feedback is generally downward. However, the management collects employees' feedback. It is an excellent style in engendering employee loyalty. It results in low staff turnover due to its

emphasis on social requirements. It's disadvantageous in that employees highly depend on the manager, and in case of a wrong decision, employees are dissatisfied with their manager (Hajra et al., 2019:1-5).

4.4.4 Democratic

When a manager practices democratic management, he or she encourages employees to participate in decision-making; thus, the majority agrees on everything. Both directions have substantial contact (from employees to managers and vice-versa). Under a democratic management style, each worker is provided with a voice at the table, and communication is relatively free-flowing (Francis and Ekaette, 2016:51-61).

Employees are involved in the decision-making mechanism, and the majority rule applies. It is critical when making highly complex decisions that require the collaboration of multiple professionals and a high level of professionalism. From a general view of an organization, work quality is improved, and tasks are always done satisfactorily. However, deciding is slow, and consensus might not always lead to taking the ideal decision (Ebrahim, 2018:13-25). Employees are encouraged to communicate their views, ideas, and emotions that contribute to the organization's success.

Because democratic leadership includes employees in decision-making, it is often referred to as participative leadership. The democratic manager keeps their workers informed of all factors affecting their job and delegated decision-making and problem-solving authority. This leadership style entails the leader acting as a coach who has the last say but solicits advice from subordinates before making a decision. Democratic leadership possesses the capacity to perform both high-quality and quantity work over a prolonged period. Numerous employees appreciate the trust they receive and demonstrate it through cooperation, teamwork, and a positive work environment. (Cherry, 2006:30-45).

4.4.5 Laissez-faire Technique

Here, the service is marginal. An employee manages their section in a project. The project manager doesn't perform management duties, resulting in uncoordinated delegation. Communication is horizontal, implying equal communication in two directions. However,

there is little communication in comparison to other management techniques. It encourages creativity and professionalism amongst employees. At times, it is not deliberate, resulting in poor management. It can lead to lacking the drive and reduced staff focus, resulting in a poor organisation's image and dissatisfaction (Abdul Qayyum and Husnain, 2012:258-264).

In many cases, laissez-faire leadership is referred regarded as the "hands-off" leadership style. It is one in which the supervisor gives little or no direction and gives employees the maximum level of autonomy possible. Employees are given complete control or power, and they are responsible for setting goals, making decisions, and resolving problems independently (Cherry, 2006:30-45).

4.4.6 Working Principles

An organization's general process in sharing rights on a decision made about a project and monitoring how various project interventions occur is project governance. Any engineering service organization is guided by project governance. An effectively governed organization actively design project-governing mechanisms such as approvals, budgeting procedures, and committees to encourage trends consistent with an organization's strategy, mission, norms, culture, and values. Project governance aims at establishing apparent authority or levels and an ideal decision making inclusive of policy conduction, influencing, planning affairs of a project and assuring its success through the definition, documentation, and dissemination of dependable, repeatable project methods (Robert and Ralf, 2016b:613-626). It entails policies, processes, and people providing a framework through which the engineering services will make decisions, optimizing results relating to the area of responsibility. Identifying and defining responsibilities, accountability, and roles of involved persons, optimum outcomes are obtained. It includes coordinating and interacting with external and internal dependencies. An organisation's management team sets up and supports the governing structure before initiating a project activity. It ensures key decisions will be made in good time. Management teams define project governance using a document outlining responsibilities and roles for making decisions with team members and stakeholders. It entails creating project committees and quality operating rules. An ideal project-governing document assists projects through clear procedures on following escalating issues, defining decision-making structures, responsibilities and roles for every stakeholder on various processes in a project (Robert and Ralf, 2016b:613-626). A service offer is made up of three primary development components:

a services conception, a service method, and a service system. The service concept articulates the customer's requirements and establishes a link between them and how the service should fulfil them. The service process specifies the events that must occur for the service to be generated, whereas the service system specifies the resources necessary to offer the service.

A way for increasing productivity in a sector or department is effectively motivating human resources. Past studies have indicated self-motivated persons are more productive compared to people who aren't self-motivated. Published literature cites numerous motivational tools. Chironis (1969:19-35) outlines six motivators for an engineering service in motivating people:

- Involving employees when setting goals
- Setting standard achievable by employees for measuring performance
- Challenging employees' self-destructive attitudes
- Ensuring policies and goals are clearly understood by employees
- Consulting employees on issues above their position levels
- Uncovering motivational tools which will operate best for individual employees

4.4.7 Skills and Capabilities

According to Thamhain (1990:80-84; 1992a; 1992b:400-421), the effective management of technology and engineering functions in the current environment will require specific administration, leadership, and technological skills.

Elements of leadership skills include setting goals, assembling a multidisciplinary team, motivating others, and gaining commitment and support from upper management. The ability to handle unstructured work environments, to communicate effectively, and to help resolve conflicts, as well as to help in problem-solving, are essential in-service management. Some technical expertise aspects include facilitating trade-offs, understanding marketing priorities, and integrating people and systems. Multifunctional projects, scheduling, straightforward interpretation of policy, staff retention, estimation of capital, resource negotiations, progress measurement, administrative management, and collaborations are examples of managerial skills. It is critical to notice that at times, the skill components of the three groups may overlap.

Service engineers and managers should understand the science and technology required to deliver value-adding technology-based services to actual people. It corresponds to the capabilities required of a service scientist (Sphorer, 2008:11-40): technology, business, and social organization.

- New technologies (i.e., ability to design and evaluate innovative technologies and processes).
- New modalities of contract or services (i.e., understand the user and customer needs and meet requirements and quality expectations).
- Innovative business models (i.e., leadership and management capacity to meet stakeholder interests and the demand for organization flexibility, effectiveness, and accountability).

Service engineers must possess a strong understanding of their speciality field and diverse skills and competencies. Chang (2010:479-493) identifies four key abilities for service system engineers:

- Skills to manage a system, a business, a market, a body of knowledge, and a financial situation.
- Knowledge of operations and service procedures
- Analytical and interpersonal skills
- Entrepreneurship, ethics, and global perspective

4.4.8 Building Processes that Adapt to Evolving Enterprises

Process and tools are dictating performance management strategies evolve. As a company grows, priorities change. Thus, performance management should change. Solely focusing on sales is relevant; however, the organization is developing, emphasizing customer relations and brand identity is necessary. It leads to a shift in performance management strategies (Cornerstone, 2017:51-60).

Solution: Document processes and clearly defined roles

With performance management strategies, an identifiable leader or project manager is essential. The person will ensure an organization’s vision is accomplished through performance management by taking the lead interest on:

- Documenting progress
- Constantly analyzing the implementation of strategies

- Researching into the performance management of a company for improved work-flow

4.4.9 Understanding and Analyzing Impacts of the strategy

The primary reason for implementing a performance management strategy is understanding how companies and individual employees perform concerning predefined targets. Performance management offers colleagues their feelings, major setbacks they experience, and areas the organization and employees can improve. This information can be utilized in (Cornerstone, 2017:51-60):

- Defining new organizational objectives
- Identifying failures and weaknesses
- Rewarding success
- Assisting in discovering and employing new employees

Solution: Analyzing and using data/information

Performance Management information, if possible, should be digitized. Digitization massively facilitates one's ability in analyzing data collected in the entire process. Data analysis should be related to goals set by a company:

- Who achieves the goal, who surpasses set goals and who underperforms?
- How will colleagues' morale be impacted?
- Where has the company made improvements, and what can be done better?
- How conversant are employees with the company's objectives?
- Does every stakeholder in the company understand their responsibilities?

Analyzed information or data can be used in informing new objectives, strategies, and company policies.

4.4.10 Utilizing the Ideal Technologies for an Organization

Traditionally, organizations conducted performance management tasks and activities using paper and pen, and reviews were done by filling tick-box forms. There's a perception among SMEs (Small &Medium Enterprises) that extensive performance managing tools

will be burdensome and costly. Platforms like engineering managed services provide art tools designed for all sorts of enterprises.
Solution: Using the right cloud-based solutions

Technologies used in management performance in an industry have been advancing rapidly over the past years, and companies can access them regardless of size. Scalable and flexible cloud-based subscriptions offer ideal solutions to companies through:

- Simplified analysis and tracking across mobile and desktop devices.
- Streamlining and automating performance reviews through workflow technologies that integrate the existing systems in a business line.
- Easily accessing online reviewing tools such as browser-based technologies recognizable to end-users, resulting in great completion rates from the respondents.
- Making training resources available and easily linking them to tools for performance management.
- Cataloguing previous targets and actions securely stored or backed up for easy retrieval.
- According to Cornerstone (2017:51-60), pre-defined feedbacks and tips are available to the managers when performance appraisals are being written through logging into systems with credentials.

4.5 Organization Design

The organisational design process entails six important decision points: centralization and decentralisation, a chain of command, departmentalization, formalisation, a span of control, and task specialisation (Robbin, Coulter, DeCenzo, 2020:57-66).

4.5.1 Work Specialization

The degree to which an organization's tasks are divided into multiple roles is referred to as work specialisation. Work specialisation refers to the fact that a single individual's complete task is not finished but is broken down into steps that various individuals accomplish. Individuals are more prone to specialise in a particular area of activity than in action. When work specialisation was established and applied in the early twentieth century, initial results indicated increased employee performance and productivity. When used excessively, it resulted in human economic diseconomies because of work specialisation fatigue, stress, boredom, increased absenteeism, poor quality, and high turnover,

all of which negated the financial gains. Recently, engineering services have considered specialisation as a necessary organisational tool but not as the principal source of rapid development in productivity (Robbin, Coulter, Decenzo, 2020:57-66)

4.5.2 Departmentalization

After jobs have been classified according to job specialization, they must be grouped to coordinate general tasks. Departmentalization is grouping the essentials of work (Robbin, Coulter, DeCenzo, 2020:57-66). Engineering services have a distinct method of categorizing and arranging work tasks. The customer department classifies jobs by customer: clients who share common problems or requirements that professionals best service. There are advantages to equating de-participation with the absence of a client. Functional departmentalization classifies jobs according to how they are conducted. This strategy may be used in any institution, albeit the functions would vary to demonstrate the institution's activity and mission. Departmentalization of processes organizes jobs according to a customer or product flow. This strategy enables work operations and activities to follow a natural customer or product processing flow.

Product departmentalization categorizes or arranges jobs according to the product line. This method enables each critical product area to be subordinated to engineering experts accountable for all aspects of the product line. Geographical division classifies jobs by location or area, such as western Canada or the east coast, central Ontario, Europe, Asia, the Pacific region, or the United States. Most big engineering firms integrate all forms of departmentalization. Each of the firm's divisions is functionally organized. Its manufacturing segment is process-oriented. Its distribution unit is geographically organized, while its sales area is segmented into four customer or client groups. The usage of cross-functional teams and customer departmentalization are two common trends in departmentalization. Engineering services use cross-functional teams, which are made up of individuals with specialized knowledge who collaborate to increase understanding and knowledge for an organization's task and customer departmentalization, which divides jobs into categories based on everyday customer needs or problems. It enables organizations to gain a complete understanding of their customers and to respond more rapidly (Robbin, Coulter, DeCenzo, 2020:57-66).

4.5.3 Chain of Command

The chain of command is a continuous line of authority that spans from the organization's top-level to its lowest levels, outlining who reports to whom. It supports employees in resolving issues such as where or who should I contact if I am experiencing a problem/challenge? Alternatively, whom am I accountable/responsible? A discussion of the chain of command would be incomplete without addressing additional concepts such as authority, accountability, delegation, responsibility, and unity of command. The phrase "authority" refers to a managerial position's head telling employees what they must do and how they must do it. Engineering managers are also an essential component of the chain of command since they encourage teamwork and decision-making. They are vested with a certain amount of authority to carry out their obligations. By integrating and coordinating employees' activities, managers assume a commitment to carry out any set objectives or responsibilities. The term "Responsibility" refers to this expectation or commitment to complete. Accountability flows from obligation, which requires managers to justify and report their work to their superiors. The concept of the unity of command contributes to maintaining the idea of a continuous chain of authority. It stipulates that each employee should report to a single supervisor who is authorised to provide directives and directions. Without organizational unity of command, several managers' disagreements and competing goals might generate difficulties. Delegation is the process of assigning authority to another employee to perform a specific task, hence empowering the employee to make some decisions. Delegation is a critical component of engineering services because it ensures that the appropriate people are involved in decision-making (Robbin, Coulter, DeCenzo, 2020:57-66).

4.5.4 Span of Control

The span of control is the most significant number of personnel that an engineering firm can effectively and efficiently manage. This control span is crucial since it has a considerable impact on the number of employees, levels, and managers necessary. The span of control idea recognises that several elements influence the optimal number of employees that a manager can effectively manage. These factors include the manager's and employees' abilities and capabilities and the task's nature. For example, the more training and experience an individual has, the less direct supervision they require. As a result, managers with highly skilled and experienced staff may effectively manage a larger span.

Additionally, the similarity of employee tasks, their complexity, subordinates' physical proximity, the extent to which standardised procedures are in place, the sophistication of the organization's information system, the strength of the organization's culture, and the manager's preferred style all contribute to determining the appropriate span. Extended control spans are also a possibility as a result of technology improvements. Managers and subordinates interact more efficiently, and there is frequently more information available to assist people in performing their duties. (Robbin, Coulter, DeCenzo, 2020:57-66).

4.5.5 Centralization and Decentralization

In some technical organizations, junior managers and personnel carry out orders, while senior management makes all choices. It may appear differently in other organizations, and decision-making decentralized to junior-level managers is centralized in the former, while decentralized decision-making is centralized in the latter. Centralization refers to the extent to which decision-making is focused inside a single organization. Centralization occurs when top management makes critical organizational decisions without feedback from below. By contrast, decentralisation occurs when junior managers or employees participate in decision-making as well. However, the terms "decentralization" and "centralization" are relative terms. A business is neither necessarily entirely decentralized nor entirely centralized (Robbin, Coulter, DeCenzo, 2020:57-66).

4.5.6 Formalization

Formalization describes how jobs within a company are standardized and how procedures and rules guide the employees' behaviours. If a job has a high formalization, the individual executing that job has limited freedom to select what is to be done, when is it to be done, and how the employees do it. A supervisor may demand an employee to handle the same input repeatedly in the same manner, resulting in consistent and uniform output. Engineering services are highly codified, with precise job descriptions, well-defined processes, and a wealth of organisational rules covering all operational aspects. Additionally, if formalisation is restricted, job behaviours are unstructured, and workers have significant discretion in carrying out their responsibilities (Robbin, Coulter, DeCenzo, 2020:57-66).

4.5.7 Structure – The Human Services Bus

The Human Services Bus (HSB) is an ideal organisational service structure designed to meet the needs of a demand-driven business environment. Its system is derived from expanding the semantics of traditional services and utilising existing organisational structures, combining them to maximise benefits and reduce constraints. The service is the HSB's central logical entity. A service can be described as anything that performs a particular function to accomplish objectives, tactical results, or strategy implementation. Additional services can be bundled together to create more robust, complex services (Bieberstein et al., 2005:691-708).

Additionally, service agents must be defined to ensure that services operate efficiently and effectively. These are individuals who have been regarded as capable of supervising, mediating, or choreographing services. Their responsibilities and tasks differ by tier and are critical to the HSB's function.

4.5.8 Team services

This section details the HSB's critical services. These services are well-defined regarding the tasks and activities they execute to support the organization's core competencies. The team services group has particular and tight tasks, such as "functional testing of component A in product XYZ," "data access performance benchmarking in the retail business," and "level 1 customer help for component B in product XYZ." The service agent for this layer is a manager responsible for mediating and ensuring that the service is functioning and meets contractual requirements, optimising connections to the collaboration engine, resolving day-to-day challenges, and regularly managing team incentives and morale (Bieberstein et al., 2005:691-708).

4.5.9 Departmental services

At the departmental level, team services are aggregated to deliver on essential business objectives, resulting in departmental services. "Testing component, A in product XYZ," "retail performance benchmarking," and "customer support for component B in product XYZ" are examples of these services. Senior managers are the choreographers of the first level of service, charged with the obligation of comprehending the business objectives given to them. They must create a service workflow based on existing services to

meet those goals while also streamlining workflow connections through collaboration with team service managers (Bieberstein et al., 2005:691-708).

4.5.10 Business-unit services

These services are generated through the coordination of departmental services to accomplish the company's tactical objectives. "Product XYZ testing," "industry performance benchmarking," and "product XYZ customer support" are all examples. Additionally, business unit services can satisfy some of their essential requirements directly through team services, boosting departmental service orchestration. Organizational capabilities are necessary for developing business-unit services that execute and deliver tactical elements and manage critical profit-and-loss results. A director is accountable for planning and implementing services at the departmental and team level to meet these expectations. He or she collaborates with service agents in the layers underneath to analyse the services their unit employs, identify process bottlenecks, reengineer service characteristics as necessary, minimise service redundancy, and design new emerging services (Bieberstein et al., 2005:691-708).

4.5.11 Divisional services

Coordination of services supplied by business units is critical to achieving the organization's strategic objectives. "Supervise product XYZ," "Supervise industry solutions," and "Supervise customer interactions." Divisional services designers have access to the team's gamut, departmental, and divisional services and can make the most use of them. Senior executives, such as vice presidents and general managers, are accountable for accomplishing strategic goals through effective divisional service coordination and financial management (Bieberstein et al., 2005:691-708).

4.5.12 Group services

These initiatives are designed to assist the organisation in accomplishing its overarching mission and objectives. They formulate and carry out strategies through the divisional services they supervise. "Software portfolio services" and "industry-solution services" are two possible examples. Senior vice presidents work closely with the CEO and his executive team to determine the organization's short- and long-term priorities. Each senior

vice president is responsible for monitoring the quality and effectiveness of their division's and business unit's resources and establishing directives to guarantee they accomplish those objectives (Bieberstein et al., 2005:691-708).

4.6 Conceptual Framework of Thesis

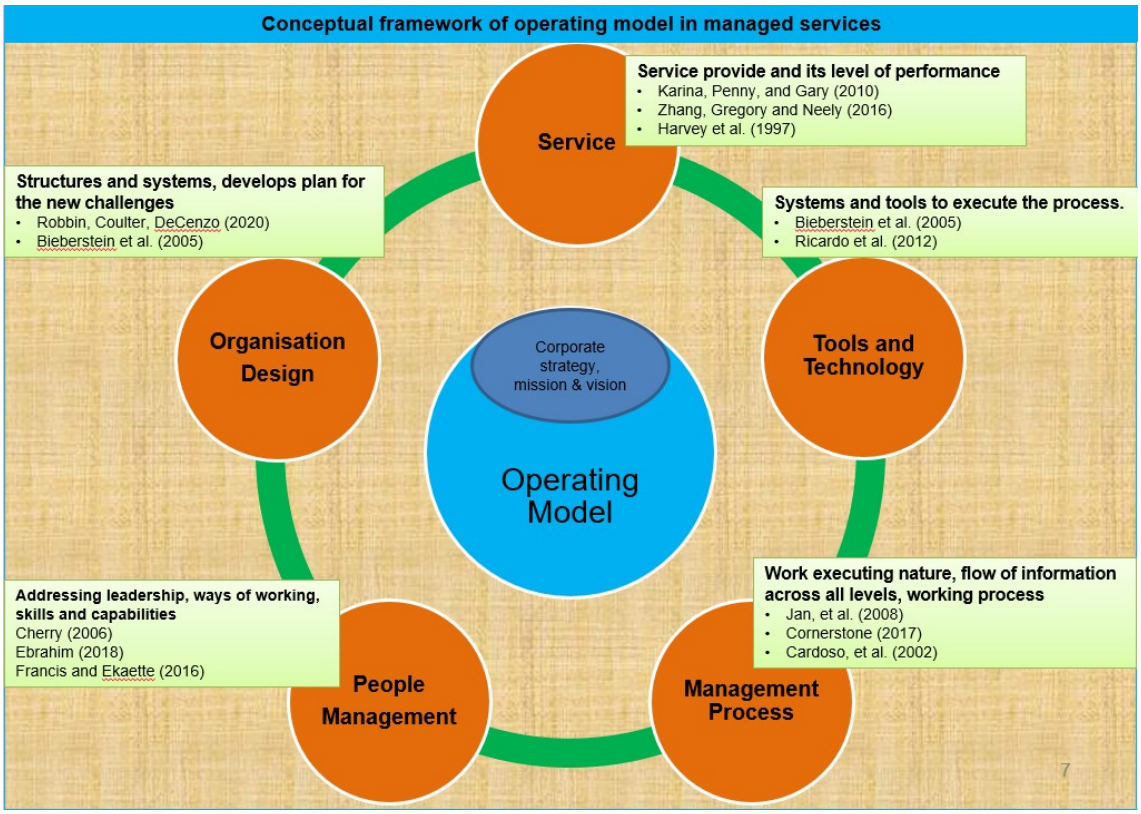

Figure 3. Conceptual Framework

The conceptual framework of this thesis is designed to develop the managed service operating model based on current state analysis from section 3 and existing literature knowledge from section 4. When combined, the result will serve as the foundation for developing a systemic framework for operating model in managed service. The conceptual framework and its main elements are illustrated in Figure 3. Each of the elements has a significant role in the operating model.

1. The first element, "service," illustrates the supplier services, service performance measures, customer service, service flexibility. This element is defining about the supplier services method, process, and operating functions.

2. The second element, “Tools and Technology, “ describes the tools, on-demand workplace, SCOR framework, service directory tool, asset directory tool, employee directory tool, and technology. This element represents the technology infrastructure used in engineering service supplier.

3. The third element, “Management Process”, elaborates on the leadership, knowledge management system, performance management, work execution nature, information flow procedure, implementation of effective stakeholders, building process, understanding and analyzing impacts of the strategy, utilizing the ideal technologies for an organization.

4. The fourth element, “People Management”, provides the existing knowledge about management technique (Autocratic, Paternalistic, Democratic, Laissez-faire Technique), working principle, skills and capabilities.

5. The fifth element, “organisation design,” discusses the specialisation of work, departmentalization, a chain of command, control centralization and decentralisation, and organisational structure.

After describing these elements, this study proceeds to Section 5 to explain the proposal for developing the operating model in managed service, illustrating the operating model’s idea in detail.

5 Building an Initial Proposal of an Operating Model in Managed Service

This phase combines the results of the current state analysis with the conceptual framework to construct the proposal using Data 2. The current state analysis and the conceptual framework of the literature were used to develop a proposal for the managed service's operating model.

5.1 Overview of the Proposal Building Stage

The current state analysis of section 3 detailed the key issues observed during the interviews. The participants were able to execute the daily task without the documented operating process was revealed. The interview participants were able to recognise many improvements they could take to carry on with them, and by doing so, they have been able to keep a closer eye on this study.

The current state finding states that the supplier does not have identification and the resources feel abandoned during the critical decision-making in the customer premises. The case engineering company wants to transform the business model from selling resources to managed services, i.e. offering service packages (complete project package) to a customer instead of resources, which will help bring the resources to the supplier premises. When the resources are in-house, the supplier needs to organise and operate resources to execute the service package task. Managing resources in-house and selling service package is a massive task for the supplier. That is why the operating model is built and proposed to the case engineering company to help operate and organize the resources to solve the issue. The existing literature, journal standards supported getting the proposal off the ground.

The participants from the data 3 stage were called to participate and provide the idea so the proposal draft can be revised for validation. The participant has contributed to refining the draft and built the operating model.

5.2 Findings of Data Collection 2

During the current state analysis and building the proposal, the participants suggested the working model for their daily task execution. Below table 4 illustrates the noted suggestions of key stakeholders, which were very helpful for building the proposal.

Table 4. Participated stakeholder suggestion from the case engineering company

	Key focus area from CS (from Data 1);	*Suggestions from stakeholders, categorised into groups (Data 2)*	*Description of the suggestion*
1	Flow Process Chart Description	State the flow process with fewer substances	Stakeholders suggested having less element for each step for their roles and responsibility.
2	Roles and responsibilities	State the roles with customer	Stakeholders suggested defining the roles with the customer how the key stakeholder handles the task with the customer.
3	Sales Process	Define the managed services sales process	Stakeholders suggested raising the issue of the sales process for managed services.

Table 4 details the ideas and suggestions of stakeholders. The common suggestions and ideas are taken to develop the proposal.

5.3 Process Activity in a logical process order

The process activity steps of the proposed operating model in a logical process order is based on the current state analysis and literature research. The case engineering company requires a common understanding operating process for all domestic and offshore departments

5.3.1 Initiation of Sales Process and Its Execution

In the first step, the sales manager roles are crucial and are in the front line of the sales business process. In the context of the case engineering company, the department manager (DM) acts as a sales manager, takes all the roles & responsibilities and initiates the sales process. The first task is to identify the target customer and to analyse the issues. After identifying the end customer, the sales manager determines the customer pain point with a solution and offers service packages instead of resources. Usually, the customers are buying resources, and it's challenging for the sales manager to propose and convince with the new product, i.e. service package. The sales manager role is very crucial. The sales manager task is to divert their own and customer business model to a new type of approach. The sales manager has to be very careful and required to perform with high negotiation skills, asserting that the offered service package provides enormous value. The sales manager assures the service package frees customer personnel

for other productive tasks like product development, strengthening strategy for the core competitive business segment, etc. When the customer understands the benefit of the service package and accepts the offer, the sales manager further proceeds with the business scope and signs the agreement. The sales manager handovers the service package to the service responsible engineer. The service-responsible engineer is responsible for planning, initiating, and executing within the time frame, budget, and business scope. DM continues to follow the status of the service package to make sure it has achieved the signed agreement with the customer. Figure4 shows the logical process order of the sales manager roles from the initiation to the execution level.

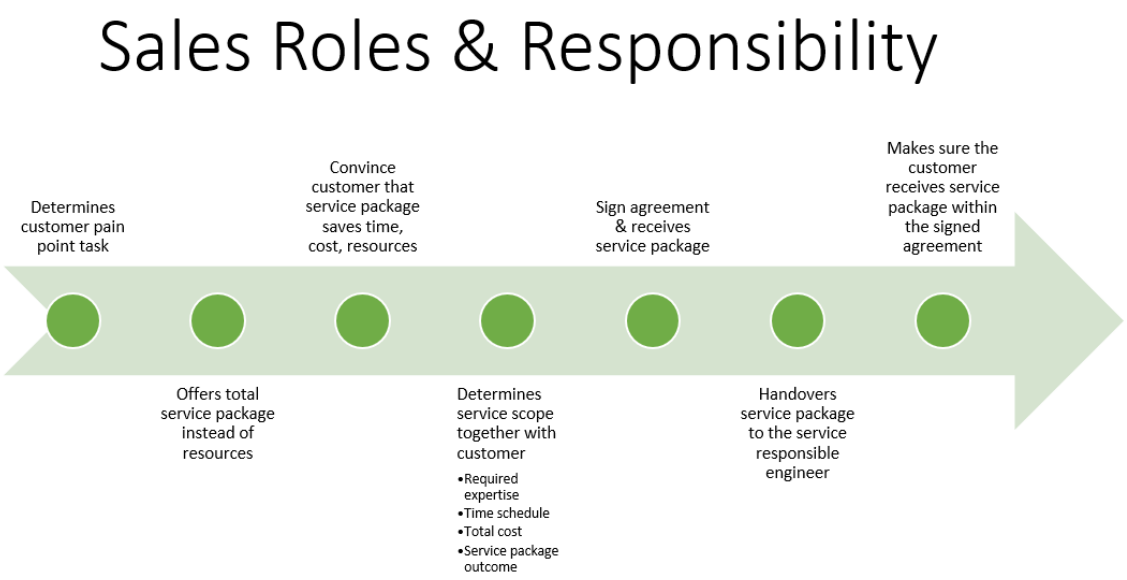

Figure 4. Sales manager executing the task in a logical process order

5.3.2 Recruitment

Below, figure 5 shows the recruitment process of the case engineering company. After the sales process, the next step is to find the proper resources to perform the task until the execution point. In the case company, the department manager (DM) steps forward to recruit the resources. Initially, the DM acted as a sales manager to accurately know the required skills and expertise. The DM finds appropriate resources within the in-house. Usually, the in-house resources are fully engaged in a customer project, but sometimes some resources might be without a task for few days to months. In this scenario, the DM might provide the necessary tools and training to reskill the resources to be assigned for the newly received service package. If there are no available resources within the case

engineering company, the next step is recruiting new resources. The vacancy is announced through different channel and media. The most suitable candidates whose profile has met the requirements are selected for the next interview phase. The highly competitive candidate among the interviewed candidates is selected for the recruitment. The DM ensures the team is complete with all required skill, knowledge, and expertise. Then the team is hand over to the service responsible engineer, who is responsible for managing resources.

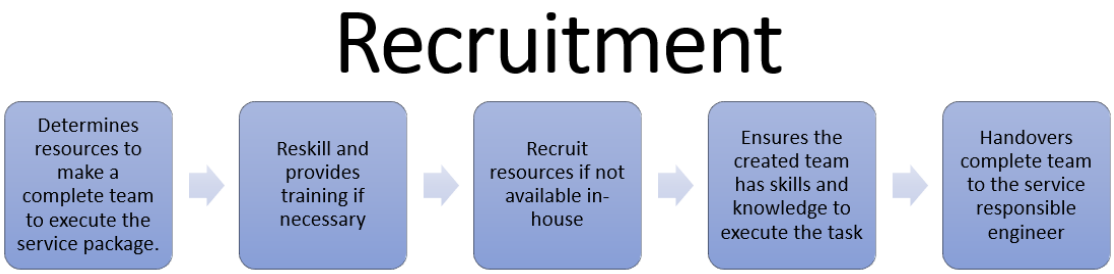

Figure 5. Department manager executing the task in a logical process order

5.3.3 IT Management

Below, figure 6 shows that the IT department receives the request from the DM to facilitate needed tools and equipment. After providing the necessary tools and equipment, the IT manager ensures the task has been performed securely.

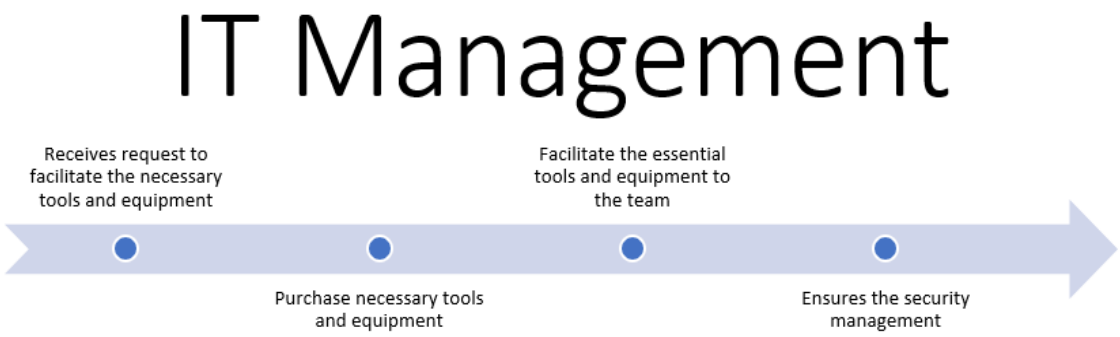

Figure 6. Service package related IT manager tasks in a logical process order

After-sales and recruitment, the DM moves to the next level to fully equip the service package team. The service package team requires all the necessary tools and equipment to perform the task that has been assigned. The DM requests the IT manager to

facilitate the needed tools and equipment. The IT manager arranges and provides all necessary tools and equipment to the team. The IT department makes sure the tools and equipment are working correctly, ensuring the tasks are performed and delivered securely. Cybersecurity is very crucial because a service package is usually coming with a confidential tag.

5.3.4 Service Package

The complete service team is equipped with tools and ready to perform the task. The received service package is ready to kick off. Below, figure 7 shows the service-responsible engineer (SRE) manage the team and service package simultaneously.

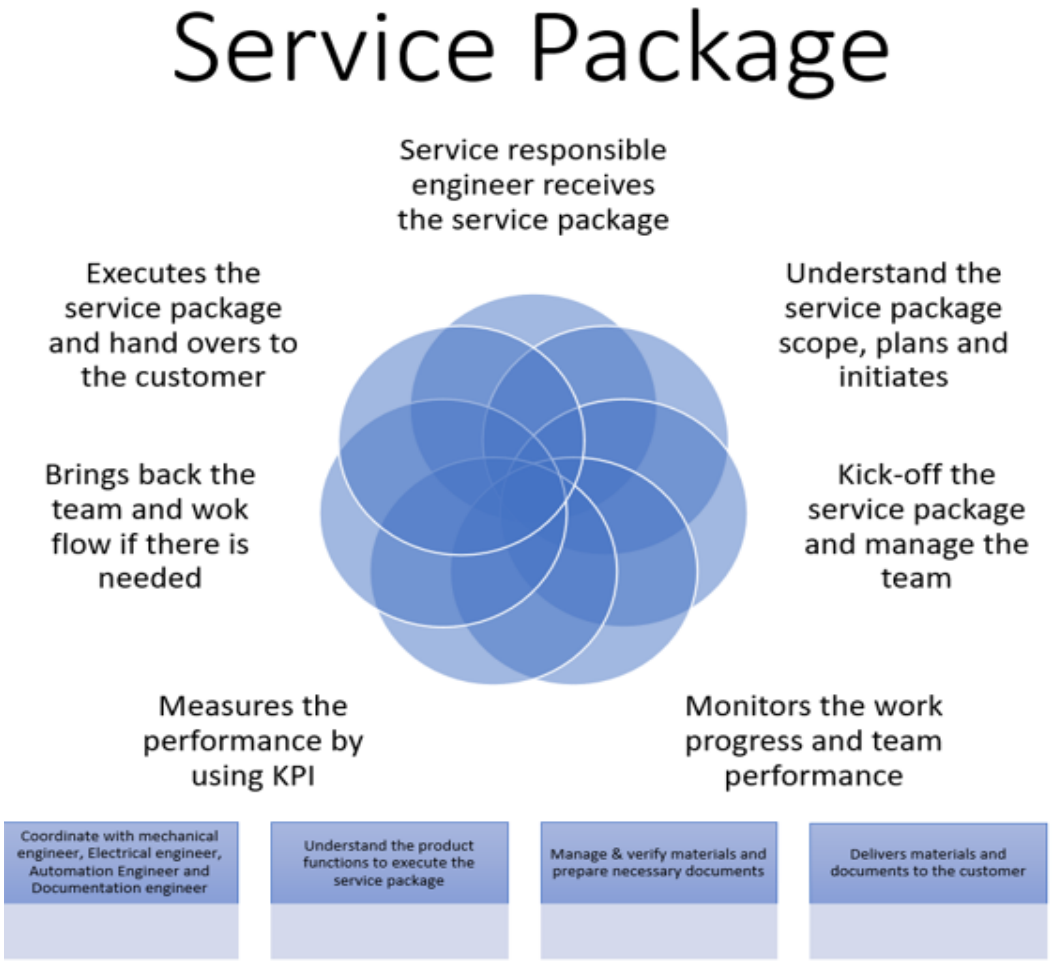

Figure 7. Service package

SRE initiates by understanding the service package, plans the resource and service activities. In a broader sense, the service responsible engineer roles and responsibilities

are parallel to the project manager. After the kick-off of the service package, SRE ensures the service package meets the schedule, budgeting, and other business scopes. The service package depends on the individual industry and organization, but overall, the SRE task is to oversee the time, budget, and resources from inception to completion. SRE is also skilled in shaping the service package trajectory by minimizing the budget costs and maximizing personnel efficiencies, leading the supplier organization to the revenue target.

SRE collaborates with the service package team from different engineering backgrounds like mechanical, electrical, automation, and documentation during the continuous workflow. SRE understands the product functions and coordinates to make the product functions correctly. SRE collaborates with the documentation engineer to document all the necessary materials to be delivered together with the product.

SRE uses KPI to measure the performance of the resources. If there is some weakness, then reports to the DM in the weekly report meeting. SRE requests to the DM facilitate needed short training, increasing the efficiency of resources to meet the required skills and knowledge for the service package. Not only resources, but SRE also monitors the workflow progress and uses KPI to measure the service package progress. There can be a risk that the service package team or workflow can divert to another direction from the scope. If the service package is out of track, SRE directs the team to progress back to the track. SRE overall analyse the risk and manage the service package & resources up to completion.

After completing the service package, SRE successfully handovers the customer within budget and business scope. SRE reports to the DM that the service team has successfully executed the service package within the time, budget and business scope. Therefore, the DM ensures the service package has achieved the agreed outcome within all business substances. After receiving positive feedback from the customer, DM creates an invoice for the customer and executes the service package life cycle.

5.4 Proposal of an operating model

This section introduces the proposal draft. Below, Table 5 illustrates the roles and responsibility of the key stakeholder in logical process order. Table 5 has documented the key substances that are combined from the previously described elements.

Table 5. Initial Proposal for an Operating Model

	Activity steps of the operating in a logical process order							
Participants	Task Relation	Analysis & Information	Facilitation	Service Management	Evaluation	KPI & Services	Agreement & management	Delivery
Department Manager (DM) acts as sales manager	Customer	Determines customer pain point task	Offer total service package instead of resources	Convince customer that service package saves time, cost, personnel	Determines service scope together with customer	Determines service package scope; required skill expertise, time schedule, total cost, service package outcome	Documents agreement and receives service package from the customer	Handovers service package to the service responsible engineer
Department Manager	Service team	Determines the resources within in-house to make a complete service team	Re-skill and provides training to the in-house resources if necessary	Recruit resources if not available within in-house	Ensures the created service team can execute service package	Provides complete service team to the service responsible manager		
IT Manager	Service team	Receives request for required tools and equipment from department manager	Provides necessary tools and equipment to a service team	Assures the service team; all the tools and equipment are working properly	Ensures Security management			
Service Responsible Engineer	Service team	Receives service package from the department manager	Understands the service package nature, initiates, and plans for the project	Directs the dedicated team during the ongoing task	Monitors the workflow process and KPI measures the work progress	Monitors the team and KPI measures the team performance	Manage the service team & brings work back on track if necessary	Executes and delivers the service package in time and within budget to customer
Service Responsible Engineer	Several departments	Coordinates with a mechanical engineer, electrical & automation engineer, documentation engineer	Understands product functions to execute the service package	Manage & verify materials and prepare necessary documents	Delegate documentation and assist in assessment delivery	Delivers documentation and materials to the customer		
Department Manager acts as a financial manager	Finance	Receives information; service package has been executed	Ensures service package has achieved the initial agreement	Creates invoice to the customer key account manager	Receives payment			

This proposal has several segments which are in logical process order according to the individual key stakeholder. One stakeholder has different roles and responsibility with another segment of stakeholder.

The first row describes the sales manager roles. The DM acts as a sales manager. Here, the sales manager responsibility is to sell the product. The very first step is to analyse and accumulate the information of the customer. After determining the end customer issues, the sales manager offers the product, i.e. service package. The sales manager negotiates with the key customer and convinces the offered product frees customer personnel and saves time. When the customer is convinced, a customer's key personnel and sales manager determine the scope of a service package, for example, time, cost, required expertise, and other business scopes. The sales manager and a key customer agree on a standard business substance and signs an agreement remaining within a business scope. Then the received service package is hand over to the service engineer.

The second key stakeholder DM role is to create a complete team to perform the service package task. The DM search resources in-house. If not available, then recruits new resources to fulfil the required position. The complete team is transferred to perform the service package task where SRE manages the resources.

The third key stakeholder, the IT manager, manages to facilitate the tools and equipment to the service package team. It is very crucial to ensure the security that the tasks are performed confidentially and delivered securely.

The fourth and fifth row indicates the role of SRE in a different segment to various participants of the team. In this segment, the stakeholder SRE takes over the service package and service package team to initiate, plan, manage and execution.

The sixth row describes the follow up after the service package execution. The key stakeholder DM measures the outcome that the service package has achieved the agreed result. After customer satisfaction, the DM creates invoices for a customer.

This proposal has an outcome from the current state analysis where the issues were raised. Resource wise; resources were lacking to get the task when they are back home to supplier premises. The resources did not have right in the customer management and decision making. Supplier wise; The DM could not provide the task to engage and could not create an invoice for a customer.

When the DM sells the total service package, then the in-house resources will have tasks to engage. The DM can create an invoice for the customer and increase revenue to meet the annual turnover target. For

The description and validation method is described in section 6. The top-level key stakeholder participated in the validation of a proposed operating model.

6 Validation of the Proposal

The results of the validation stage of this thesis are discussed in this section. And some implementation ideas are documented in the original proposal for an operating model. The recommendation for the proposal from the participant is documented and presented in this section.

6.1 Overview of the Validation Stage

The proposal was based on the current state analysis and the idea developed from the conceptual framework. During the development of the proposal, key stakeholder participated and presented their view and opinion. Based on the participant's opinion and current state analysis issues, the proposal for the operating model was drafted and presented to the top-level key stakeholder from the case engineering company for validation.

The proposal draft was presented through the teams meeting. The material presented during the gate presentation was presented to the key stakeholder so the author of this thesis can present the same substances and get feedback on the same elements.

The validation participant reported that the proposal is in perfect shape and mentioned that the activities' substance does not require additional modification. The author requested to provide some feedback so the proposal can be refined and precisely defined. Therefore, the refined final proposal of an operating model can be recommended to implement throughout the case engineering company.

The validation participant provided three more substances with the idea than the proposed model, i.e. *sales tool to be defined, measuring customer satisfaction after the product is delivered securely and participant roles with responsibility in own business area*. During the teams meeting, the participant informed that there is not documented current operating model. The way the case engineering company has changed their business strategy, top-level key stakeholders revealed no supporting document had been documented for the daily work.

6.2 Feedback on the Proposed Operating Model

The participants provided feedback and improved opinion during the teams meeting. The recommended substances are documented in table 6. This section aims to discuss the recorded substance and create a final proposal based on the initial proposal.

Table 6. Proposal for an Operating Model

	Key focus area from Current State	*Suggestions from stakeholders, categorised into groups (Data 3)*	*Description of the suggestion*
1	Sales tools	Tools that measure the pain point of a customer	Determining and analysing a customer's pain point is challenging, so a specific measuring tool is essential to develop.
2	Customer Satisfaction	Measuring customer satisfaction is necessary	After the delivery of the service package outcome, customer satisfaction level needs to be measured.
3	Participants role	Each participant is responsible for their business area.	A sales manager and financial manager are the proper personnel to handle the sales and financial activities, respectively.

Table 6 illustrates the field notes of the teams meeting. The first comment is recorded in table 6 for future development. The sales tools will be developed based on this paper registered operating model.

6.3 Developments to the Proposal

The common opinions provided by the key stakeholders are recorded. All the recommendations which were not related to the thesis objective are not recorded. Some suggestions were more related to sales management.

However, the customer satisfaction element is recorded and presented in the final proposal. The supplier would like to measure the satisfaction of the customer after the service package outcome delivery. This substance will help the supplier track the customer satisfaction level, which will be the most powerful tool to retain the old customer.

The substance related to sales management is not recorded in the final proposal. The substance which participants suggested is to the depth of sales management. The feedback & suggestions were to find the solutions for sales management and increase the

case engineering company's target revenue. The raised issues during the meeting are as follows:

- How to increase the sales of service package?
- How to find the pain point of the targeted customer?

6.4 Final Proposal

In this section, the final operating model has the sales manager as sales roles and the finance manager as finance roles. Initially, the department manager was acting as a sales manager and finance manager simultaneously. Now, the sales manager is responsible for performing the sales activities while the finance manager is responsible for performing the finance activities. The department manager has one more activity to measure "customer satisfaction". The department manager had an "*ensuring service package has received initial agreement*" element during the financial activity, but it has moved to his business area. Below table 6 illustrates the final proposal of an operating model where the yellow highlighted substance had been either added, revised or moved to its business area according to the key stakeholder's common feedback.

Table 6. Final Proposal for an Operating Model

	Activity steps of the operating in a logical process order							
Participants	Task Relation	Analysis & Information	Facilitation	Service Management	Evaluation	KPI & Services	Agreement & management	Delivery
Sales Manager	Customer	Determines customer pain point task	Offer total service package instead of resources	Convince customer that service package saves time, cost, personnel	Determines service scope together with customer	Determines service package scope; required skill expertise, time schedule, total cost, service package outcome	Documents agreement and receives service package from the customer	Handovers service package to the service responsible engineer
Department Manager	Service team	Determines the resources within in-house to make a complete service team	Re-skill and provides training to the in-house resources if necessary	Recruit resources if not available within in-house	Ensures the created service team can execute service package	Provides complete service team to the service responsible manager	Ensures service package has achieved the initial agreement after the execution	Measures Customer satisfaction (measuring tools need to be implemented)
IT Manager	Service team	Receives request for required tools and equipment from department manager	Provides necessary tools and equipment to a service team	Assures the service team; all the tools and equipment are working properly	Ensures Security management			
Service Responsible Engineer	Service team	Receives service package from the department manager	Understands the service package nature, initiates, and plans for the project	Directs the dedicated team during the ongoing task	Monitors the workflow process and KPI measures the work progress	Monitors the team and KPI measures the team performance	Manage the service team & brings work back on track if necessary	Executes and delivers the service package in time and within budget to customer
Service Responsible Engineer	Several departments	Coordinates with a mechanical engineer, electrical & automation engineer, documentation engineer	Understands product functions to execute the service package	Manage & verify materials and prepare necessary documents	Delegate documentation and assist in assessment delivery	Delivers documentation and materials to the customer		
Finance Manager	Finance	Receives information; service package has been executed	Creates invoice to the customer key account manager	Receives payment				

6.5 Recommendations /Action Plan

The operating model of this thesis is very relevant and helpful in the daily work of the case company. According to the participants, the proposed model's recorded substance is almost the same as the working task. The decision is up to the top-level management to implement or keep it as a recorded document for the case engineering company.

7 Conclusions

This section describes the executive summary of this thesis report. The summary describes and provides information about the solution to the issues and challenges raised in the business context. This section focuses mainly on the crucial content of the body and summarizes.

7.1 Executive Summary

The current business model of the case engineering company is based on supplying the resources, and the case engineering company has initiated a strategy to transform a business model from marketing resources to a total service package. When the business model has been transformed into a complete service package, the case engineering company faces the issues in resource management that need to be addressed. Currently, the case engineering company does not have a documented operating model in a managed service. Therefore, this thesis aims to introduce an operating model in managed service for the case engineering company.

The current state analysis was done with the participation of key stakeholder of the case engineering company. Besides the key stakeholder participation, thematic analysis was also done from the available confined internal document. The issues were identified during the current state analysis, which needs to be addressed in the building operating model. The current state analysis was done by applying qualitative data collection. After the current state analysis, the literature review was done by researching existing literature, book, journal and related business article. The literature review provided the conceptual framework to design the operating model for the case engineering company. The idea developed from the conceptual framework is used as a tool to address the issues collected during the current state analysis.

After analysing the current state analysis and idea developed from the conceptual framework, a proposal of an operating model is built. During the built of a proposal, the key

stakeholders were invited to brainstorm and develop an operating model. Based on the current state analysis, conceptual framework and opinion from the participants, the proposal of an operating model is built. The built proposal model details the roles and responsibilities of the participants and participants activities in logical process order during the operation of the tasks.

The proposal of an operating model was further presented to the top-level key stakeholder of the case engineering company. The purpose of the presentation was to collect the feedback and redevelop it into an actual working level. There was feedback from the key stakeholder to add a task substance and participants position to the proposed operating model. The substance was related to operational tasks for the participants and each business role (area) for each participant.

The final operating model provides participants with a step-by-step process order for completing tasks. Suppose the top executive level decides the proposed model is appropriate, then the final proposed model could be implemented for the regional department where the participants participated during the data collection.

7.2 Next Steps and Recommendations toward Implementation

The case engineering company is a global company, and this thesis report is produced by utilizing only one department of one country. The built operating model does not illustrate the working culture of other countries. It would be wise to call the involvement of other countries participants also. The next step toward recommendation is to further collaborate with the majority of participants from several departments from several countries. Therefore, the appropriate model can be redeveloped based on this thesis report by collecting the vast amount of data through different countries that could provide the current state of the case engineering company. However, the produced operating model is also at a general level for all the departments located around the globe. The author of this thesis acknowledges the developed operating model is more appropriate for the regional department where the current analysis was done.

7.3 Thesis Evaluation

The purpose of this thesis is to develop an operating model in managed service. Since the initial stage of this thesis, the business substance remained constant. The outcome

is produced step by step, following the design plan and staying in the same business elements.

The author realized there could have been a better way to collect more relevant challenges data by calling participants of the several regional branches of the case engineering company. The participants from different region could provide more challenging issues. And that could give the appropriate and demanding challenges for the case engineering company.

The second area was to develop the conceptual framework from the existing literature. There could be a better way to develop the conceptual framework by diving into the deep core content from the business substance and making the current conceptual framework a bit narrower. The narrow and deep conceptual framework could have provided this thesis more relevant and accurate design idea of an operating model. The author realized all the above comment after the final proposal of an operating model was built.

The third area is participants during the building of a proposal of an operating model. The case engineering company is a multinational company. The participants from a different country would produce the general operating model for all the offshore department for the case engineering company.

The evaluation of this thesis is discussed in the four-way as validity, reliability, logic and relevance of search are discussed in the following paragraph.

7.3.1 Validity

According to Thomson, S. B. (2011:78), the term 'descriptive validity' refers to the data's accuracy. When the information is collected from the participant, the transcription report must reflect what the participants are saying. In this thesis report, the current state analysis and building proposal were made by interviewing the participants and documenting the data as field notes and records. In this study, the documented data has been interpreted accurately from the participants' interview.

7.3.2 Reliability

If the report is investigated and reproduced using a similar methodology, the achieved results will be similar is referred to as reliability (Golafshani, 2003:598). To match the reliability, the data collection of this thesis was conducted from the key stakeholders from the different roles in the current state analysis. The same participants were called to provide their views and idea for proposal building to ensure this study can achieve a reliable result.

7.3.3 The logic of this Thesis

This study has followed the logical content through the research design discussed in chapter 2.2. The chapter was presented to the students and instructor of this study. The reference idea of students and instructors were taken into consideration to put the research design in a logical order. The first research was current state analysis, second conceptual framework followed by co-creation of proposal and validation.

7.3.4 Relevance

When the business challenge needs to address then the research is done. Then the objective of the study is formulated. In this thesis, the objective was formulated from the business challenge with the collaboration of the key stakeholders, top-level key stakeholders, who can influence the outcome's implementation.

7.4 Closing Words

The objective was proposed to the resource supplying company. The supplier had decided to change the business environment. Instead of providing the resources, the case engineering company would like to keep the resources in the in-house premises. To keep the resources at their premises, the case engineering company would need more effort to receive service packages from the customer, manage the resources, manage the supplier management, tools, equipment, etc. To manage the resources, building an operating model in managed service is proposed. The outcome of this thesis will provide the case engineering company as a tool to operate the daily task execution. This paper will benefit and influence the case engineering company to further develop an operating model at a general level for an offshore company.

References

Saunders, M., Lewis, p., Thorhill, A., (2009). Research Methods for Business Students. Fifth Edition. Pearson Education Limited, 2009.

Alvarez Gil, J. (1994), [a]Capital budgeting and Flexible Manufacturing. International Journal of Production Economics, Vol. 36, pp. 109-28.

Abdul Qayyum, C., and Hussain, J. (2012). Impact of Transaction and Laissez Faire Leadership Style on Motivation. International Journal of Business and Social Science. 3 (7); 258 -264.

Abernethy, A., and Lillis, M. (1995), The impact of Manufacturing Flexibility on Management Control System Design. Accounting, Organizations and Society, Vol. 20, pp. 241-58.

Adler, P.S. (1988), Managing Flexible Automation. California Management Review, Vol. 30 No. 2, pp. 34-56.

Baltacioglu, T., Ada, E., Kaplan, D., Yurt, O., and Kaplan, C. (2007). A New Framework for Services Supply Chains. Serv Ind J 27(2):105–124.

Bieberstein, N., Bose, S., Walker, L., and Lynch, A. (2005). Impact of service-oriented Architecture on Enterprise Systems, Organizational Structures, and Individuals. IBM Systems Journal, VOL 44, NO 4, 2005. pp 691 – 708.

Brennan, L. (2006). “Operations management for engineering consulting firms: A case study,” J. Manage. Eng., vol. 22, no. 3, pp. 98–107, 2006.

Cardoso, J., Miller, J. A., Sheth, A. P., & Arnold, J. (2002). Modeling Quality of Service for Workflows and Web Service Processes.

Carrillo, P.; Chinowsky, P. 2006. Exploiting Knowledge Management: The Engineering and Construction Perspective, Journal of Management in Engineering 22(1): 2–10.

Chang, C.M. 2010. Service Systems Management and Engineering, Creating Strategic Differentiation and Operational Excellence. John Wiley & Sons, Inc. ISBN 978-0-470-42332-5.

Chang, W. C. ; Li, S. T. 2007. Fostering Knowledge Management Deployment in R&D Workspaces: A Five-Stage Approach, R&D Management 37(5): 479–493.

Cherry, K. (2006). Leadership styles.

Chironis, N. P. (ed.). Management Guide for Engineers and Technical Administrators, New York: McGraw-Hill, 1969.

Cornerstone (2017). 6 Steps to Performance Management Best Practices. A practical Guide.

Daniel, A. (2003). Service Operation Flexibility and Performance in Engineering Consult Firms. International Journal of Operation and Production Management.

Darlington, H. (2018). 9 Paths to great Customer Service. Supply House Times.

David, S., and Joe, Z. (2013). Analyzing Performance in Service Organizations. MIT Sloan Management Review.VOL.54 NO.4. pg 37 -42.

Dhillon, B.S., 2002.Engineering and Technology Management Tools and Applications 1st ed., Boston, London: Artech House Publishers.

Dixon, M., Toman, N., DeLisi, R. (2013). Effortless Experience. The United States, New York: Portfolio Penguin.

Drucker, P. (1999). Management Challenges for the 21st Century, Harper Business School Press, Cambridge, MA.

Duclos, L.K., Siha, S.M. and Lummus, R.R. (1995). JIT in Services: a review of current practices and future directions for research, International Journal of Service Industry Management, Vol. 6 No. 5, pp. 36-52.

Ebrahim Hasan Al Khajeh (2018)," Impact of Leadership Styles on Organizational Performance", Journal of Human Resources Management Research.

Engwall, M., King, R., and Werr, A. (2005). Model in Action: how management model are interpreted in new development. R&D Management, 35(4) 427 -439.

Ernst, A., H. Jiang, M. Krishnamoorthy, and D. Sier, (2004). “Staff scheduling and rostering: A review of applications, methods and models,” Eur. J. Oper. Res., vol. 153, no. 1, pp. 3–27, 2004.

Fitzgerald, L., Johnston, R., Brignall, T., Silvestro, R. and Voss, C. (1991), Performance Measurement in Service Businesses, CIMA, London.

Francis, O., and Ekaette I. (2016). Management styles and employees’ performance in small scale business enterprises in Akwa Ibom State, Nigeria. International Journal of Small Business and Entrepreneurship Research Vol.4, No.1, pp.51-61.

Galbraith, J. (1994). Competing with Flexible Lateral Organizations, Addison Wesley, Reading, MA.

Galbraith, J. (2000). Designing the Global Corporation, JosseyBass, San Francisco, CA.

Goodman, J. (2009) Strategic Customer Service: Managing the Customer Experience to Increase Positive Word of Mouth, Build Loyalty, And Maximize Profits.

Hajra, A., Kairat, M., Muhammad, B., Shafaq, I., Ziaur, R. (2019). Impact of Personality Trait and Paternalistic Management Style on Job. Journal of Research in Psychology, 1 (2); 1-5.

Hargaden, V., and Ryan, J., (2015)."Resource Planning in Engineering Services Firms" (2015). Supply Chain Management and Analytics Publications. Transactions on Engineering Management, VOL. 62, NO. 4. page 578 -590.

Harindran A., Chandra V., (2017). Research Methodology. Pearson Education India

Harvey, J., Lefebvre, L.A. and Lefebvre, E. (1997), [a]Flexibility and technology in services: a conceptual model, International Journal of Operations & Production Management, Vol. 17 No. 21, pp. 29-45.

Hayes, R.H., Wheelwright, S.C. and Clark, K. (1988), Dynamic Manufacturing: Creating the Learning Organization, Free Press, New York, NY.

Heisig P., Clarkson J. (2014) Modelling and Management of Engineering Processes – Concepts, Toosl and Case Studies, University of Cambridge, United Kingdom.

Hughes A.M. (1994) Strategic Database Marketing, Probus Publishing Company, Chicago

IBM. (2004). On Demand Workplace Online Documentation.

Jan Kratzer, Roger Th.A.J. Leenders, Jo M.L. Van Engelen. (2008). The social structure of leadership and creativity in engineering design teams: An empirical analysis. J. Eng. Technol. Manage. 25 (2008) 269–286.

Golafshani, N. (2000). Understanding reliability and validity in qualitative research.

Karina, F., Penny, B., and Gary, G. (2010). Engineering services in the Americas. Report of the Centre on Globalisation, Governance & Competitiveness, Duke University, Durham.

Katiyar, Jyoti; Khalid, Anila. 2014. Analysis of role of Performance Management in Human resource management and measures for its improvement. International Journal of Advanced Research in Engineering and Sciences.

Kedia BL, Lahiri S (2007) International Outsourcing of Servicess: A Partnership Model. J Int Manag 13(1):22–37.

Lacity M, Willcocks L, Rottman J (2008) Global outsourcing of back office servicess: lessons, trends, and enduring challenges. Strat Outsour 1(1):13–34.

Linderman, Kevin; Schroeder, Roger G.; and Sanders, Janine, (2010)."A Knowledge Framework Underlying Process Management". Journal of Decision Sciences Volume 41 Number 4. Pg 689 – 719.

McCarhy, E. (1996). To Outsource or No to Outsource? What's Right for You? Pension Management, Vol. 32. No. 4, pp. 12-17.

Mihalis, G. (2011),"Management of service supply chains with a service-oriented reference model: the case of management consulting", Supply Chain Management: An International Journal, Vol. 16 Iss: 5 pp. 346 – 361

Mortazavi, S. M. H. 2010. Consulting Engineering firms as Learning Organization. Academic Conferences Ltd.

Parikh, M.A. and Joshi, K. (2005), "Purchasing process transformation: restructuring for small purchases", International Journal of Operations & Production Management, Vol. 25 No. 11, pp. 1042-1061.

Quinn, B. and Hilmer, G. (1994). Strategic Outsourcing.Sloan Management Review, summer, pp. 43-55.

Ricardo, P., Arnit, L., Bil, T., and Oscar, H. (2012). Service System Engineering: Emerging Skill and Tool. Procedia Computer Science 8 (2012) 420 – 427.

Robbin, S., Coulter, K., and DeCenzo, A. (2020). Fundamental of Management (10th Ed).

Robert Joslin Ralf Müller , (2016b),"The impact of project methodologies on project success in different project environments", International Journal of Managing Projects in Business, Vol. 9 Iss 2 pp.1-32.

Robert, J., and Ralf, M. (2016a). The Relationship between Project Governance and Project Success. International Journal of Project Management 34 (2016) 4: 613 – 626.

Thomson, S. B. (2011). Qualitative Research: Validity. JOAAG, Vol. 6.

Sampson, S.E. (1996), ªRamifications of monitoring service quality through passively solicited customer feedback. Decision Sciences, Vol. 27 No. 4, pp. 601-21.

Spohrer, J. (2008), “Services sciences, management, and engineering (SSME) and its relation to academic disciplines”, in Stauss, B., Engelmann, K., Kremer, A. and Luhn, A. (Eds), Services Science: Fundamentals, Challenges and Future Developments, Springer, Frankfurt, pp. 11-40.

Suarez, F.F., Cusumano, M.A. and Fine, C.H. (1996), ªAn empirical study of manufacturing flexibility in printed circuit board assembly. Operations Research, Vol. 44 No. 1, pp. 223-40.

Thamhain, J. (1990). “Managing Technology: The People Factor,” Technical and Skill Training, August/September 1990, pp. 80–84.

Thamhain, J. (1992a). Engineering Management, New York: John Wiley and Sons, 1992.

Thamhain, J. (1992b). “Developing Engineering Program Management Skills,” in Handbook on Management of R and D and Engineering, D. F. Kocaoglu (ed.), New York: John Wiley and Sons, 1992, pp. 400–421.

Tserng, H. P.; Lin, Y. C. 2004. Developing an activity-based Knowledge Management Systems for contractors, Automation in Construction 13(6): 781–802.

Tserng, H. P.; Yin, S. Y. L.; Lee, M. H. 2010. The use of knowledge map model in construction industry, Journal of Civil Engineering and Management 16(3): 332–344.

Yu, W. D.; Yang, J. B.; Tseng, J. C. R.; Liu, S. J.; Chang, P. L. 2009. Enhancing engineering services with integrated proactive knowledge management model, in International Symposium on Advancement of Construction Management and Real Estate, CRIOCM 2009, 29–31 October 2009, Nanjing, China, 2409–2416.

Yu, Z.; Haghighat, F.; Fung, B. C. M.; Zhou, L. 2012. A novel methodology for knowledge discovery through mining associations between building operational data, Energy and Buildings 47: 430–440.

Zhang, Y., Gregory, M., Neely, A., 2016. Global engineering services: Shedding light on network capabilities. Journal of Operation Management. 42–43, 80–94.

Current State Analysis Interview of the case engineering company

Informant 1: Depart Manager
Informant 2: Director, Service Solution
Informant 3: Director, Engineering Services Development
Informant 4: SVP, Global Sales
Informant 5: Depart Manager
Informant 6: Depart Manager
Document: Field Notes

The following questions aim to get the idea of the current state of an operating model of the case engineering company. The questions are attached in this appendix to report how the current state of analysis has approached this level. The answers are only available to the evaluator.

1. Could you brief me on the current operating model?
2. How would you describe the current ways of working in the CV operating model?
3. What are the significant issues in the CV operating model?
4. What kind of challenges the department manager faces while the employees are at customer premises?
5. Could you provide the current model that corresponds to key stakeholders' roles and responsibilities?
6. What kind of challenges does the employee face at the customer premises?
7. Do you have recorded customer feedback and comments on the issue that needs to be solved?
8. Do you think the sales department have efficient tools to execute the operating model tasks?
9. Which of the key elements need to be improved to operate successfully?
10. How do you perceive the importance of an operating model?
11. How do you approach new customers?
12. Do you see room to improve in the current way of working?