TALLINN UNIVERSITY OF TECHNOLOGY

SCHOOL OF ENGINEERING

Department of Mechanical and Industrial Engineering

HOSPITALITY SERVICE PROCESS ANALYSIS AND IMPROVEMENT BY THE LEAN APPROACH

MAJUTUSTEENUSE PROTSESSIANALÜÜS JA PARENDAMINE KULUSÄÄSTLIKU LÄHENEMISVIISI ABIL

MASTER THESIS

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Tallinn 2020

AUTHOR'S DECLARATION

Hereby I declare, that I have written this thesis independently. No academic degree has been applied for based on this material. All works, major viewpoints and data of the other authors used in this thesis have been referenced.

18th May 2020

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Thesis topic:

(In English) Hospitality service process analysis and improvement by the lean approach

(In Estonian) Majutusteenuse protsessianalüüs ja parendamine kulusäästliku lähenemisviisi abil

Thesis main objectives:

1. To understand lean tools and techniques applicable in hospitality service improvement and identifying wastes involves with the process and eliminating waste.
2. To recommend appropriate lean tools and techniques applicable to hospitality service sector in order to simplify and standardize the work processes.
3. Based on the analysis and result providing possible solutions or proposals that will enhance the service process.

Thesis tasks and time schedule:

No	Task description	Deadline
1.	Topic proposal and structure of thesis	10.02.2020
2.	Literature search and reading	05.03.2020
3.	Methodology design	01.05.2020
4.	Analysis and result	10.05.2020
5.	Final reporting	25.05.2020

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PREFACE

This thesis work initiated by Md Hafizur Rahman on the topic hospitality service process analysis and improvement by lean approach. In order to complete thesis I have chosen case form my current working place and thesis work completed by me.

In order to finish this thesis number of people having contributed especially cordial, thanks go to my supervisor Kashif Mahmood, lecturer and engineer –Department of Mechanical and Industrial Engineering, Tallinn University of Technology, Estonia, and my manager Daniel Stoilov- operation manager Hilton Tallinn Park, who supported for data collection process and by consulting. The completion of this thesis work would not be possible without the extremely relevant assistance and the encouragement of them. Special thanks go to the head of the program professor Kristo Karjust to give me a change to get in the program and achieve this accomplishment.

I would express my sincere gratitude to my friends who were helping and advising me during the thesis work. I would like to express also sincere gratitude to my family especially my beloved wife who supported me throughout the two years of the study period and always motivated and encouraged me. At the same time I would like to highly express my gratitude to my elder brother Towhedur Rahman and my parents who made a significant contributions to my academic career, without their support and encouragement never would have been possible for me to gain this achievement.

Finally, I would like to say this Master's thesis aim is to work on hospitality service process analysis and improvement by using lean approach; therefore it was a great opportunity to learn about lean approach and its tools and techniques usability not only in manufacturing but also service sector especially in hospitality industry.

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LIST OF ABBREVIATION

TPS - Toyota production system

JIT - Just-in-time

VSM – Value stream map

SMED – Single minute exchange of dies

TQM – Total quality management

TPM – Total production management

ERP – Enterprise resource planning

F&B – Food and beverage

VOC – Voice of customers

FO – Front office

HSK – Housekeeping

VAT – Value-added time

NVT – Non-value added time

LIFO – Last in first out

FIFO – First in first out

HRC - Human-robot collaboration

HR – Human resource

INTRODUCTION

Due to globalization within the competitive business world, the extent of customer expectation is the main key to fulfilment. The service industry is one of the most important industrial categories which highly contribute to the economy. Since quality is one of the foremost important factors for various competitive advantages within the global marketplace and corporations are forcefully to adopt quality management tools and practices for continuous improvement so as to attain the upper performance and business excellence. However, it's been seen competition between hotel industries growing very sharply, therefore hospitality industry has to work on very effectively its operation to enhance the standard of the products and services and implement competitive strategies to chop the operational costs and lift efficiency because service quality is that the core activity within the hospitality industry and its role within the success of the hospitality sector cannot emphasize enough. It’s the character of the hospitality industry to continually improve and enhance the standard of services for business success.

By using lean approach possible to enhance cash management, reduction error ensures fewer delays, fewer complaints, reduced operational tasks, reduction of rework, and improvement of productivity and overall reduces the unnecessary movement within the full-service process. Lean thinking particularly is a very effective and proven technique of eliminating waste and acceleration of process flow. Implementing it within the hospitality industry ensures the very best level of customer satisfaction at an identical time by cutting costs and reducing the process of the tasks.

However, the aim of this thesis is to review the lean approach and its tools and techniques, presenting the way of process improvement within the hospitality industry. The introductory chapter was designed for presenting the background of the study, problem statement, research questions, objective, and definition of the most important concepts, important of the study, and finally presented a plan for the whole research. In order to understand the area of lean literature, a review has been organized based on the objective. In the analysis and discussion part, the author presented the implemented result found by using lean tools and techniques that supported the literature review. Finally, a conclusion is drawn on the overall research process and finding. Moreover, this study provides the deep hospitality process analysis on the standard operating procedure based on selected literature and implement so as to spot or define the matter within the process or identify the non-value added process, measure the method performance, analyse and at last improvise

by addressing and eliminating the basis cause and providing a controlling method for the longer-term process performance.

Background of the study

Most of the organizations use some shorts of business approaches which enables them to satisfy their customers while providing their products or services with few resources because customer satisfaction or customer loyalty is one of the many factors that determine the success of the organization. The customer stays loyal once they receive a high level of services or products. However, there are many tools and techniques companies use so as to satisfy their customers and learn one among the most effective tools and techniques that ensure a better level of customer satisfaction by using limited resources and efforts. Lean has been very useful techniques for the manufacturing and production industry and plenty of books and publications focused on lean explain the implementation of techniques including manufacturing, healthcare, banking, telecom, insurance and many more are successfully implemented to enhance the method.

The implement of lean is still not very attentional within the hospitality industry because there is an absence of research and study conducted within this area. Also, many service industries like hospitality think lean associated with manufacturing and production and lean first invented for the manufacturing industry. In recent years lean is getting used all told styles of organization and lean philosophy significantly contributing to the method improvement of the business process. In particular, the business within the industry like hospitality can put in this business process improvement plans like lean methodology so as to supply their customer a better value, distinctive and authentic experience while developing their competitive advantages like increase benefits, lower the value by eliminating waste from the method and solving the matter from the method, improve effectiveness and efficiency, develop the effective team by getting employees involved and fostering trust and therefore the ultimate result's enhanced customer satisfaction.

However, this thesis intended to conduct a study on hospitality process improvement by using lean approach. Len could be a process improvement methodology focused on providing value to the customer through the business decisions that eliminate waste and optimize resources. Lean provides organizations with a transparent competitive advantage since the proper application of the lean principle brings benefits, for

instance, greater productivity, and greater throughput, improve quality, reduce cycle times, less fire-fighting, smoother operation, and reducing budget items.

Problem statement

F&B is a front line operation and has direct connection with customers and it is very crucial and important area of hospitality business, therefore service process has to be highly optimized but according to the current state of process, it is very clear that, there are many wastes of human resources and involved unnecessary process. Author believes that, when there is no optimized process of the service it highly impacts the business and lead customer dissatisfaction. From that point of view, author has taken the case into consideration to optimize the current process by using lean approach which has not been used widely in the hospitality sector before.

Research questions

A research question is very important to start any kind of study because; research question is an answerable inquiry into a specific concern or issue and initial step for a project. Research questions also guide the researcher to collect the data and require elements to design the research until completion. However, for this particular thesis work author intended to design the work based on the certain questions and questions are connected to each segment of the thesis work such as for the literature part, choosing suitable method from the literature and coming up with some good solutions at the end of the work, therefore, following questions are developed to carry out the research:

1. What is lean and what are the lean tools, techniques and how to identify the wastes from the hospitality service process in order to standardize the process by using lean tools and techniques?

2. What is the suitable lean method can be implemented to improve the hospitality service process?

3. What are the possible solutions that can accelerate the hospitality service process?

Objective of the thesis

The objective of any study helps to achieve the aim of the research. Research objectives also guide to get the right solution for a particular problem. However, the objective of the study needs to be specific, measurable, achievable, realistic, and constrained, therefore in order to complete this thesis work, the following objectives are taken into consideration.

- To understand lean tools and techniques applicable in hospitality service improvement and identifying wastes involves with the process and eliminating wastes.
- To recommend appropriate lean tools and techniques applicable to hospitality service sector in order to simplify and standardize the work processes.
- To compare the result between As-Is Process and To-Be Process by using value stream mapping.
- The lack of comparative studies had done related to lean implementation in hospitality service process improvement therefore, this study aim to enhance lean applicability in this sector.
- Providing possible solutions or proposals that will enhance the service process.

Research approach

Research approach gives the idea to researches how to come up with the research result and help to choose relevant literature and data collection methodology. The main challenges for this thesis work are to review the implantation of the lean method tools and techniques not only in manufacturing but also in the service area, especially for hospitality service. Most of the research on lean is cantered on manufacturing and its impact on the company's performance and improvement, however, less focus has been given on lean implementation in the service sector especially in the hospitality sector. Hence, the subsequent research is concentrated on the role of lean tools and techniques in process improvement in order to identify the non-value and value-added activities within the F&B service of the hospitality sector.

Key concepts of lean

The following author described the key concepts of lean because it is very important to display the basics of lean before going into the details. In the literature review, the author has covered different areas of lean principles and implementation within the service and hospitality industry, therefore author believes basic concept clarification is important to understand the theory of lean deeply in order to implement or practice.

Lean production:

Lean production is an approach to manage that focuses on extirpation waste, whilst ensuring quality. This approach is often applied to any aspect of the business. Lean production aims to chop costs by making the business more efficient and attentive to market needs. This approach has taken off to chop out or minimize activities that don't add value to the production process, like holding of stock, repairing faulty products, and unnecessary movement of individuals and products around the business.

Lean thinking:

Lean thinking is doing more with less meaning: use the smallest amount of effort, energy, equipment, time, facility space, materials and capital-while giving customers exactly they need and wish to follow the principal are: specify a value, identify the value stream, flow, pull and pursue perfection.

Lean services

Lean service could be a lean thinking application within the service industry. Lean service focuses on market conditions, customer needs, eliminating the waste of the entire service process, reducing cost, and providing more perfect service. Lean service identifies the waste within the service process like design waste, service flaw waste, serviceability waste, service process waste, and repair delay waste. No waste is upper than customer satisfaction.

Waste

Lean thinking aims to get rid of the wastes from the work process because waste elimination is one of the foremost effective ways to extend the profitability of any business. However, waste is any action or step within the process that doesn't add value to the customer. In other words, waste is any process that the customer doesn't want to procure. It includes any activity that does not add value besides the lowest equipment, parts, and employees, which are required for the business.

Process

The process is a graphical representation with an illustrative description of how things get done. In other words a process is a series of standard action tools or techniques that are applied to transform the inputs to the process into output. It helps to visualize the activity and guides decision making. Process mapping helps organizations in many ways and possibilities to identify the value-added, non-value added, and require activity.

Value-added activity

Value-added simply will be defined as something customers willing to pay to receive. If the customer isn't willing to buy it, then there's no value. A narrower definition is can be of value-added activity is one which contributes to the customer's perceived value of the products or service. Value-added activities help in converting a product primary stage to end product or service within the least possible time, at minimum cost.

Non-value added activity

Non-value added activities may be explained as steps of the method of a service that fails to fulfil the customer requirement or demand. Non-value added activity can be explained as an activity that absorbs resources but creates no value. Non-value added activities include rework, inspection, movement, and any of the activities of the 8 waste.

Significance of the study

Lean has quickly become the foremost important method to keep up business process quality in many industries, helping organizations attain higher effectiveness and improved operational efficiency. These vital aspects within the hospitality industry, giving a hotel a competitive advantage because of great customer service, the specified guest experience, and the top quality of service. However, much research has already been conducted within the manufacturing and different areas of service industries based on the lean but very little attention has been given to hospitality sector, therefore the aim of the thesis is process improvement within the hospitality industry by using lean methodology, and significance of the study very relative and demandable. The study has considered even very significant for the following reason:

- Identifying and meeting the specific expectation of the customers and delivering high-quality service to customers in the hospitality industry is imperative for achieving sustaining competitiveness. Implementing lean in the hospitality business leads processes efficiently and effectively which also leads to increased customer satisfaction and improved service quality.

- Quality is the key factor for any organization and lean is a proven method to increase the quality and possible to implement in the hospitality industry as the hospitality business requires daily basis quality improvement.

- Lead time is also very important for service providers especially for hospitality because lead time measures how long it takes to complete a process from beginning to end and the hospitality industry is a very useful tool to work on it.

- Sustainability is the main goal of the business by offering its unique product and services. The less waste and better is the sustainability of the business. Lean implementation identifies the waste very easily and ensures company sustainability in the competitive market.

- Using lean tools and techniques is possible to make employee tasks easy because they know about the plan, routine, can avoid unnecessary tasks and movement, therefore, boost productivity and at the same time employee satisfaction which is even more important in the hospitality business.

- Ultimately the less is waste; cost the higher is the profit. By lean implementation manufacturing and much service industry significantly increase their profitability and it is also possible in the hospitality sector.

Thesis outline

The thesis work has divided into five parts. The first part introduction which consists of a background of the study, problem statement, research questions, key concepts of lean, importance of the study, and thesis outline. The second part consists of the introduction of lean, lean principles, 8 waste, and lean in manufacturing, service and hospitality industry. The third chapter research methodology. The fourth part analysis, proposed solution and compare the result. Finally, a general conclusion presented for the whole research.

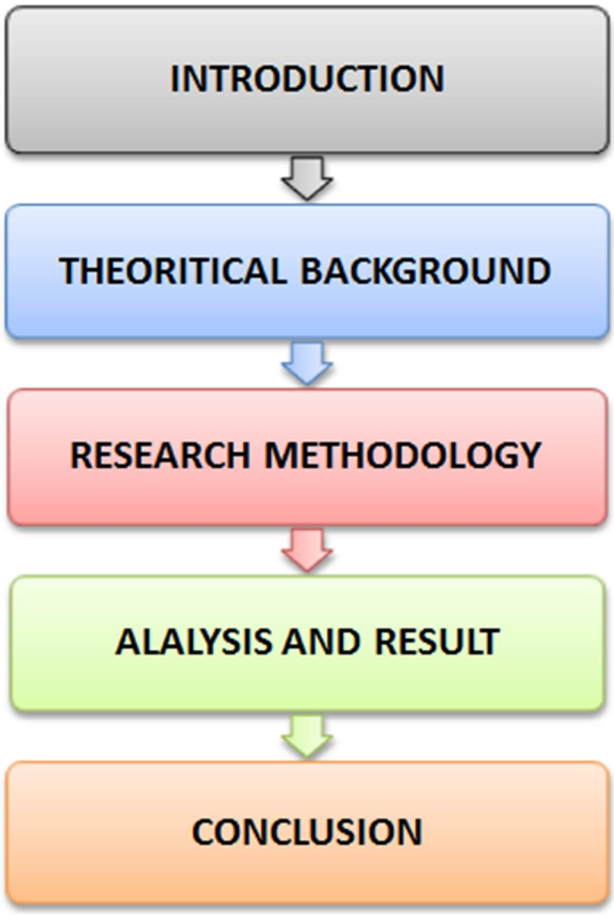

Figure 1: Thesis outline

1. THEORETICAL FOUNDATION

The theoretical foundation has been designed for the overview of lean and based on the existing knowledge, observation, and ideas relevant to a research problem where presented the key concept, models, and assumptions to guide the thesis work. In order to design the theoretical foundation, author have used various articles, textbooks, internet websites, different electronic databases such as Google Scholar, EBSCO, science direct, research gate EBL eBook platform, google books platform, and books from Tallinn University of Technology.

1.1 Background of lean

1.1.1 Introduction of lean

The starting point of lean activities can be traced back to the Toyota Production System (TPS) and was created by Taiichi Ohno at Toyota Motor Corporation. This system was emphasized on the effective utilization of the resources through level scheduling to help companies achieve more with less human effort, time, and cost [1]. From that point forward, TPS has persistently developed and turned out to be known in the West, initially as just-in-time (JIT) production. Afterward, it had been advanced as lean production or lean thinking[2].

Lean could be a systematic approach to scale back or eliminate activities that don't add value to the method. It emphasizes removing wasteful steps in a very process and taking the sole value-added steps. The lean method ensures top quality and customer satisfaction. It also helps reduce process cycle time, improving product or service delivery time, reducing or eliminating the possibility of defect generation, reducing inventory level, optimizing resources for key improvements among others. Enhancing value for the customer is that the essence of Lean. This means delivering what the customer needs when it's required and at the sole possible price. Lean offers a structured methodology that maximizes value for the customer through the elimination of waste from an organization’s activities. Lean examines the complete value stream. The worth stream is described due to the sum of all activities completed by a company to provide a product or to deliver a service. The elimination of waste may be a key underlying principle of Lean. It requires moving far from the traditional approaches to process improvement and instead of specializing within the merchandise or service provided to the end-customer. A culture of continuous

improvement is very important to any organization's sustained success within the elimination of waste. Instilling this culture is completed by considering aspects of the business.

The Lean way to determine value is whether or not customers will pay for that step in the process[3]. Lean accomplishes this by determining if steps in a very process are value add, non-value add, or customer value-add. The value-add and customer value add are steps that can't be eliminated from a process. Costs savings in lean are realized by eliminating the non-value add steps. A preferred tool for identifying the non-value adds steps are by way of the worth stream map. Value stream maps are a visible layout of a process step by step. They're usually wiped out a bunch setting with those at home with the method analysed. Once wasteful non-value added steps are identified and eliminated, the organization is more apt to concentrate on delivering a more customer value added product[4].

Another key principle of Lean is an organized workspace. Reducing the clutter, unnecessary items in a very workplace, and maintaining a clean workspace has many benefits. a number of these benefits include giving the world a more professional look, making the operational environment easier to navigate, and enabling relief workers to require over for others in an efficient fashion. Other practitioners defined lean as an applied model of substantive techniques that perform the required tasks in the process while maintaining the minimum of activities that do not add value to the end-customer [5]. Similarly,[6] pointed out that lean is a management approach that attempt to organize the human activities to deliver more added values to customers while eliminating waste inside and afar organizations value chain. It is an approach to monitor and control the waste inadvertently generated by a specific process to accomplish cost lessening, quality and proficiency optimization with less exertion[7].

Based on the definitions it will be said that a lean approach provides people with the tools to assist them and their companies to seek out hidden wastes and to tackle them and also lean could be a process improvement methodology and lean has been implemented across a range of producing, service, and repair organizations. This can be mainly because of its participative nature and its journal of providing efficiency and price savings at the identical time as embedding a culture of continuous improvement. Therefore, lean tools and techniques create a change of organizational culture so as to implement the 'good practice of process/operations improvement that enables the reduction of waste, improvement of flow, more target the requirements of shoppers and which takes a process view'. Lean implementations should ideally involve a programmed of continuous improvement that's wide-ranging and ends up in the entire

of the organization visibly changing over an extended period of your time. As far because the different definition it's clear that lean mainly implemented to enhance customer satisfaction by using different tools and techniques and these tools and techniques helps to eliminate the non-value added activities from the process. However, the subsequent chapter presented the lean principals from the various author prospective.

1.1.2 Lean principals

By bearing on the Oxford dictionary (2010), "Lean" means thin, lacking in richness and quantity, economical, sharp, and low content. The main idea beyond the Lean concept is to maximize the customer's delivered value while minimizing waste. The philosophy of Lean is to deliver a service of prime quality at a lower cost. The lean thinking prescription for the elimination of waste (Muda, Mura, and muri), might be a five-stage process called lean principles which are explained as follows:

Figure 2: lean principals[8]

Define Value:

The customer defines the worth of a product or service. Hence, the first step is to identify customers and need to know customer value. It is highly required to understand what is of value to the customer[9]. and understand his/her requirement [10]. As well as, it needs to identify the customer expectations of the product[11]. In addition, [10] the concept of customer value aimed to identify the internal and external factors that affect the decision of customers. Value can be identified in terms of the activities that add or do not add value to eliminate waste[12].

Map the value stream:

The value stream mapping displays the workflow process stages for a product or service. The value stream mapping helps to identify & eliminate NVA activities. This eventually helps to reduce the process delays and thereby improves the quality of product/service. Value stream mapping is determining all activities required for the right product[11]. This step refers to determining the activities and the route of products from start to finish when done correctly will produce products and services that achieve customer value[10].

Create Flow:

Create flow to the customer by ensuring a continuous flow system in producing product or service. Flow will optimize the process to maximize process efficiency. The aim is to create a constant flow of product without interruptions from start to finish, such as: avoiding any "bottlenecks" or "Batch and queue"[11]. [13][10] reported that this step required that all effort would be made to reduce the barriers that prevent such flow.

Establish Pull:

Establish pull method by meeting system beat time. The beat time is the rate at which a product must be ready to meet customer demand. JIT (Just in time) is a tool promoting the Pull system. This ensures a smooth workflow of the process without any disruptions. It also helps to diminish inventory levels.

Seek perfection:

It is a journey of continuous improvement; it seeks to deliver products and services as the customer needs at a suitable price for them. There are several factors required for the perfection process including; adding value, available, adequate, flexible, and continuous flow. If one of these factors fails the waste will appear[10][11] therefore

must need to put consistent efforts to improve the existing business processes to cater to ever-changing customer needs. This ensures the elimination of waste and defects of free products & quality service to customers. The following chapter presented to show the 8 waste with examples and risks:

1.1.3 Eight waste according to lean

According to[14] lean is about eliminating waste and creating customer value and consists of principles that constitute the backbone of the philosophy. Various tools that together came to be referred to as lean production were first pioneered at the Toyota Corporation and were later employed in the automotive, manufacturing and repair industry[15]. Consistent with [15] the TPS has defined three broader styles of wastes, "Muda" (original wastes created within the work floor), "Muri" (all unreasonable work done by workers and machines thanks to the poorness of the organization) and "Mura" (unevenness of the work/process),[16]. By using the lean methodology it is possible to remove below mentioned eight types of waste, which are the non-value added activities in the process. These wastes are further explained below:

Table 1: Explanation of eight waste [17]

WASTE	DEFINATION	EXAMPLES	RISKS
Defects	Errors, producing defective work that needs to be redone.	Info entered incorrectly or not at all during order entry. Receiving the wrong material, or not receiving it at all. Returns material showing up without appropriate paperwork.	Adds expense but no benefit; costs time and money; creates delays; adds risk of being damaged, misplaced or lost.
Overproduction	Producing too much or too soon, doing work before and irrespective of customer demand.	Working an order before it's needed, like tag and hold. Processing paperwork early because of free time. Keeping paper AND electronic copies of paperwork.	Consumes resources could use elsewhere; risk of losing sales due to "tied up" inventory.
Waiting	Material or people waiting for work, resources, information.	Staged material waiting to be picked up. One department waiting on clarifying info from other department. people waiting for work when unbalanced demand. When work is slow, employees take an improvement item work on).	Costs time and money, stops flow to customer, causes stress to employees.
Non-utilizing talent	Underutilization of people's talent like knowledge, skills, abilities, etc.	Lack of cross-training among similar positions. No standards for people to follow and then improve.	Frustrated and unfulfilled employees, high turnover, poor morale and lack of belief that things will ever change.
Transportation	Movement of things (material, paperwork, supplies) redundant moving of things, or moving things farther	Material gets picked; then taken to the checker line; the checker moves it to the checker station to check; then moves it to be staged at will call, transfer trailer, etc. Cash drawers are given to cashier; cashier puts it inside sales safe until the next day; then they pull it and use it;	Adds expense but no benefit; costs time and money; creates delays; adds risk of things being damaged, misplaced or lost

	than necessary.	then it goes back to the sales safe for overnight storage, then it's counted and taken to accounting the next day. Shared tools (like ladders) were being hunted for and moved many times throughout the day by many people.	
Inventory	Having too much or not enough of an inventory item – material, supplies, files, etc.	Purchasing just-in-case inventory. Not having enough or appropriate tools to complete a specific task. Unorganized and spread out supplies causing a large quantity of redundant supplies.	Too much inventory consumes resources, increases risk of damage, and reduces the ability communicate what to have. Too little inventory increases the risk of losing sales and/or customers.
Motion	Movement of people or any motion that is not necessary to successfully complete a task or that makes a task harder than it should be or is unsafe.	Walking to find/use tools or equipment, like walking to another department to use the printer. Salesmen having to "check stock" for a customer order before they can place an order. Bending or reaching to use tools or complete tasks.	Costs time and places undue stress on employees and equipment; may even cause mistakes or injuries.
Extra process	Doing more than the customer is willing to pay for having a process that's overcomplicated as evidenced by too many steps.	Lack of cross-training among similar positions. No standards for people to follow and then improve.	Frustrated and unfulfilled employees, high turnover, poor morale and lack of belief that things will ever change.

1.1.4 Lean tools and techniques:

Learn tools and techniques are a method of creating an environment that reduces wastes, improves efficiency, and increases customer value. However, there are a number of lean tools and techniques. Some of the tools are useful for manufacturing and some are very useful for the service industry but depending also company business strategy and layout. In the following the brief introduction provided of the different lean tools and techniques.

Measurable parameter tools:

Lean has relationships with other methods used to measure quality, such as; total quality management and six-sigma, which also aim to deliver high-quality service [18]. However, there are differences between these tools, e.g. six-sigma seeks to achieve the effectiveness based on statistics, and TQM engages in delivering high quality from a customer standpoint by involving all staff in continuous improvement.

VSM (Value stream mapping):

VSM helps to identify wastes from the process.[19] Reported that value stream mapping draws the production process step by step starting from design through development and production to distribution. From a customer perspective, many processes do not add value such as handling and moving items and organizing/storage do not add value and add unnecessary costs. The goal of the VSM is to identify all types of waste in the value stream and take steps for trying to eliminate the waste [20].

Kaizen:

It is a nonstop improvement approaches that specialize in small-small improvements. It involves the commitment of down level people within the organization towards process improvements, facilitated by subordinates and supported by management. There are many benefits of Kaizen method such as real-time problem management, digital workflow, one-click update, performance analysis and so on.

Just in Time:

It's a pull approach to meet customer demands as and when it flows from a customer. Just-in time (JIT) came into wide use in the Japanese shipbuilding and automotive industries, and It refers to a number of practices and tools that aim to satisfy the market by producing the products needed, when needed and in the required quantity and quality[21]. One simple definition was given by [22] and according to his study

"JIT or zero-inventory system is an idealized concept of inventory management wherein we are able to supply whatever material is required, wherever required, and whenever required JIT with 100% supply assurances without keeping any inventory on hand.

SMED (Single minute exchange of dies):

It improves equipment changeover time. It works on a principle of reducing changeover time to within ten minutes.

Poka Yoke:

It's a mistake-proofing device used in assembly to alert operators on defects or failures.

Jidoka (Automation):

It is known as intelligent automation. It stops the assembly or production line if a defect occurs.

Heijunka:

It's the concept of Line Balancing. The aim is to evenly distribute the load by balancing production lines.

Gemba (Go & See):

The aim is to go to the actual place of work. Observe the process and executions in real time with care. Record the observations. It's another way to find process pitfalls.

Kanban:

It's a signal system to manage inventory levels. Kanban boards can be displayed and managed to see the current inventory level on a real-time basis. It also alerts the management to bring attention to excessive inventory. Excessive inventory ties up the capital and blocks it from productive usage.

5s (sort, set in order, shine, standardize, sustain):

5s is a method for organizing spaces so work will be performed efficiently, effectively, and safely. This method focuses on putting everything where it belongs and keeping the workplace clean, which makes it easier for people to try and do their jobs without trifling or risking injury. 5s terms come from Japanese words.

1.2 Lean in manufacturing industry

Lean Manufacturing is an effective and fast growing method in the world of competition. Lean Manufacturing is employed for the incessant removal wastes in the manufacturing to improve the efficiency and productivity. The main emphasis of lean manufacturing is to fulfil customer demands for high quality and low cost. The technique not only recognizes the reasons for waste but also helps in its removal through marked principles and strategies. The implementation of Lean manufacturing- its principles as described by Womack in 1990- as depicted in literature and the case studies on various industries do not seem to follow a specific methodology. Instead each time, the principles are applied according to the experience and the suggestions of the engineer or consultant responsible for bringing LM into a facility[23]. This suggests that a different combination of lean tools can be utilized, depending on the various aspects of the value-creating process. Lean approach very useful methodology for production process because lean improves efficiency, reduces wastes and increase productivity. Using lean in manufacturing many other benefits such as increase product quality, improved lead time, sustainability, employee's satisfaction, company profits and one of the best examples is Toyota production. The following figure presenting example of the value stream map in manufacturing industry.

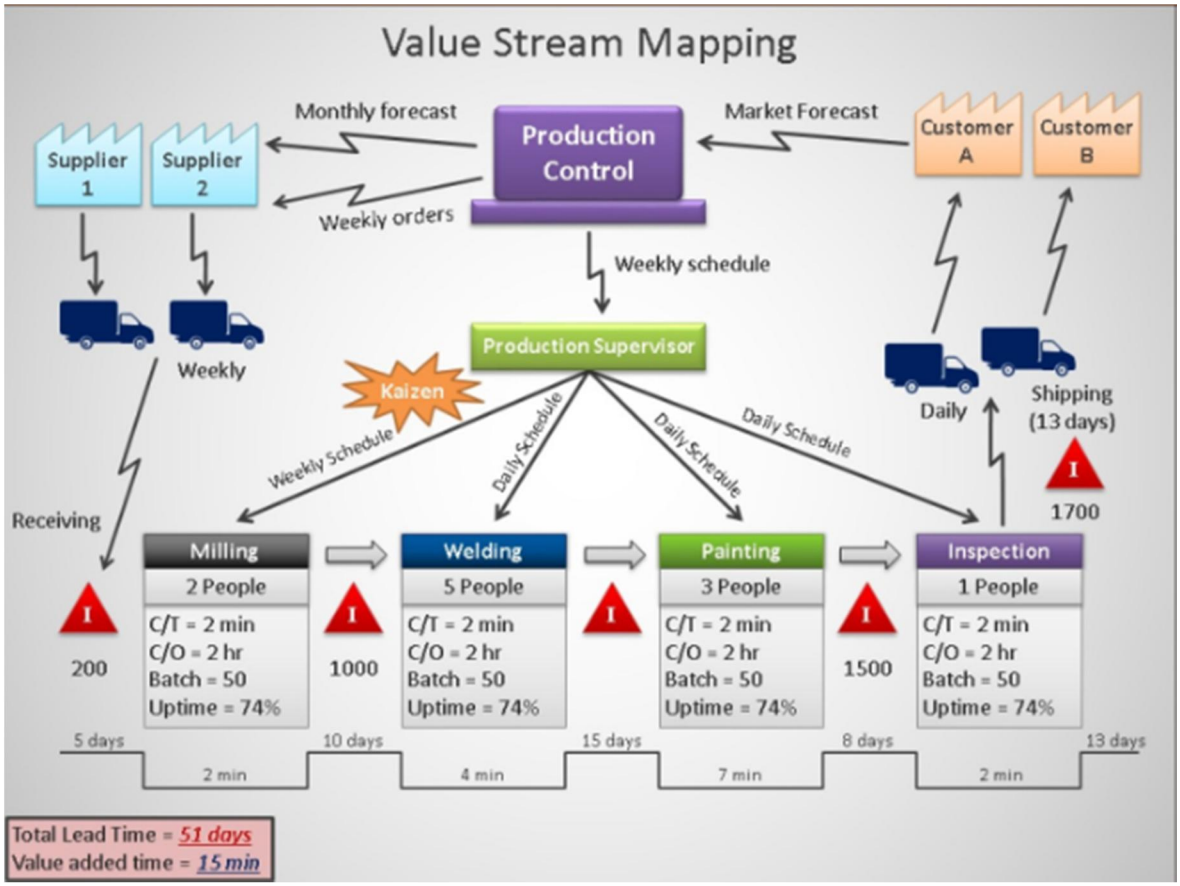

Figure 3: VSM diagram in production control. [24]

The figure presents the value stream map of how customer value is created in the steps of manufacturing production control and shipping process. It is important to know the value stream focuses only on areas of a firm that add value to the product or service. Value stream mapping is one of the well-known lean tools likewise many other lean tools and techniques widely being used in the manufacturing industry to optimize the production process. In manufacturing industries, other useful lean tools are Kanban, Kaizen, and 5s.

1.3 Lean in service industry

Lean thinking involves understanding the philosophy of continuously finding ways to reduce waste by applying lean tools and techniques for customer satisfaction[25]. Service firms have to meet the precise requirements of every and each customer so they'll always stay earlier than their competitors. Companies within the industry are under constant pressure to deliver exceptional customer service. Particularly today when there's more competition and greater customer demand than ever. Though

service companies are very different from manufacturing like healthcare providers, IT companies, marketing services but still have wasteful processes that might be removed or reduced by lean tools.

Through the applying of lean tools, these wasteful activities are often identified and eliminated or reduced. Whilst also providing solutions to scale back errors, maximize employee engagement, and become cheaper. Wasteful activities within the industry tend to be more intangible than within the manufacturing industry, as they're not always physically observable. This is often where lean tools like Visual Management are especially useful; as they assist bring 'hidden' waste into focus. Companies employing a Lean methodology can then pull on other Lean tools to get rid of waste and solve problems.

Lean can benefit organizations in a very diverse range of service sectors. Within the healthcare sector, lean tools and techniques are often accustomed increase the amount of times caregivers are ready to spend with patients, reduce time spent on paperwork, and reduce patient waiting time. In retail and hospitality, Lean can help streamline order processes and improve the management of facilities and stock/inventory. Lean helps financial services companies meet customer requirements faster and with greater accuracy. And it's becoming increasingly valued within the education and other service sectors for driving greater efficiency and costs reductions. The following example have brought for banking sector.

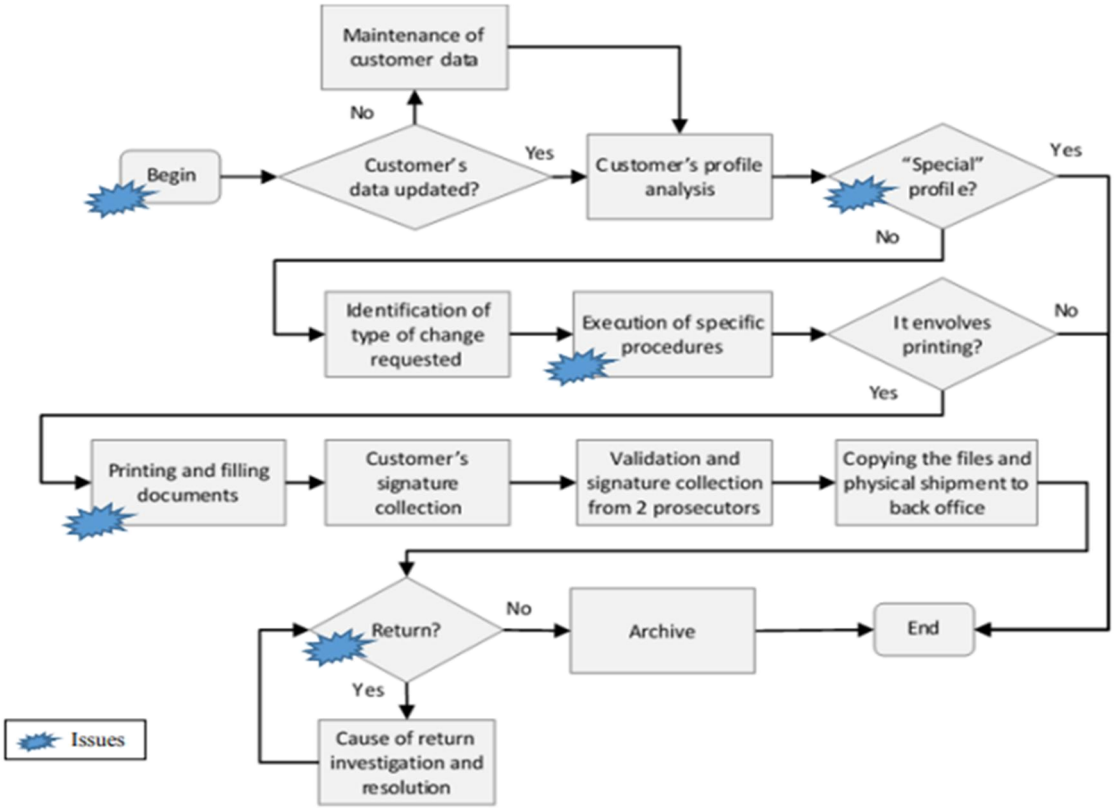

Figure 4: Simplified VSM banking sector[26]

1.4 Lean in the hospitality industry

Lean is a well-known process improvement methodology that has acknowledged wide acceptance and approval by many service and manufacturing establishments across the globe that need to identify defects in their operations and work towards rearrangement of their processes. The resulting improvements in quality lead to the sophisticated profitability and sustainability of their competitive advantage. In the service business such as hospitality can put in place business process enhancement strategies like lean in order to offer their customers a higher value, unique and dependable experience while evolving their competitive advantage thanks to the following benefits:

- Increase profit by simplifying the task and process.
- Lower the costs by cutting non-value added process and reducing waste.
- Improve the effectiveness and efficiency of the operational procedure.
- Develop team effectiveness because lean practice allows employees taking the ownership of their duty and they provide desired service.

- Enhance customer experiences because lean ensures the higher level of service and quality.

In order to achieve and uphold competitiveness in the cut-throat hospitality industry, hotels have to identify and meet the expectations of their guests, as well as deliver high-quality service. The efficiency and effectiveness resulting from lean in the hospitality business will lead to better service quality, higher morale among employees, and increased customer satisfaction.

The hospitality industry is very large and produces huge quantities of service in line with specifications that match product quality with customer needs at a price that customers are willing to pay[12]. Lean management seeks to work out the customer value whether or not customers can pay for that step within the process[3], e.g., cleaning a space in an exceedingly hotel are a few things that a customer may hold valuable. This process of cleaning and preparing room for the customer including several steps which will not add value for the shoppers[19]. For that, Lean aimed to eliminate these steps without affecting the standard of product and repair[27]. The hospitality industry seeks to deliver products in line with their specification, that specialize in suppliers can minimize this variation. From now, Lean concentrates on monitoring and controlling performance. So, raw materials are one in every of the factors that make Lean application within the hospitality industry different from the other[12]. On the opposite hand, the study of [28] reported that Lean management is applicable to implement within the hospitality industry. Unfortunately, not all Lean tools were suitable to implement within the hospitality area. because it has been mentioned before the aim of the thesis hospitality process improvement by the lean implementation, particularly food and beverage service process, therefore the subsequent chapters have presented the wastes associated with food and beverage service from the angle lean, critical success factors of lean implementation in hospitality, challenges, and benefits and eventually the proposed method that has been taken a tool to investigate the F&B service and improve the service. As like many other services in hospitality F&B is very crucial area and front line operation and has connection directly with customers. Likewise many other service F&B service produce many wastes which does not add any values for the customers. The following chapter aim is to introduce F&B service waste:

1.4.1 Types of waste in hospitality F&B service

According to Lean management, any operation that does not add value for the customer must be considered waste, and every effort should be made to avoid that waste. The following table has presented F&B service wastes from lean prospective.

Table 2: 8 waste F&B service

Wastes	Defining the wastes
Defects	Not organizing of service stations, No cleanliness, Don't understand the customer needs, weak or missing process, uncontrolled inventory level, No standard of table service, no acknowledgement, engaging in unnecessary talk between servers and miscommunication between kitchens and guests and serving wrong products or services.
Overproduction	Unclear customer needs, long preparation time, attempts to avoid long preparation time, poorly applied automation, poor planning and forecasting, advance produce (push production), not having proper measurement and excess use of materials.
Waiting	Waiting for table to be seated, waiting for server to approach the guest, waiting for order to place, not having proper knowledge of menu and running again for information to explain to the guest, messing with order sequence, waiting for foods and drinks to serve on the table, cleaning the table, second or third round food or drinks and bill to pay.
Transportation	Poorly scheduled deliveries from central kitchen to restaurant, not having a proper roadmap for the food delivery kitchen to the table, drinks bar to the table, not using proper way to carry the equipment used for restaurant or cleaning tables.
Inventory	Less or over stock foods or drinks or any other things related to the service such as napkins, silverware, glass, not maintaining proper heat for food or drinks, not maintain LIPO and FIFO method, wrong items on the self, expiring foods or drinks, not organized the stocks according to standard, not having regular inspection on the stock level.
Motion	Excess movement of servers, bartenders, kitchen workers.
Extra-process	Process steps are not needed, doing twice or more the same task.
Unused talent	Not using telnets for the right tasks.

1.4.2 Lean tools and techniques in hospitality industry

According to different sources and analysis four types of lean tools are very useful in the hospitality industry they are measurable parameter tools; value stream mapping; 5S - sort; sweep; standardize; simplify; sustain; kaizen tools. In following those tools presented in brief:

Measurable parameter tools:

Companies including hospitality businesses use the measurable parameter tools for several reasons like to observe and control the operation process, to drive improvement, to maximise the effectiveness of the development effort, to attain alignment with organizational goals and objectives, and to reward and discipline employees and managers. However, most typical measurable parameter tools are total quality management and six- sigma and lean encompasses a relationship with both methods to live the standard of the service. However, there are differences between these tools, e.g. Six-Sigma seeks to attain the effectiveness supported statistics, and TQM engages in delivering top quality from a customer standpoint by involving all staff in continuous improvement.

Value stream mapping:

A Value Stream Map (VSM) could be a visual representation that helps to know the flow valuable during a business process as perceived by the customer. Its primary goal is to spot and eliminate waste (Muda) and makes the method as near lean as possible. It considered as an improvement tool instead of just a definition of how the method operates or should operate. It is a really useful tool within the industry and might be used successfully in hospitality F&B service process improvement. A value stream map is checked out as a strategic tool, a change management tool, and a communication tool. It's a set useful and non-value added processes that produce a decent, a service, or a mix of both. It helps identify opportunities for reducing waste and improving quality by making the non-value added activities easier to spot. It can effectively communicate where to focus the continual improvement efforts to deliver more value.

5s (sort, set in order, shine, standardize, sustain):

5s is a very useful tool for housekeeping because 5s can be used to reduce unnecessary items and clean the working environment; it's also improved the safety and cost. 5s has benefits both employees and hotel and main object of the 5s to

reduce the waste during cleaning activities. The housekeeping 5 pillars are 5s means Sort; sweep; standardize; simplify; sustain.

Kaizen tools:

Continuous improvement is that the main objective of lean implementation. within the lean concept, Kaizen means 'change for good',[29] therefore the whole meaning is sweet changes, [30] by regular meetings with employees for taking suggestions that help the hotels to unravel the issues and improve the performance[31]. Highlighted that kaizen concentrates on workplace attitudes and includes five elements: quality circles; teamwork; improved morale; personal discipline and suggestions for improvement. Kaizen ends up in greater efficiency, happier workers, fewer errors, improved profits, and a far more streamlined company.

1.5 Lean implementation in hospitality industry

Generally, a Lean implementation objective is to maximize the guest value and to reduce the employment of the resource. It also offers great value to their guests, to scale back costs, and to stay competitive within the hospitality industry. On the opposite hand, Lean is taken into account a tool to forestall wastage or unnecessary steps in an exceedingly process. Additionally, Lean is additionally a tool for giving the worker skills to provide a prime quality of service to realize customer needs. Also, the advantages of implementing Lean are including; less process of waste, reduced lead-time, less rework, financial saving, reduced inventory, and increased process understanding.

In hotels, waste isn't new, and reducing it requires cooperation effort between all staff. Lean principles play a critical role to eliminate the various varieties of waste.[32] The most rationale of Lean is to get rid of wastage altogether the assembly steps and consider the core valuable stream mapping. Lean guiding principles are putting things right the primary time and eliminating waste like over-production, inventory (over-stocking), transporting, processing (packing, wrong equipment for the job), waiting, motion (moving of people), and defects.

1.6 Critical success factors implementing lean in hospitality industry

The critical success factor implementing lean can be as following:

Strategic orientation:

In order to gain success improving the process and performance of implementing the lean in the hospitality sector for the long term, lean programs should be implemented in the hospitality strategy. Understanding hospitality strategy is very important for optimizing lean programs. Top managers must develop, direct, and communicate hospitality improvement strategies. Moreover, top managers should prepare a clear strategic deployment plan showing the lean objectives. Management also needs to develop a communication plan, clear direction, and guidance on deploying lean. Also in order to implement lean identifying and having a clear concept of hospitality waste is very essential. Lack of common understanding of the benefits of lean disrupts the implementation of lean in the hospitality industry. Hospitality managers need to make a challenging vision and motivate employees to achieve it. A clear vision gives direction to hospitality employees to achieve the objective.

Culture:

Antony [33] found that improving work methods through lean initiatives has more effect on organizational culture than just training employees. Culture encompasses the behaviours of people in hospitality and strategies that can be considered in support of organizational objectives. Hence, the culture of continuous improvement caused by a combination of employee training and results of lean projects (e.g., reducing wastes). Additionally, behaviour and understanding of managers affect the culture of improvement when they want to see real improvements. In hospitality, the organizational culture is all about changing the way people behave with customers (e.g., guests and local companies, etc.).

Management system:

The management system includes a performance measurement system, a communication system, and a management responsibility system. Performance measurement is an important tool for sustainable improvement. The lack of a performance evaluation system increases the discouragement of implementing improvement techniques in hospitality. After lean programs, the time, costs, productivity, quality, and waste of modified processes must be measured and modified processes must compare to the previous processes. Assessments of the success of

lean implementation are usually related to measuring operational and financial performance[34]. Effective communication at all levels vertically and horizontally is one of the factors considered by the author to lean success. No shared understanding of the lean project goal is achieved by a poor communication system. Only through proper communication, employees will be more involved and cooperate as a team for lean scenarios. Through proper communication, organizations can create a common language for improvement and change[33]. The top management must be responsible for lean outcomes and support them. Hence, hospitality should embrace change to improve its competitive advantage. Without management responsibility and commitment, it is a waste of time and resources for starting the lean transformation. The author believes that the top management should attend in lean workshops and discuss lean strategy and methodology. In order to involve and motivate the top management, it is vital to select projects, which are linked to customer satisfaction and cost reduction directly. Failure in management commitment disrupts lean projects. Top management should spend adequate time for organizational transformation.

Implementation process:

The success in implementing organizational changes depends on the standard of the implementation process[35]. It requires a joint effort between hospitality management and a lean project manager. Obviously, both the short-term wins and long-term wins should be sought at hospitality. The most suggestion for short-term wins is that lean achievements present as quickly as possible. Lean systems should have continuous support from the highest and middle management. Otherwise is that the preparation of an action plan that might specify lean program priorities and estimate time schedules. Hospitality should identify which processes are key processes and contribute to a competitive advantage. It should also specify which processes should be focused and where people may have certain opportunities for improvement. so as to support lean programs, hospitality employees should be empowered. Hence, there's a desire for lean training. Hospitality should achieve an appropriate level of information about its processes. The standard of coaching for those involved within the project is extremely important.

In order to correct the deployment of this system in hospitality, it should be led by professional project management. In order to correct the deployment of the lean system at the hospitality, the lean program should be led by professional and strong project managers. So the enterprises that intend to implement this push should provide the necessary resources. Therefore, the hospitality that intended to implement

a lean system should provide management resources. Hospitality would then be able to deploy the concept of lean successfully.

Implementation team:

One of the most requirements to lean success could be a professional implementation team. The implementation team should be equipped with negotiation tools, improvement toolboxes, and persuading techniques. Implementation team members should lean adequate time to pick out and execute a lean project.

1.7 Lean implementation challenges in hospitality industry

Lean implementation challenge is seen from a unique perspective like management, organizational, finance, and other prospective:

Management issues:

Management issues are lack of management focus, support, capital fund, implementation of know-how, long run vision, past experience of failure, and lack of have to create a way of urgency.

Organizational issues:

Organizational issues are lack of resource, company culture, and lack of innovative ideas, communication, time, training, and understanding about lean, clashes with other initiatives like TQM, TPM, JIT, and repair environments.

Finance issues:

Finance issues perceive lean will cost more and are large scale companies, no financial targets and sliding back to the previous state within the absence of endurance, no immediate financial advantage, not recognizing financial benefits.

Other issues:

Other issues are is unstable demand, conflicts with ERP implementations, middle management resistance, and employees proof against change.

1.8 Benefits of lean implementation in hospitality industry

Lean is a guide to building a stable organization and continuous improvement process by identifying actual problems or wastes from the process by using tools and techniques. Lean implementation initially can be costly for the organization but in the long run brings the following advantages for the business by optimizing the process.

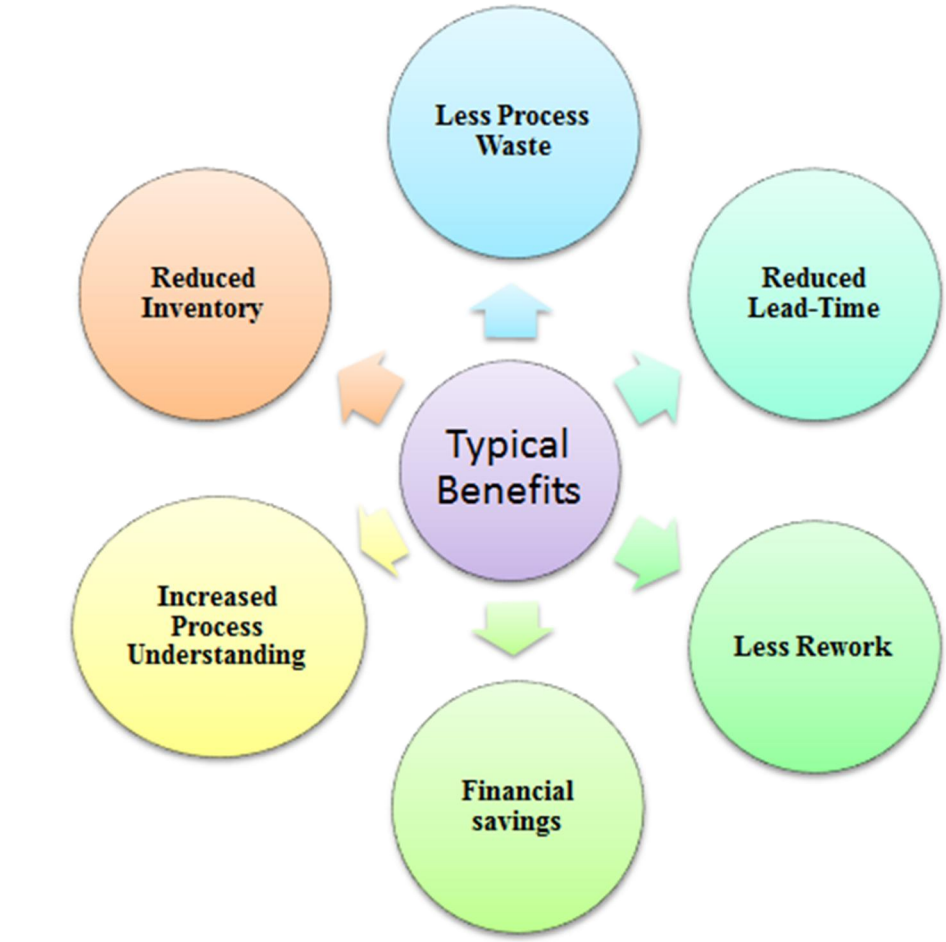

Figure 5: Benefits of lean in hospitality [36]

Learn tools and techniques cut the non-value added activities; therefore reduce the lead-time in the process. As lean cut the unnecessary work and visualize the steps therefore workers can focus on the process-wise activities and ultimately reduce the rework thus, also possible to use fewer resources result in less cost. By practicing lean people get used to and they understand better and can implement the process better. As lean another important area of inventory control and by implementing lean possible to improve inventory control processes.

2. RESEARCH METHODOLOGY

This chapter aims to justify and contextualize the methodology used in the present thesis according to the problem stated and the proposed goals. The essential stages of the research are described. In addition, the theoretical foundations are connected with the research questions in order to provide guidance to the development of the case study. The principles that justify the selection of the processes are described and a framework of lean thinking tools is presented in order to provide sustainable ground for the selection of the most appropriate mapping tool to be used in this research. This selection is based on the theoretical application of each one of the mapping tools and the context of the research.

2.1 Research approach and data collection process

The research process is the way of conducting research and collecting data for particular research. There are three procedures conducting research and they are qualitative and quantitative and case analysis.

2.1.1 Qualitative method

Qualitative data collection and data analysis methods are widely adaptable and can be applied across research subject and disease type. Qualitative data collection methods can help researchers understand not only customer experience but also their views about products and services. Qualitative research method take place by interviews, diaries, journals, classroom observation and immersions; and open-ended questionnaires to obtain, analyse and interpret the data content analysis of visual and textual materials, and oral history[37].

2.1.2 Quantitative Research

[38] Remark that quantitative research starts with a statement of a problem, generating of hypothesis or research question, reviewing related literature, and a quantitative analysis of data. Quantitative research is employed to quantify the matter by way of generating numerical data or data that may be converted into usable statistics. It's wont to quantify attitudes, opinions, behaviours, and other defined

variables – and generalize results from a bigger sample population. Quantitative Research uses measurable data to formulate facts and uncover patterns in research. Quantitative data collection methods are rather more structured than Qualitative data collection methods. Quantitative data collection methods include various sorts of surveys – online surveys, paper surveys, mobile surveys face-to-face interviews, telephone interviews, longitudinal studies, website interceptors, online polls, and systematic observations.

2.2 Case study approach

On the other hand, case study is very specific to particular area of business and possible to focus particular sector for deep analysis. According to the aim of the thesis case study approach has been considered. However,[39] describes a case study as: "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident. Case study is a very influential methodology for research because case study focuses and offers the reach techniques investigating the real life fact. The result of the case study can be implemented in the same case in order to visualize the implemented solution. Case study research has grown in reputation as an effective methodology to investigate and understand complex issues in real world settings. Case study designs have been used across a number of disciplines, particularly the social sciences, education, engineering, business, law, and health, to address a wide range of research questions. Advantages of case study method include data collection and analysis within the context of phenomenon, integration of qualitative and quantitative data in data analysis, and the ability to capture complexities of real-life situations so that the phenomenon can be studied in greater levels of depth. Case study method is the most widely used method in academia for researchers interested in qualitative research.[40]

2.2.1 Data collection process

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypothesis, and evaluate outcomes. There are two types' data that can be collected: primary data and secondary data.

2.2.2 Primary data

Data used in research originally obtained through the direct efforts of the researchers through surveys, interview, and direct observation. Primary data is more costly to obtain than the secondary data. However, for this particular research primary data was collected by the direct observation of particular service process and from the company directly, therefore collecting primary data less affordable. Confidential data has not been used as it is not allowed by company to publish.

2.2.3 Secondary data

Secondary data refers to data that was collected by someone other than the user. For the secondary data, the author used various recent articles; research that has been conducted previously related to this topic, different websites, as well some books. Secondary data was collected to give the theatrical overview of the study. Though the lean is widely used method and there plenty of resources but finding the recent and research concept related topic were labour intensive.

2.3 Case description

Since this particular study has designed based on a case of the hospitality sector, therefore author has chosen the current state F&B service process of the Hilton Tallinn Park Hotel. However, F&B is a front line service of the hospitality business where customer service and satisfaction key to success, therefore improving the service process of F&B is very essential for the hospitality industry in order to survive and hold a strong position in the present competitive business world. In the hospitality industry F&B services include banqueting, executive lounge, room service, bar and restaurant among all those areas of F&B service restaurant is the most vital area and has a high turnover of the guest daily basis and significant amount revenue generated by restaurant service, therefore by providing outstanding service is the expectation of each and every customers. In order to ensure customer satisfaction and company profitability continuous process improvement is very essential. The author, therefore, particularly has chosen the restaurant process as a case to analyse and improvise by using a lean approach and there is a lack of process management and can improve by lean-approach. The current state of process has many unnecessary processes

involved. For the better understand the current state of process has been presented in appendices 1:

2.4 Voice of the customers

Voice of customer refers the customer feedback about the product or service. It mainly focused on customer expectation, needs understanding and product improvement. Voice of customer is a business strategy that used by business to describe need and requirement of the customers. Voice of customer help business to spot early and potential business crisis, evaluate new concept, ideas and solutions, customize products, service, add-ons and feature to meet the need of the customers, customer satisfaction and fulfil the customer needs. However, in the hospitality business voice of customer can be play be crucial role because when customer visits to the restaurant they deserved number of expectations. Based on thesis aim author intention to connect the relation to voice of customer with the service which, marked following in the figure. In the service, it is very important focus on speed of the serve, taking order, time a delivery process and so on.

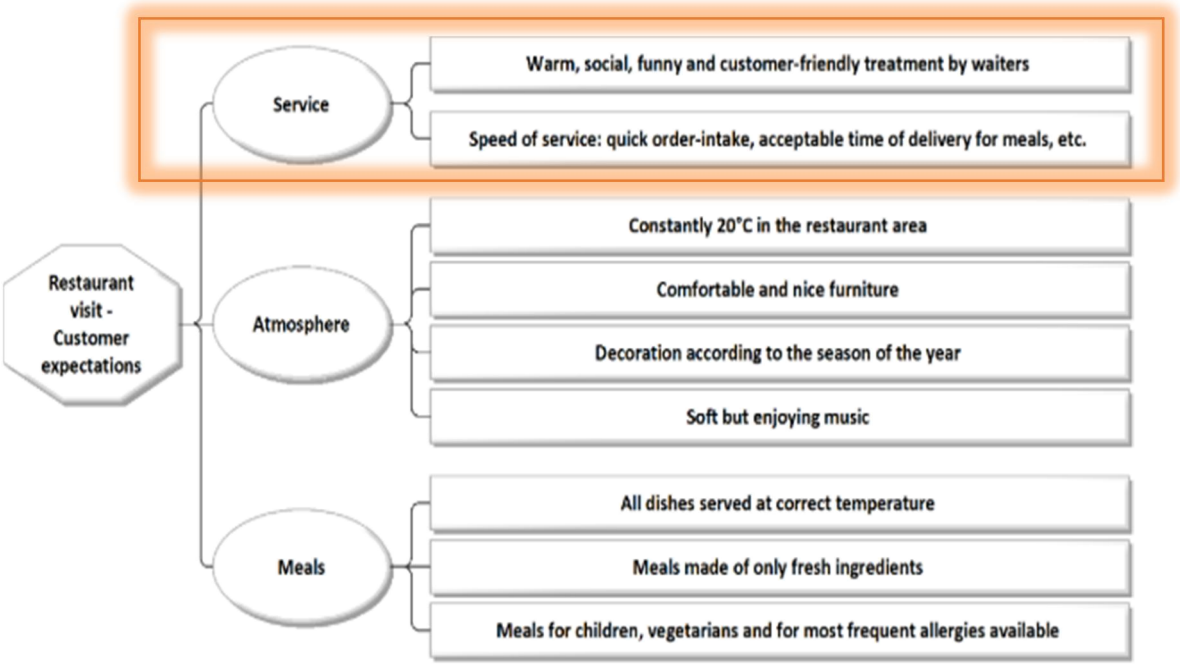

Figure 6: Voice of the customers[41]

2.5 Goal statement

VOC is the rendering of a customer's needs, requirement, and expectation with regards to the product or service delivered by a business process or by the organization. It is applicable for both internal and external customers and main step to capture the Voice of the customer. The voice of customer can be identifying different ways such by survey, interviews, live chat and by the experience of service providers.

2.7 Scope and boundaries

However, in order to fulfil the customer expectation according to Voice of customer can implement different strategy and one of the important strategy is identify the non-value added activates by mapping the value stream map and remove the waste from the process. In this case author also has taken the same strategy, therefore the goal is to map the As-is process and mapping value stream to identify the non-value added activity and proposed the possible solutions, again map the To-be process and mapping value stream map and map the To-be process according to that. Finally compare the result between two processes. In this case, the Voice of customer considered from the experiences service providers.

There are some limitation also related to case study such time frame, limited data, such as not clear picture of the process, not having lean approach in the process and no lean related plan for the future, therefore it not even possible to implement within short period of time. There is more limitation involved such as confidential data has not been used and finding suitable literature related to the topic was challenging.

2.8 Proposed research model

According to literature review it is very clear that lean tools and techniques can help for hospitality process improvement, therefore need suitable tools and techniques and steps to bring the outcome of the improvised solution. In this particular study the author believed value stream mapping is the best and suitable tool that can be implemented to analyse the current process and came up with an improvised process for the future. Therefore, author proposed research model is following:

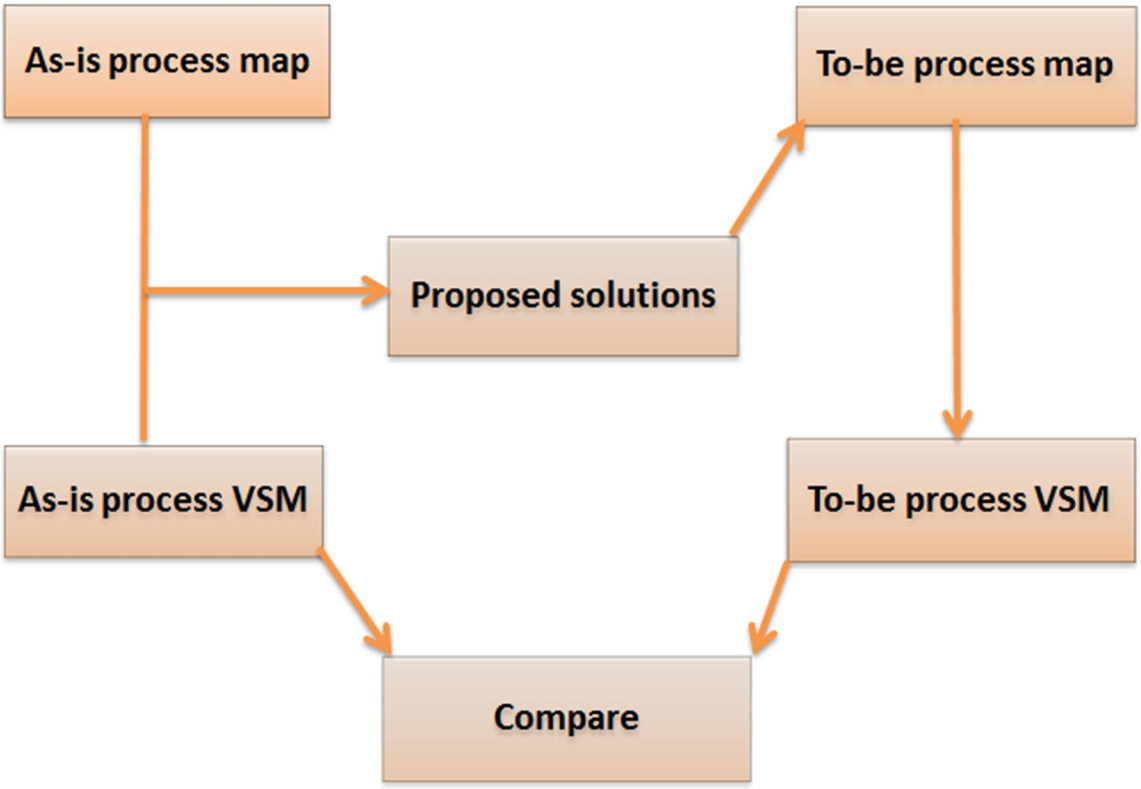

Figure 7: Proposed research model

3. ANALYSIS AND RESULT

The result and analysis have been designed based on the case which mainly the current state of the F&B service process of the company because F&B is the front line operation and has direct connection with customers, therefore F&B service improvement is vital for the company. In order to carry on the analysis author map the process by using ARIS process modelling tool because by process modelling possible to analyse the current state of process to find opportunities for improvement, to implement the improved process and monitor and control their execution[42]. The result presenting the current state of the As-is process and analysis the waste by value stream mapping the present state of the process map and identify waste, based on that provided possible solution. In order to, come up with the improvise solution author mapped to-be process and map the value stream based on that. The main process are 13 to complete service but there are many sub-process involved with each and every process of the main process. In the following different diagram has presented of the as-is process to show the waste are involved with the sub-process. In order to understand clearly process flow author started from the core process.

3.1 As-is process and current state of VSM

Figure 9 presenting the core process of the company which consists of four main managerial processes, they are respectively operation management, commercial, finance, and human resource. F&B department is under the operation management and other operational department are HSK, FO but F&B one of the most important area, therefore company pay very high level of attention on F&B service. F&B also important because, it is a front line operation of the company and has direct connection with the customer in daily basis. Ensuring value added activity for customers is the key of success of F&B service, therefore continuous process improvement highly require for the company. However, the supporting process is sales, marketing, and reservation.

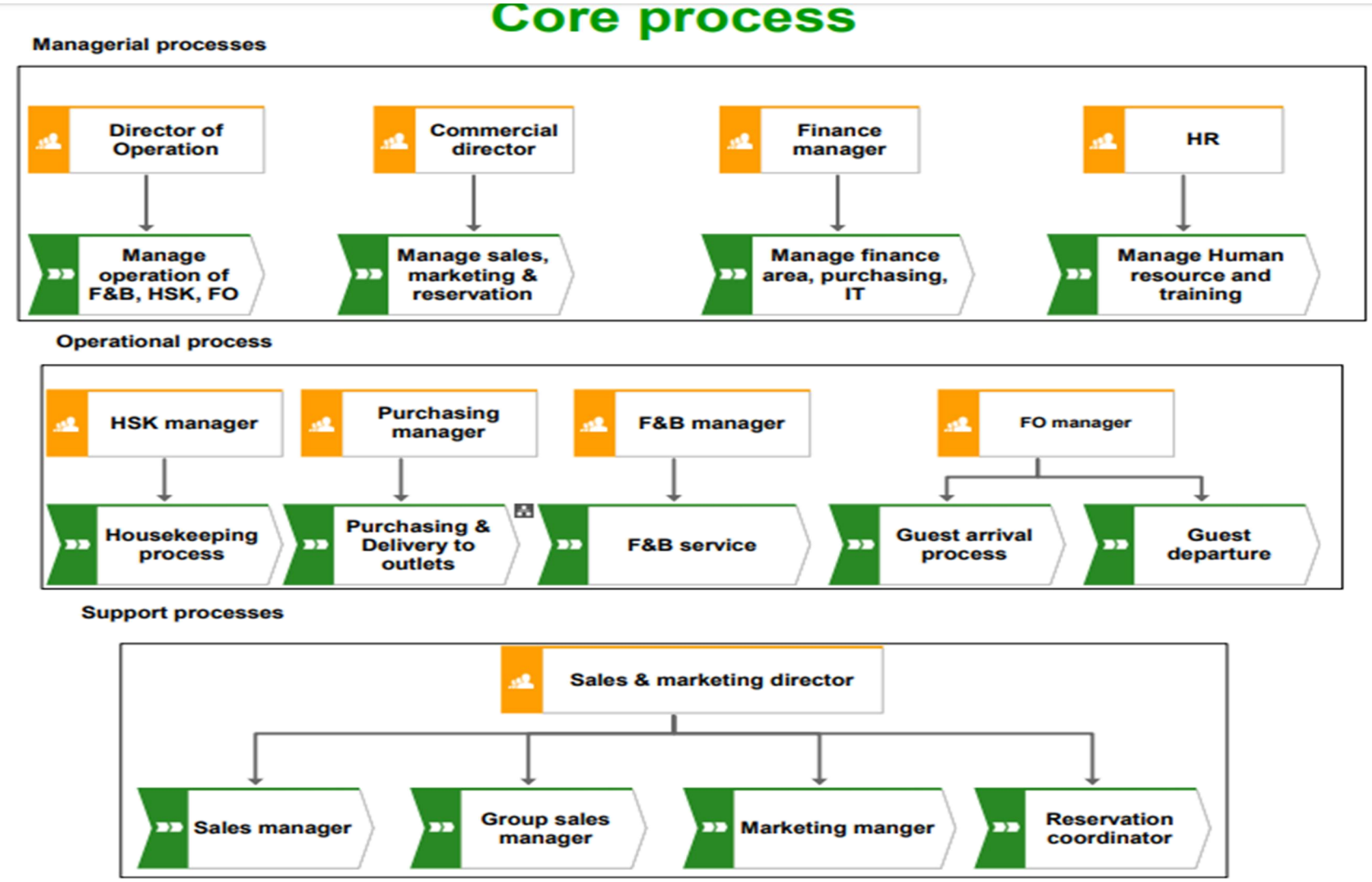

Figure 8: Core process level 1

F&B provides the experiences of conference, lobby, kitchen restaurant, and experiences of the executive lounge which has presented in figure 10 in the following. However, the main aim of the thesis works to analyse the restaurant experiences by lean principals and methods.

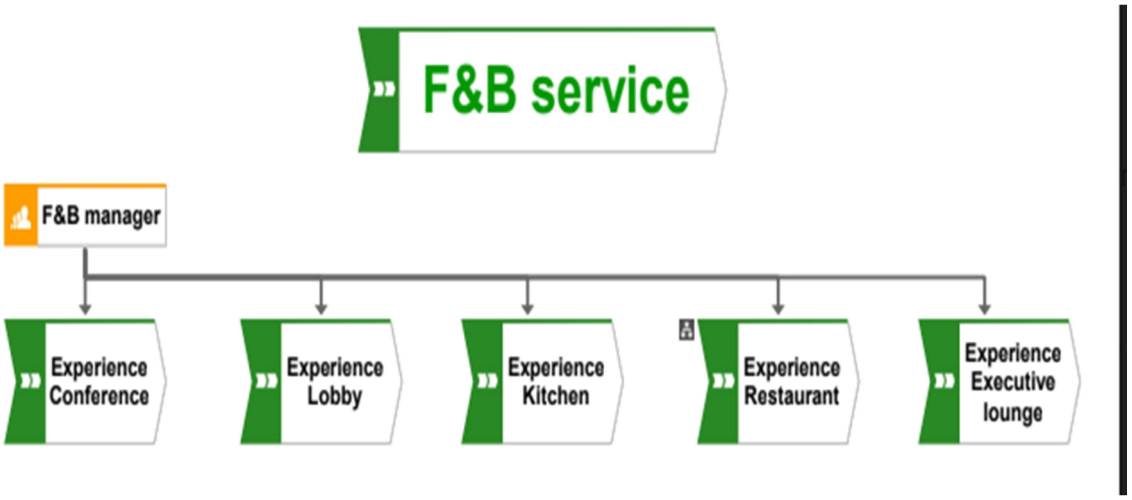

Figure 9: F&B outlets, level 2

Figure 11, level 3 presenting the main process involved with the restaurant services, there are 13 processes are involved in order to complete a service which is as follows. Every main process has the number of sub-process and some of them are explained in rest of the figures to identify the waste and applied lean waste analysis tools which known as 8 waste because when waste are removed from the process than only value-adding process remains to deliver satisfactory service or product for the customer. However, 8 waste are defects, overproduction, waiting, Non-utilized talent, transportation, inventory, motion, and extra process. By using the value stream map possible to identify the waste even more precisely and presented for this research completion.

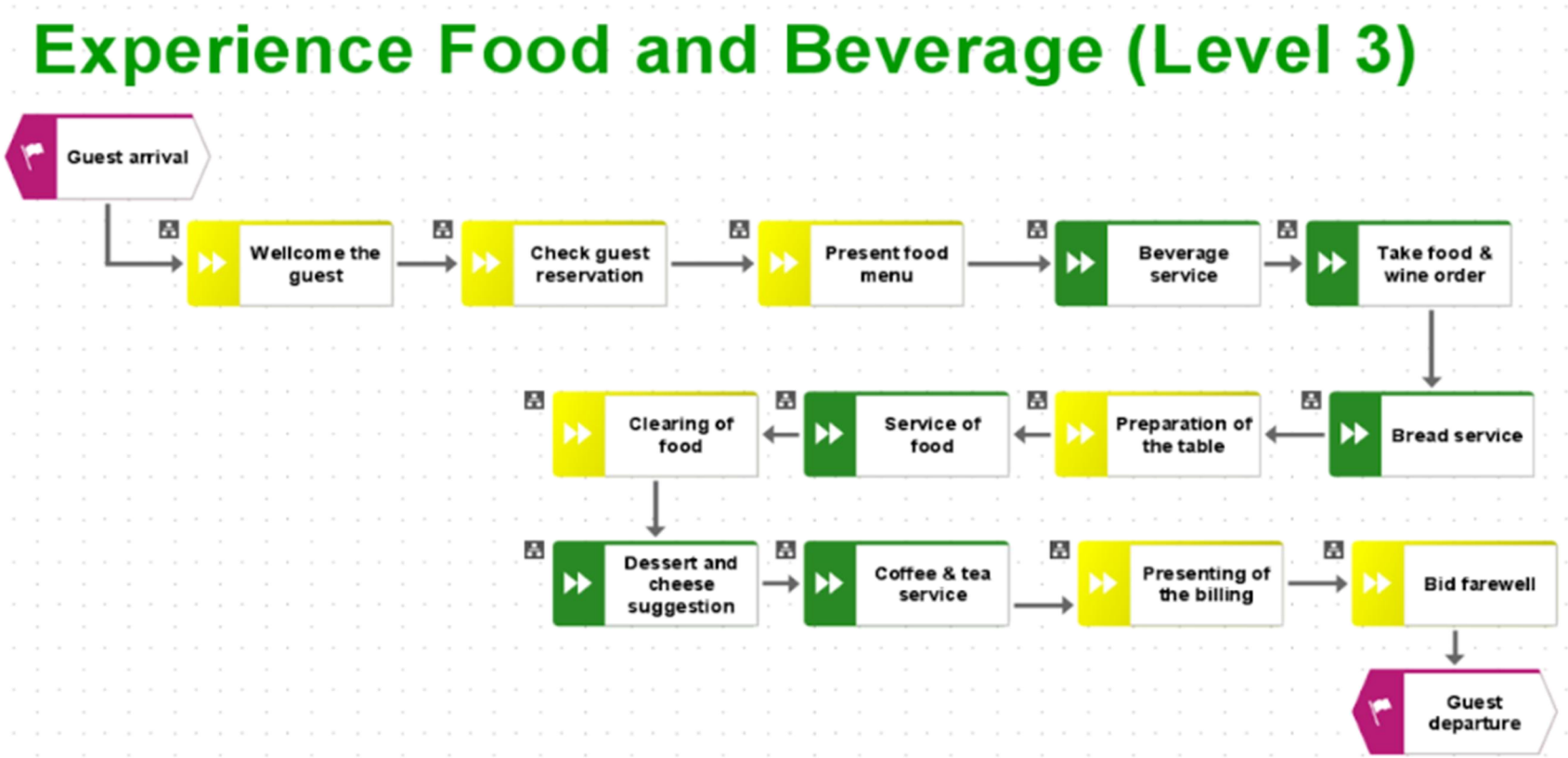

Figure 10: As-is process, level 3

As it is mentioned before there is 13 main process to complete a full service and there are many activities involved with each of the main process and those activities fund by breaking down each of the main processes as much as possible and all the activities are also

explained for service providers as a service instruction which has presented in appendices 1. However, from each main process, the value-added activates identified by green, require activates by yellow and non-value added activities by red colour. Also, the highlighted red colour circles are very crucial waste within the process. In order to map the process and identify the activities, ARIS architect 2010 has been used. In figure 11 below presenting the guest reservation checking process where there are no value-added activities, there some activities are required, therefore this process can be eliminated completely from the process and can be improvised with some other smart solutions.

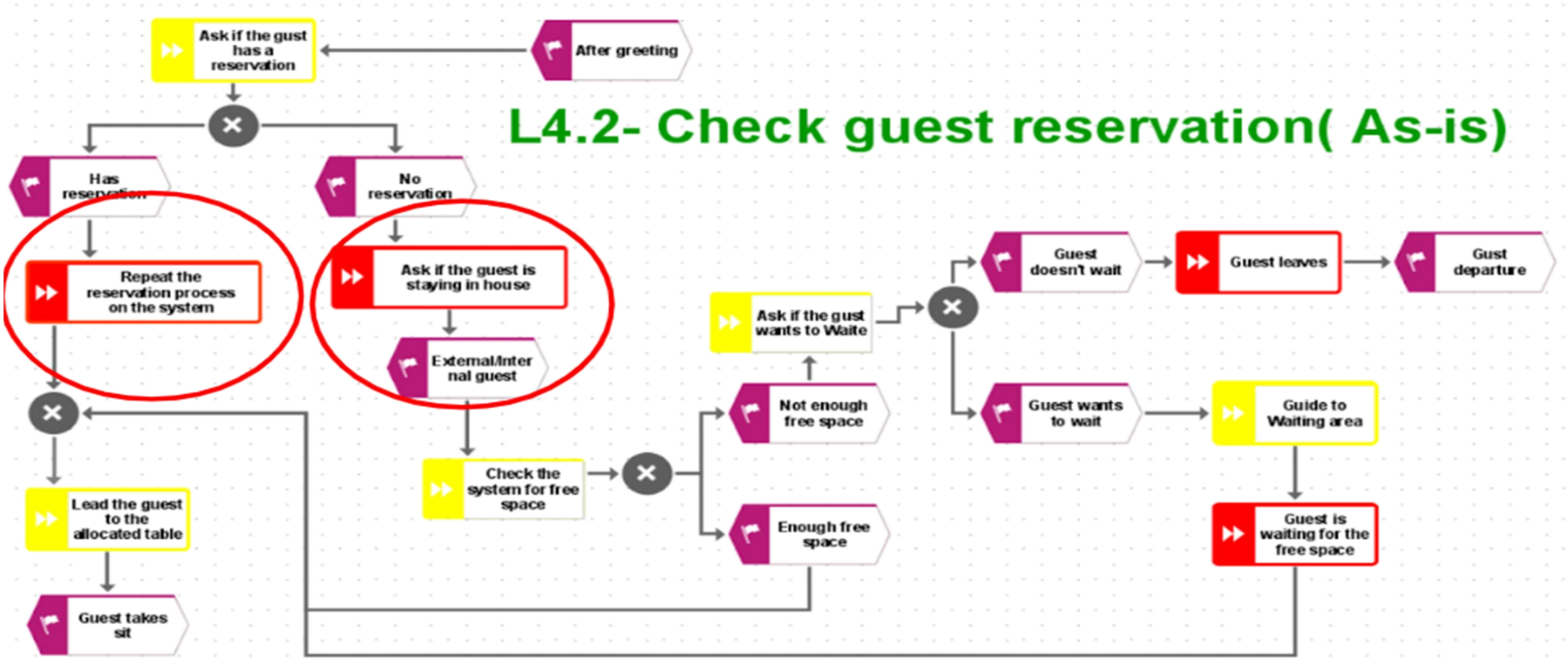

Figure 11: As-is guest reservation check

The menu is the key requirement of the F&B service. A visually appealing menu is very essential for restaurant service. In the following figure on the existing process, there is also unnecessary activities involved such as giving an introduction to the guest, presenting the menu to each guest, if they want to place orders straight, waiting for the guest to be ready, proving information available products and all those activities are types of waste as there is a possibility of improvising by other ways. The crucial waste are marked with circle.

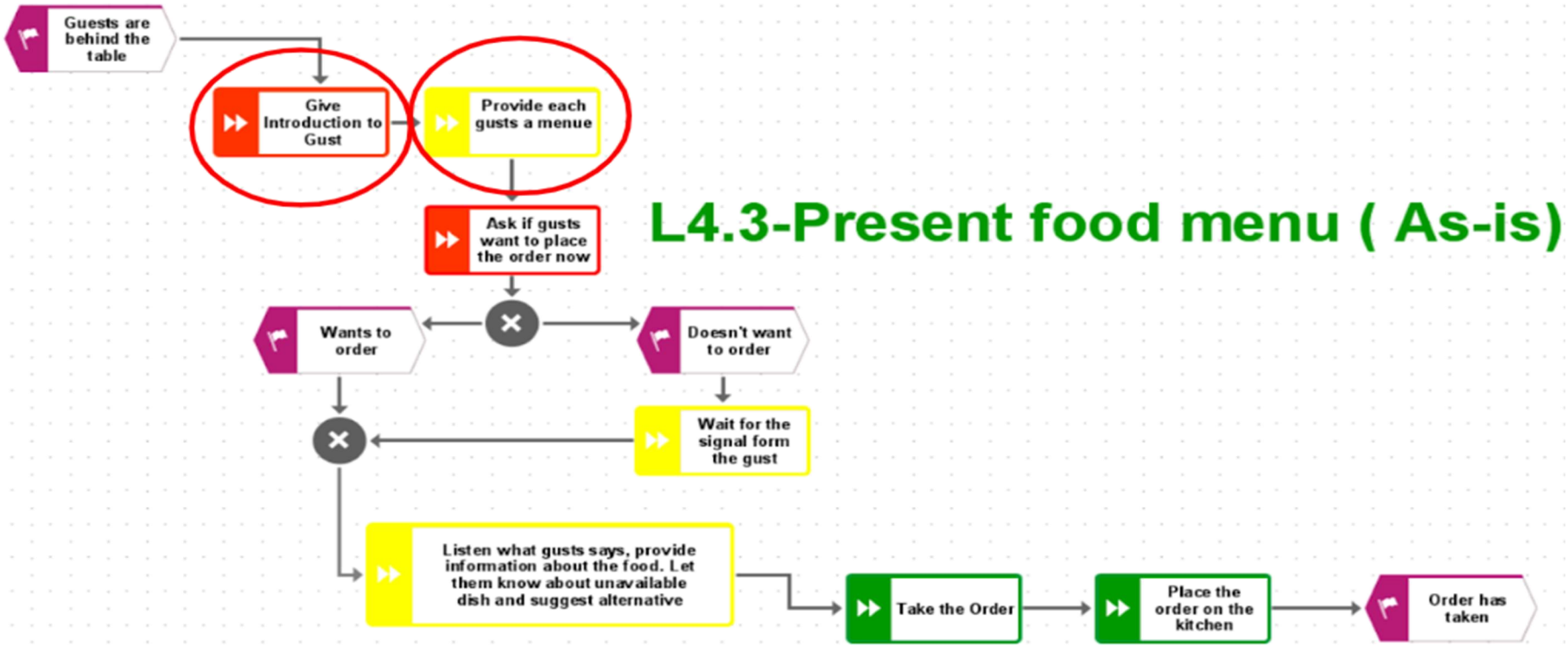

Figure 12: As-is presenting menu

Likewise in figure 13 taking food and wine order, there are many unnecessary tasks involved, introducing again service prover to the guest, repeating the order, asking guest for another choice if there is deficiency, asking in the bar to prepare the drink, forwarding the order to the kitchen and crucial waste marked with the circle for better understanding.

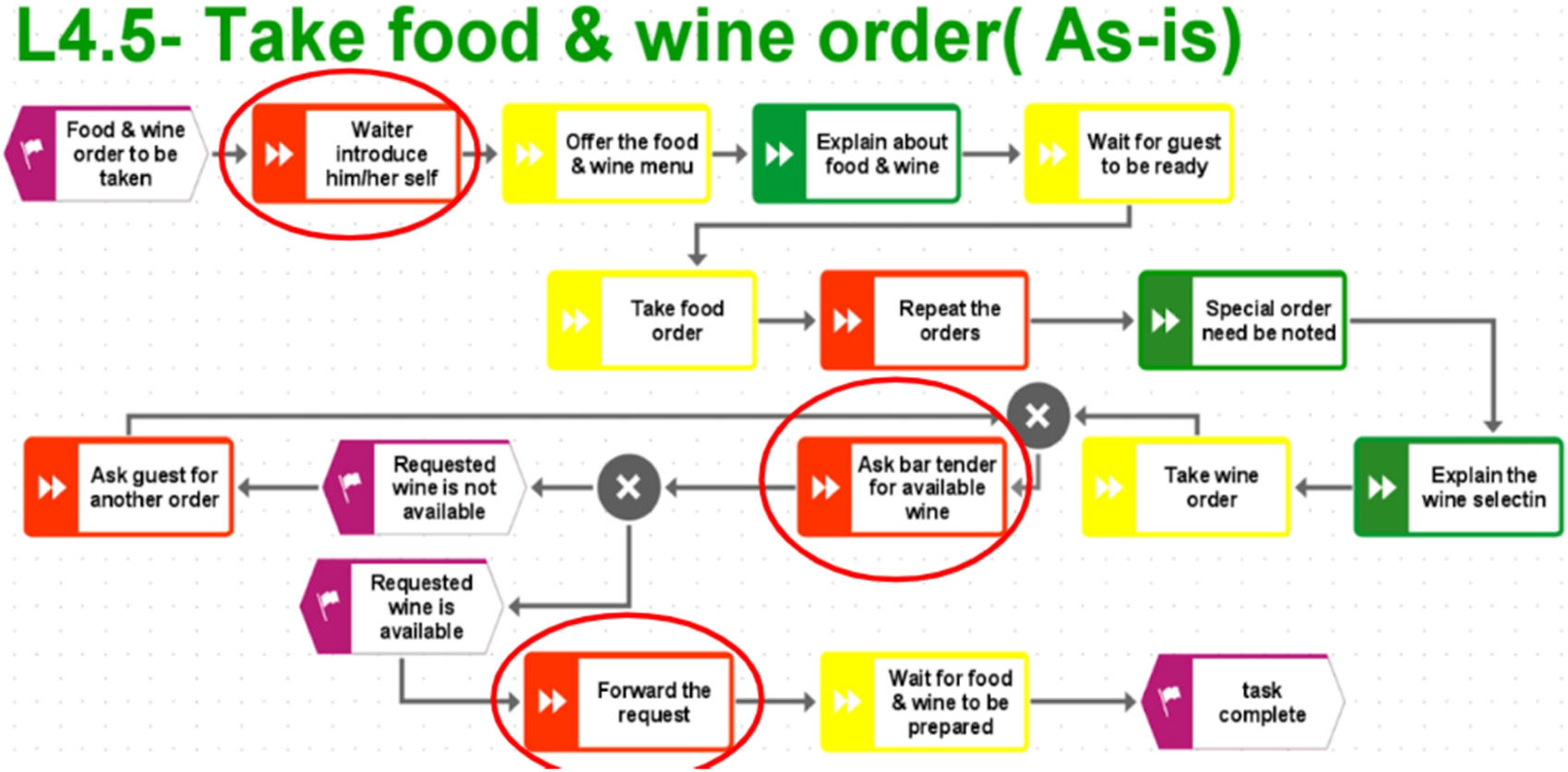

Figure 13: As-is taking order

In figure 14 with the bread service, non-value added activities identified as cutting the bread into slice and there are other activities just require but not adding any values to the customer and it is a crucial waste.

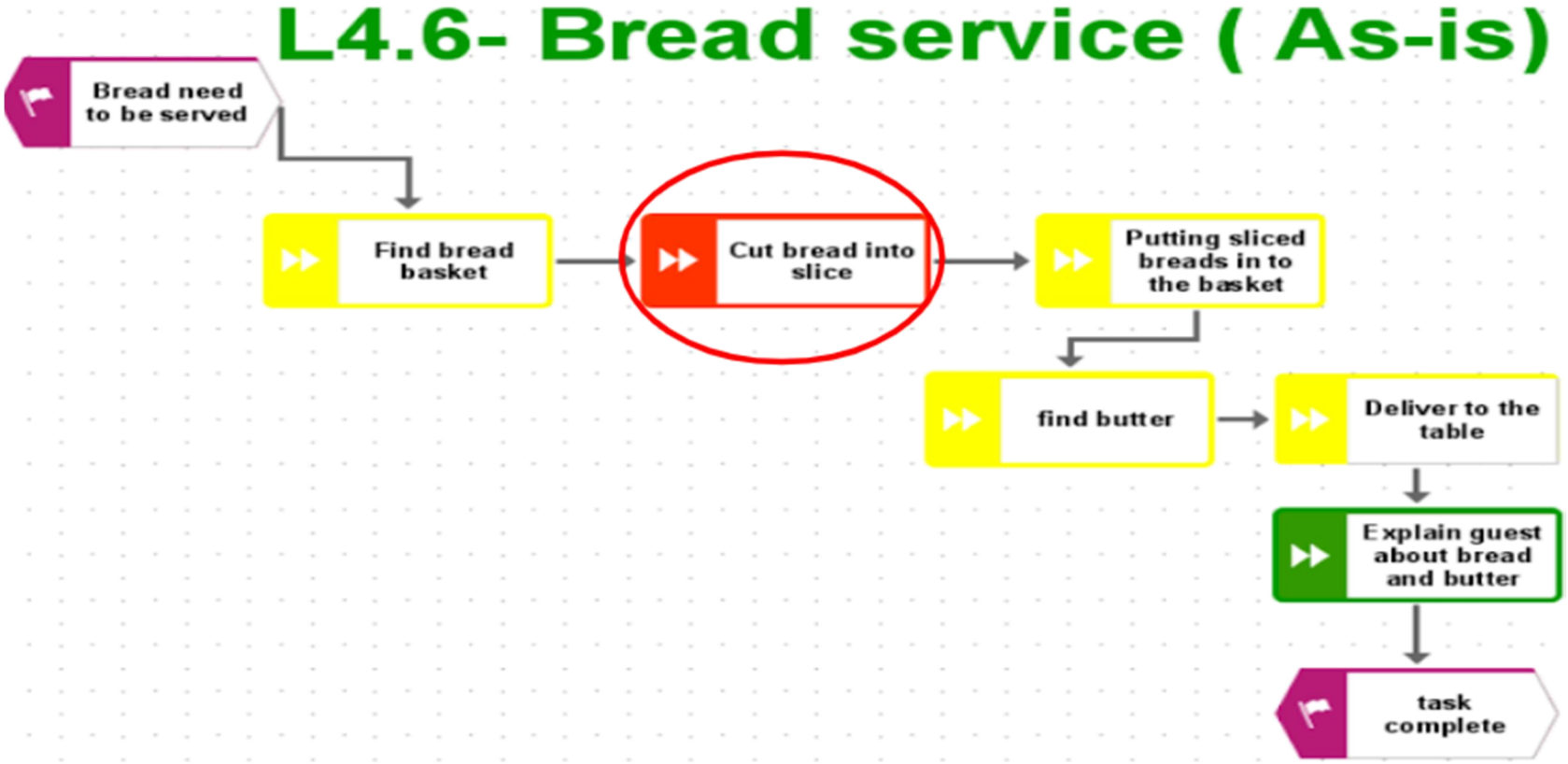

Figure 14: As-is bread service

Similarly, in figure 15 with the preparation of the table, there are no value-added activities involve for the customer must of the activities are just required among the required process there is also misleading, and therefore those activities identified as non-value-added activities. The circle activities even very crucial waste within the other activities.

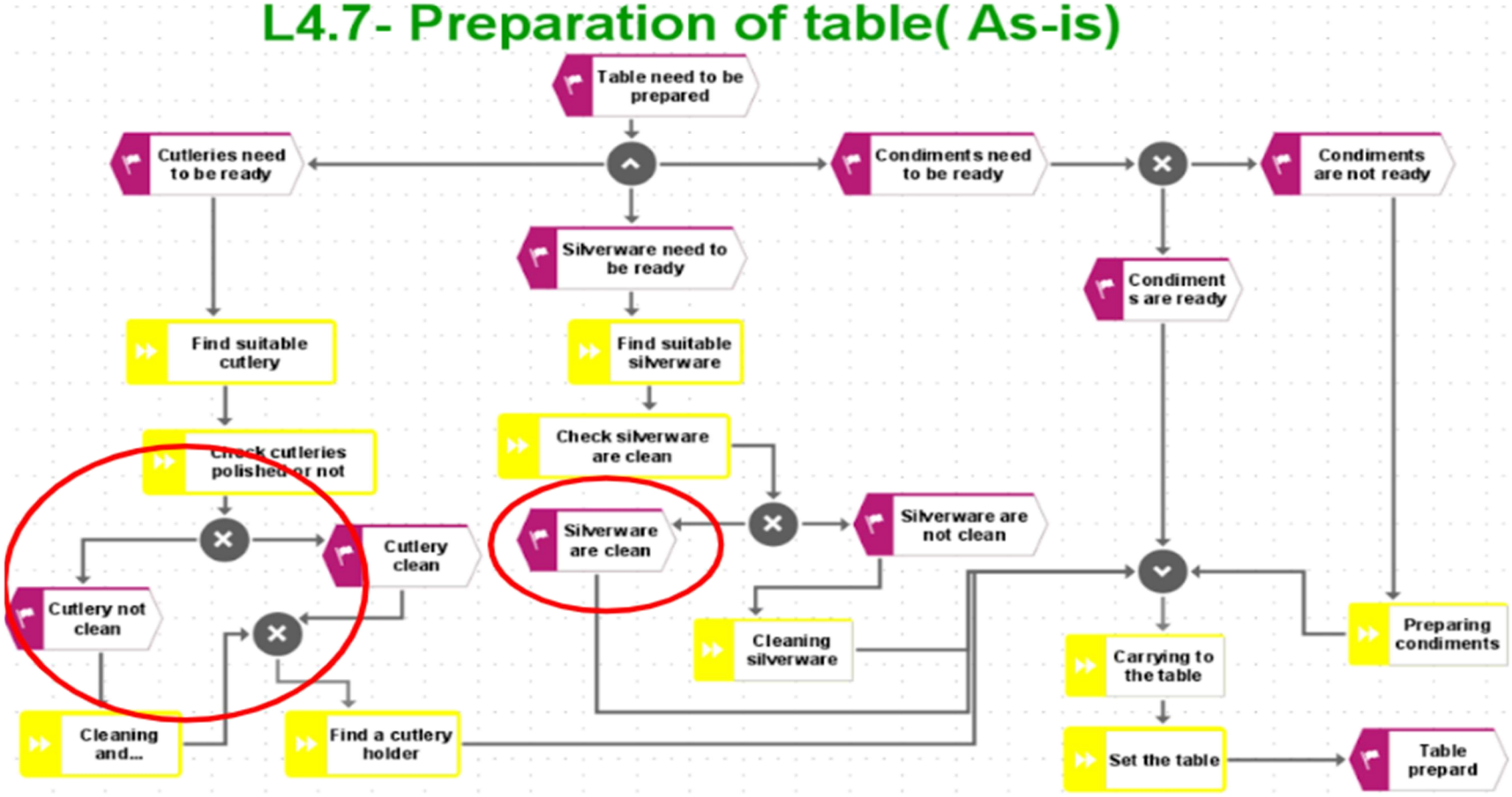

Figure 15: As-is table preparation

By analysing the activities of coffee and tea service no value-added activity has found because of this process full of waste because this order can be completed by guests through the automated system and possible to serve the drinks to the guest by few activities. The wastes are clearly identified with red colour in the following figure:

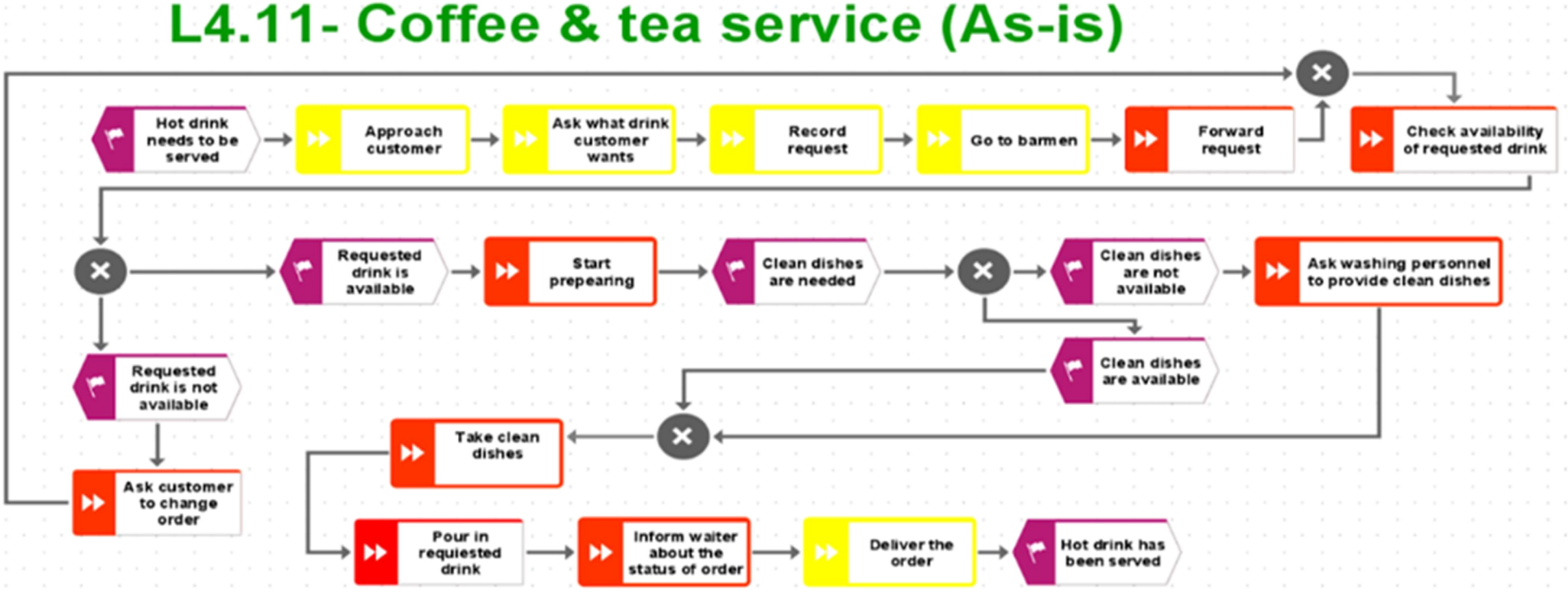

Figure 16: As-is hot beverage service

Same way in figure 17, presenting bill most of the activities are non-value added and involved unnecessary steps to complete, therefore this process needed to improvise.

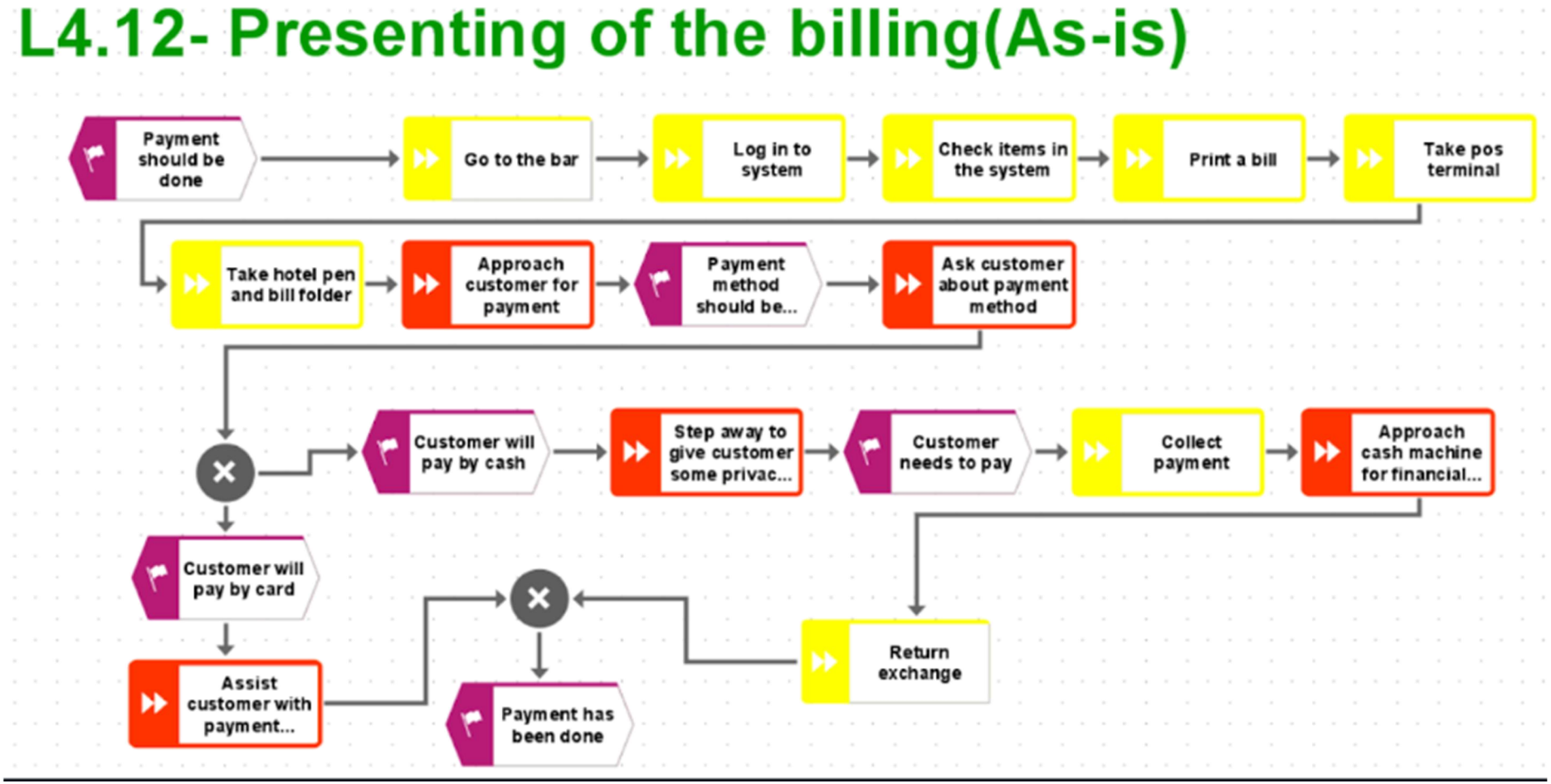

Figure 17: As-is billing process

Any activity that adds no value should not be in the process because they are time and cost consuming and lead the dissatisfaction of the customers. As the aim of the as-is hospitality process analysis to show the current state of the service process. Also to clarify how the service process works today in the F&B department, as a result of the complete service process has been presented step by step with the activities. Based on the as-is process of current state it can be said that, in most of the process, very few activates are value-added, most of activates are either require or non-value added. It is very clear that there is a lack of process management activates and the existing process is not adding values and continuous process improvement is highly required. Continuous process improvements remove the inefficiencies and improve the productivity of team members. With continuous process enhancing companies can evaluate the metric and evolve process without restricting the way teams work.

However, In order to carry out the value stream map author collected the information about the VAT and NVT for every process by interviewing different service providers, outlet managers, and supervisors and the following table are presenting the result. This table prepared to show as preparation of carrying out the as processes value stream map and in the value stream map has shown how the activities are related to the 8 waste.

Table 3: As-is process VSM data in minutes

Process	VAT (Min)	NVT (Min)
Greeting guest	O	2
Reservation check	0	2
Presenting menu	0	2
Taking order	0	3
Preparation of table	2	2
Beverage service	2	2
Bread service	2	1
Food serving	2	2
Clearing food	0	3
Desert service	2	2
Coffee and tea service	2	2
Presenting bill	1	1
Bid farewell	1	1
Total	**14**	**25**

The same information mentioned in figure 18 has been used for each process in the current state of the value stream and visualized the waste related to each process by 8 waste methodologies. The VSM is a map of process flow for better visualization, by

using VSM not only map the material flow but also information flow that signal and control the service process. The ultimate goal of the VSM is to identify the waste to eliminate form the process[20]. According to the current state of value stream map, it is clearly can be said that there are the number of activates are just waste within the process and they can be categorized within the 8 waste namely, defects, overproduction, waiting, Non-utilized talent, transportation, inventory, motion, and extra process.

Based on the analysis by as is process value stream mapping found many extra processes are involved such as greeting the guest, reservation check, presenting a menu, and taking orders and can solve different means. However, defects also happen with beverage and food service, because wrong making process or adding the wrong ingredient, at the same time overproduction are involved also with them, such as sometimes due to missing understanding kitchen or bar produces the extra product which completely waste. There is also waiting to involve with many of the processes such as beverage service, bread service, food service, clearing the table waiting for the bill to pay. Transportation involved with carrying equipment or product. Inventory such as holding extra food ingredients, unnecessary drinks stock, not maintaining a proper process for inventory lead to spoilt the product, not having proper forecasting, and so on. However, motion involved with all most all processes and one of the crucial is the motion of the service providers meaning it is very common service provider's move here and there without any reason. Non-utilizing talents also one of the crucial waste in the process because, telnets are not being used in the proper way, therefore, impacting many other processes by it.

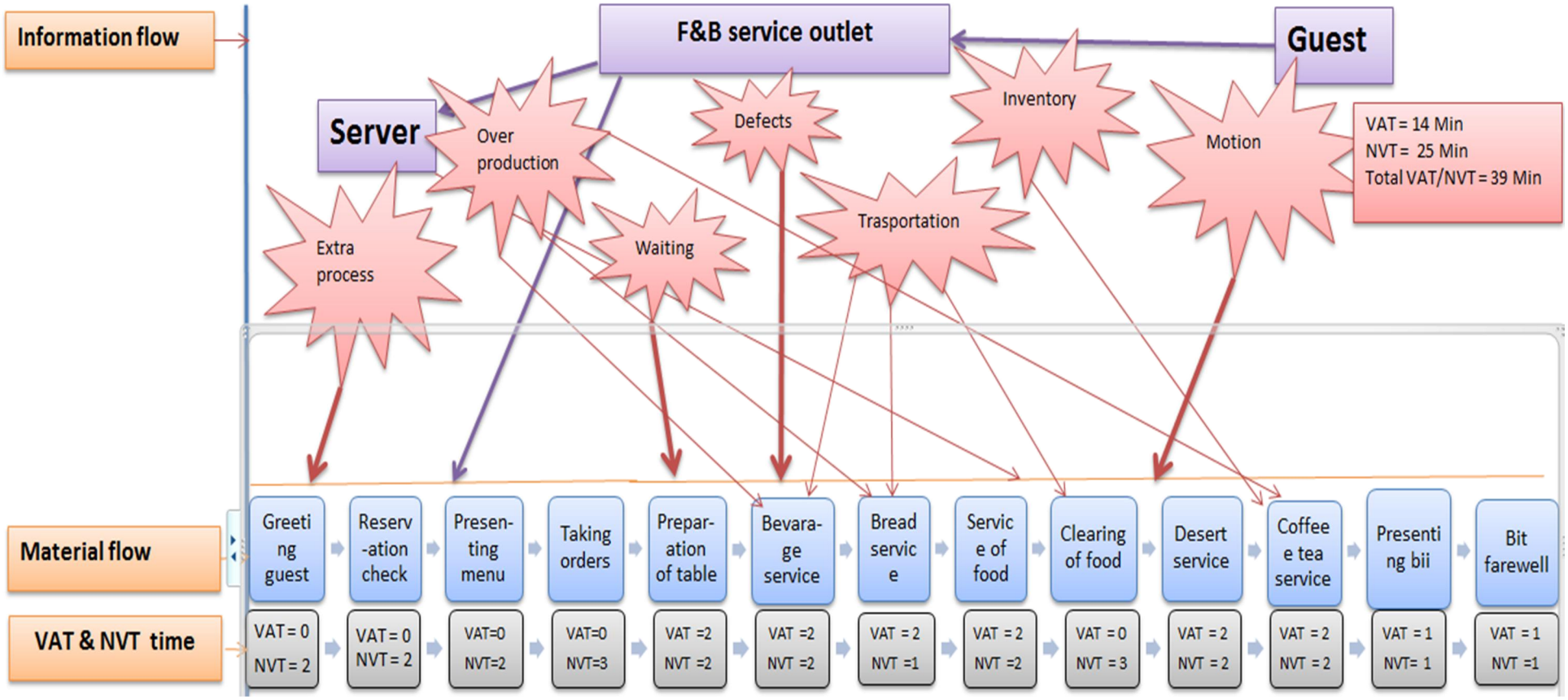

Figure 18: VSM of as-is process

In order to identify involved waste related to each process the following table has been presented by using lean 8 waste identification process and proposed solution also added for consideration.

Table 4: 8 waste in As-As process

Wastes	Defining in each process
Defects	Not taking right order, not preparing right drinks and food with the right ingredient, wrong table preparation, not organizing of service stations, no cleanliness, don't understand the customer needs, weak or missing process, uncontrolled inventory level, not following standard, no acknowledgment, no proper communication between servers and guests, miscommunication with kitchens and serving wrong products or services, not printing write the bill, doing twice or more something, not having proper preparation.
Extra process	Greeting guest, reservation check, presenting menu, taking orders, bread service.
Over production	Extra food or drink preparation, extra preparation, unplanned set up of the serving area and station.
Waiting	Waiting for server to approach, to take orders, to serve food and drinks, to clean the table, to present bill to pay and many more.
Transportation	Not using proper method of carrying equipment and products to serve the guest table. Not using proper method for cleaning.
Inventory	Holding extra ingredient, food items, and drinks and not having proper control on them. Having unnecessary stocks. Expiring products and not following LIFO, FIFO method.
Motion	Extra movement of servers, bar tenders and food maker.
Non-utilized talents	Not using telnets for right tasks or not giving tasks.

3.2 Proposed solutions

According to the literature of this study, there is the number of lean tools and techniques which have mentioned and the author found value stream mapping is suitable for F&B service process improvement because using value stream mapping possible to visualize the waste and easy to eliminate. Though human labour is a very traditional approach for F&B but implementing technologies in service process can make a very big difference. In order to solve the identified problems and eliminate

them such as extra process, motion, defects and other waste can introduce digital/ technological solution such as:

Digital check-in: Digital check-in can be completed by self-checking by the guest and in the busy restaurant hosts can spend time controlling reservations and managing phone calls and help other activities. By this process guest also can allocate their table and can see the availability without hostages.

Digital menu: The Digital menu also can be implemented which will customer to see the availability of the items and can order by self-selection. Digital menu also saves time, lower cost because pronating new menu cost for company, higher profit margin, increase brand image, visual appeal, make communication easier, reduce perceived waiting time, 24/7 support thus the customer can decide in advance about their choice, boost the selling as it a less time-consuming process and less human time and efforts used, safe and secure for health during any kind of emergency like corona or normal life as well and less human interaction needed. However, nowadays the voice ordering system can be implemented to reduce human interaction.

Inventory automation: Counting, ordering, reviving is a very common task in the restaurant. Manual ordering and counting sometimes make the task difficult to track a trace. By automating the inventory system possible to reduce the food and drink cost significantly because automatic inventory control can tack the products comes in the kitchen and bar and what leftover. Inventory automating also tracks the product transferring between the departments.

Robot for carrying and cleaning dirty dishes: Recently, human-Robot collaboration (HRC) has lots of attention as robotic system has already become essential components within the various industrial sectors. HRC provides relief to human workers from heavy tasks by establishing communication channels between humans and robots for better overall performance. for several companies collaborating robotics is becoming a technique to extend efficiency and productivity[43]. Similarly, the robot may be installed for hospitality service also like employing a robot trolley for carrying the dirty dishes may be a really useful means during rush time. Especially during breakfast, group dinner, or launch even may be very useful for the banqueting area. It'll significantly reduce human labour, cost and at the identical time improve customer satisfaction because the guest doesn't must look ahead to the server to gather the dirty dishes, guests just must put the dishes on the trolley. Likewise, the robot may be a really useful kitchen and possibly transform many activities within the kitchen into the smart solution which ultimately saves the interval and increase the restaurant service efficiency.

Other technologies: There are some other technologies that can improve the restaurant service such as the installation of a digital solution for buffet service where customer can mark the missing items which pop up in the kitchen and no people require for buffet caring instead can do some other tasks require a human hand. Near-field communication NFC technology which is wireless data transfer technology allows to communicate nearby without internet and it can be very useful for communicating within the servers.[44] Recognition technology which is the face scanner and can be very useful for buffet service in the restaurant.[44]Likewise many other technologies robot can be installed because, installation of robot minimizes the cut human labour, reduce cost, accelerate the service process by continuously performing the tasks, and ensure error-free services.

Overall, by digital solution and automating system possible to solve most of the problems defined in table 4.

3.3 To-be process and future state of VSM

The to-be process mapped after eliminating extra process and the waste from the process and the following figures presenting the optimized process. The aim of the to-be process is to bring the only value-added activities within the process and reducing all other non-value adding activities and in order to do that technological solution also proposed in the previous chapter. In the following figures, some of the examples of the To-be process are presented. In the As-is process, the number of the process was 13 but in the To-be process, 6 processes and also eliminated involved waste within these 6 processes those are non-value added activities, therefore Value-added time improved significantly and Non-value added time deducted from the process.

Figure 19, F&B service presenting a simplified to-be process after removing the unnecessary process from the as-is process. The number of the process was in the as-is process were 13 and in the To-be process 6. Again from the 6 process non-value added activities removed and simplified process figures are presenting accordingly. Based on that again value stream mapped has developed to compare the result between the as-Is process and To-be process. The process removed from the As-is process is welcoming guest, checking reservation, presenting the menu, taking the order, clearing table, bread service, presenting bill and bit farewell because most of the process can be completed by guest by digital solution except bread service but it self-service by the guest.

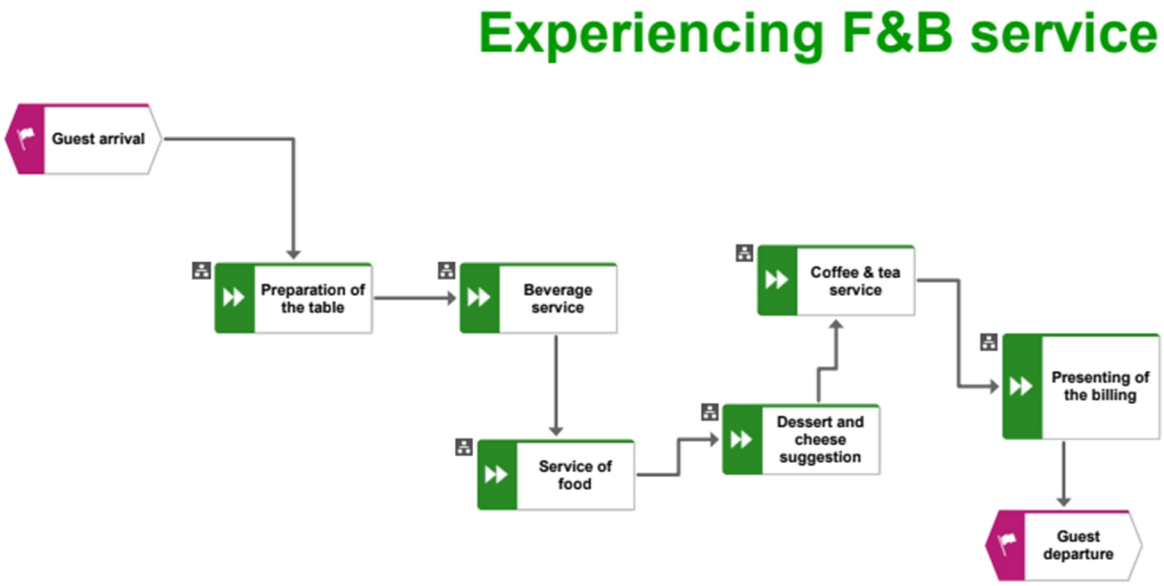

Figure 19: F&B To-be process

The figure 20 presenting the table preparation activities, though those activities do not add any values for the customer it is a very important process for the restaurant in order to serve the customer, therefore simply following activities need to have in the process. Before in the As-is process, the number of activities was 19 but in the To-Be process now 7.

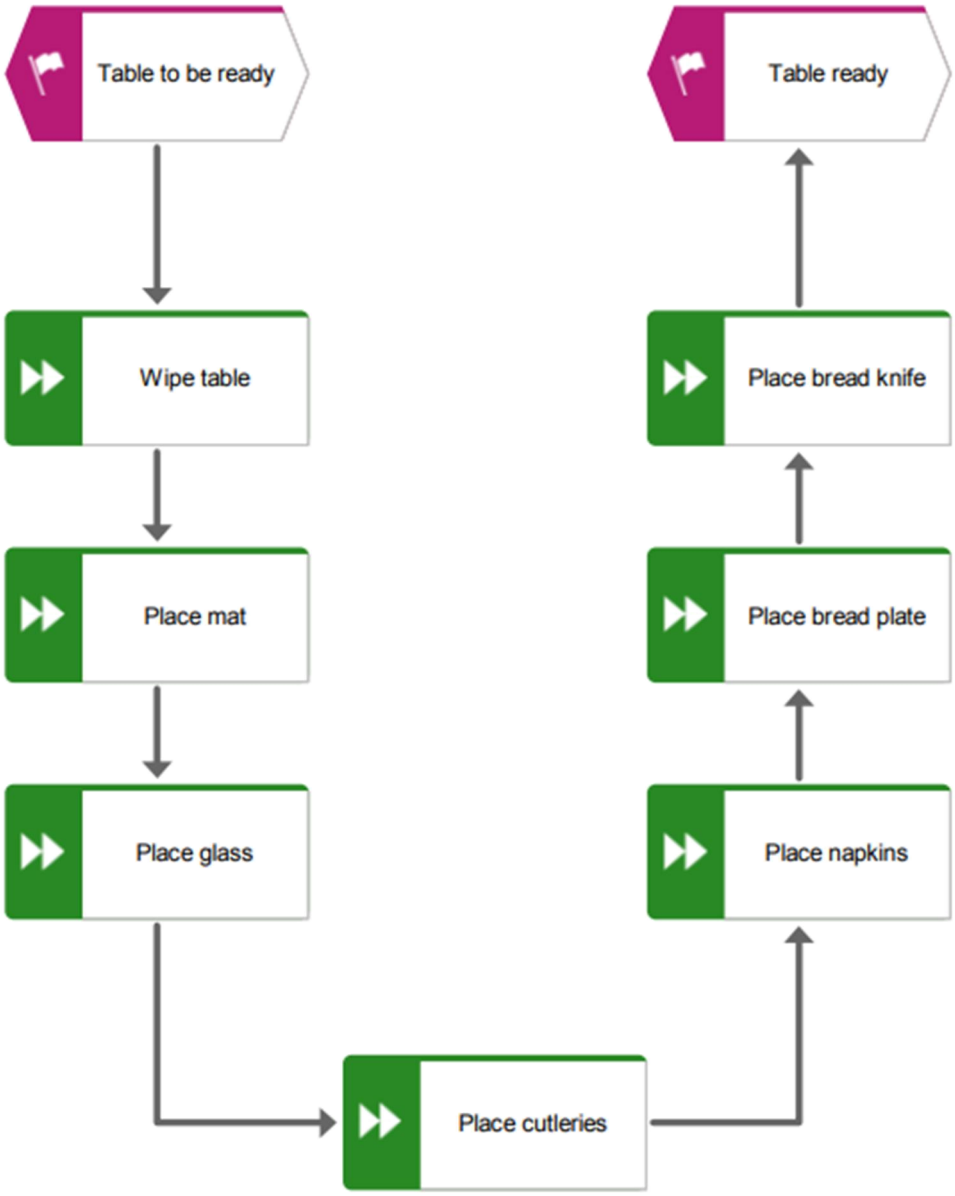

Figure 20: To-be table preparation

Figure 21 presenting the beverage service To-be process and the process simplified by eliminating order related activities taken by the server which can be done by guest by digitally and simply order can be forward to the bartender and server just take and serve on the table, therefore the following steps are required.

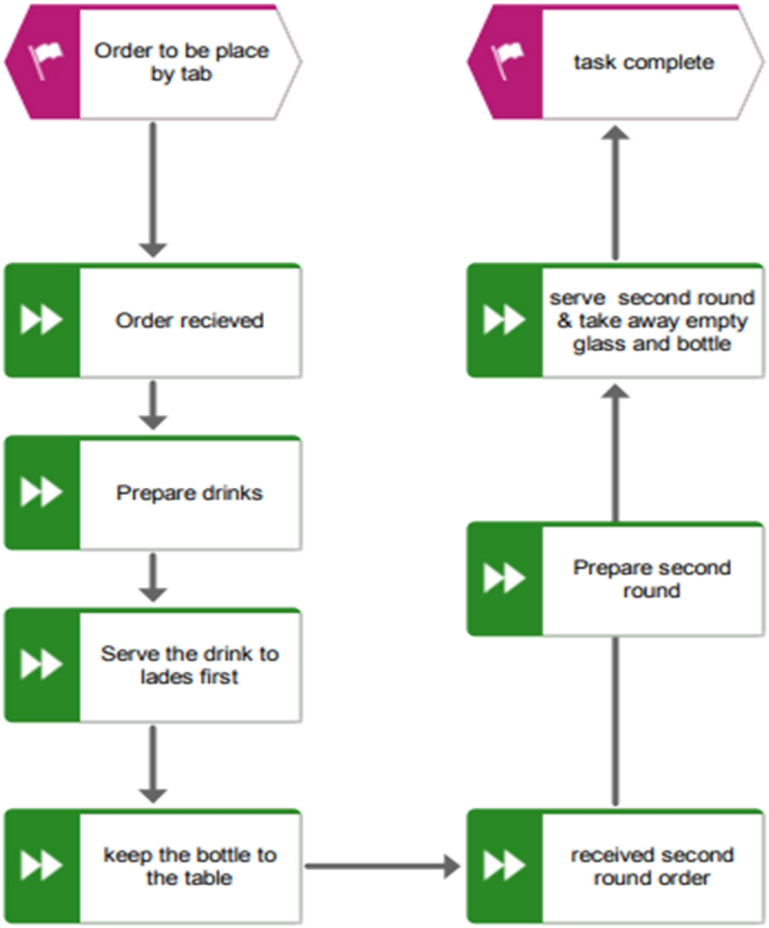

Figure 21: To-be beverage service

In the following figure serving food, the To-be process has presented which can be done by following very simple steps, because the main activity here to just deliver the food to the guest table. The other related activities are clearing the starter before and bring food from the kitchen. Any other activities out of those steps have considered waste.

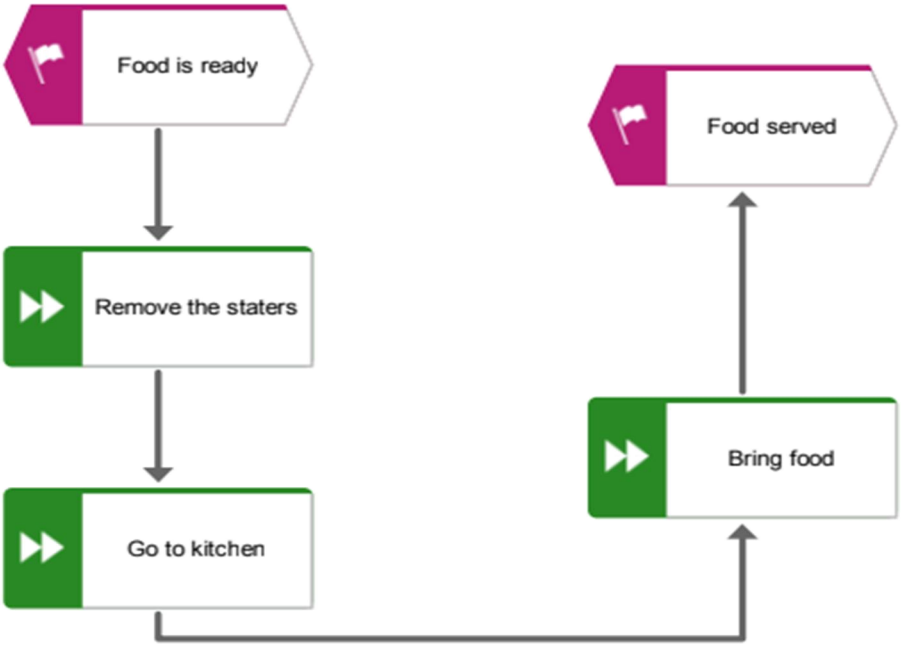

Figure 22: To-be serving food

In As-is process desert service reworking process such coming to take order ones again which can be taken at ones digitally and no need to explain guest as all the explanations are in the system, therefore those activities and other Non-Value added activities are removed from the process. Simplified to the To-be process is as follows.

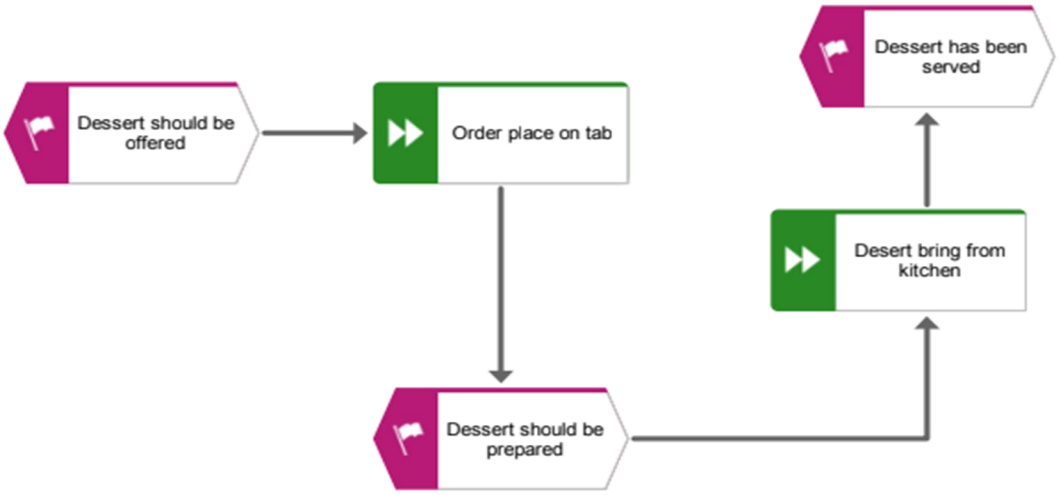

Figure 23: To-be desert service

On that step of the process of the as-is process, the number of activities was a lot and most of them add no-value. Only here in the simplified process waiting time drinks preparation period. Otherwise here in the figure 24 processes is very simple and possible to finish within a few steps.

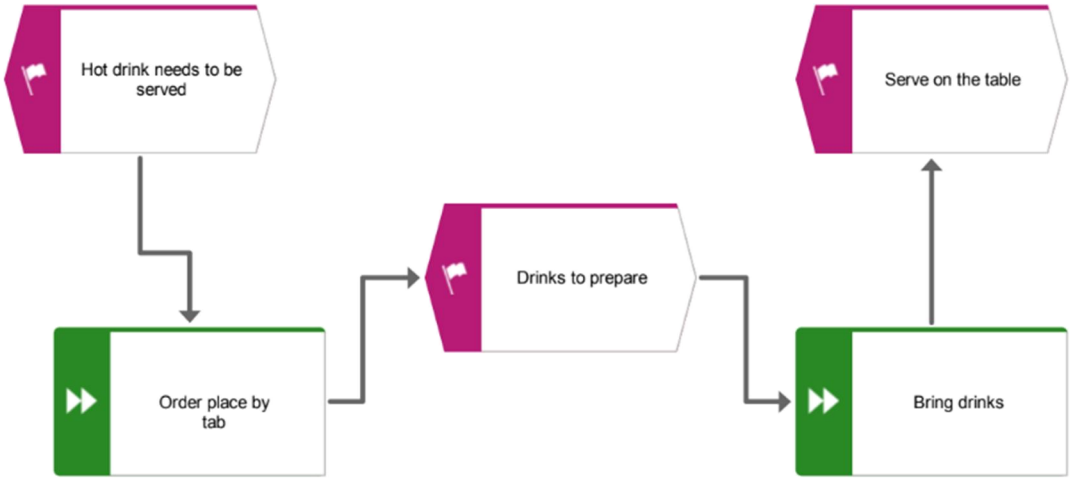

Figure 24: To-be serving hot drinks

In the payment process, no need to print the bill for guests except the guest from in house or even it can be recorded into the digital solution. Otherwise, the server just needs to accept the payment and return the change to the guest and complete the payment process within fewer activities as it in figure 25.

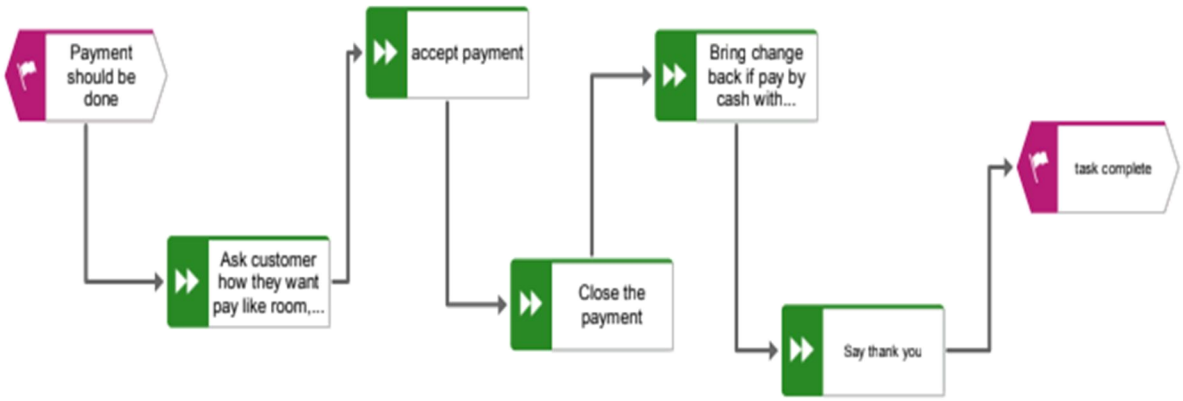

Figure 25: To-be collecting payment

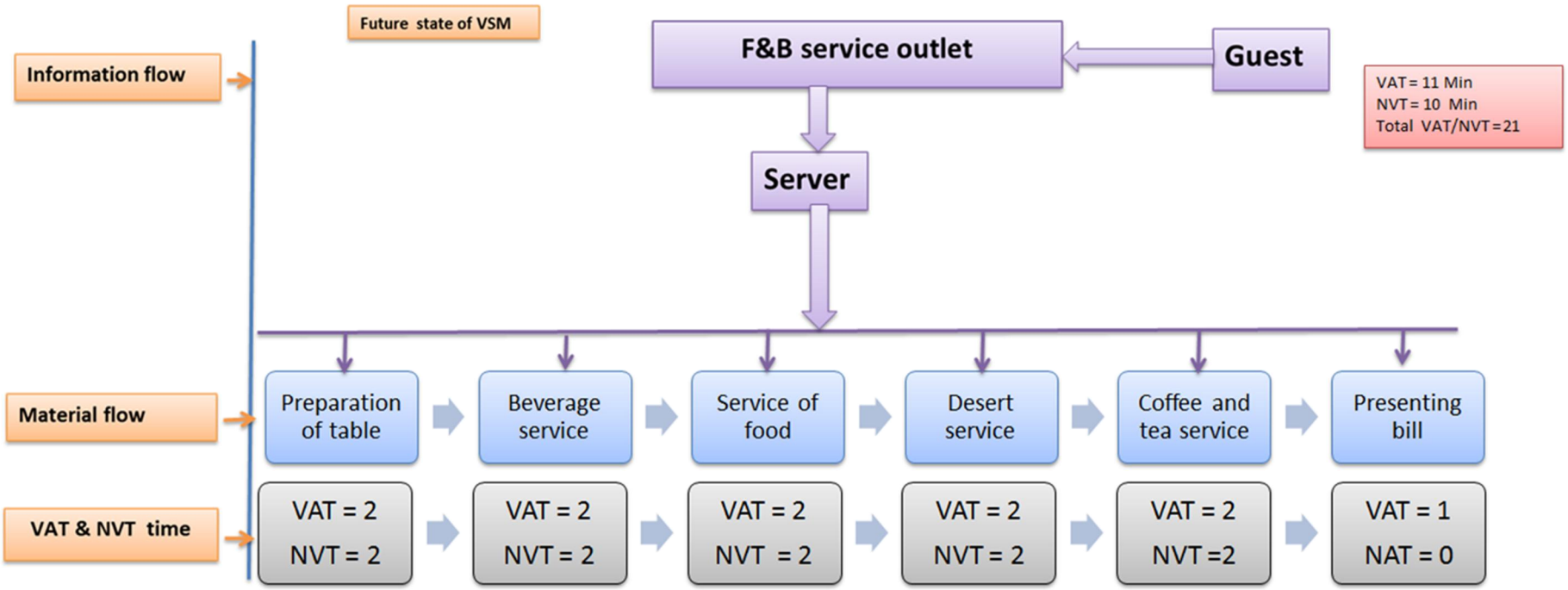

Figure 26: VSM of to-be process

The To-Be process VSM presenting the main steps of the process need for completing the service per guest. By mapping the To-Be process VSM total time found 21 minutes which more than 50% less compare to as-is process VSM. However, the To-be process VSM presented to summarize the To-Be process mentioned in different figures previously. The result after the To-be process VSM presented as following by table:

Table 5: Result after To-be process VSM

Process	VAT	NVT
Preparing of table	2	2
Beverage service	2	2
Service of food	2	2
Desert service	2	2
Coffee and tea service	2	2
Presenting bill	1	0
Total	**11**	**10**

3.4 Comparison as-is VSM and To-be VSM

In the following the comparison has shown between as-is process VSM and To-be process VSM. Also, a calculation has presented based on the processing time of As-is and To-be process to show how company can be benefited from lean-approach.

Total time saves per table service (VSM as-is process – VSM To-be process)

VSM as-is process = (VAT+ NVT) = (14+25) minutes

= 39 minutes

VSM To-be process = (VAT+ VAT) = (11+10) minutes

= 21 minutes

Time save after To-be VSM = (VSM as-is – VSM To-be) = (39-21) = **18 minutes**

Which is in % (before-after/before x100) = (39-21/39x100)

Time save by = **46%**

In order to complete the cost, calculation author collected the average number of table service per day and payment per hour for the server which are respectively 200 tables per day and per hour payment 6€.

According to as-is process daily, monthly and yearly expenses for the servers by company as following:

Table 6: Expenses in a year for servers

Total hours per day = (Number of Tables per day x total time per Table)	**200x39 = 130 hours**
Per day expense = (Total hours x per hour payment)	130x6 = 780€
Per month = (per day expense x 30)	780x30 = 23,400€
Per year = (Per day expense x365)	=780x 365 = **2,84,700€**

According to To-be process daily, monthly and yearly expenses for the servers by company as following:

Table 7: Expenses in a year for servers

Total hours per day = (Number of tables per day x total time per tables)	**200x21 = 70 hours**
Per day expense = (Total hours x per hour payment)	70x6 = 420€
Per month = (per day expense x 30)	420x30 = 12600€
Per year = (Per day expense x365)	=420x365 = **1,53,300€**

Now, (As-is process expenses – To-be process expenses)

= (2, 84,700- 1, 53,300) = **1, 31,400€,** Company can save per year.

Which is in % (before-after/beforex100) = (2, 84,700-1, 53,300/2, 84,700x100)

Money save by **= 46%**

According to analysis and result it is clear by using a lean approach company can improve the process, at the same time possible to cut a significantly cost per year.

4. CONCLUSION

For any businesses in the service industry excellent customer service and satisfaction is the highest priority, in this regard hospitality also one of the very important areas and highly competitive everywhere in the world. However, many hospitality industries find themselves buckling under the strain of too much demand, not enough capacity to deliver, and error due to lack of standardizing ways of working. Lean is a very useful tool to implement not only in manufacturing but also can be implemented like other service areas in hospitality. According to this particular study, lean can be defined as a very helpful tool to determine what customer value and to optimize the process by cutting out waste-activities that absorb the unexpected time and resources but add no value to the customers. By implementing lean tools and techniques it is possible to achieve maximum productivity and performance with fewer resources. This study also revealed the values in the eyes of the customer, identified value-added activities by value stream mapping, and holds the process highly useful for adding values.

Moreover by using lean analysis possible to solve the problems and accelerate the service process with human interaction as well as installing technologies depending on the service type and customer expectation but installing technologies like a robot and automating tasks can be highly recommended to ensure service efficiency in the competitive business world especially for the hospitality business. Nowadays, smart technologies changing the way of business, the more is the technology adaptation the more success of the business because advanced technology ensures customer satisfaction. An industry like hospitality human interaction ratio is very high to perform the tasks which might the level of hygiene issues and using technology very effective solution to reduce the human interaction and ensure the safety of customer health.

Finally, the customer is the core of the hospitality industry and lean is the best approach can be implemented in order to eliminate all types of waste related to service and improve the customer satisfaction by introducing proper solution in every aspect of the service, therefore implementing the lean approach in hospitality process improvement is very obvious to compete within the competitive business world to survive.

5. SUMMARY

The aim of the study is the hospitality service process analysis and improvement by using lean-approach. Lean is a very widely used approach not only production sector but also in service sectors. However, very little attention has paid to the hospitality industry; therefore there is scope and areas where a lean approach can be used to improve the process such as for the F&B service in hospitality. In order to support the research, the author covered theories such as lean in general, lean in manufacturing, service, hospitality, and analysed the case on current state of the F&B service process. Based on the literature, the VSM model has chosen to analyse the as-is process and proposed the possible solutions and according to the solutions, the To-Be process has mapped, and VSM presented for the To-Be process ones again as an improvised process map. Finally, a comparison has presented between the As-Is process VSM and To-Be process VSM, shown time difference and financial impact before and after lean implementation.

6. KOKKUVÕTE

Töö eesmärk on uurida ja parendada külastusteenuste protsessi kasutades kulusäästliku mõtlemise põhimõtteid. Kulusäästlik mõtlemine on laialdaselt kasutatud lähenemine mitte ainult tootmises vaid ka teenindussektoris. Sellegipoolest on väga vähe tähelepanu pööratud teenindussektorile ning alasid, mida uurida on seetõttu mitmeid, näiteks toitlustusteenus.

Uurimuse toetuseks läbis autor järgnevad teemad: kulusäästlik mõtlemine üldiselt, kulusäästliku mõtlemise kasutamine tootmises, teeninduses, külastusteenustes ja analüüsis toitlustusteenuse praegust protsessi.Kirjandusele toetudes valiti väärtusahela kaardistamise meetod, et analüüsida hetkeolukorda, pakkuda võimalikke lahendusi ja lahendustele toetudes tulevikuprotsess kaardistati ning seejärel kaardistati ka tulevikuprotsessi väärtusahel. Lõpetuseks esitleti võrdlus hetke- ja tulevikuprotsessi väärtusahelate vahel ning näidati ajalist ning rahalist mõju enne ja pärast kulusäästliku mõtlemise juurutamist.

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8. Appendices

8.1 Appendices 1

STANDARD OPERATING PROCEDURES
CHAMBERS 1.7 PREPARATION OF TABLE

Hilton HOTELS & RESORTS

PURPOSE...	1.7 Preparation of the table
WHEN TO...	After posting food & beverage in micros

TASK	***THIS IS HOW WE DO IT...***
Setting the tables 	➢ Cutlery must be polished and in good condition. Appropriate silverware will be provided before serving order; condiments will either be pre-set or serve with food. ➢ Cutleries will be carried on a cutlery pocket with under liner. ➢ T.M need to set the appropriate cutlery to correspond with guest order. The right cutlery shall be set accordingly until **main course**. ➢ Use only forefinger and thumb to pick up, at the handle, and place the cutlery. This is due to hygiene purposes and also to prevent fingerprints. ➢ Butcher paper is layered on the table as part of standard setting. Traditional salt & pepper grinder, olive oil and vinegar will complete with the centerpiece. ➢ All cutlery will be set based on the order, with the first course setting placed on the table as open setting and followed by the next course (from outside move inwards) if required.

RESULT...	Guests have clean, appropriate cutlery to use for each course of their meal
STANDARDS...	Setting matches the order

Prepared By :	Acknowledge by:	Approve By:
.....	.....	.....
Assistant Outlet Manager	Director Of Food & Beverage	Hotel Manager / Director Of Operation