



Business Process Management in Service-Based Companies

Master Thesis

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Declaration

Hereby, I declare that this thesis is my original and my own unaided authorial work. All references, sources and literature used in this work or excerpted during elaboration of this thesis are properly cited and acknowledged in reference to the due source.

Faranak Yazdani

Acknowledgments

First and foremost, my acknowledgment goes to my Lord, without whom I would not have strength and courage to take this and many other steps in my life. Second, I would like to express my gratitude to my supervisors, Prof. Dr. Hans-Knud Arndt and Dr. Naoum Jamous, for their support, consultations and supervision during my work on the thesis. And last, but not least my acknowledgment goes to my family for their unfailing support they have given me throughout my life.

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List of Abbreviations

Architecture of Information System	ARIS
Association of Business Process Management Professionals	ABPMP
Business Process Management	BPM
Business Process Management System	BPMS
Business Process Reengineering	BPR
Certification Body	CB
European Foundation for Quality Management	EFQM
Event-driven Process Chain	EPC
Guidelines of Modeling	GoM
Performance Measurement	PM
Performance Measurement Framework	PMF
Performance Measurement System	PMS
Results and Determinants Matrix	RDM
Service-Based Company	SBC
Total Quality Management	TQM
Workflow Management	WfM
Workflow Management Coalition	WfMC

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Abstract

Today's competitive market makes businesses more dependent on their ability to react to changes, and adjust their processes to the new requirements. In this environment, it is a major challenge for business organizations to transform the vast number of concepts and ideas into products and services. In order to achieve this, many organizations try to improve their business process continuously from different aspects. In this context, Business Process Management is a good support for organizations. Business Process Management is an effective approach to govern, improve and optimize organization's operations and processes. Since Business Process Management is a spacious concept, it is influenced by many other concepts and encompasses various approaches that determine its constancy. Process Modeling, Process Optimization and Performance Measurement are some examples.

Although extant literature specific to Service-Based Companies suggests that Business Process Management positively affects organizational outcomes, empirical evidence is predominantly anecdotal. Focusing on the Certification Process and Service Industry, this study links the use of Business Process Management with essential properties of Process Modeling, Process Optimization, and Performance Measurement. The goal of this study is twofold:

- Business Processes are essential elements in any organization. As the lack of process models and process descriptions hinders the efficiency of the processes, this study gives a clear understanding of certification process by modeling and optimizing the core process of Certification Bodies. Organization X is chosen as the case of study. Organization X is a Certification Body in Germany and it has already implemented Business Process Management approach for two years. In this research, the core process of Organization X will be modeled and optimized. The thesis describes how the quality of business processes can be improved and optimized using Business Process Management. Aim of the empirical part of this study is to analyze the processes of Organization X as a Certification Body and to propose solutions which should help the organization improve the quality and effectivity of its processes. The new modeled processes are more streamlined and simplified in order to bring more value for similar organizations by

increasing the satisfaction of stakeholders as well as minimizing the duplicate efforts and optimizing the throughput times.

- The second goal of this thesis is to identify and investigate critical factors influencing the performance of Service-Based Companies. In doing so, this study develops a new Performance Measurement Framework that is able to effectively measure the performance of Service Sector.

In order to achieve the goals of this study, both inductive and deductive research approach is applied. In the modeling phase of this study; namely the inductive phase, the research starts with data collection and process model will be developed based on the gathered data. The deductive approach is applied to develop a Performance Measurement Framework on the base of previous and existing theories. Furthermore, the research strategy of this study is qualitative, since the detailed data for the purpose of this thesis are gathered through literature review, interviews and documents.

Research results illustrate the impacts of Business Process Management and show how modeling processes provides a clear understanding of workflows in organizations. In addition, the study shows that an effective Performance Measurement Framework, which aligns to the Service-Based Companies' daily processes, can help organizations to formulate right strategies and improve positively. A Performance Measurement Framework that meets the requirements of Service-Based Companies is stemmed from organizational strategy and measures both performance Enablers and Results as well as the organizational processes; which should be aligned with the strategy. In this model, the Enablers are categorized into two classes of Internal and External factors and respectively encompass five factors including:

- Quality of service
- Innovation
- Competitiveness
- Human Resource
- Flexibility

Furthermore, the framework is balanced and measures both financial and non-financial results. By measuring the financial results, Deep-Cost Measurement and Cost drivers must be taken into account. And finally, Variance Analysis is an integrated part in the framework, since it is an inseparable characteristic of Service Industry.

At the end, the findings of this study are translated into concrete suggestions for practitioners. The certification core process has been modeled and optimized; which can be utilized by all Certification Bodies and the developed Performance Measurement Framework can be used in Service Sector since it meets the requirements of Service-Based Companies.

In summary, this study investigates and analyzes three main tasks as following:

- Scientific literature in the field of Business Process Management as a holistic approach, and Process Modeling, Process Optimization and Performance Measurement as topics that are included in the context of BPM;
- Modeling the core process of Certification Bodies;
- Current existing Performance Measurement techniques in order to develop an efficient framework for SBCs.

Chapter 1 - Introduction

1.1 Background

Globalization has increased competition in today's international and domestic markets. Nowadays, many organizations face fierce competition and try to increase their market share and pay more attention to quality as well as customer satisfaction to gain more profits. In order to achieve this, organizations should make decisions and react to market changes quickly. Therefore, efficient management of business processes has gained increasing attention and many organizations try to improve their business processes continuously in response to market and environmental changes. As a result, Business Process Management has become a popular approach. Business Process Management (BPM) is a management discipline which has gained prevalence during last decades and aims at lifting organizations' performance through improvement, management and control of business processes [49]. More flexibility, increased accuracy, cost savings and reduced investment are some of the benefits targeted by BPM [40]. BPM is inherited from different approaches and hence, it represents a holistic discipline as opposed to a single structured methodology [24]. There is an extensive body of research on the effects of BPM within organizations and the adoption of BPM by industries. The process of BPM adoption starts typically with fostering a general awareness of BPM and continues with conducting isolated projects of processes improvement. Over time, beneficial outcomes of such projects are assuming and the organizational activities can be corralled into formal programs and supported by focusing on strategy and governance, methods and technologies as well as people and culture [84].

BPM is a holistic approach that is linked with many other concepts; such as Process Modeling, Process Optimization and Performance Measurement (PM). Process Modeling is one important concept in the context of BPM. Organizations document and communicate their processes by utilizing business process models. Process Modeling generally starts by documentation of business processes and continues by (re)designing the existing processes in order to the automatic execution of processes [23]. After initial modeling of business processes, these

processes should be continuously controlled and optimized. This approach encourages organizations to get back to their basics, improve or eliminate the processes that aren't working and to create an efficient environment of analysis and monitoring. Performance Measurement is another approach in the context of BPM. In order to manage business processes, it is essential to measure and possess information on the current progress and past performance of the processes.

To summarize, BPM is a combination of concepts and technologies to govern business processes and improve organizational fundamental activities. BPM helps organizations to execute a strategic program and improves the correspondence between organizational strategy and business processes.

1.2 Motivation and Goal Definition

In the past, organizations operated in a stable market and they had their large consumer markets. By contrast, today's organizations are challenged by a dynamic marketplace and increasing complexity. The market is characterized by varying preferences of customers. In this context, The BPM as a business driver has gained decisively importance.

A very important aspect which is tightly linked with BPM is the design and modeling processes. The lack or poor quality of process models and process descriptions hinders the efficiency of processes in organizations. One of the primary goals of this study is to model and reengineer the certification process conducted by Certification Bodies (CBs).

In addition, this study investigates the development of Performance Measurement Systems (PMSs) as an inseparable part of BPM. Management accounting was traditionally used to create performance benchmarks within organizations. At the late of 80s, studies had shown that the traditional use of financial data doesn't satisfy the Performance Measurement in the new economy since the complexity of organizations was increasing [68]. Sustainable shareholder value is influenced by non-financial factors, such as quality of internal processes, customer loyalty, employee satisfaction, and organizational innovation [20]. Hence, a series of PMSs have been introduced. Balanced Scorecard [53], Results and Determinants Matrix [32], and EFQM Business Excellence Model [29] are some popular and widely used examples. Other than these

Performance Measurement models, many other approaches, such as Total Quality Management (TQM), Benchmarking, etc., were also introduced and used in practice. However, most of these systems and frameworks were designed for organizations without focusing on Service-Based Companies (SBCs) and there is no consensus whether these introduced models are applicable and totally appropriate for SBCs. Due to the importance of service sector, today's business market is increasingly characterized as economy of service. The growth of service sector is considered as an indicator of economic progress. While much of the available literature provides good guidelines for manufacturing companies, there is less focus addressing challenges of adopting BPM in SBCs. As SBCs have their own characteristics other than manufacturing ones and the value creation is ultimately linked with the processes, adopting BPM has other challenges in such organizations. Because of the important role of SBCs in the new economic environment, this thesis focuses on measuring performance in SBCs and aims at identifying and investigating the critical success factors which influence the performance of SBCs. This thesis develops a new Performance Measurement Framework (PMF) that is able to measure the performance of such organizations.

- In order to achieve the defined goals of this thesis, two main questions are investigated:
- How can the current certification core processes of CBs be modeled and optimized?
- What is an effective PMS for SBCs?

To address the above primary questions, the following sub-questions are answered:

- Why do organizations model their business processes and which modeling methods are available?
- What is process optimization and how can it be used to improve process efficiency?
- How is a PMS designed and how can it be used?
- What are the knowledge gaps regarding PMSs for SBCs?
- How can SBCs design an effective PMF and what are the critical success factors that drive performance of these organizations?
- What are the performance measures and indicators that should be measured by SBCs?

The above defined sub-questions are discussed in this thesis based of literature of Business Process Management, Process Optimization, Process modelling, and Performance Measurement.

The answers of these questions are then used in implementation and solution chapter, where certification process is modeled and a PMF for SBCs is developed. The completed thesis includes a modeled and optimized Certification Process and a PMF for SBCs.

1.3 Contribution of the Study

The contributions of this thesis are both theoretical and practical and are as follows:

- The lack or poor quality of process models in organizations hinders the efficiency and effectivity of processes in today's organizations. This study tries to model and optimize the certification process conducted by CBs.
- During last two decades, many PM Systems and Frameworks have been developed. However, most of them have a general view on organizations and don't consider SBCs as companies with different characteristics. This study identifies the requirements of PMSs through the analysis of literature available in this field for an effective use in SBCs.

1.4 Methodology

This thesis models and optimizes the certification process and develops a new PMF for SBCs. To achieve this, a comprehensive and extensive literature review on Business Process Management, Process Modeling, Process Optimization and Performance Measurement, has been conducted. In order to model the certification process, the first task is to understand and study the current situation and to identify all dependencies and stakeholders affecting the processes. As the second step, research data must be gathered and the findings must be analyzed in order to improve and optimize actions and processes and to evaluate whether the new outcomes are more desirable and more effective than the old ones. Furthermore, an extensive and a comprehensive literature review must be conducted to analyze popular existing PM Frameworks and Systems in order to identify the strengths and weaknesses of them and summarize the research regarding PM in SBCs and to develop a new PMF for these organizations.

In order to achieve all these goals and objectives, this study employs both inductive and deductive research approaches and the qualitative research strategy. The inductive approach is applied, since in the modeling phase of this study, the research starts with data collection and new theories will be developed based on the data. The deductive approach is also applicable for this study, since a theoretical PMF will be developed on the base previous theories, and then this theory will be applied to one specific instance. The research strategy of this study is qualitative, because detailed data are gathered through literature review, interviews and documents and are analyzed.

1.5 Thesis Structure

This thesis is comprised of five chapters. Chapter 1 is an introduction which goes through the background, motivation, contribution and the methodology of the study. Chapter 2 involves the literature on Business Process Management, Process Modeling and Optimization and Performance Measurement. Chapter 3 presents the methodology of the study. Chapter 4 is the solution and implementation part of the thesis and investigates the modeling and optimizing the certification process. After that and in order to develop a PMF for SBCs, the characteristics of SBCs and the theoretical approaches of PM for SBCs will be studied, the strengths and weaknesses of presented PMSs will be compared and a new PMF for SBCs will be developed. Chapter 5 presents the findings of this thesis and is the conclusion chapter.

Chapter 2 – Literature Review

2.1 Introduction

In today's competitive market, it is crucial for organizations to design, manage, and improve their business processes to improve their performance and increase the profitability. Given that, BPM has become a key factor in order to manage business processes. The development way of organizational structures has been changed in organizations during the last two decades, that forced the organizations to focus on their processes. In today's dynamic world of business, the organization that manage their business processes poorly, have difficulties in the market. The importance of business processes has been changed within organizations and this trend brings more processes under the supervision of BPM. BPM is a holistic approach and many other approaches have been appeared in its context. Business Process Modeling, Process Optimization and Performance Measurement are some examples.

This chapter of this thesis gives an overview on the topic of BPM and is structured as follows: Section 2.2 goes through the background of BPM by defining the terms "Process" and "Business Process", introducing the lifecycle of BPM, and finally benefits of utilizing this approach. Section 2.3 provides a literature review on the topic of Process Modeling and also Modeling Techniques. At the end of this section Event-Driven Process Chain; as a modeling language, will be introduced in order to be used for the purpose of this thesis. And finally, section 2.4 gives a brief overview on Performance Measurement and Performance Measurement Systems. Each section begins with an introduction and ends with a summary which highlights the important points mentioned in each part.

2.2 Business Process Management

2.2.1 Introduction

Business Process Management is an approach which helps organizations to align their strategic objectives with their operational goals of increasing effectiveness and efficiency in the dynamic business environment. The objectives of any organization are achieved by a set of business processes that should be continually improved. BPM is a combination of practices that focuses on driving organizational value through a process-oriented culture.

2.2.2 From Function-Oriented to Process-Oriented

Business functions are a group of activities based on particular skill or goal, i.e., sales or manufacturing. Function-oriented organizations dates back to the time of Wealth of Nations, where organizations could achieve higher economic goals, profit margins and increase market share, by using highly skilled workers who were able to perform individual tasks. Whereas functions focus on individual tasks, business processes focus on the end-to-end activities and across all functional boundaries in order to deliver customer value. The new development way of organizational structure has forced the organizations to shift from function-oriented structure to process-oriented ones. A function-oriented business manages the organization along functional lines, while a process-oriented organization focuses on business processes. In both cases, the organizations optimize their activities, but the main challenging difference is that optimizing a functional unit may harm other functions or another unit but optimizing the business processes helps the whole organization.

The idea of being process-oriented is not a new one and can be seen in literature even from early 30's where Nordsieck pointed out the importance of process-oriented organizational structure [75]. This trend continued on until the recent discussions that brought the topic in practice through the approaches published by Porter [81]., Scheer [89], Davenport [21], and Hammer [41].

In order to have a better understanding of process-oriented organizational structure, one should know what actually a process is. In the next section, we go through the definition of the term process, business process and also the difference between these two terms.

2.2.3 Process and Business Process

The term “Process” was first used by Adam Smith in 1776 [91]. There are many different definitions in the literature and different scholars have given various definitions at different times. Davenport defines a process as a specific order of activities in a particular time and space, with a beginning and end point; which has its identified inputs and outputs [22]. Glykas defines a process as horizontally connected activities aim at achieving a desired result [35]. A similar definition is also given by Association of Business Process Management Professionals (ABPMP), which introduces a process as a set of activities to achieve a goal in order to solve a specific problem [1]. McCormack & Johnson define a process as a specific group of activities and subordinate tasks that result in the performance of a service that is of value [62]. On the other hand, a business can be defined as an activity that provides value for the society which can determine economic associations of people [105]. Therefore, a business process can be defined as a set of logically related tasks that results in a defined outcome and generates economic profit for an organization [22].

To consider it from a broader aspect, there is no clear and specific difference between a “Process” and “Business process” in literature. However, in business operations, a distinction can be made between these two, as a business process generates economic profit whereas a process can be any process including activities. ABPMP defines a business process as an “End-to-End” activity which goes beyond functional limits and transposes the organization’s hierarchical structure to generate value for its customers [1]. In general, a business process comprises activities that produce an output of value and can be thought as a box that turns a certain input into an output of greater value [39]. Another similar definition and a more complete one introduce a business process as a network of orderly linked activities with a repetitive nature that transforms inputs to outputs by utilizing information and resources, in order to meet customer needs [60]. Figure 2.1 shows a general model of a business process.



Fig. 2.1. General model of a business process

All of the provided definitions, make it clear that each process consists of three main and basic elements of inputs, activities and outputs. To summarize all these definitions, a process can be defined as series of events that bring people, technology and information together, to create valuable outputs and help an organization to carry out its mission.

A significant focus of BPM according to the compilation of business processes model deals with classification of business processes. The following section provides an overview on this classification.

2.2.3.1 Classification of Business Processes

Business processes can be divided into several groups from several perspectives and there are many approaches regarding this classification. There is a classification by Ould [78] based on the perspective of “Value Chain” by Porter [80]. This classification divides the business processes based on roles and into three classes:

Core processes: The value-added processes that ensure accomplishment of the company, creating value to satisfy the external customer, represent the key area of business. These processes; which are also known as end-to-end processes, enable the organization to achieve its goals. Production, sale or distribution are some examples of these kinds of processes.

Support processes: Processes of this type support the organizational core processes and they concern secondary activities within an organization. Although support processes don’t add value but they are essential to assure that the organizational core processes will continue to function and they facilitate the process of adding value. Hence, these processes are associated with the

functional areas in an organization. Examples of these kinds of processes can be found in technical support, human resources and accounting.

Management processes: These processes have the role of governing business operations and operation of systems. They manage the core as well as the support processes and set strategic directions and goals for the organization. These kinds of processes measure and control business activities and ensure that the core and support processes meet operational, regulatory, legal and financial goals. These processes do not directly add value; however, they are necessary to ensure that an organization operates efficiently and effectively. Corporate planning, strategic decision-making, and governance are working areas of these processes.

However, some scholars categorize the business processes into two groups of Primary and Supportive based on the value chain model of Porter [79] and do not distinguish between Management and Support processes. Primary processes are directly associated with the value creation and are supported by Supportive processes.

There is another classification based on processes' characteristics which classifies the processes into work, behavioral and change processes [34]. The sequence of activities is described by work processes. A behavioral process can be a core process, support or also management process and finally the change processes describe how a business changes over time.

The processes of the case organization in this study will be investigated based on the first categorization by Ould. After giving a clear definition of Process and Business Process, the next section of this thesis gives an overview on the topic of Business Process Management as a systematic approach to make organizational processes effective, efficient and also adaptable to the ever-changing market environment.

2.2.4 Business Process Management

Business Process Management refers to management approaches or methods of aligning business processes to improve the effectiveness of businesses [40]. The antecedents of the BPM research area lie in the field of Business Administration and Information Systems. The promise of

coordinating aspects of business activities in business processes triggered several research initiatives into the formal definition of BPM. BPM is a holistic management approach and can be defined as time-logical sequences of activities conducted to work on a process-oriented business object to achieve the business goals [8]. BPM can also be defined as an organization's ability to change organizational business processes and includes methods, techniques, and tools to support the design, configuration, enactment, evaluation, and analysis of operational business processes [86]. BPM and Workflow Management (WfM) are two topics which are tightly linked to each other and both approaches are fundamentally quite similar; however, there exist some important differences. WfM started to be common in the 90's. The Workflow Management Coalition (WfMC) defines workflows as the automation of business processes, in part or whole [106]. During this automation and according to a set of procedural rules, the exchange of information will occur among the participant of the processes. As mentioned before BPM is an approach which focuses on modeling and improving business processes which is also included in the lifecycle of a Workflow (Figure 2.2). Galler and Scheer argue that the BPM approaches are integrated in the lifecycle of Workflows. They describe the lifecycle of workflows in a way that the development of a workflow application starts with modeling and analyzing the processes. In other words, a business process model is a kind of input for a workflow system that results in a workflow model.

Based on the all information provided above, a comprehensive definition of BPM has been provided by ABPMP as following:

“BPM is a disciplined and systematic approach to document, identify, design, execute, monitor, measure, and control automated as well as the non-automated business processes to achieve consistent and targeted results aligned with the organization's strategic goals [1].”

In summary, it becomes clear that BPM helps organizations to improve their business processes continuously in order to provide effective service or product by focusing on process-oriented business structure. BPM has got its own lifecycle that will be presented in the next section.

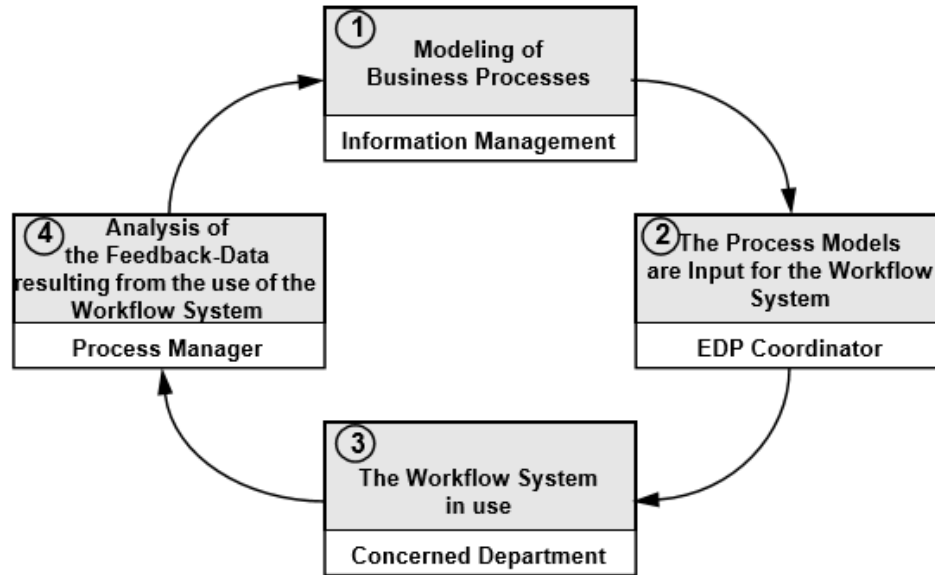


Fig. 2.2. Workflow Lifecycle [43]

2.2.5 BPM Lifecycle

As discussed before, BPM can be defined as a systematic approach of managing business processes within an organization. The management of business processes can be arranged in a cyclical structure which visualizes the lifecycle of BPM. To date, a number of common BPM activities are identified and defined as BPM lifecycle. The model provided by Smith and Fingar [92] is considered to be the initial model. Most introduced lifecycles are conceptually similar; however, they have different levels of details and structures. A comparison of various BPM lifecycles according to the models provided by Smith and Fingar [92], van der Aalst [99], Weske [103] and the model provided by ABPMP [1] are presented in Table 2.1, which illustrates the included phases within the provided models. As one of the most holistic models, the BPM lifecycle provided by ABPMP will be used for the purpose of this thesis.

Table 2.1. Comparison of different BPM lifecycles

	Smith & Fingar	Van der Aalst	Weske	ABPMP
Planning and Strategy	*			*
Analysis		*	*	*
Design	*	*	*	*
Modeling	*	*	*	*
Implementation	*	*	*	*
Monitoring and Control	*	*	*	*
Optimization	*			*

- Lifecycle phases identified and included in each model are marked with “*”.

The BPM lifecycle provided by ABPMP consists of six phases including plan, analyze, design, model, measure and control, and transform. These phases are arranged in a cyclic structure (Figure 2.3). In the following we go through each phase in details.

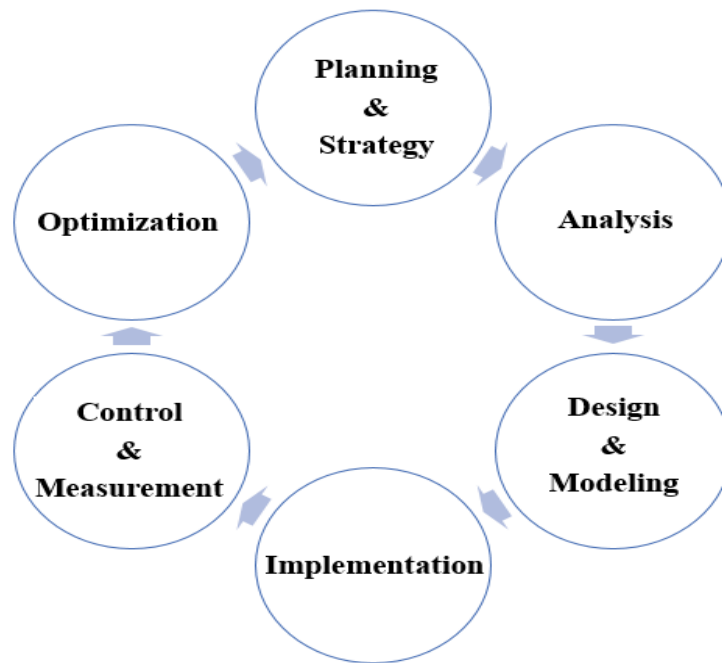


Fig. 2.3. Business Process Management Lifecycle [1]

Planning and Strategy: As BPM lifecycle is a cyclical model, there is no starting point for it; however, it logically starts from strategic planning. In this phase, the project and process scopes, roles and responsibilities, organizational resources as well as the technologies are defined. From BPM perspective, a detailed plan is required to implement, manage, change or accommodating new process requirements. The To-Be objectives of the organization will be taken into consideration and will be accordingly analyzed in the next phase.

Analysis: The executional analysis of business processes uses the results of planning phase and analyzes the business processes in a broader context. In fact, process analysis is the phase of understanding business processes, and their efficiency and effectiveness. The analysis phase deals with the activities and aims at aligning business processes with their organizational objectives. This phase of BPM Lifecycle encompasses the decomposition of process components and analyzing them with the help of analytical techniques. During this phase of BPM, documentations will be used to validate and understand both AS-IS and TO-BE state of processes. In case of discrepancies between the AS-IS and the TO-BE models, the deficiencies in business processes will be investigated. Additionally, the achievement of enterprise's objectives will be analyzed from customer, organizational and process perspectives.

Design and Modeling: Process design involves creating specifications for processes according to business objectives. It provides strategies, guidelines and plans for applying business processes and their components. In this phase, different aspects of business processes are explored in detail and different involved elements are investigated. The design phase also visualizes how business applications, data resources, technology platforms, financial and operational measures interact with internal and external processes. Process design is actually an intentional and thoughtful plan for implementing, managing and measuring business processes. This phase investigates designing process roles, techniques, process patterns and also considerations such as executive leadership, compliance and strategic alignment.

Modelling the business processes is one of the most important phases during implementation of BPM. This phase includes a critical set of business processes that enable organizations to understand, manage, communicate and measure the primary components of processes. In this phase, business processes are identified, prioritized, validated, and represented with the help of

models. Business models are represented with process modeling languages. The business process models facilitate the communication about these processes and visualize the relations among process elements. In the design and modeling phase, the process modelling techniques, validation, simulation, and verification techniques will be used. Business process modeling is the core element and the sub phase of design phase [103]. With the help of a particular business process modeling notation, the informal business processes are formalized. A business process model illustrates which steps are required, in what order, and by whom these steps need to be taken [22]. After an initial modeling of business processes, they must be validated. The validation of business processes can be done in workshops, in that the persons discuss the designed business processes. Once the business processes are validated, simulation techniques support this validation, through which the possible deficits in the process model are shown up. Finally, the business processes will be verified. Business process models are investigated for verification before execution. The verification of business processes is concerned to check, whether the process model is free of logical errors.

Process modeling is considered as the most important phase in BPM Lifecycle [100], which visualizes the operations of business processes for better understanding. Section 2.2 of this thesis investigates the topic of process modeling with respect to BPM.

Implementation: Once the business processes are modeled and verified, they should be implemented. The implementation of business processes can be done either with a Business Process Management System (BPMS) or without a software system [103]. In case of using a software system, an implementation platform must be chosen, configured and also integrated based on the organizational environment. This system controls the execution based on the constraints and rules which are defined in the model. After that, the implementation of the processes must be tested. Traditional software engineering testing techniques are used at this level. It should be taken into consideration that the integration and performance of the tests are important for finding out potential run time problems during this phase. By the end of testing, the system is ready to be deployed within the organization as its target environment.

Control and Measurement: After modelling the business processes and implementation, the BPM lifecycle enters to the phase of control and measurement. Business process instances; that

are considered to fulfil the business goals of an organization, should be measured and controlled. The monitoring and control of business processes deals with adjustment of organizational resources to ensure that the process objectives are met. This will be done through Performance Measurement Systems and evaluation techniques. Performance Measurement Systems control the execution of instances defined in the business process model. During the process controlling, it must be guaranteed that the process activities are performed based the execution constraints which are previously specified in the process model. Controlling and measuring are instances which provide performance transparency in organizations and can be executed by defining performance measures or indicators. Performance Measurement is the subject of discussion in Section 2.3 of this thesis.

Optimization: Process optimization addresses the change and continuous improvement of business processes. Process improvement, optimization, and reengineering are subjects of investigation in this phase. Process optimization aims at adjusting business processes to specified set of parameters without violating the constraint. The most common goals of process optimization are minimizing cost and maximizing throughput.

In order to be successful in the intense competitive market, organizations need to work integrated in all functional areas of their business with clear understanding of cross-functional processes. The role of BPM in creating sustainable competitive advantage was termed as Business Process Reengineering and first introduced by Hammer [39] and also by Davenport and Short [22]. Process Optimization or Business Process Reengineering is a management strategy; which focuses on analyzing and designing or redesigning business processes in an organization. Process Optimization and BPR were outlined as a new BPM approach that generates radical improvements in performance. BPR is fundamentally rethink and radically redesign of business processes in order to create dramatic organizational improvements regarding critical performance measures; such as quality, costs, services and speed [40]. The three driving forces behind this approach are customers, competition and change in organizational environment and it is based on extension of Porter's ([79], [80], [82]) competitive advantage approach. In order to optimize and reengineer business processes, both human and technical enablers are required. Process Optimization is usually conducted by using specific tools. Information technology is one of the most powerful tools which facilitates BPR efforts. By using information technologies and

computers, the communication among involved parties, simulation of business processes and also benchmarking will be possible. In order to yield influential and effective results, BPR must be carried out with all-or-nothing attitude and without trappings of old and ineffective processes [40].

During the Process Optimization, the current organizational processes must be totally understood in order to know how they work and what their important efficiency factors are. A reengineering team must build a high-level view of a current business processes to be able to create new and better way of doing things [40]. Davenport presents a framework for BPR which consists of five steps [21]. (Figure 2.4)

It may take several years for an organization to conduct and implement BPR activities. Davenport's BPR approach is an iterative effort and not just a sequential process [21]. It takes time for benefits of Process Optimization to appear and active management is needed after initiatives are completed. The newly designed processes should be constantly assessed and measured, continuously improved and if needed, again optimized and reengineered [21].

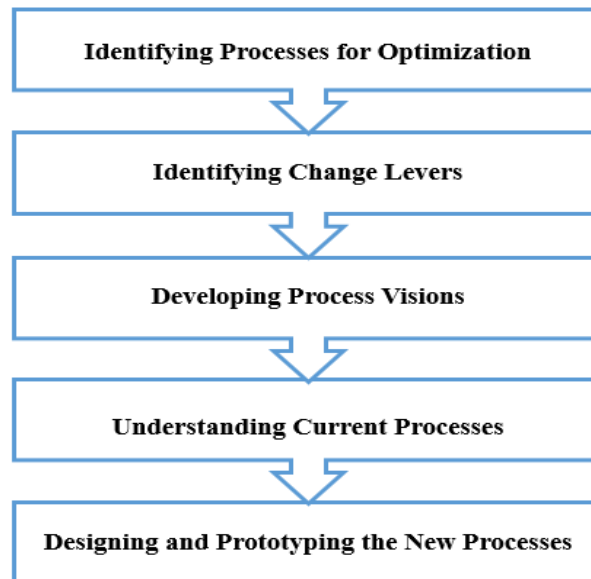


Fig. 2.4: A High-level Approach to Process Optimization [21]

Process Optimization; as an integrated approach in the context of BPM, brings many benefits for organizations. The benefits of BPM as a broader and holistic approach are even much more for organization. In the next section, we provide an overview on some benefits of BPM.

2.2.6 Benefits of Business Process Management

Organizations implement BPM for a variety of reasons; however, the most important stimulus for today's businesses is to be more competitive in the market. By utilizing BPM and explicit representation of business processes, organizations can expect not only lower costs and higher revenues, but also motivated employees and satisfied customers. The benefits of BPM can be based on three main categories [85]:

Efficiency: By eliminating manual entry of data, reducing process cycle time and reducing manual analysis, BPM helps organization to perform more efficiently.

Effectivity: BPM helps organizations to be more effective by providing better and faster exception handling. It also supports businesses in the decision-making processes and ensures a consistent process execution.

Agility: BPM leverages the adaption to the changes in a controlled fashion and provides support when new processes are required for business models.

In addition to these three main categories and amidst all other benefits of implementing BPM, some of the most important ones are also summarized by Weske [103]:

- Better understanding: Explicit representation of processes helps organizations to get a clear understanding of the operations and their dependencies.
- Standardization of execution: IT-supported process execution and explicit representation of processes help the organizations to narrow the gap between to-be models and as-is ones. This helps organizations to reach a more standardized process execution.

- Improved communication: Using BPM terminology helps organizations to improve the communication among the stakeholders, and accordingly the analysis will be more collaborative and the identification of potential improvements will become easier.
- More flexibility: BPM improves the flexibility of business processes and leverages faster adaptation to market changes and customer requirements
- Continuous process improvement: Explicit modeling of processes and IT-supported process execution enable efficient analysis as well as the identification of potential improvements.
- Furthermore, BPM enables organizations to collect and identify performance measures during processes, which makes internal and external benchmarking possible [8].

2.2.7 Summary

Despite the fact that BPM is a top priority by organizations in the intense competition of today's economy, it does not exist a common definition of this term. In this thesis, BPM is defined as a systematic and structured approach in order to analyze, manage, control and improve business processes to improve the quality of products and services [30]. The benefits of BPM are efficiency, effectiveness and agility. When adapting BPM approach to business processes, the BPM lifecycle can be applied. The BPM Lifecycle introduced in this thesis contains the following phases:

1. Planning and Strategy
2. Analysis
3. Design and Modeling
4. Implementation
1. Control and Management
2. Optimization

BPM is a holistic approach and in its context, many other approaches; such as Process Modeling, Process Optimization, and Performance Measurement have been emerged. The next section of this thesis gives an overview on Process Modeling.

2.3 Process Modelling

2.3.1 Introduction

As the worldwide competition grows, it is very important for organizations to overcome the obstacles of this heated competition. In this environment, it is crucial for organizations to hone their business processes to be as effective as possible. Focusing on business processes, which transform inputs into outputs, allows organizations to understand and manage materials, information, as well as the people in an integrated fashion (Gavin, 1998). Understanding the business processes is a key factor when having an efficient BPM is the goal of an organization. In order to focus on its strength points, manage resources and eliminate the weaknesses of a business, organizations should model and document their processes. In the context of BPM, the process models play a pivotal role. Modeling processes as an inseparable part of BPM aims at and describing, standardizing and reengineering business processes. Process modeling helps the organizations to understand their business procedures correctly and to distinguish between value adding and non-value adding processes. Process modeling reveals unclear or complicated business processes, faulty outputs or unnecessary efforts [10]. Business process modeling visualizes the business logic within an organization and evaluates and its functions systematically. Modeling processes is cheap to perform and enables organizations to acknowledge faults and development needs in current processes [96].

There are many methodologies introduced in order to design and model business processes. Some of the methodologies have been specifically developed for modeling processes in the field of BPM, while others predate the discipline of BPM and have been later adapted for this purpose.

2.3.2 Business Process Modeling

Business process models are created in the design phase of the BPM lifecycle. In order to define business process modeling, the output of process modeling should be taken into consideration. During the modeling process, the processes of real world or artificial business processes will be mapped into models. Modeling processes or in other words the explicit representation of business

processes is an essential concept within BPM, which is a mean of communication among stakeholders of processes and also creates a common and clear understanding of business processes [103].

Generally, the process models are characterized by three basic properties including a mapping, an abstraction and finally fit for purpose [27]. Mapping of processes refers to transferring real-world processes into models. Furthermore, a business model has a level of abstraction which is chosen by the modeler in order to hide irrelevant details for the process model. And finally, the purpose of a model is essential to illustrate the goal of the model. In order to model business processes, the procedure of modeling should be taken into consideration which includes the steps which should be taken to model business processes. Next section provides an overview on the process of modeling.

2.3.3 Modeling Procedure

During the modeling process all activities done within business processes should be captured and accordingly mapped. Given that, a clear understanding of the processes is required. By modeling the processes, it is necessary to identify the involved stakeholders as well as their activities. The process of modeling defines the necessary steps to create a proper model by using a modeling language. Frederiks and van der Weide [33] introduced a 4-stage approach for information modeling procedure. As process modeling is a specific type of information modeling, this approach has been frequently investigated to create business process models [59]. The four phases of modeling procedure are: elicitation, modeling, validation and verification (Figure 2.5).

In the following we go through each phase in details:

Elicitation: At the very first step, the information which should be captured in process models must be collected from the so-called universe of discourse. The objective of the elicitation phase is to identify the requirements of the process stakeholders. After that, the information which is explicitly available must be transferred into an agreed format. The roles of the stakeholders of processes are complementary for this phase, as they elicit and capture the modeling requirements and their context. This information can be captured through interviews or brainstorming, which

are some commonly used techniques for elicitation. The relevant knowledge of stakeholders and also the modelers must be gathered to fulfill the modeling purpose.

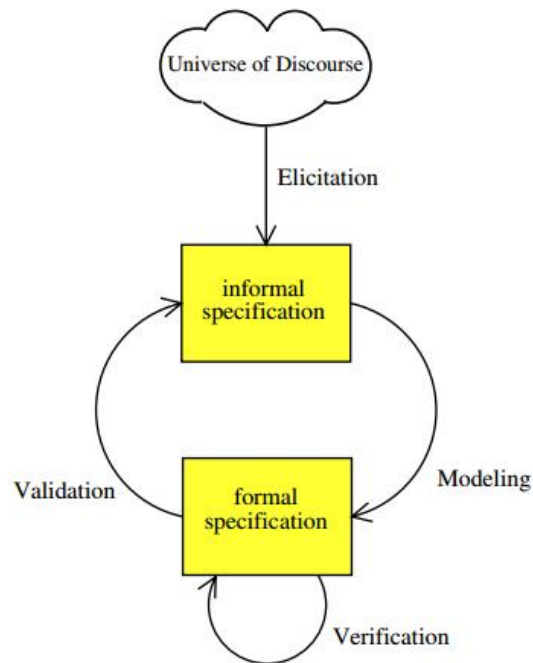


Fig. 2.5. Modeling Procedure [33]

Modeling: During this phase the informal specification will be transformed into formal specifications. Discovering the significant modeling concepts and their relationships will be taken place in this phase of modeling process. Given the unified format and the selected modeling language, the process instances and activities should be identified and accordingly be covered in the models.

Verification: In this phase, verification checks will be done in order to make sure that the model is syntactically correct. The formal specifications are checked for consistency sustainability and correctness.

Validation: This phase controls the process models based of semantically correctness of specifications.

During the last two phases of modeling procedure, the models will be handed over to the experts and the validation checks will be done. In case of ambiguities or any other problems, the models must be marked for readjustment. Note that the collaboration among stakeholders during the modeling procedure is very important, since it improves the level of communication and negotiation. To create appropriate models during the modeling procedure, Guidelines of Modelling (GoM) should be taken into consideration. Next section goes through these principles.

2.3.4 Guidelines of Modelling

In order to support modelers to create appropriate models, GoM provides six principles [9]. Correctness, relevance, and economic efficiency are the three necessary pre-conditions while the three other principles of clarity, comparability and systematic design are considered as optimal (Figure 2.6).

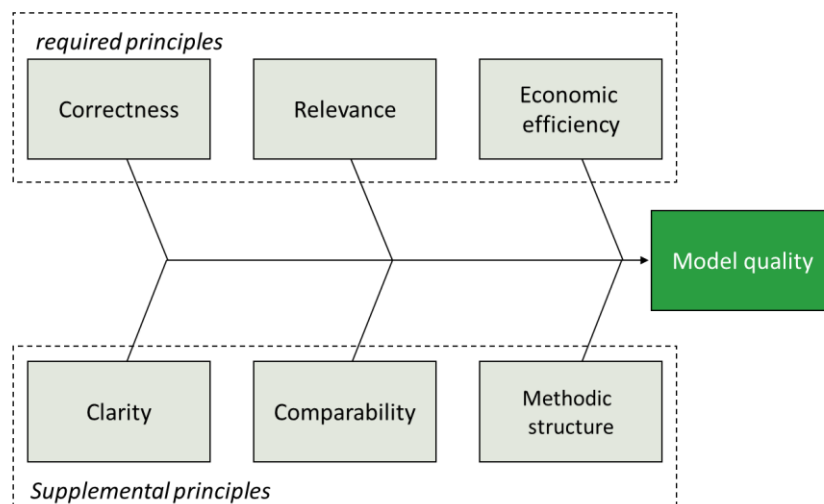


Fig. 2.6. The Framework of the Guidelines of Modeling [9]

Correctness: This guideline encompasses two facets of syntactic and semantic correctness. Semantic correctness ensures that the structure as well as the behavior of the model is consistent regarding the real world. In addition, the consistency between different models is also viewed as a part of the correctness of the model.

Relevance: This guideline postulates three aspects. First, a relevant object system or so-called universe of discourse should be selected. Second, a relevant modeling technique as well as the modeling language should be taken or an existing meta model must be configured adequately. Finally, a relevant model system must be developed.

Economic Efficiency: In the context of business process modeling, economic efficiency refers to trade-off between the benefits of certain aspects which are included in the model and their costs. In other words, in the case that the elimination of some aspects of the model, improves its readability, this elimination is acceptable.

Clarity: This principal is a subjective concept and postulates that the process model is understood by the user of the model. Clarity of a model is an important aspect, since without having a readable and understandable model, other efforts become useless.

Comparability: This guideline expects a consistent use of all other guidelines by a modeling project. This guideline includes the conformity of applications and layouts between different models a same modeling project. Otherwise, two models may follow different rules. The importance of comparing models is obvious if e.g. as-is-model and to-be-model have to be compared.

Systematic Design: This guideline postulates well-defined relationships among models of different views (e.g. function view, organizational view, resource view). Every input and output of a process model must be specified within a corresponding data model and all relevant views must be integrated.

In order to create business process models, a technique of modeling should be chosen; which has got its special components. Next section of this study provides an overview on modeling technique and its elements.

2.3.5 Elements of Modeling Techniques

Business process models can be created based on different modeling standards and techniques. To create a business process model, an appropriate technique must be chosen. Each modeling technique encompasses two major parts of the modeling language the modeling method [63]. (Figure 2.7)

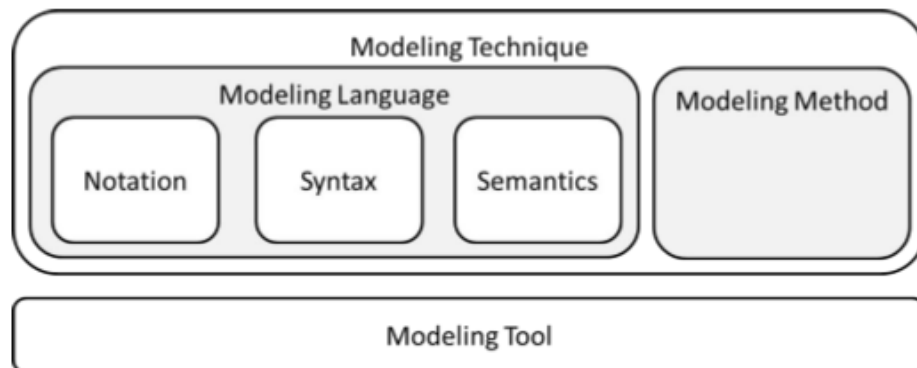


Fig. 2.7. Components of a Modeling Technique [63]

A modeling language can be accordingly divided into at least one notation, syntax, and semantics. The modeling notation includes the graphical symbols used to model processes. The syntax refers to the rules to join and combine the symbols. Finally, the semantic binds a meaningful definition to each symbol in order to clarify its specific use. The modeling method; as the second part of the modeling technique, defines the procedures that are applicable in order to create process models. Following these procedures ensures the compliance of the method to the modeling notations.

There are many process modelling techniques available in the literature and many researchers have already provided an overview of them ([64], [86], [103]). Some of the most common modelling languages are listed below:

- Flowchart
- Petri net
- Unified Modeling Language (UML)

- Role Activity Diagram
- Event-driven Process Chain (EPC)
- Business Process Management Notation (BPMN)

In this study, we focus on Event-driven Process Chain (EPC) process modeling technique. Among all introduced modeling languages EPC and BPMN are the most appropriate ones for modelling business processes. For the purpose of this study, various modeling languages have been studied. BPMN has not been chosen because it has a great number of elements and rather complicated. Furthermore, compared to formalized EPC, BPMN models are rather informal [98]. EPC Modeling language has been chosen because it is easy to understand and illustrates the processes on the level of business logic clearly and also shows how the tasks and activities conducted in the organization add value to the business. EPC has become a widespread process modeling technique during the recent years. In addition, the researcher was also familiar with EPC modeling language and therefore, it has been used to model the business processes. During the next section, we introduce the EPC process modeling technique.

2.3.6 Event-driven process chain

The Architecture of Information System (ARIS) provides a popular and widely accepted organizational modeling methodology. This framework defines five different views for organizations including:

- Organization view
- Data view
- Control view
- Function view
- Product/Service view

Event-Driven Process Chain is one type of flowchart and a graphical business process modeling language introduced in 1992 by Keller, Nüttgens and Scheer [54]. EPC's are used to provide the control view in the ARIS Framework. EPC visualizes events and functions and the logical timing










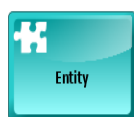

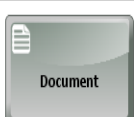







and order of business processes. EPC is targeted to describe business processes and is not used to describe processes on a level of formal specification but on the level of business logic. Table 2.2 shows all notations of EPC modeling technique. It is obvious that the syntaxes must be taken into consideration by creating models. The next section of this chapter provides an overview on the syntaxes and basic rules of molding with EPCs.

2.3.6.1 Rules of EPC Molding

Like modeling with any other modeling language, during creating models with EPCs certain rules must be followed. The rules of EPC modeling are as follows [44]:

- An EPC starts and ends with an event.
- An Event can be followed by a number of Activities. In the past, it was said, that Activities and Events must be joint alternately. Since this rule leads to long process models, today it is suggested to add an Event, if it is needed to document an important state change.
- Events or Activities must not have more than one incoming or outgoing connection.
- Only the use of connection operators is allowed in order to link events and functions.
- Organizational units are responsible for the functions and cannot be linked to Events.
- The same connection operator must be used in order to open and rejoin a branching.
- Events cannot make decisions; therefore, it is not allowed to use OR- and XOR-Operators after them (Figure 2.8).

Table 2.2. Notations of EPC [44]

Shape	Name	Description	Shape	Name	Description
	Event	Triggers an activity or process interface to work or provides the state that a function or process interface results in		Role	Position or person's role performing the activity
	Activity	Manual actions that are done during a process		Person	Individual person assigned to perform the activity
	Process Interface	Upstream and downstream processes that occur from one process to the other		Location	Physical location such as a factory, building, office, or workplace
  	Operators			Entity	Identifiable object that represents a database component
	AND	A decision path that requires both paths to be satisfied before the process continuous		Database	Identifiable object that represents the generation of a database components or requires data before the activity continuous
	XOR	A decision path that requires one path, but not both paths to be satisfied before the process continuous		Document	Identifiable object that represents an incoming/outgoing item (human or system-generated) that supports the activity
  	Connectors			IT System	Automated (system-generated) actions that are done during a process
	Assignment	Connection between a function and the responsible organization unit		Product	Identifiable object that represents a product that supports the activity
	Control Flow	Connection between an event and function, process path, or logical connector creating chronological sequence and logical		Risk	Identifiable activities that may have critical effect on the progress or used to define countermeasures
	Organizational Unit	Department within an organization			
	Information Flow	Connection between a function and input or output data, upon which the function read changes or writes			

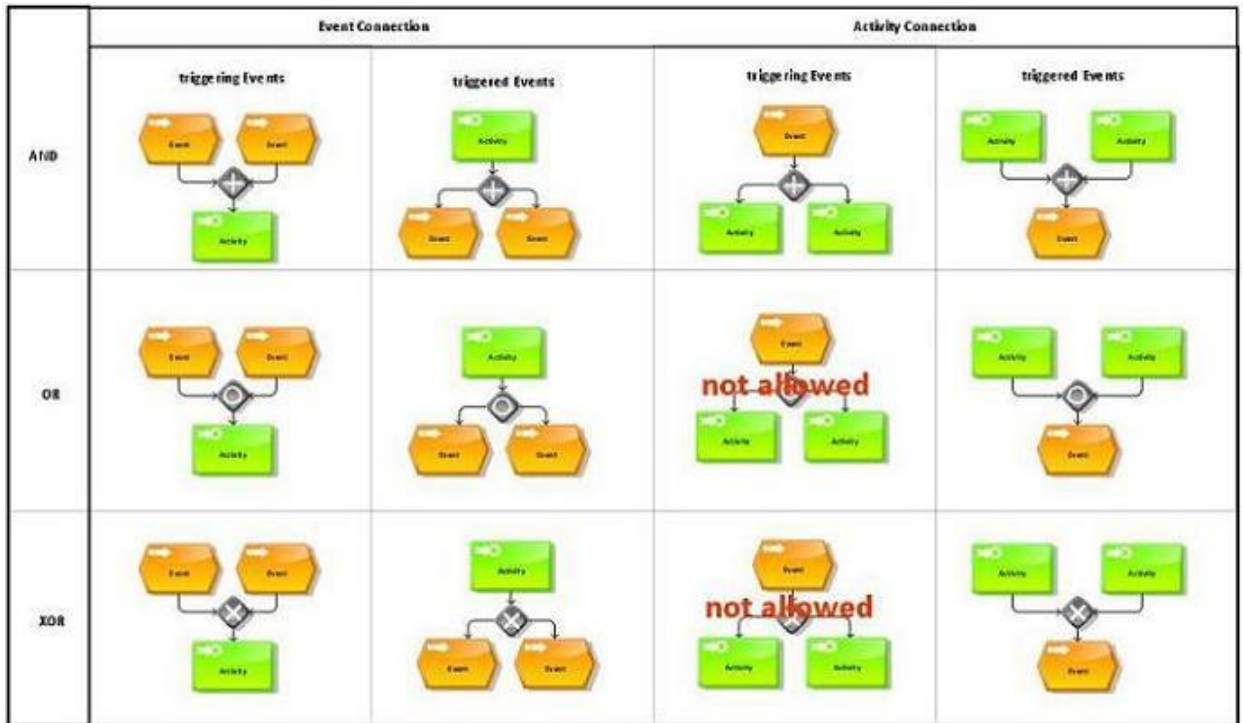


Fig. 2.8. Connection Rules of EPC Modeling [44]

2.3.7 Summary

In this section, the importance of Business Process Modeling as an inseparable part of Business Process Management was highlighted. The procedure of business process modeling was described and guidelines of process modeling are introduced. As business process models, must be created based on a modeling techniques, the components of a modeling technique were explained. Finally, as the processes of the case organization of this study are modeled with Event-Driven Process Chain, we have provided an overview on EPC modeling technique and the basic rules of EPC modeling. The next section of this thesis argues the important role of Performance Measurement in BPM and gives an overview on Performance Measurement and Performance Management Systems.

2.3 Performance Measurement

2.3.1 Introduction

Organizations produce their products or services by performing a set of core business processes; which influence the quality of the products and services and also the customer satisfaction. Therefore, it is important for organizations to realize the importance of being process-oriented in order to be successful in the market. As a result, BPM; as a process-oriented management discipline, have emerged in the last decades to support organizations in this case. In the context of BPM, numerous approaches have emerged. BPM standardizes the business processes by utilizing of process models and continuously analyzes the optimization of these processes. As a prerequisite for managing, analyzing and optimizing the processes, the measurement of process attributes (e.g. costs, duration or customer satisfaction) is required. In addition, it is essential to have information on the current status of business processes as well as the past performance in order to be able to manage them efficiently. This requires to define measures or indicators for each process, that measure its performance. Comparing the values of indicators shows the progress of processes. During this section, we will define the term “Performance” and provide an overview on the topic of Performance Measurement and its associated theories.

2.3.2 Performance

Performance is a term used widely in many fields which define measures of how well a mechanism or a process achieves its ultimate goals and purposes. In the context of business, performance can include two dimensions of efficiency; regarding using as few inputs as possible to obtain the outputs, and effectiveness; in order to deliver desired outputs [77]. An organization must achieve its expected goals and objective with greater efficiency as well as the effectiveness than its competitors in order to attain a superior performance [67]. To measure the efficiency and effectiveness, various indicators should be defined and measured. Financial indicators have been traditionally used to measure these two dimensions [67]. Later the manufacturing performance measures are suggested by researchers that five key-dimensions should be assessed including costs, quality, flexibility, delivery speed, and delivery reliability [67]. By measuring these factors, performance is balanced and reflects interest of stockholders.

In this thesis, we define performance as a mean to achieve ultimate objectives by utilizing resource economically and in order to achieve the interests of stakeholders.

2.3.3 Performance Measurement

Although much research has been investigated in the field of performance measurement, the definition of this term is still debated. Performance Measurement was defined by Anthony as a process through which the managers ensure that organizational resources are obtained and used effectively and efficiently in order to accomplish the organization's objectives [3]. Neely defines Performance Measurement as a process that quantifies the efficiency and effectiveness of past actions by acquisition, sorting, collation, interpretation, analysis, and dissemination of appropriate and relevant data [67]. In 2003, Moullin claimed that the Neely's definition does not give a clear guidance to organizations about what it is really all about, since it defines PM as a process [66]. He defines Performance Measurement as an approach which evaluates how well organizations are managed and how well they deliver value for their customers and stakeholders" [66]. A more specific definition of performance measurement was provided by Amaratunga and Baldry. They argue that the measurement is a basis for organizations to assess how well they are progressing towards their predetermined objectives. In addition, it helps organizations to identify their strengths and weaknesses, and decides on their future initiatives, with the aim of improving performance [2].

Considering all given definitions and for the purpose of this thesis, Performance Measurement can be defined as a structured approach for gathering, monitoring, controlling, analyzing and assessing the information regarding organizational activities to achieve the proposed objectives.

The importance of Performance Measurement in organizations is that this approach not only improves the organizational performance, but also increases the productivity of the business. The next section of this thesis provides an overview on important role of Performance Measurement in organization.

2.3.4 Need for Performance Measurement

Performance Measurement is a good fashion to align the organizational activities with the organizational objectives. Neely provides four main reasons why organizations should measure the performance [67]:

Check position: Measures are used to establish the current position and monitor the progress over time. Measures also enable organizations to compare themselves with other organizations to understand where they are in comparison to others.

Communicate position: Measures enable organization to communicate performance with their customers, shareholders, or employees by for example releasing annual reports. These communications can be voluntary or legislative.

Confirm priorities: Measures provide insights into what matters the most for an organization, in order to identify priorities.

Compel progress: Measures influence people's attitude and behavior and encourage them to search for ways in order to improve performance. In addition, the measures can form the basis for reward.

Generally seen, the overarching reason for PM initiatives is to ultimately increase organizational efficiency and effectiveness. From an organizational perspective, PM can be used for [36]:

- Personnel evaluation, incentives and promotion (salary, promotion prospects, project participation, bonuses)
- Resource allocation (project participation, forming and dissolving teams, assignment of new projects and resources)
- Control and correction
- Learning and continuous improvement

Beside all these roles and purposes, there is also empirical evidence that the use of PM influences the leadership quality, project selection and also financial innovation success [48].

Performance measurement is a key topic amongst accounting researchers and the need for this approach became clear since its introduction back in the 1960's. During the next section, we go through the background and evolution of Performance Measurement.

2.3.5 Evolution of Performance Measurement

Performance Measurement has been commonly seen as a mechanism developed to support strategy implementation at management level of organizations and has focused mainly on accounting information that produced primarily to measure monetary factors; such as cost efficiency and financial performance and the external aspects of a business were ignored [6]. Although financial and monetary indicators are indispensable to assess business performance, they just inform the managers about the organization's capability to create value. Since the globalization has increased competitiveness among organizations and contributed to make business environment more complex, different kind of Performance Measurement was required that focuses not only financial indicators. The rapid changes of technology, enormous expanding information process capabilities as well as the vigorous global competition led to the fact that the traditional management accounting systems were not able anymore to provide useful information to fulfill organizational objectives [50]. Traditional models of performance measurement focused on maximizing the shareholders' wealth; such as return on investment (ROI) and earning per share (EPS), which are the result of organizational performance and management actions, and not the cause of it. [28]. Performance Measurement should include both financial and non-financial indicators to cater to the dynamic and complex business conditions, which is essential to get a complete view of organizational performance in the new millennium. The shortcomings of traditional performance measurement have triggered a revolution in this context (Table 2.3)

Table 2.3: Evolution of Performance Measurement [94]

Measures	1960's	1970's	1980's	1990 onwards
Main Focus	Financial	Financial	Financial / Managerial	Financial / Non Financial
Key Developments	Accounting Earnings	Accounting Earnings	Unit Costs	Balanced Scorecard
	Earnings Per share	Residual Income	Joined Budgets	Economic Value Added
	ROI	ROI	Operating Profits	Activity-Based Costing
	NPV		Cash Flows	

In response to these shortcomings and limitations, new aspects of Performance Measurement were introduced. The next section gives an overview on Performance Measurement Systems (PMSs) through which Performance Measurement should be realized.

2.3.6 Performance Measurement System

After late 1980s, in order to overcome the limitations and shortcomings of traditional measurement systems, various holistic PMSs have been developed, which seek to simultaneously balance financial and non-financial measures. Performance Measurement Systems (PMSs) were developed as a means of monitoring as well as the maintaining controlling strategies in organizations to ensure the pursuing of strategies that lead to the achievement of organizational objectives [15]. Hence, A PMS can be defined as the set of metrics, measures or indicators used to quantify both the efficiency and effectiveness of actions [72]. A PMS is a system aims at implementing organizational strategies, which helps senior management of an organization to select measures that best represent the organization's strategy. A PMS is a mechanism that improves the likelihood that an organization can implement its strategy successfully [4].

In order to design a performance measurement system, a framework was developed by Neely which is shown in Figure 2.9.

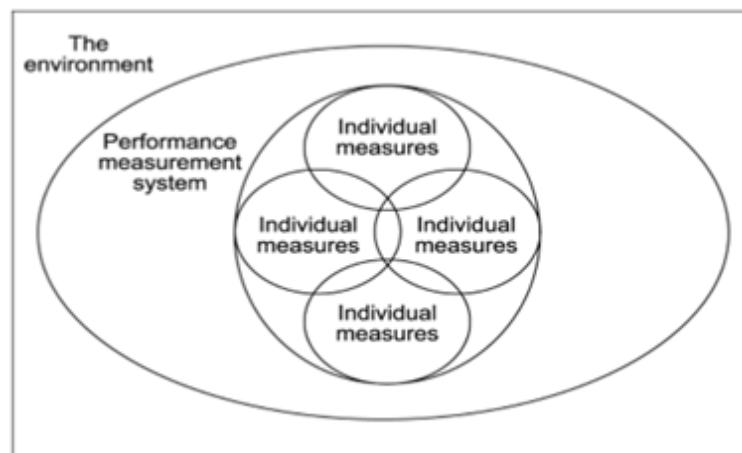


Fig. 2.9. Framework for PMS Design [72]

This framework investigates a PMS at three different levels:

- (1) The individual performance measures as a set of metrics
- (2) The performance measurement system as an entity which encompasses the individual metrics
- (3) The relationship between the performance measurement system and the environment in which it operates.

To develop a PMS, a set of criteria and characteristics should be taken into consideration to define the measures which should [55]:

- provide a balanced picture of the business,
- be a succinct overview of organizational performance,
- be multi-dimensional,
- provide comprehensive mapping,
- be integrated across the organization's functions and also through its hierarchy,
- provide data to monitor past performance and plan future performance.

PMSs are widely practiced in today's businesses. To date, many PMSs are introduced. Each of these PMSs has its unique perspectives and evaluate the organization's performance by taking different factors into consideration. Table 2.4 gives a list of the most popular and widely used PMSs.

Beside all these systems, frameworks and models, there are also approaches based on quality management; such as the European Foundation for Quality Management (EFQM), that are not developed specifically for Performance Measurement; however, they can be served as a tool of managing performance to help organization improve their performance. There exist also many other theories and methods applied in practice, such as Key Performance Indicators (KPIs) and Benchmarking. In the following we present 3 well-known and widely used measurement systems which are relevant for the purpose of this thesis; namely the Balanced Scorecard, EFQM Excellence Model, and Results and Determinants Matrix.

Table 2.4. List of Performance Measurement Systems

Performance Measurement System	Development Year
Activity-Based Costing (ABC)	1971
Activity Based Management (ABM)	1988
Strategic Measurement Analysis and Reporting Technique (SMART)	1988
Supportive Performance Measures (SPA)	1989
Customer Value Analysis (CVA)	1990
Performance Measurement Questionnaire (PMQ)	1990
Results and Determinants Matrix (RDM)	1991
The Balanced Scorecard (BSC)	1992
Service-Profit Chain (SPC)	1994
Return on Quality (RoQ)	1995
Cambridge Performance Measurement Process (CPMP)	1996
Consistent Performance Measurement System (CPMS)	1996
Integrated Performance Measurement System (IPMS)	1997
Business Excellence Model (BEM)	1999
Dynamic Performance Measurement System (DPMS)	2000
Action-Profit Linkage (APL)	2001
Manufacturing System Design Decomposition (MSDD)	2001
Performance Prism (PP)	2001
Capability Economic Value of Intangible and Tangible Assets (CEVITA)	2004
Performance, Development, Growth Benchmarking System (PDGBS)	2006
Unused Capacity Decomposition (UCD)	2007

2.3.6.1 The Balanced Scorecard

By developing the Balanced Scorecard (BSC) Kaplan and Norton have made a significant contribution in the literature of PMSs to overcome the shortcomings of traditional PMSs by linking these systems to the organizational strategy [53]. BSC is perhaps the most well-known PMS. The word “balanced” is a sign that this system combines both financial and non-financial measures. BSC categorizes the performance measures from four main perspectives and dimensions (Figure 2.10) which respectively enable organizations to answer four important questions:

- Customer perspective: How do our customers see us?
- Financial perspective: How do we look to shareholders?
- Internal perspective: What must we excel at?
- Innovation & learning perspective: How can we continue to improve and create value?

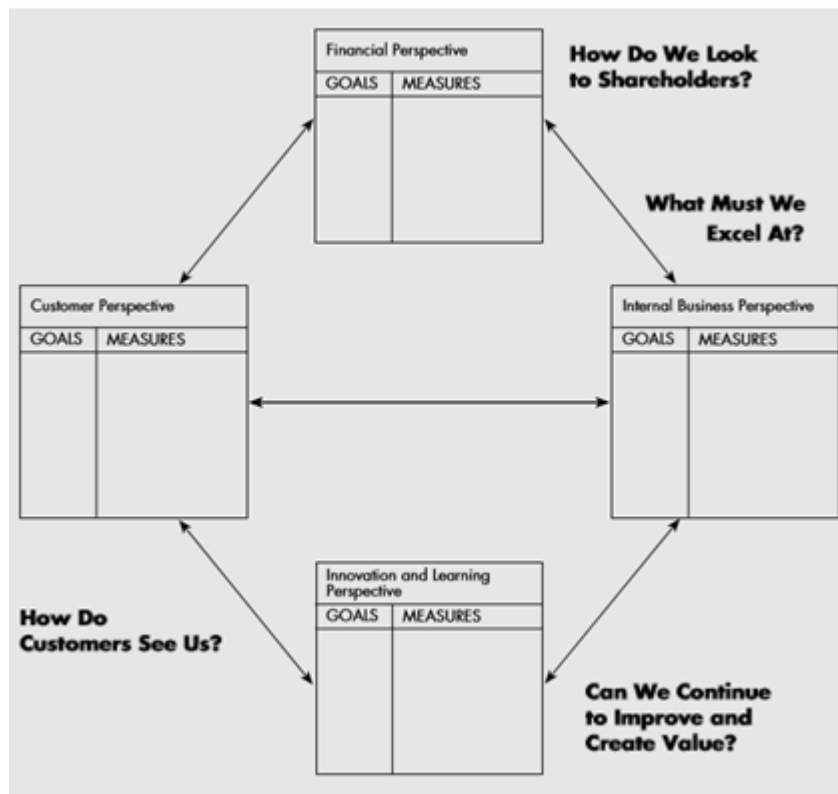


Fig. 2. 10. Balanced Scorecard [52]

BSC incorporates both financial and non-financial measures; which are derived from organization's strategy. BSC enables not only the monitoring of present organizational performance, but also captures information about future performance of the organization [53]. BSC are actually the driving indicators and measures, which differ for each organization. After BSC is customized to the corporate level of the company, it will be cascaded downward to strategic and support business units [74]. The four perspectives of BSC are considered as a chain of cause and effect. For instance, the financial performance of an organization depends on its customer's loyalty, which is clearly influenced by organization's internal processes and the internal processes are results of employee's skills. A good Balanced Scorecard should be an appropriate combination of performance drivers (leading indicators) and outcomes (lagging indicators) [53].

Although the BSC is widely lauded, has attracted criticism from variety of sources. Some critical analyses are provided in the following:

- BSC neglects the most fundamental perspective; namely the competitor perspective [71].
- BSC is not a completed and consistent approach; rather, it merely provides senior managers of organizations with a performance monitoring tool for strategic and operational objectives [32].
- BSC does not provide a broad view of the stakeholders who interact with an organization [69].
- BSC is only a conceptual model. It is very difficult to elaborate this approach without previous thorough practical experience [51];
- The focus of traditional BSC is too much on lagging indicators which only show final results. Many of other measurement systems are more balanced and provide equal attention to leading and lagging indicators [51];
- BSC is well-suited for engineering organizations and less appropriate for other industry organization types and especially service industries [57].

These and many other critiques on BSC show that, although BSC is a very popular tool, there have been many limitations and shortcomings identified regarding this approach. However, the BSC allows organizations to apply more perspectives other than the four above-mentioned which

can be relevant for the specific business. Overall, the requirements for utilizing multi-dimensional benefits of BSC depend on the ability of the organizations and how they use this approach. BSC is a strategic PMS and a balanced approach which encompasses financial and non-financial measures. Many other performance measurement approaches have been developed which have tried to eliminate the shortcomings and limitations of BSC.

2.3.6.2 EFQM Excellence Model

The Excellence Model was introduced by European Foundation for Quality Management (EFQM) at the beginning of 1992. EFQM was established as 14 companies joined forces in 1988 to develop a management tool which aims at improving the performance and competitiveness of organizations. The EFQM Model is a non-prescriptive and self-assessment framework that helps organizations to measure where they are on their path to Excellence and to understand the gaps. Furthermore, it simulates solutions and provides guidelines to achieve sustainable excellence.

There are eight fundamental concepts that explain the EFQM Excellence Model (Figure 2.11).

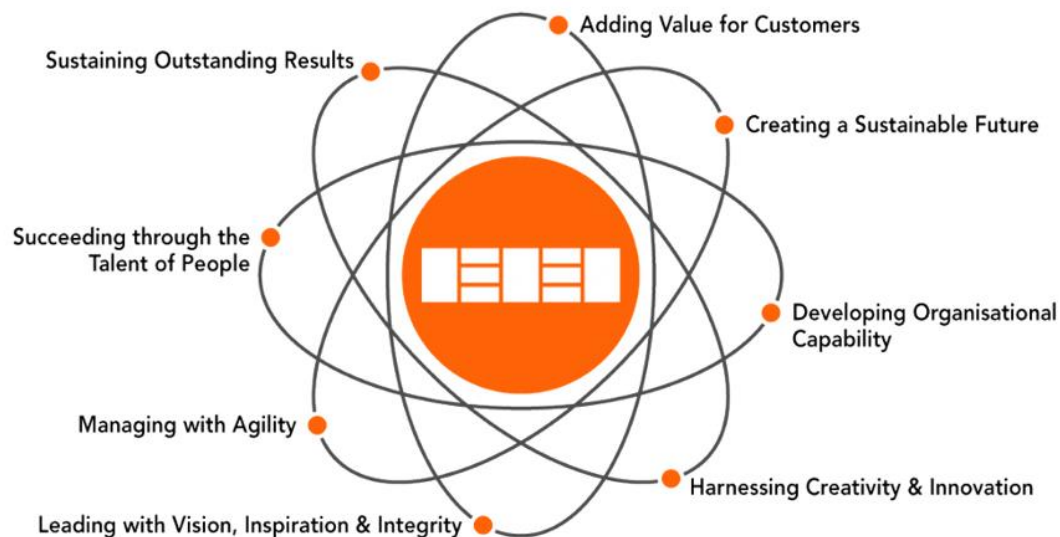


Fig. 2.11. The EFQM's Fundamental Concepts [29]

These concepts are comprehensive and should be totally understood by organization when they want to start their excellence journey:

- **Adding value for customers:** Excellence is adding value for customers consistently by understanding and fulfilling their needs and expectations.
- **Creating a sustainable future:** Excellence is impacting the world around in a positive manner and by enhancing the performance whilst simultaneously improving the environmental, social and economic conditions.
- **Developing organizational capability:** Excellence is enhancing capabilities by managing change effectively within and also beyond the organizational boundaries.
- **Harnessing creativity and innovation:** Excellence is systematic innovation and continual improvement by harnessing the creativity of stakeholders in order to generate increased value and higher levels of performance.
- **Leading with vision, inspiration and integrity:** Excellence is visionary, inspirational and integrated leadership, coupled with strategy and purpose.
- **Managing with agility:** Excellent organizations recognize their ability to identify opportunities and threats respond to them effectively and efficiently.
- **Succeeding through the talent of people:** Excellent organizations develop and maintain value-added partnership with their people and create culture of empowerment to achieve organizational as well as the personal goals.
- **Sustaining outstanding results:** Excellence is achieving sustained and outstanding results that meet the short-term as well as the long-term needs of stakeholders.

EFQM model consists of nine criteria (Fig. 2.12), which can be accordingly divided to two groups of “Enablers” and “Results”. The Enablers show HOW the management of an organization is and the Results illustrate WHAT the organization wants to achieve [104]. Actually, the performance results are the cause of enablers, and the enablers will be improved by using the feedbacks from the performance results. The five enablers assess whether effective approaches are available to enable the organization achieve its results. And the four results illustrate whether comprehensive measures are available to monitor the performance of organization and to assess whether strategic objectives have been met.

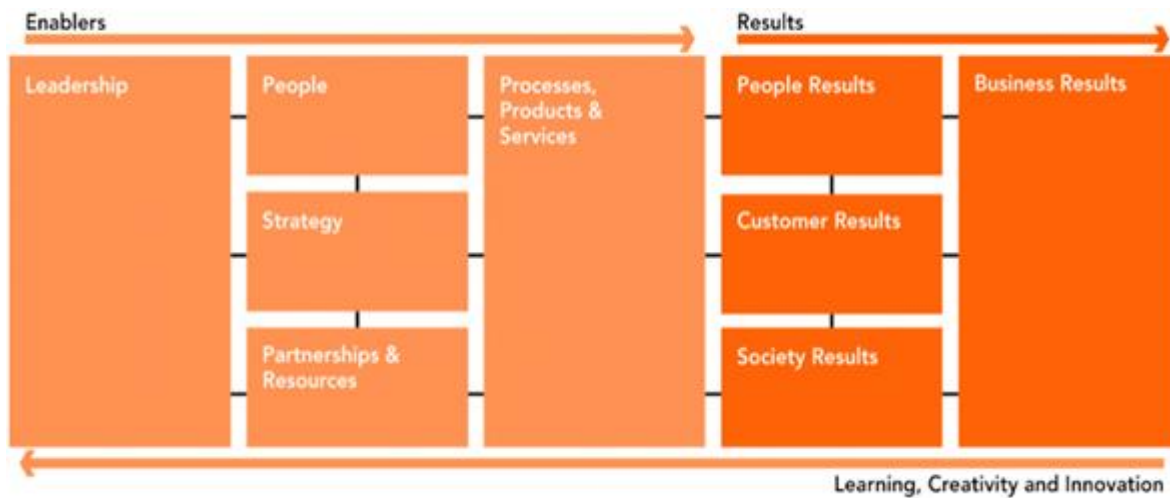


Fig. 2.12. EFQM Excellence Model [29]

In comparison to the BSC, the EFQM model takes a broader view of performance; however, it contains some dimensions which are not easily measurable [70].

2.3.6.3 Results and Determinants Matrix

Fitzgerald, Johnston et al. [32] developed a framework of Performance Measurement specified for Service Industry which is also relevant for this thesis. As Fitzgerald et al. published their interdisciplinary case study research, they developed a normative model for PM in services that consists of three main elements including a control model; a recommended level of organizational analysis; and range of dimensions.

Control Model

Fitzgerald et al. provided a feedforward/feedback control model (Figure 2.13). In this model PM is part of the feedback control and is a stimulus for appropriate organizational actions at right levels.

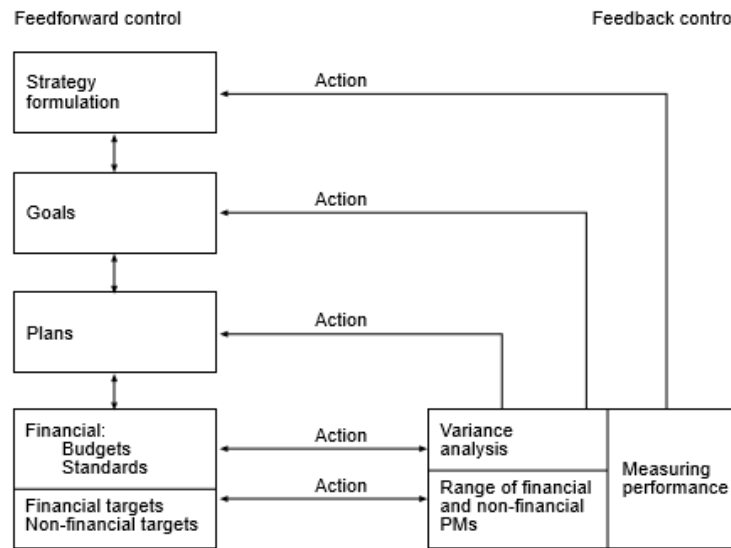


Fig. 2.13. Feedforward/Feedback Control Model [32]

Level of Organizational Analysis

Fitzgerald et al. identified three service archetypes including professional services, service shops and mass services which refers to the level of organizational analysis and actually the number of customers processed per day as the primary classificatory organizational mechanism (Fig 2.14)

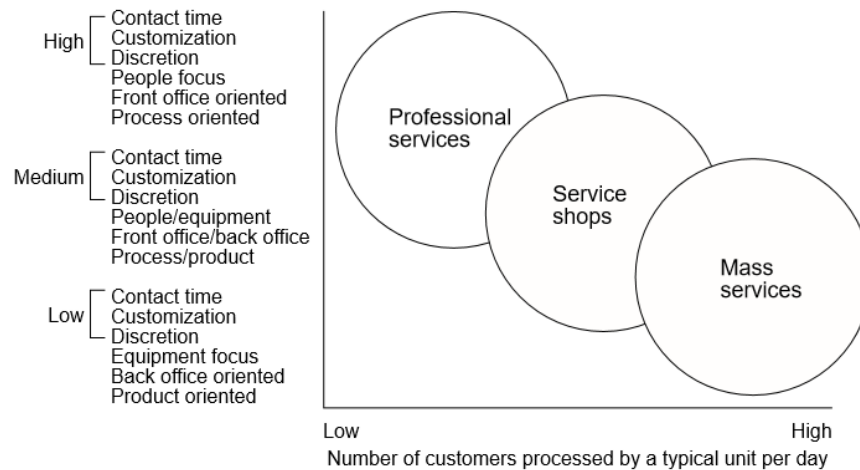


Fig. 2.14. Service Classification Scheme [32]

Range of Dimensions

Understanding the fact that organizations compete on different factors other than costs and expenses, Fitzgerald et al. suggested six dimensions for PM. These six dimensions are divided to two categories of “Results” based on organizational strategy and “Determinants” of strategy’s success. Table 2.5 shows these six dimensions and gives examples for measures. There will be trade-offs and interactions among these six dimensions that lead to better and balanced strategic plans.

Table 2.5. Performance Measures across Six Dimensions

	Dimensions of performance	Example of measures
Results	Competitiveness	Relative market share and position Sales growth Measures of the customer base
	Financial performance	Profitability Liquidity Capital structure Market ratios
Determinants	Quality of service	Reliability Responsiveness Aesthetics/appearance Cleanliness/tidiness Comfort Friendliness Communication Courtesy Competence Access Availability Security
	Flexibility	Volume flexibility Delivery speed flexibility Specification flexibility
	Resource utilization	Productivity Efficiency
	Innovation	Performance of the innovation process Performance of individual innovations

This categorization reflects the concept of causality and highlights the fact that the performance results obtained are a function of past performance of the business with regard to specific determinants.

2.3.7 Summary

The concept of Performance Measurement has been reviewed and discussed in this section. The literature of Performance Measurement provides a multi-dimension perspective which reflects two main aspects of effectiveness and efficiency in organizations. This section has also given a review on some popular and widely used measurement approaches and systems. The Balanced Scorecard approach is a popular strategic tool. That help organizations to clarify their objectives and goals, communicate their strategy, and set up performance objectives. The EFQM Excellence Model is a non-prescriptive and self-assessment framework which is not developed as a PMS but can be used as a tool of managing performance to improve performance and is also appropriate for benchmarking. And finally, Results and Determinants Matrix is a framework specified for Service Industry. The literature provided in this section will be used to develop a PMF for SBCs later in the chapter 4 of this thesis.

Chapter 3 – Methodology

3.1 Introduction

Creswell refers to two research approaches of reasoning as inductive and deductive [19]. He defines induction as a method that use participants' views and perspectives to generate a theory or to build broader themes and interconnecting the existing themes, while deduction is working from a theory to hypotheses and then to data in order to add to or contradict a theory. Furthermore, he defines two research strategies including qualitative and quantitative [19]. Qualitative research is exploratory and it is useful when important variables will not be examined in a research. In contrast, quantitative strategy emphasizes measurement and analyzes causal relationship between research variables. This research studies the issues of BPM, Process Modeling and PM in CBs and SBCs. The main objective is to model the certification process and develop a PMF for Service Industry. In order to achieve this, both inductive and deductive approaches are employed and qualitative strategy is used.

This chapter is organized as follows. The research approach is discussed in section 4.2; research strategy and research design are presented in sections 4.3 and 4.4. The methods of data collection and data analysis are presented in sections 4.5 and 4.6; and finally, the study's creditability is discussed in section 4.7.

3.2 Research Approach

There exist two types of inductive and deductive research approach that can be applied when conducting a research. When a research starts with data collection and new theories will be developed based on the data, the inductive approach is applied [88]. The deductive approach is applied when a researcher builds a theoretical framework on the base previous theories, and then tries to apply this theory to one specific instance [46]. In this thesis, the research approach is both inductive and deductive. In order to model certification processes, inductive approach is applied, because data is collected and a certification process is modeled based on the data. On the other hand, in order to develop a PMF for SBCs, it is important to go through the existing literature and

previous theories concerning PMSs which is a deductive approach. when conducting the deductive approach, it is essential to build a solid literature review and have a full and clear understanding of the theoretical backgrounds concerning the specific research field [16]. From this point, we have focused on PM theories in order to develop a new framework, which combines theories of other researches, integrates them and tries to make more criteria that assess the performance of SBCs.

3.3 Research Strategy

There are two main strategies of quantitative and qualitative which are applicable in the researches. Quantitative research is a strategy that emphasizes quantification in data collection. In the quantitative research, researchers promote certain hypothesis at the beginning of the research, and then try to collect statistic data in order to prove the hypothesis [16]. The main methods that can be used in quantitative research are experiment, official statistics, social survey, structured observation and content analysis [90]. On the other hand, qualitative research is a strategy that focuses on words rather than quantification. In a qualitative research, detailed data can be gathered through literature review, interviews and documents [25]. Qualitative strategy helps people understand social phenomena better and gives them more knowledge of a specific research field. In this thesis, we have employed the qualitative strategy. This study models certification process and develops a new PMF through the main success factors of any organization including strategic alignment, leadership, people, culture, governance, methods and information technology. Among all these, some factors like leadership, people, and culture cannot be captured through a quantitative strategy since these factors are human behaviors and social phenomena. These factors can be better captured by a qualitative strategy, such as face-to-face interview as one of the qualitative research methods in order to gather qualitative data. During our research, we conducted interviews and meetings in order to collect data to model certification processes and optimize them. In addition, a framework is developed during this study which is based on literature review and data analysis of PM theories and comparing the features of current PM implementation as well as their requirements.

3.4 Research Design

Research design provides a framework for collection and analysis of data. Four main research designs can be applied, when conducting a research [16]:

- Cross-sectional design
- longitudinal design
- Experimental design
- Case study design

In this thesis, we have chosen case study design to conduct our research. Case study design can be selected when understanding a specific case is important for the research. The case study design entails intensive analysis of a single case; such as a single business, a single event or a single individual [16]. In our study, we focus on modeling processes of specific organization and developing a PMF for a particular business, namely SBCs. Therefore, the case study design has been chosen for the purpose of this thesis. Case study design helps to understand the complex issues better and is suitable for conducting this research.

3.5 Data Collection

The data for modeling processes has been gathered from databases and documents and by using interviews, conversations, meetings and perception as a collection method. Analysis of documents is assumed as a traditional data collection method in qualitative research. Document analysis encompasses a range of activities that seek to reveal information hidden in document collections [56]. In addition to the documents, interviews are often classified as primary source of collecting data and require care and expertise [83]. In order to conduct this study, a group of employees from different levels were selected to participate in the interviews and meetings of modeling and optimization process; to document their current way of doing tasks and processes and to develop new ideas. The interviews were conducted in semi-structured and face-to-face manner. Semi-structured interviews obtain more data and information than focused structured interviews [26]; because they don't restrict the answers to just 'Yes' or 'No' and allow the interviewees to describe their thoughts freely; hence, it broadens the data that will be gathered.

Data gathered for the purpose of this study are quoted in empirical part of the study and the process modeled and optimized are created using these comments.

In order to develop a new PMS for SBCs, data is collected through literature review, which is secondary data type and can be used to accomplish different purposes and is often characterized as cheap, wide in scope, flexible, ideological or systematic [76]. Data collected by literature review helped us to analyze existing PM theories to identify the strengths and weaknesses of each method and summarize the research regarding PM in SBCs.

3.6 Data Analysis

For modeling the certification process and after finishing interviews, the analysis of data, based on data gathered from interviews and documents, has been started. By analyzing data, a clear picture of the current situation of the organization is made and according to the data that was collected from interviews and documents, the process of certification is modeled and optimized. Additionally, based on analysis of data collected from literature review, the researcher built a practical PMF for SBCs.

3.7 Credibility

Two aspects are considered to ensure the credibility of a study, including reliability and validity [87]. Reliability refers to producing consistent results over time and is characterized with precision and objectivity. Validity refers to measurement of what is supposed to be measured and producing accurate result [87].

3.7.1 Reliability

To ensure the internal reliability of this research, we have used low inference descriptors to create a careful audit trail, by using an appropriate device to record the data in interviews (with permission). Additionally, the reliability was increased by going through the results with the

team and by reaching a consensus that the research results are correct and in line from each member's perspective.

Furthermore, in the phase of developing a PMF for SBCs reliability has to be ensured, but since BPM, the topics of PM and their trends are changing continuously, it is not certain that the results of this research would be the same if the study would be conducted again in the future.

3.7.2 Validity

In this thesis, validity has to be ensured during the interviews. The questions during interviews must have been easy to understand and have to be asked in a straight manner. The responses must be validated through follow-up questions.

3.8 Summary

This chapter has outlined the methodology employed in this study. The research approach is both inductive and deductive and we have employed the qualitative strategy for the purpose of this study. The data is gathered and analyzed with the help of different methods including studying the literature, interviews, and documents. Furthermore, the creditability of the research is ensured and the reliability and validity is controlled.

Chapter 4 – Implementation and Solution

4.1 Introduction

In today's competitive world of business, customers place more and more demand on service industries. As there exists no production in a Service-Based Companies, the use of a well-structured and process-oriented system and adapting BPN approaches ensure that a service organization meets or exceeds its customer expectations. BPM as a holistic approach and other approaches which are included in the context of BPM enable organizations to systematically improve their performance. This chapter highlights the benefits of adapting BPM and other approaches that are linked with BPM. During the chapter the certification process will be modeled and a conceptual PMF for SBCs will be visualized. This chapter is structured as follows: In section 4.2 the certification process will be modeled and optimized. In order to develop a PMF for SBCs, section 4.3 goes through the characteristics and features of SBCs. The Challenges and requirements of measuring performance in SBCs are highlighted. Current PMSs in the case of service industry are analyzed and knowledge gaps are identified. Finally, and at the end of this chapter a PMF is developed which meets the requirements of SBCs.

4.2 Modeling the Certification Process

4.2.1 Certification Bodies and Certification Process

Organizations looking to certify their management systems, products or special processes should do it through Certification Bodies. Products and services can be audited against various standards or by CBs which are accredited to perform audits. CBs will be contracted by organizations to undertake external audits. Standards and certifications awarded by Certification Bodies are a competitive factor for any organization, as they define how an organization can meet the requirements of its customers and the stakeholders. Certification of products and services ensures the safety as well as the quality. Certification of products and services is a complicated process and specific standards must be followed in order to ensure the conformity. The standards set out the rules for processes, documents, and requirements which are audited during the verification

process. CBs provide reports on system performance which declare that a process, product or a service conforms to specified pre-determined requirements declared in standards. In other words, a certificate issued by CBs illustrates that the certified organization has followed and fulfilled quality properties and other requirements recognized in a given standard.

Certification bodies are responsible for:

- selecting qualified and experienced auditors to conduct audits
- confirming the qualified auditors for specified services or products (the audit scope)
- reviewing the audit team's findings and reports in order to make a decision, whether an organization achieves or maintains certification

The core processes of the certification process and the process of becoming a certificate based on different standards is generally as follows:

- Client fills out an application form based on the related standard and the inquiry will be received by the CB;
- An offer will be prepared by the CB which includes the estimated price and also the requirements which should be fulfilled by the client;
- In case of the acceptance of the offer, the client signs a contract with the CB;
- An employee of the CB will be assigned to each client, who will assist the client with audit coordination throughout the whole certification process and
- An audit team will be assigned to the client based on factors such as industry knowledge, and scope experience.
- The respective employee and the audit team schedule the initial audit and prepare all necessary documents for the audit including audit plan. The audit will be performed in accordance to the audit plan.
- Upon completion of the audit, the audit team writes an audit report identifying any non-conformities to the standards. These reports should be reviewed by the experts in the CB.
- A bill which include all costs for conduction of the audit will be send to the client and the customer pays for the service.
- Once the expert approves the conformities to the relating standard, the certificate will be issued and sent to the client.

- The assigned employee gets in touch with the client to set up subsequent surveillance audits, which usually takes place every three years.

4.2.1.1 Organization X

Organization X is an independent and accredited CB. Its main focus is on certification of products and services in the fields of quality, safety, environment and health. Organization X has a total number of 40 employees including intern and extern workers. Each certification field, as a separate department, has one department manager and a number of customer support employees. All departments of Organization X are under the direct control of organization's managing director. One primary goal of this thesis is to model and optimize the certification process which is the core process and main activity of Organization X. This model is adaptable to all certification bodies. Modeling the certification process was requested by the managing director of Organization X as it was suspected that the business processes are not performed efficiently. The managing director wanted also to have a clear map of processes which are currently running in the certification body and how simpler and better the remodeled processes would be.

As mentioned in section 2.1.3.1 of this thesis, the processes of any organization can be divided to management, core and support processes. Figure 4.1 visualizes these three process categories in Organization X that can be also adapted by all CBs.

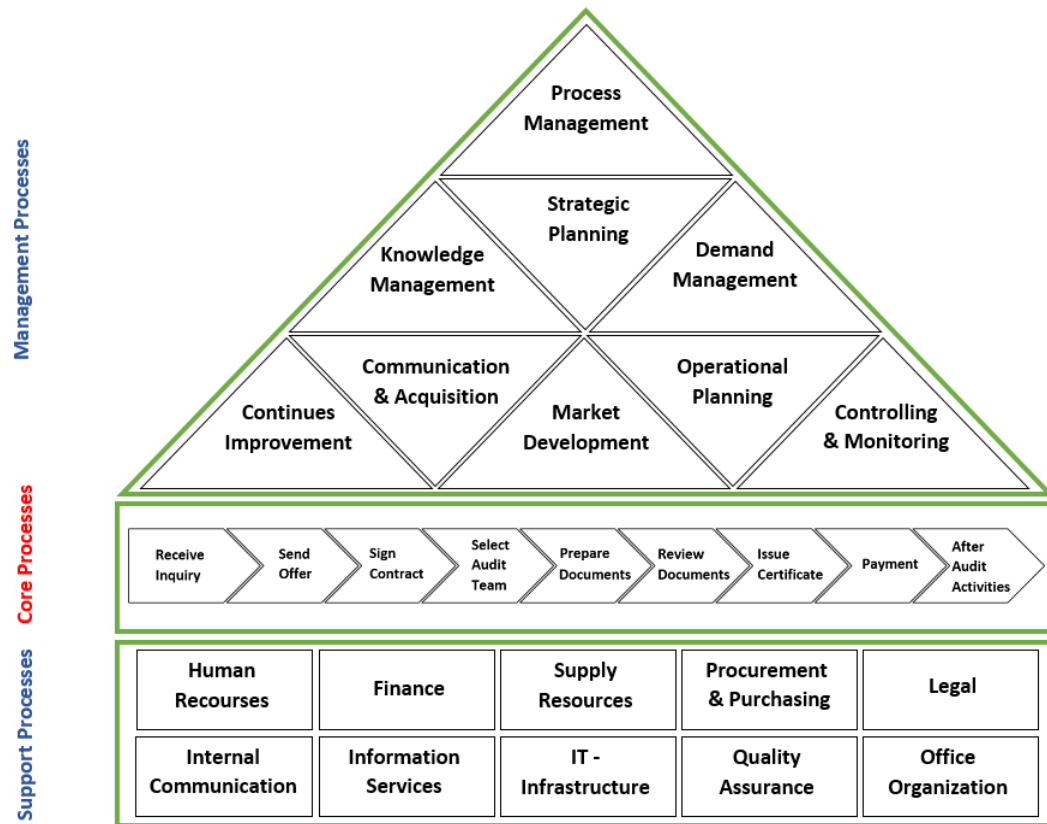


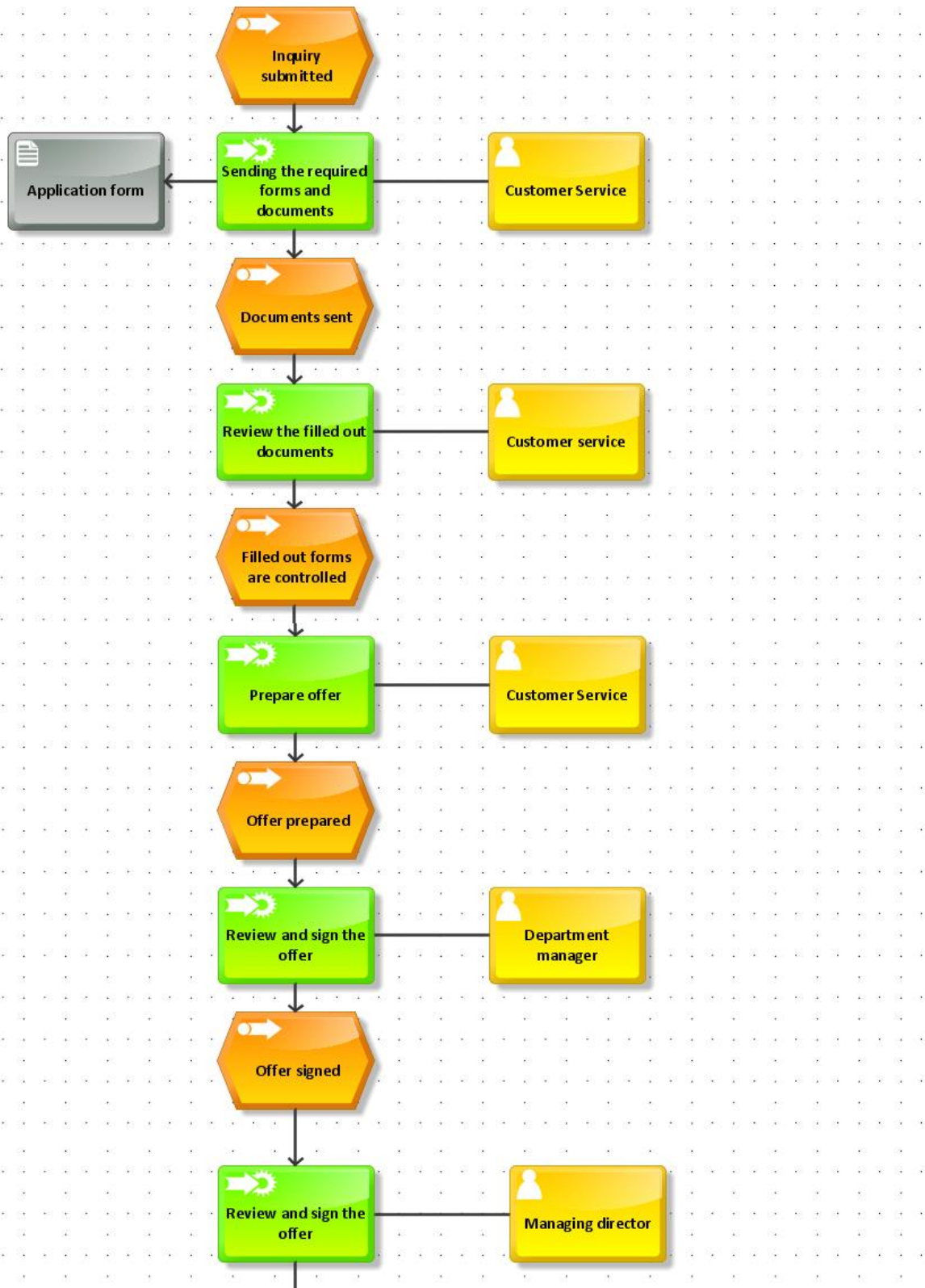
Fig. 4.1. Process Classification in Organization X

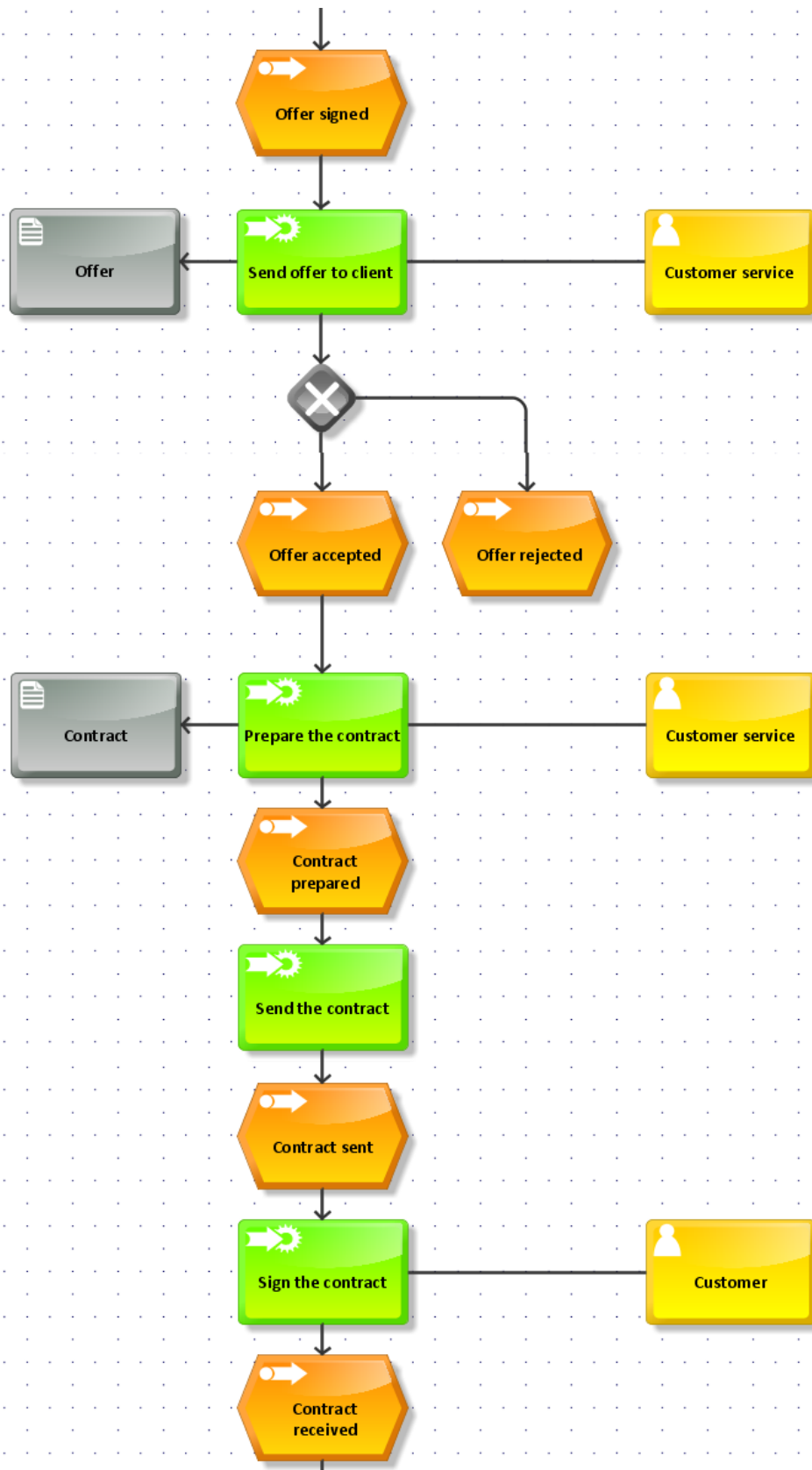
4.2.2 Certification Process Model

As a business process model is a detailed description of what must be done to accomplish a specific goal, interviews and study of documents; presented in section 3.3 of this thesis was used in order to gather detailed information of how the core process is done. Various modeling languages were studied and presented to the project team and Event-driven process chain was chosen, since the modeling language is easy to understand and illustrates the processes on the level of business logic clearly and also shows how the tasks and activities conducted in the organization add value to the business. In order to gather all relevant data and having a better understanding of producers, the department managers discussed their point of view on how they see the certification process and what are the logical events and functions and all the presented information were documented. The clarifying questions were discussed. The discussion bounced back and forth as the project managers added details on processes and changed the sequences of

tasks and function and expressed their opinions about how the certification processes are actually carried out. As a consequence, a macro level of the process modeling was developed first and micro parts were added later to the macro models which were important and critical to present the most challenging areas of core processes. By end of the meeting and agreement upon the results of the first meeting, the modelling process started using the data gathered in the first meeting. During modeling the processes, it became clear that creation a complete process model based on the data and documentation was not possible, since some key information was missing and some parts were not completely understandable. Therefore, the second meeting was planned and the process model was sent to the department managers to be studied before the next meeting. The first draft of the process model was inspected and discussed during the second meeting. The missing information was added and the incorrect parts were fixed. The second process model draft sent to the department after the second meeting and modeling the processes. The third meeting was accordingly reserved, where the modeled core process was finalized Fig 4.2.

The main processes which are conducted by Organization X starts with an inquiry from client's side who is interested for a special service. The request will be send to the related department and the department manager assigns an employee of customer service to this client who is responsible for the organizational issues for the whole process. The respective employee sends an application form to the customer to be filled out and completed. The customer fills out the required documents and by getting back the forms, the customer service prepares an offer based on the criteria which are available in manual and structures of the organization. This offer will be reviewed by the department manager and signed. After that, the managing director reviews and signs the offer. The offer will be send to the client and upon agreement, the customer service prepares a contract and sends it to the customer. When the customer signs this contract, it will be signed again by the department manager and also the managing director and the process of auditing can be started. The detailed activities that would be done during the audit process is irrelevant for the certification body and therefore, are not modeled in this study. In addition, the processes which take place after the conduction of audit, including review of documents, issue the certificate, payment and after audit activities, such as following up for the surveillance audit, will be done in simple steps and we have not modeled them in this thesis.





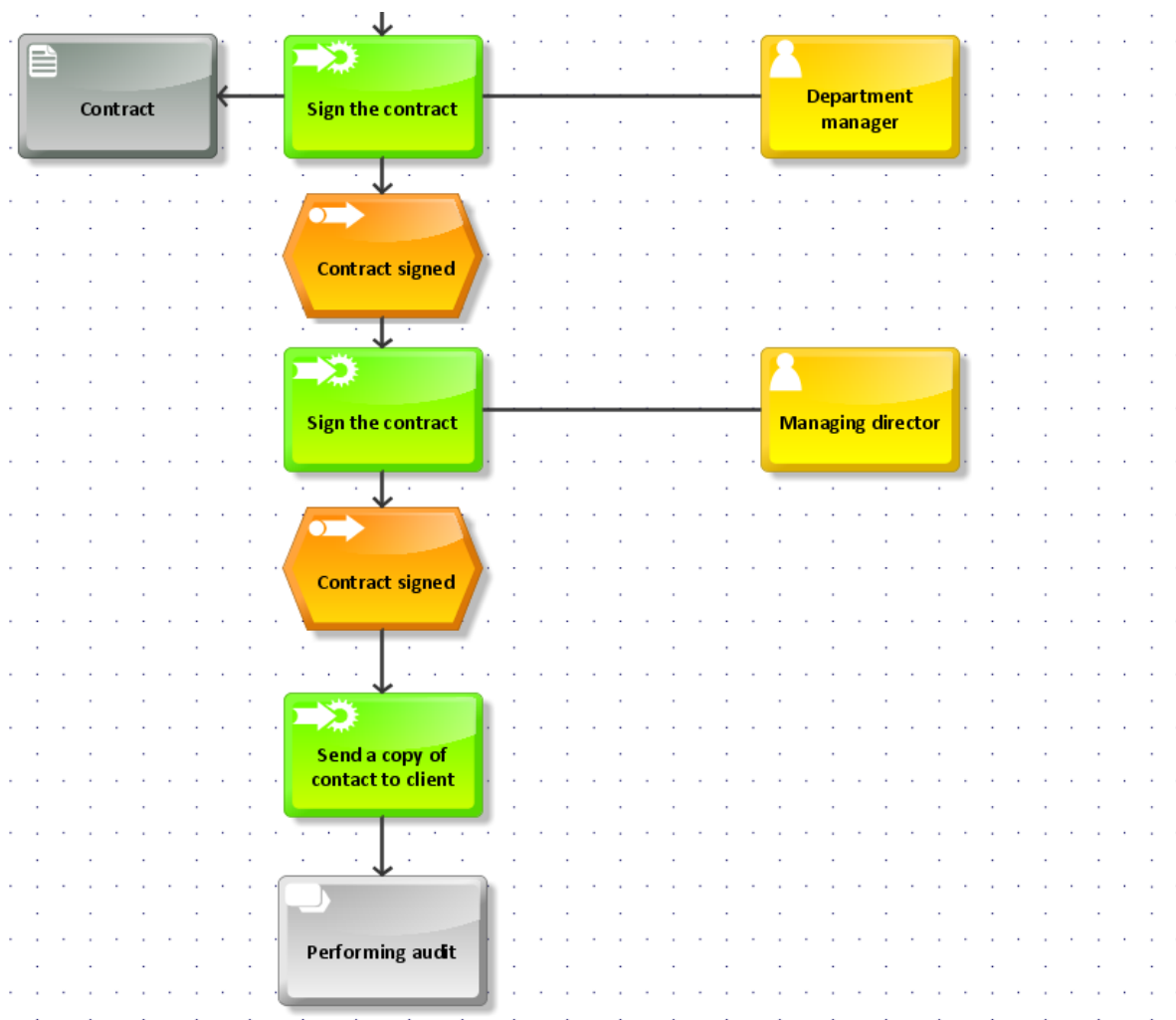


Fig. 4.2. Initial Certification Process Model

4.2.3 Optimization of Process Model

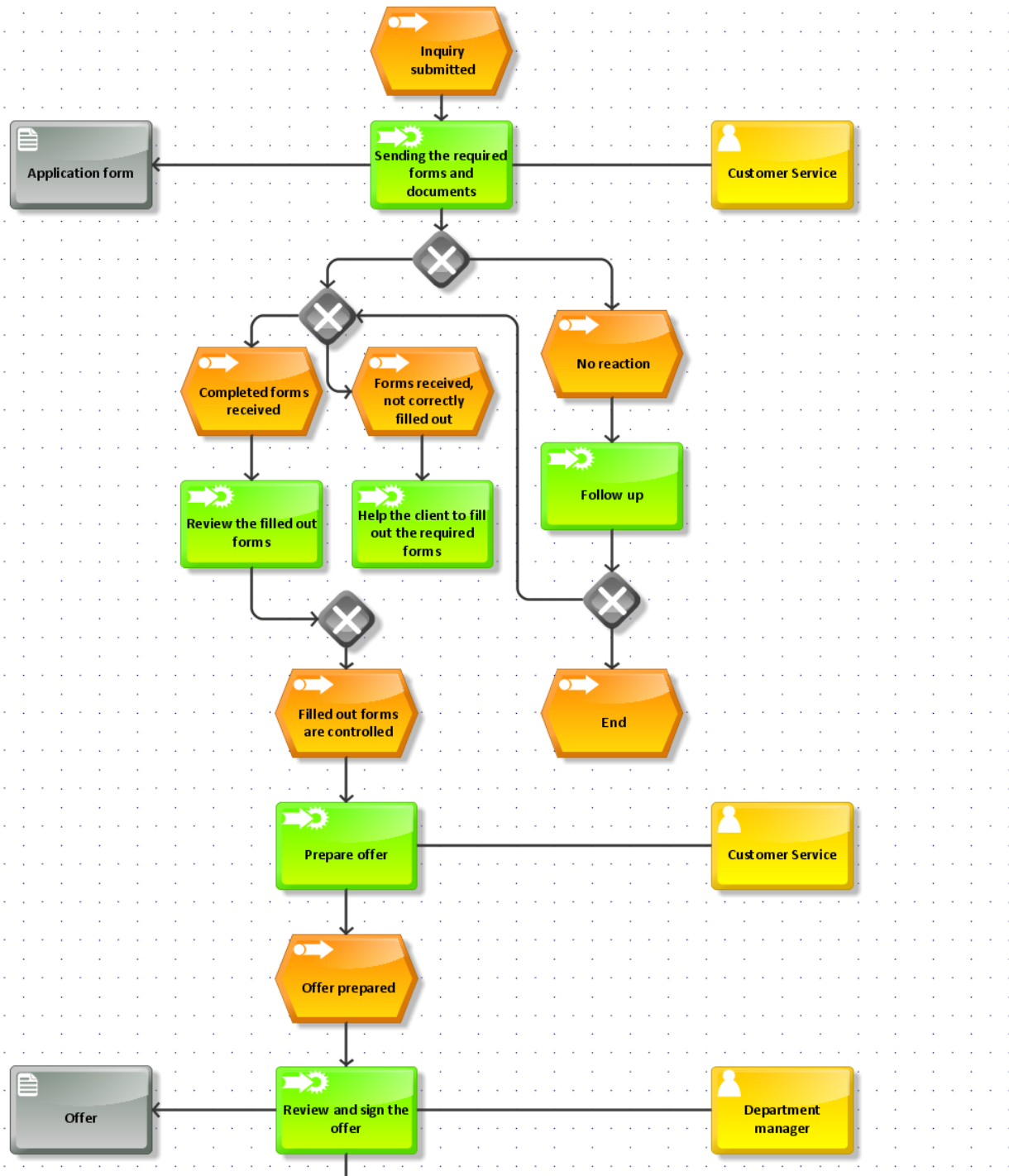
After modeling the current core processes, optimization of processes was started. The theory behind the process optimization and process reengineering; as presented in section 2.2.5, were described to the head of departments. Department managers and the managing director had a fairly clear picture of improvement potentials in the current core processes and also how the stakeholders can act and perform their activities in an improved and more efficient manner. The ideas of managers about improvements potentials and weaknesses of the process model were completely documented and will be presented in the following.

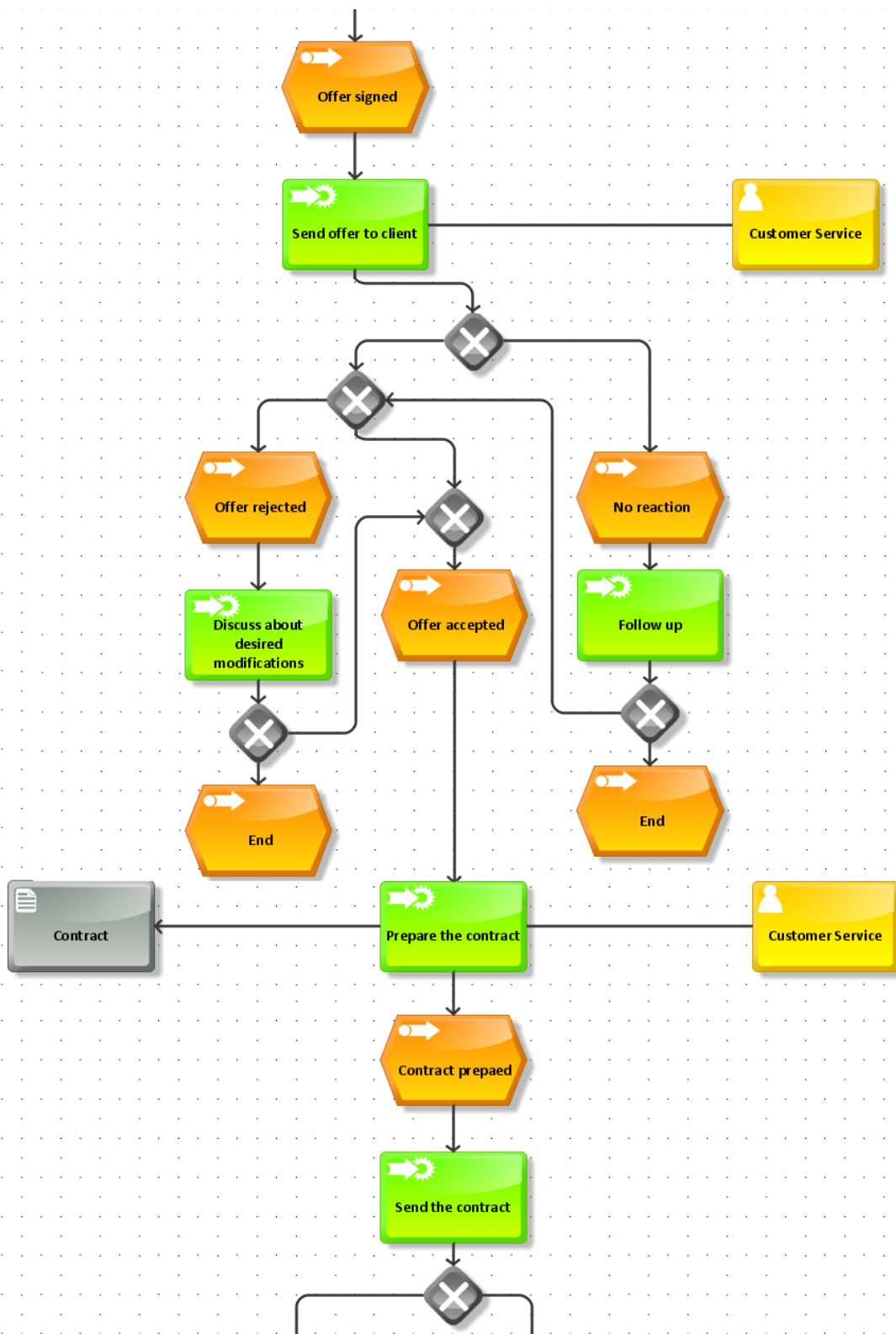
4.2.3.1 Improvement Potentials

Customers are the most important elements in the exercise for any business. Customer satisfaction and high user productivity is a main goal of every business. In order to support this, Organization X must ensure that the communication with clients is in an effective way. It has been widely commented that one of the key causes of the failure of winning new customers is the lack of follow-up processes by Organization X which can be understood from the initiative model clearly. After sending the required documents to the customers, there would be three possibilities two of which were not taken into consideration before optimization and reengineering the processes. If the customer fills out the required documents, the process can continue. But it may also be possible that the customer doesn't react after sending the documents. This may have many reasons; for example; the customer may have forgotten to fill out the required documents or needs help by filling out the form and so on. The same problem can be also seen as a weakness point of the modeled process after sending the offer and also the contract to the customer. The customers, who don't sign the contract can be followed up by the customer service to be asked for the possible reasons which can be lack of time, unsatisfied with the offered price or service and other possible reasons. This can be seen as an improvement potential for the business model. The responsible employee can be reminded with the help of a software system to call back the customer.

Another weakness point which can also be interpreted from the initial model is the numbers of reviewing and signing required documents by department managers and also the directing manager. As the directing manager works usually out of the organization and is not available all time, this can lead to long waiting time to getting an offer or contract signed by him, which also leads to customer dissatisfaction. As a solution for this weakness of the model, the offers can be signed by department managers, who are also expert in the related field and the directing manager can just sign the final version of the contract by reviewing the offer and contract. After discussing the improvement potentials of the process model, the reengineered process model was created (Fig 4.3). After optimization and reengineering the core process model became lean and more efficient.

As discussed in section 2.3 of this thesis, after modeling the processes and as a prerequisite for managing and analyzing process models, measuring the process attributes is required. In the next section of this thesis we develop a PMF for SBCs that encompass CBs as organizations which offer services.





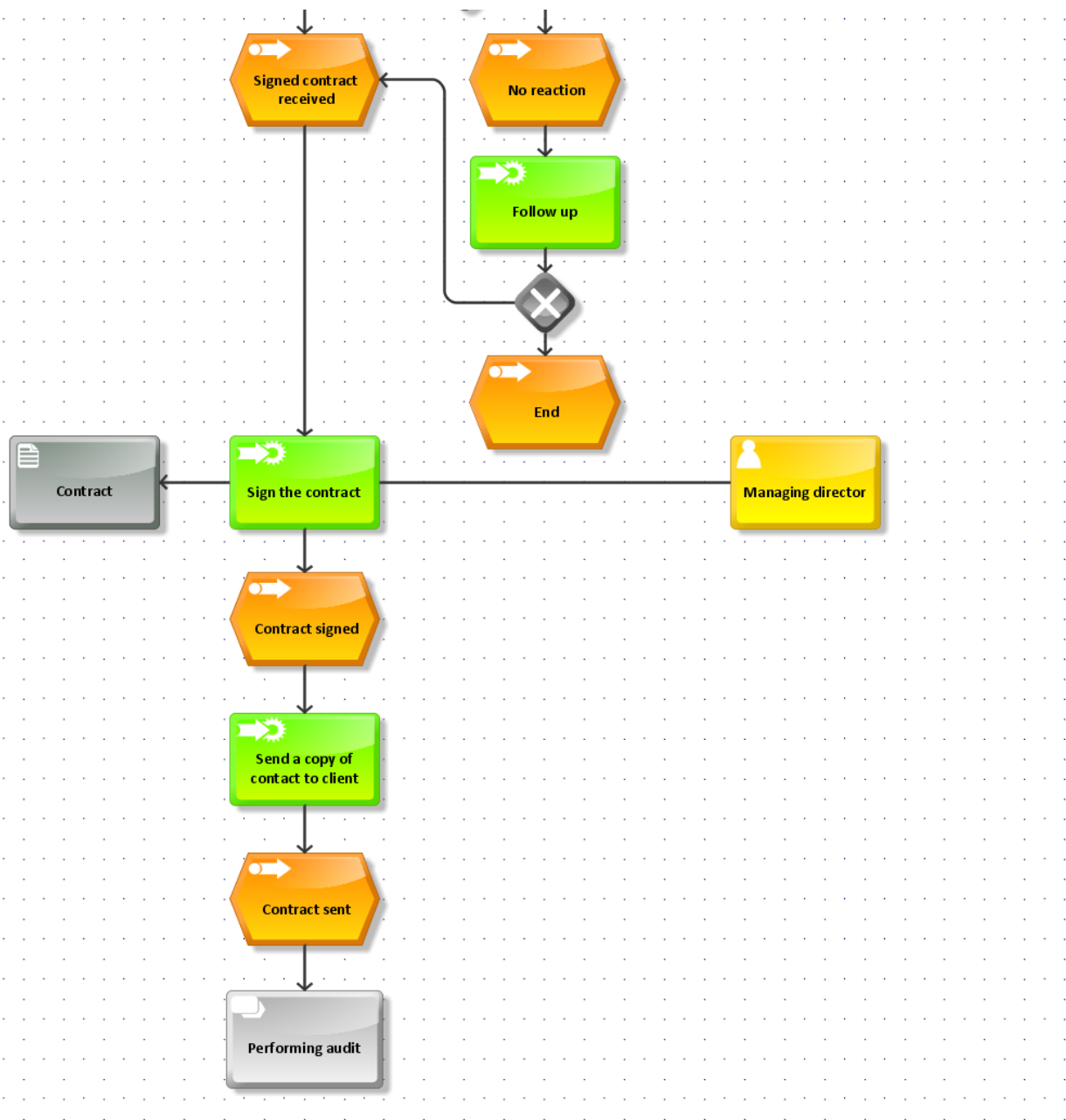


Fig. 4.3. Optimized Certification Process Model

4.3 Developing a Performance Measurement Framework for Service-Based Companies

Performance Measurement Systems were historically developed as a means of monitoring and controlling organizational activities to ensure that an organization pursues its strategies which leads to achievement of goals and objectives. In response to the limitations of traditional PMSs, which focused on financial factors, a number of PMFs have been developed in the last years. However, these PMSs are not specifically developed for SBCs. As SBCs have characteristics which distinguish them from Product-Based Companies, a specific PMF is needed for these organizations. Among all these systems and frameworks, the model presented by Fitzgerald et al., in 1991 [32] focuses on performance measurement in service industry; which has also its shortcomings and doesn't take all factors of measuring performance into consideration. The remainder of this chapter builds a PMF for SBCs based on previous research. The features and requirements of PMFs for SBCs are generalized and discussed. After that a conceptual PMF for SBCs is developed.

4.3.1 Characteristics of Service-Based Companies

The business of SBCs is increasingly complex. As these organizations produce no products, it is very important for these companies to implement a process-oriented structure and accordingly an appropriate PMS to be successful in the market. Service Industry has been distinguished from the manufacturing sector based on five key characteristics including intangibility, inseparability, heterogeneity, perishability, and lack of ownership [18]:

Intangibility: While physical products in the store are widely displayed for customers, intangibility is a dominant characteristic of services. Although most offered services include some tangible elements, the service performance itself is intangible and is difficult to grasp.

Inseparability: A key distinguishing characteristic of services is that the service provision is inseparable from the service consumption. Therefore, it is very difficult to separate and distinguish the provider of a service from the service itself. This means that the customer of a service interacts with the provider during the process of delivery.

Heterogeneity: In the manufacturing sector, companies pay special attention to ensuring consistency in production processes. Therefore, more often than not all customers can be sure that the product they buy will not vary. The provision of services, however, includes a large measure of human elements. Heterogeneity of services refers to the difficulty and change of achieving a standardized output based people-based performances.

Perishability: In comparison to physical products, services are perishable. This means that unlike most physical products, services cannot be stored or saved or stored.

Lack of ownership: A distinguishing characteristic of a service is that, unlike a physical product, the consumer does not get the ownership by paying for a service; a customer of a service pays to use the service. Payment for a service is for an access, not for a tangible ownership.

Because of these characteristics of services and since the cost and quality of services provided by SBCs can vary even within the same industry, customers have preferences and they are willing to pay for different components of services; such quality, speed, degree of variety, etc. Better management of a service system will lead to greater profitability for the organization. In order to manage a service system, an efficient measurement system is needed. Therefore; to improve a SBC's competitiveness, the nature of the service systems, the associated management tasks, the requirements and challenges of measuring performance must be studied. The next session of this thesis goes through the challenges of measuring performance in service sector.

4.3.2 Challenges of Measuring Performance in Service Industry

Faced with the stiffening competition, service industries are trying to boost their productivity. Whereas manufacturing businesses can raise their productivity by monitoring, measuring and reducing waste and variance in their production and distribution processes that are relatively homogenous, it is trickier for service industries to find a stable way of improving performance, since their customers and activities vary too widely. There exist some important factors and challenges which should be taken into consideration while measuring the performance in SBCs:

- Strategy development plays an important role for the success of any organization. Strategy development in service industry is different from that of manufacturing companies and therefore; they require different strategic thinking [95]. This topic becomes even more important when it comes to service industry, because SBCs may easily fall into strategic management traps [38]. These companies should recognize the importance of strategic decisions and their impact on the efficiency of business processes.
- Considering strategic alignment; as a mechanism, which helps organizations to visualize the relationship between their strategies and business processes, is very important for any organization. Strategic alignment enables decision makers to gather meaningful insights based on current processes [65]. Literature argues for a third generation of PMSs which encompass organizational strategic alignment, wherein the PMSs are fully integrated with business processes [73].
- Business processes are meant to develop products and services in order to create optimum value for customers. Business processes are the way by which organizations deliver value to their customers and other stakeholders. The findings indicate that in today's market manufacturing companies are more process-oriented than SBCs [14]. The importance of measuring business processes should not be underestimated in organizations [102] and particularly in service industry, as SBCs are characterized by their processes.
- Setting up a variance-measurement programs is a very crucial factor for SBCs, since variance is inescapable in SBCs. Variance in SBCs refers to three factors of service level agreements, environment, and work volume. First, the more types of services a SBC offers, the more variability is expected in its agreements. Second, each customer's environment has its own unique aspects which are challenging to measure. Finally, size is a major reason of wide variance among business units. As a result, volume needs to be considered that help explain organizational costs [42].
- Many reviews of the literature in the field of service industry revealed the significance of service quality construct [31]. Traditional measures that are based on organizations'

profitability, are inadequate for evaluating the strategic performance. Organizations should measure the quality of transformations and not merely the outcomes [17].

- Innovation is the major stimulating force of change and growth in any organization and also in the service sector. However, the character and the nature of innovation activities in SBCs differ from those of the manufacturing sector [45]. SBCs should consider their organizational aspects and the coordination of their activities in order to develop new services [45]. Consequences of empirical research on innovation in SBCs are manifold; therefore, new forms of performance measures and indicators are needed in such organizations [45].
- SBCs need to compare their performance against themselves rather than against external measures which are poorly defined and may not be suitable for them. Using external benchmarks cause challenges because SBCs may face difficulties in getting comparable measurements from different organizational parts. Although an organization must know, what its competitors are achieving, it's performance should not be measured against them because these benchmarks are just samples of data which have little explanation behind them. Companies that use external benchmarks are often frustrated to find themselves off by a factor of five to ten, positively or negatively [42]. Hence, it is important for SBCs to measure both internal and external competitiveness.
- A strong relationship between employee satisfaction and service quality is considered for SBCs [93]. The important role of human resources in service industry is not neglectable. The importance of employee satisfaction as well as its impact on organizational performance is often ignored in the literature [12]. This becomes more important, when talking about SBCs, since services are characterized by very close customer contacts [45]. In the service sector, many employees have direct contact with customers. Hence, motivated and satisfied employees affect the quality of services. All these facts show the importance of human resources in service industry which should be measured and controlled continuously by SBCs. Human resource measures can relate to e.g. employee satisfaction, well-being, development and effectiveness. According to all these facts, it is

important for SBCs to measure the satisfaction of all stakeholders and not merely the stockholders.

- One of the most important competitive advantages of SBCs is their flexibility and how quickly they can react to customer requests and needs. The studies on service flexibility are not as comprehensive as flexibility in manufacturing industry [58]. In SBCs, flexibility still lacks an accurate definition and not all flexibility dimensions have been clearly defined [5]. Agility, adaptability and flexibility in are the key factors of competitive strength in SBCs [58]. Due to the importance of flexibility in service industry, SBCs should study, analyze and measure their flexibility more comprehensively.
- Setting up a broad and deep cost-measurement system is very important for SBCs to report and compare all expenses common to service delivery. This system helps SBCs to have a better understanding of their cross-functional trade-offs and rein their total costs. When a SBC tries to measure only the selected costs, rather than using a more comprehensive approach, it will see that the teams hit every budget target but still losing money. The reason for this is that the services are very fungible, and it's easy to measure wrong things or shift the costs to unmeasured areas [42].
- Financial data is difficult to measure and interpret in SBCs. Furthermore, in order to identify and monitor the root causes of the organizational expenses, SBCs must look deeper than the financial costs. Measuring only the cost of an activity or task wouldn't reveal the underlying reason, why these costs are stemmed. Better measurement systems look at cost drivers, such as cost per employee or incidents per employee per day [42].

4.3.3 Requirements of PMSs in SBCs

As discussed in the previous section, there are many challenges regarding measuring performance in SBCs. Based on these facts, PMSs in SBCs must be used to manage and measure

variance and uncertainty, quality of services, innovation, competitiveness, human resource, and flexibility. In addition, as many scholars ([11], [13]) argue that a PMS should support the definition, development, and evolution of organizational strategy, it is crucial for SBCs to have a PMS which help them to develop their strategies. Another important fact is that the SBCs are not typically well-endowed with their processes; therefore, a PMS developed for SBCs should align with business processes. It is also clear that this PMS should be also balanced, flexible, dynamic; and take all stakeholders of the processes into consideration.

In summary, a PMS in SBCs encompasses the following key elements as its requirements:

- Strategy development
- Strategic alignment
- Process Measurement
- Variance management
- Quality of service
- Innovation
- Competitiveness
- Human resource
- Flexibility
- Deep-cost measurement
- Cost-driver measurement

In addition to all above mentioned facts, a PMS should be balanced. A balanced PMS must be able to measure financial and non-financial, as well as the internal and external factors. Keegan et al. argue that organizations usually focus just on internal performance; however, the performance measures have to reflect the external performance and organizational multidimensional environment [97]. Therefore, organizations should design and implement an effective PMS that assist in providing detailed information of their internal and external performance factors.

The next section of this thesis goes through the theoretical approaches of PMSs in SBCs and their components of measuring performance. After analyzing the knowledge gaps of these PMSs, a conceptual PMF will be developed for service industry.

4.3.4 Performance Measurement Systems for Service-Based Companies

As the topic of performance measurement has received a lot of attention in recent decades, many PMFs vying for management attention within organizations and many studies have been conducted. In the following we study the issues of PM approaches; presented in section 2.3.6 of this thesis, in SBCs. The goal is to identify the strengths and weaknesses of these approaches and to develop a PMF which considers all requirements of SBCs.

4.3.4.1 The Balanced Scorecard

As discussed in Section 2.3.6.1, the measures employed in the BSC are based on organizational strategy. The BSC encompasses both financial and non-financial measures and provides a comprehensive PMF that translates the organizational strategy into a coherent set of performance indicators and measures. In other words, BSC favors a clear focus on organizational strategy, and uses it as a starting point for setting goals and objectives.

By taking the characteristics of SBCs into consideration there are some shortcomings and challenges when the BSC is applied to SBCs. As discussed in the section 4.3.2, variance and flexibility management are two inseparable factors of measuring performance in SBCs which are not taken into consideration by BSC. Furthermore, BSC neglects the competitor perspective [71], which is a fundamental perspective in SBCs. It should be also take into consideration that main focus of traditional Balanced Scorecard is much on performance results and it is not as balanced as other measurement tools; such as EFQM Excellence Model [51]. It has also been argued that External environment measuring factors are excluded when adapting BSC [61].

4.3.4.2. EFQM Excellence Model

As reviewed in section 2.3.6.2, EFQM Excellence Model is a non-prescriptive framework that helps organizations to improve their performance. EFQM Excellence Model classifies the performance measures into two groups of Enablers and Results. On the other hand, EFQM considers the importance of business processes and can signalize if organizational strategy and processes aren't properly aligned [101]. Another strength of EFQM is that, this model takes the influence results of people, customers, society as well as the business into account.

Regarding the SBCs, there are some shortcomings applying EFQM. Research shows that EFQM does not behave in the way expected by developers of this model. While BSC is appropriate for controlling the strategy implementation in organizations, EFQM raises doubts. Some researchers claim that EFQM needs BSC to adjust the organizational strategy and to keep promises and visions alive for a continuous communication and attention [102]. Another weakness point of EFQM is that the model just deals with adapting current business processes into account as Enablers and neglects the organization's mission is regarding future processes and performance [107]. Studies show that there are usually higher achievements by adapting EFQM in manufacturing companies compared with SBCs [37]. Finally, although the EFQM meets the SBCs' Performance measurement requirements, as it is a dynamic and flexible approach, it falls short managing variance in such organizations.

4.3.4.3. Results and Determinants Matrix

Results and Determinants Matrix is developed specially for service industries and classifies measures into two categories of Results and Determinants. The approach creates a link between performance Determinants; which reflect the past business performance, with Results that illustrate present organizational performance. In other words, results are lagging indicators of a business, whereas determinants are conceptualized as leading indicators. The model highlights the importance of variance analysis and measuring flexibility in SBCs.

RDM is not process-oriented and neglects the importance of business processes and measuring their performance in organizations. Furthermore, a shortcoming of this measurement framework is that it does not address measuring the human resource factors a crucial dimension of performance in SBCs. Although human resource and other topics which are linked to it such as employee satisfaction and employee motivation are essential to the success of any business, it becomes more crucial for SBCs. In SBCs, more employees have direct customer contacts and they have a closer relationship with the customers comparing with Product-Based Companies.

4.3.5 Comparing PM Approaches Used for SBCs

Based on the analysis in section 4.3.3 of this thesis and also according to the strengths of introduced PM Systems and Frameworks in this thesis a typology is developed which addresses the requirements of developing a PMF for SBCs (Table 4.1).

Table. 4.1. Typology of Developing a PMS in SBCs

PM Requirements	
<ul style="list-style-type: none"> - Strategy development - Strategic alignment - Process Measurement - Variance management 	
Enablers	
<ul style="list-style-type: none"> - Internal/External <ul style="list-style-type: none"> ➤ Quality of service ➤ Innovation ➤ Competitiveness ➤ Human resource ➤ Flexibility 	
Results	
<ul style="list-style-type: none"> - Financial <ul style="list-style-type: none"> ➤ Deep-cost measurement ➤ Cost-driver measurement - Non-financial <ul style="list-style-type: none"> ➤ People ➤ Society ➤ Customer ➤ Business 	

Furthermore, in Section 4.3.4, issues of different PMSs have been addressed. To identify the strengths and weaknesses of these approaches and as a basis for analysis, the typology is used (Table 4.2).

Table 4.2. Comparison of PM Approaches based on Typology of Developing a PMS in SBCs

		BSC	EFQM	RDM
Performance Dimensions				
Balanced	Financial & Non-Financial	*	*	*
	Internal & External			
Enablers & Results			*	*
Enablers				
Strategy development		*		*
Strategic alignment		*		
Process Measurement		*	*	
Variance management				*
Quality of service				*
Innovation		*	*	*
Competitiveness			*	*
Human resource			*	
Flexibility			*	*
Results				
Deep-cost measurement				
Cost-driver measurement				
People			*	
Society			*	
Customer		*	*	
Business			*	

4.3.6 Knowledge Gap

All approaches introduced and analyzed leave following knowledge gaps:

- Despite the development of various PMSs and appearance of many theories over the last two decades, there is no consensus on an ideal PMS for organizations. Different PMSs are developed, while each model has its strengths as well as the weaknesses.
- There exist just a few approaches that investigate the concept of PM in SBCs. The requirements of PMSs in SBCs are different from Product-Based ones, since these companies have their own characteristics other than manufacturing ones. Hence such organizations need their own specific PMSs.
- Most introduced PMSs examine one or several critical success factors that contribute to measurement of performance. There is no unitary framework which comprehensively measures the performance in SBCs.

4.3.7 Developing a Performance Measurement Framework for Service Industry

In order to close the knowledge gaps and based on the analysis during this chapter, a PMF for SBCS has been developed (Figure 4.4). In the remainder of this chapter we go through each element of this model in details.

Strategy Formulation

Strategy development plays a crucial role for the success of any organization. Strategy development refers to the process of selecting the most appropriate course of actions in order to realize organizational goals and objectives and thereby to achieve the organizational vision.

Strategy provides an overall direction and gives a specific direction to achieve success. The way an organization formulates its strategy is one of the contested areas of debate; however, the defined and formulated strategy will definitely affect the processes as well as the performance measures that will be designed and developed later. Strategy formulation is the result of a rational and systematic process which will be then communicated to the whole organization for implementation. In large organizations, the process of strategy development typically occurs with the help of formal strategic planning systems. As an alternative way, organizations can formulate their strategy based on descriptive studies and through multi-level processes of decision-making.

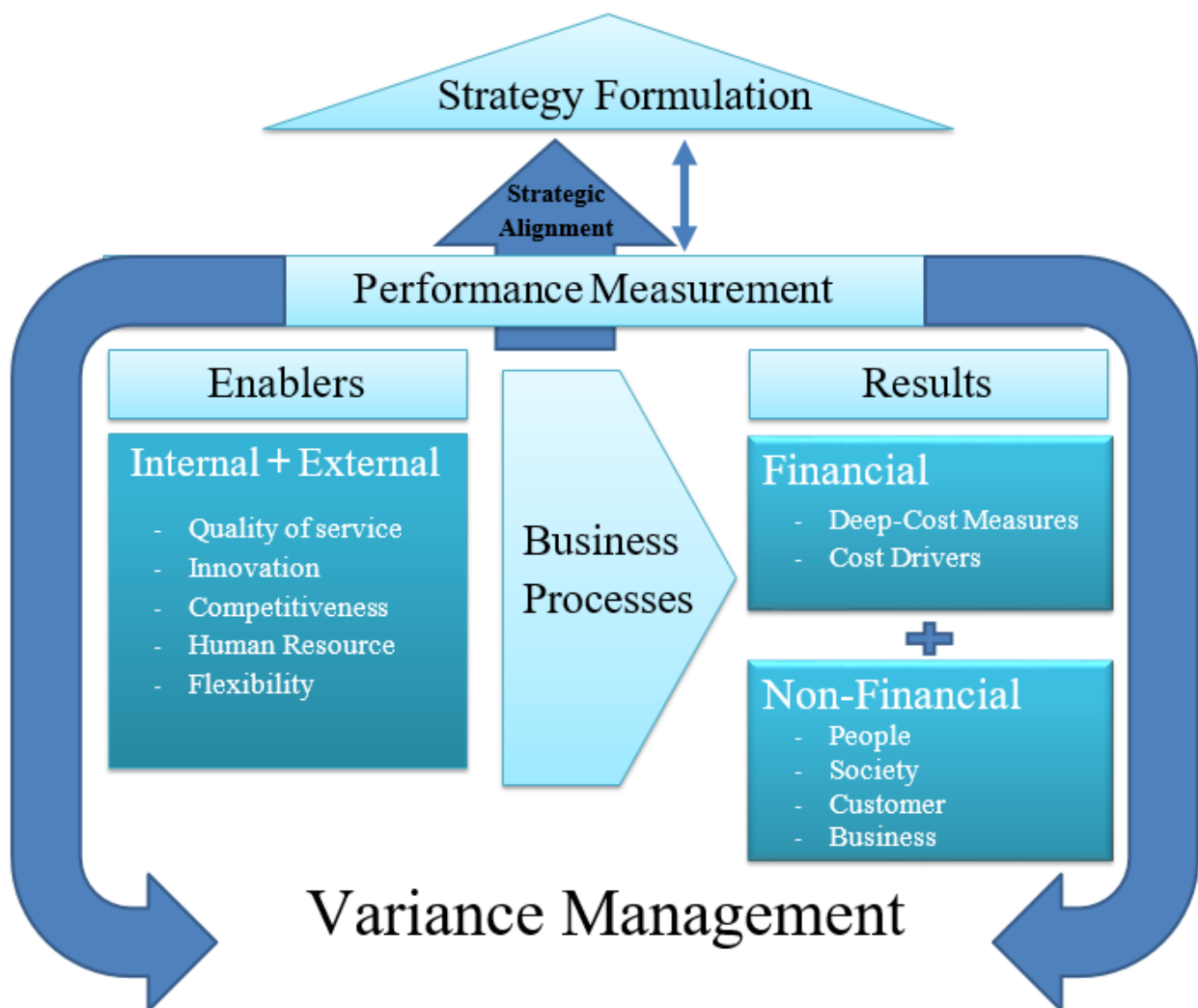


Fig. 4.4. Performance Measurement Framework for Service-Based Companies

Strategic Alignment

After development and formulation of the organization's strategy, and before setting up a PMS, strategic alignment must be taken into account. Strategic alignment helps SBCs to visualize the relationship between their strategy and the business processes. Strategic alignment is way of understanding the business nature based on the correlation of organizational strategy and business processes. Strategic alignment enables organizations to realize how achievable their visions are and enables them to contemplate their longevity. During the development and design of business processes, there is a need for any organization to be able to explain how a process is aligned with the strategy. Business processes can be considered as aligned if they realize part of a strategy.

Performance Measurement

As soon as the organizational strategy starts to spell out the business processes, a PMS can be designed in order to measure the performance of the organization as well as the processes. Based on the models of EFQM and RDM, we have categorized performance measures into two classes of "Enablers" and "Results". The Enablers illustrate the authorities of an organization and show what an organization can do or manipulate. Performance Enablers can be seen as inputs or leading indicators. On the other hand, performance Results focus on what an organization wants to achieve. They can be seen as performance outcomes or lagging indicators. Performance Enablers assess whether effective approaches are available to achieve performance Results. And the feedbacks from performance Results help to improve the Enablers. In addition, we have considered business processes as a separate factor in this model; since an efficient PMS in a process-oriented environment should not rely just on Enablers and Results as Inputs and Outputs. Business Processes concern with the fact that how the organizations develop, manage and improve their tasks and activities. Organizations must create a solid foundation of process-based measures in order to get more granular data to get better Results through the Enablers. To achieve this, each process of the organization must be defined, modeled and the performance

measures and indicators must be consequently defined based on the characteristics of the specific process.

Performance Enablers are respectively categorized into two classes of Internal and External factors. The reason for this is that based on the System Theory an organization can be considered as a whole system which consists of interrelated parts [47]. Each part ensures the survival and continuity of the whole system. Studies consider organizations as systems located in a larger system-environment and claim that, there exists a dynamic relationship between an organization and its environment. Indeed, such a relationship must be taken into consideration while developing a PMS [7]. The Internal and External Enablers encompass five measuring categories including the Quality of service, Innovation, Competitiveness, Human resources and the Flexibility:

Quality of service: Delivering Service Quality is an important factor and should be also measured. Gronroos defines Service Quality as a discrepancy between the quality which is delivered and the performance that employees actually expect [38]. Conceptually, service quality is defined as global judgment or attitude Parasuraman et al. [108] developed the SERVQUAL framework in order to measure the Service Quality. This framework encompasses measuring five dimensions including:

- Tangibles
- Responsiveness
- Reliability
- Assurance
- Empathy

Innovation: Innovation is one of the main parts of an organizational strategy which turns ideas into value and it means improved processes, products, or services. Innovation may seem difficult to measure but should not be skipped, while measuring performance. Innovation is the major stimulating force of change and growth in any organization and also in SBCs. Organizations need to know how efficiently and how effectively they're innovating. To achieve this, appropriate metrics should be defined and take into account.

Competitiveness: SBCs must know, what its competitors are achieving. Furthermore, it's also important for SBCs to compare their performance against themselves. Hence, it is important for SBCs to measure both internal and external competitiveness. SBCs need to benchmark their performance internally as well as externally and should define appropriate indicators to measure the competitiveness.

Human Resources: A strong relationship between employee satisfaction and service quality is considered for SBCs. Measuring Human Resource: which is associated with measures; such as Employee Satisfaction or Motivation, is very important for SBCs, since employee satisfaction and motivation will lead to high quality of service and consequently to customer satisfaction.

Flexibility: Flexibility is the ability of an organization to change WHAT, WHEN and HOW. One of the most important competitive advantages of SBCs is their flexibility. Flexibility in different dimensions; such as service flexibility, delivery, and volume flexibility, is an inseparable characteristic of SBCs. Due to the importance of flexibility in service industry, SBCs should study, analyze and measure their flexibility more comprehensively.

Some examples of each dimension, presented above, are presented in Table 4.3.

Table 4.3. Example of Performance Enablers

Quality of service	Reliability Comfort Availability Competence
Innovation	Fraction of the work force trained in innovation Amount of leadership time spent on innovation
Competitiveness	Market share Sales growth
Human Resources	Employee satisfaction Degree of employee motivation
Flexibility	Volume flexibility Delivery flexibility

An efficient PMS must be balanced; hence, in this model the performance results are categorized into two classes in order to measure both financial and non-financial outputs of an organization. The financial measures respectively encompass Deep-Cost measures as well as the Cost Drivers:

Deep-Cost measures: SBCs need to use comprehensive methods to measure their costs. They should not only measure the selected costs, because services are very fungible, and they may measure wrong things or shift the costs to unmeasured areas. Setting up a deep cost-measurement system is very important for SBCs. These measures help SBCs to have a better understanding of their cross-functional and total costs.

Cost Drivers: Financial data is difficult to measure and interpret in SBCs. To manage and measure the root causes of the organizational expenses, SBCs must look deeper than the financial costs. Better performance measures look at cost drivers and the root of the organizational costs.

Like as the EFQM Excellence Model, this model measures the influence of performance results on People, Society, Customers and Business.

People: What does an organization achieve in associated with its employees?

Society: How does an organization satisfy the needs and expectations of the society?

Customers: What does an organization fulfills according to its customers?

Business: How does an organization achieve the planned business performance and how does it satisfy the needs of the shareholders?

Variance Management

In the presented model, “Variance Analysis” is integrated in the PMF as an important and inseparable part. Variance is a key characteristic of SBCs which should be continuously managed, measured and analyzed. Setting up a variance-measurement programs is crucial for SBCs, since variance is inescapable in SBCs.

The PMF developed in this chapter aims at measuring the performance of SBCs efficiently and more effectively by taking all characteristics of service industry into account.

Chapter 5 – Discussion and Conclusion

5.1 Findings and Conclusion

As the result of this master thesis the certification process was modeled and optimized, which have been presented in chapter 4 of this study. Furthermore, a Performance Measurement Framework is developed which meets the requirements of the Service-Based Companies.

5.1.1 Modeled and Optimized Certification Process

The optimized certification process starts with an inquiry from customer's side who is interested for getting a certification. The inquiry will be send to the related department, which has experts for the relevant standards. The department manager assigns an employee to the customer and the respective employee is responsible to help the customer and perform the relevant activities for the whole process. The respective employee sends an application form to the customer which should be completed. In case that the customer fills out the required documents and by getting back the application form, the customer service prepares an offer. If the customers need support by filling out the required documents, they will receive support from the respective employee. It may also happen that the customer doesn't react. In this case the process should be followed up by the employees of the certification body. After receiving the filled-out application form, an offer will be prepared by an employee and will be reviewed by the department manager and signed. The offer will be send to the client and upon agreement, the customer service prepares a contract and sends it to the customer. By receiving the signed contract, the managing director also signs the contract and the process of auditing starts.

The key findings from this part of the study are:

- Business process modeling is an analytical illustration of organization's processes
- Process modeling is widely highlighted as a critical component in the success of adapting BPM
- Process Modeling is used to map organizational current processes ("as-is" model) in order to find out weaknesses and to create a baseline for process improvements and to design future process model ("to-be" model).

- Modeling and optimization of business processes need time and commitment.
- In order to optimize and reengineer business processes, the current state of business processes must be well studied and analyzed.
- Optimizing the business processes brings drastically changes in the old way of conducting processes.

5.1.2 Performance Measurement Framework for Service-Based Companies

In addition to modeling the certification process, a PMF has been developed for SBCs, which focuses on effective measurement of performance in SBCs

The key findings from this part of the study are:

- To date, many PMSs have been introduced and each of them has its own strong and weak points.
- PMSs used in manufacturing companies do not suit SBCs, since service industry has its own characteristics.
- The performance of SBCs depends on formulating appropriate strategies and processes, which should align to their resources and environment to achieve desirable results.
- Measuring the performance of SBCs should be done from a systematic and balanced perspective. Internal and external performance Enablers as well as the financial and non-financial performance Results should be taken into account.
- Eight factors should be considered in a PMF designed for SBCs:
 - Strategy development
 - Strategic alignment
 - Process Measurement
 - Variance management
 - Quality of service
 - Innovation
 - Competitiveness
 - Human resource

- Flexibility
 - Deep-cost measurement
 - Cost-driver measurement
- The influence of performance Results on People, Society, Customers, and Business should be examined, while measuring performance in SBCs.
 - Management and measurement of variance is an important factor in measuring the performance of SBCs and should be taken into consideration.

5.2 Recommendations for Future Work

Based on the present study, the following future research is suggested:

- This study has employed qualitative strategy to develop a PMF for SBCs. Identification and testing the validity of developed PMF based on the quantitative strategy is recommended.
- Furthermore, additional factors and criteria which should be included in an effective PMF which serve to further support of SBCs in organizational development and planning, can be investigated.

References

- [1] ABPMP. (2013). Association of Business Process Management Professionals. [Online]. Available at: http://c.ymcdn.com/sites/www.abpmp.org/resource/resmgr/Docs/ABPMP_CBOK_Guide__Portuguese.pdf.
- [2] Amaratunga, D., and Baldry, D. (2002). Moving from performance measurement to performance management. *Facilities*, 20(5/6).
- [3] Anthony R.N. (1965). *Planning and control systems: Framework for analysis*. Boston, MA: Harvard University Press.
- [4] Anthony, R.J. and Govindarajan, V., (2007). *Management control systems*. New York, NY: McGraw-Hill.
- [5] Aranda, D. (2003). Service operations strategy: flexibility and performance in engineering consulting firms. *International Journal of Operations & Production*, 23(11).
- [6] Aureli, S. (2010). *The introduction of innovative performance measurement and management control systems: the role of financial investors and their acquired companies*. In Epstein et al. (Eds.). *Performance Measurement and management control: Innovative Concepts and practice*, Emerald Group Publishing Limited.
- [7] Barnes, M., Coulton, L., Dickinson, T., Dransfield, S., Field, J., Fisher, N., Saunders, I., and Shaw, D. (1998). *A new approach to performance measurement for small to medium enterprises*. Conference Proceedings Performance.
- [8] Becker, J. and Kahn, D. (2003). *The process in focus*. In Becker, J., Kugeler, M. and Rosemann, M. (Eds.), *Process management: A guide for the design of business processes*. Berlin: Springer.
- [9] Becker, J., Rosemann, M., and Schütte, R. (1995): *Guidelines of modelling (GoM)*. *Wirtschaftsinformatik* 37(5).
- [10] Biazzo, S. (2000). Approaches to business process analysis. *Business Process Management*, 6(2).
- [11] Bititci, U. S., Carrie, A. S., McDevitt, L. (1997). Integrated performance measurement systems: a development guide. *International Journal of Operations & Production Management*, 17(5).
- [12] Boudreau, J.W. (2004). Organizational behavior, strategy, performance, and design. *Management Science*, 50(11).

- [13] Bourne, M., Mills, J., Wilcox, M., Neely, A., and Platts, K. (2000). Designing, implementing and updating performance measurement systems. *International Journal of Operations and Production Management*, 20(7).
- [14] BPM (2014). Process Management in Service Organizations VS. Manufacturing Companies. [Online]. Available at: <http://www.processorientation.com/?p=840>.
- [15] Brignall S., Ballantine J. (1995). *Performance measurement in service business revisited*. MCB University Press
- [16] Bryman, A. and Bell, E. (2007). *Business research methods*. New York, NY: Oxford University Press Inc.
- [17] Chakravarthy, B.S., (1986). Measuring strategic performance. *Strategic Management Journal*. 7(5).
- [18] Clemes, M., Mollenkopf, D. and Burn, D. (2000). An investigation of marketing problems across service typologies. *Journal of Services Marketing*, 14(7).
- [19] Creswell, J. W. (2003). *Research design: qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.
- [20] Cumby, J., and Conrod, J. (2001). Non-financial performance measures in the Canadian biotechnology industry, *Intellectual Capital*, 2(3).
- [21] Davenport, T.H. (1993), *Process innovation: Reengineering work through information technology*. Boston, MA: Harvard Business School Press.
- [22] Davenport, T.H., Short, J.E. (1990). The new industrial engineering: Information technology and business process redesign. *Sloan Management Review*, 31(4).
- [23] Davies, I., Green, P., Rosemann, M., Indulska, M. and Gallo, S. (2006). How do practitioners use conceptual modeling in practice? *Data & Knowledge Engineering*, 58(3).
- [24] De Bruin, T., and Rosemann, M. (2005). *Towards a business process management maturity model*. Paper presented at the ECIS 2005 Proceedings of the 13th European Conference on Information Systems, CD Rom.
- [25] Denzin, N. K., and Lincoln Y. S. (1998). *Strategies of qualitative inquiry (Introduction)*. Thousand Oaks, CA: Sage Publications.
- [26] Denzin, N. K., and Lincoln Y. S. (2003). *Collecting and interpreting qualitative materials*. Thousand Oaks, CA: Sage Publications.

- [27] Dumas, M. La Rosa, M., Mendling, J., and Reijers, H.A. (2013). *Fundamentals of business process management*. Springer.
- [28] Eccles, R.G., and Pyburn, P.J. (1992). Creating a comprehensive system to measure performance. *Management Accounting (USA)*, 74 (4).
- [29] EFQM. (2013). European Foundation for Quality Management. [Online]. Available at: <http://www.efqm.org/the-efqm-excellence-model>.
- [30] Elzinga, J., Horak, T., lee, C.Y., and Bruner, C. (1995). Business process management: Survey and methodology. *IEEE Transactions on Engineering Management*.
- [31] Fisk, R.P., Brown, S.W., and Bitner, M.J. (1993). Tracking the evolution of the services marketing literature. *Journal of Retailing*, 69.
- [32] Fitzgerald, L., Johnston, R., Brignall, T.J., Silvestro, R., and Voss, C. (1991), Performance Measurement in Service Businesses, *Management Accounting*, 69(10), London.
- [33] Frederiks, P.J.M., van der Weide, T.P. (2006). Information modeling: The process and the required competencies of its participants. *Data and Knowledge Engineering*, 58(1).
- [34] Garvin, D. A. (1998). The process of organization and management. *Sloan Management Review*, 39(4).
- [35] Glykas, M.M., (2011). Effort based performance measurement in business process management. *Knowledge and Process Management*, 18(1).
- [36] Godener, A., and Soderquist, K. E. (2004). Use and impact of performance measurement results in R&D and NPD: an exploratory study. *R & D Management*, 34(2).
- [37] Gomez Gomez, J., Martinez Costa, M., and Martinez Lorente, A. R. (2011). A critical evaluation of the EFQM model. *International Journal of Quality & Reliability Management*, 28(5).
- [38] Gronroos, C. (1983) Strategic management and marketing in the service sector. Cambridge.
- [39] Hammer, M. (1997). Beyond reengineering: *How the process-oriented organization is changing our work and our lives*. New York, NY: Harper Business.
- [40] Hammer, M. (2010). *What is Business Process Management? Handbook on Business Process Management*. Berlin: Springer.
- [41] Hammer, M., and Champy, J. A. (1993). *Reengineering the corporation: A Manifesto for business revolution*. New York, NY: Harper Business Books.

- [42] Harmon, E., Hensel, S., and Lukes, T. (2006). *Measuring performance in services. The McKinsey Quarterly 1*.
- [43] Galler, J.; Scheer, A.W. (1995): Workflow-Projekte: Vom Geschäftsprozessmodell zur unternehmensspezifischen Workflow-Anwendung. *Information Management*, 10 (1).
- [44] ARIS Community. (2010). Basic rules of EPC modelling. [Online]. Available at: <http://www.ariscommunity.com/users/rbaureis/2010-03-22-basic-rules-epc-modelling>.
- [45] Hipp, C., Grupp, H. (2005): *Innovation in the service sector: The demand for service-specific innovation measurement concepts and typologies*. *Research Policy*, 34(4).
- [46] Hyde, K. F. (2000), Recognizing deductive process in qualitative research, *Qualitative market research, An International Journal*, 3(2).
- [47] Jackson, M. C. (2000). *Systems approaches to management*. New York;London, Kluwer Academic/Plenum.
- [48] Janssen, S., Moeller, K., and Schlaefke, M. (2011). Using performance measures conceptually in innovation control. *Journal of Management Control*, 22(1).
- [49] Jeston, J., Nelis, J. (2006). *Business process management*. Oxford: Butterworth-Heinemann. Key Statistics Australian Small Business (2011). Department of innovation, industry, science and research, Canberra.
- [50] Johnson H.T, and Kaplan R.S., (1987) *Relevance lost: The rise and fall of management accounting*. Boston, MA: Harvard Business School Press.
- [51] Kanji, G. (2002). Performance measurement system. *Total Quality Management*, 13(5).
- [52] Kaplan R.S., and Norton P.D., (1992). The balanced scorecard: Measures that drive performance. *Harvard Business Review*, 70(1).
- [53] Kaplan, R.S., and Norton, D.P.P. (1996). *The balanced scorecard: translating strategy into action*. Boston, MA: Harvard Business School Press.
- [54] Keller, G., Nüttgens, M., and Scheer, A.W. (1992). *Semantische Prozessmodellierung auf der Grundlage Ereignisgesteuerter Prozessketten (EPK)*. Veröffentlichungen des Instituts für Wirtschaftsinformatik, University of Saarland, Saarbrücken.
- [55] Kennerley, M., Neely, A. (2000). A framework of the factors affecting the evolution of performance measurement systems. *International Journal of Operations & Production Management*, 22(11).
- [56] Kevin, D. (2005). Documentary analysis in CAM Research (Part 1). *Complementary Therapies*, 13.

- [57] Kraaijenbrink, J.(2012). *Five reasons to abandon the Balanced Scorecard*. [Online]. Available at: <http://kraaijenbrink.com/2012/10/five-reasons-to-abandon-the-balanced-scorecard>.
- [58] Kunze, T. (2008). *Flexibility measurement within the service industry*. Diploma thesis.
- [59] Leopold, H. (2013). *Natural language in business process models: Theoretical foundations, techniques, and applications*, Lecture Notes in Business Information Processing, 168.
- [60] Ljungberg, A (1998). *Measurement systems and process orientation with focus on the order process*. Lund university. [Online]. Available at: <http://lup.lub.lu.se/search/record/18704>.
- [61] Rillo, M. (2004), Limitations of the Balanced Scorecard, *Proceedings of the 2nd International Conference on Business Administration*, University of Tartu, College of Parnu, Suedia.
- [62] McCormack, K.P. and Johnson, W. C. (2001): *Business process orientation: gaining the e-business competitive advantage*; CRC press LLC.
- [63] Mendling, J. (2008): *Metrics for process models: Empirical foundations of verification, error prediction, and guidelines for correctness*. New York, NY: Springer.
- [64] Mili, H., Tremblay, G., Jaoude, G.B. (2010). Business process modeling languages: Sorting through the alphabet soup. *ACM Computing Surveys*, 43,(1).
- [65] Morrison, E.D., Ghose, A.K., Dam, H.K., Hinge, K.G., Hoesch-Klohe, K. (2011). *Strategic alignment of business processes*. University of Wollongong, Online Research 2011.
- [66] Moullin, M. (2003). Defining performance measurement. *Perspectives on Performance*, 2(2).
- [67] Neely, A. (1998). Three models of measurement: theory and practice. *International Journal of Business Performance Management*, 1(1).
- [68] Neely, A., Adams, C., and Kennerley, M., (2002). *The Performance Prism, the scorecard for measuring and managing business success*. London: FT Prentice Hall, Financial Times.
- [69] Neely, A., and Adams, C. (2001). The performance prism in practice. *Measuring Business Excellence*, 5(2).
- [70] Neely, A., and Adams, C. (2001). The performance prism perspective. *Cost Management*, 15(1).
- [71] Neely, A., Gregory, M., and Platts, K. (1995). Performance measurement system design: A literature review and research agenda. *International journal of operations & production management*, 15(4).

- [72] Neely, A., Gregory, M., and Platts, K. (2005) Performance measurement system design, *International Journal of Operations and Production Management*, 25(12).
- [73] Neely, A., Marr, B., Roos, G., Pike, S. and Gupta, O. (2003). Towards the third generation of performance measurement. *Controlling*, 3(4).
- [74] Niven P.R. (2006). *Balanced scorecard step-by-step: Maximizing performance and maintaining results*. Hoboken, NJ: John Wiley & Sons.
- [75] Nordsieck, F. (1934). *Grundlagen der Organisationslehre*. Poeschel. Stuttgart.
- [76] Osifo, C.O. (2015). Public management research and a three qualitative research strategy. *Review Public Administration Management*, 3.
- [77] Otley, D. (2001). Extending the boundaries of management accounting research: Developing systems for performance management. *The British Accounting Review*, 33(3).
- [78] Ould, M. A. (1997). Designing a re-engineering proof process architecture. *Business Process Management*, 3(3).
- [79] Porter, M.E. (1980). *Competitive Strategy*. New York, NY: Free Press.
- [80] Porter, M.E. (1985). *Competitive Advantage*. New York, NY: Free Press.
- [81] Porter, M.E. (1989). *Wettbewerbsvorteile: Spitzenleistungen erreichen und behaupten*, Campus. Frankfurt am Main
- [82] Porter, M.E. (1990). The competitive advantage of nations. *Harvard Business Review*, 68(2).
- [83] Ragin, C. (1987). *The comparative method: Moving beyond qualitative and quantitative strategies*. Berkeley, CA: University of California Press.
- [84] Rosemann, M., and vom Brocke, J. (2010). *The six core elements of business process management*. In J. vom Brocke & M. Rosemann (Eds.), *Handbook on Business Process Management 1*. International Handbooks on Information Systems. Berlin Heidelberg: Springer.
- [85] Rudden, J. (2007). Making the case for business process management: A benefits checklist. *Business Process Trends*.
- [86] Ryan, K. L. K., Stephen S. G. L., and Eng Wah Lee. (2009). Business process management standards: a survey. *Business Process Management Journal*, 15(5).
- [87] Sarantakos, S. (1998). *Social research*. South Melbourne: Australia, Macmillan Education.

- [88] Saunders, M., Lewis, P. and Thornhill, A. (2007). *Research methods for business students*. Harlow, England: Prentice Hall.
- [89] Scheer, A.W. (1990) *Architektur integrierter Informationssysteme - Grundlagen der Unternehmensmodellierung*. Berlin.
- [90] Silverman, D. (2000). *Doing qualitative research: A practical handbook*. London: SAGE Publications Ltd.
- [91] Smith, A. (1776). *Wealth of nations*. London: Methuen & Co., Ltd.
- [92] Smith, H., and Fingar, P. (2003). *Business process management: The third wave*. Tampa, FL: Meghan-Kiffer Press.
- [93] Spiro, Rosann L., and Barton A. (1990). Adaptive selling: Conceptualization, measurement, and nomological validity. *Journal of Marketing Research*, 27(1).
- [94] Swamy, R. (2002): Strategic performance measurement in the new millennium: *CMA Management*, 3(76).
- [95] Thomas, Dan R. E. (1978), Strategy is Different in Service Businesses. *Harvard Business Review*, 56 (4).
- [96] Ungan, M. (2006). Towards a better understanding of process documentation. *The TQM Magazine*, 18(4).
- [97] Keegan, D., Eiler, R. and Jones, C. (1989). Are your performance measures obsolete?. *Management Accounting*, 70(2).
- [98] Pitschke, J. (2010). *Why are Business Process Models often too complex? Do's and don'ts for business process modelers*, Version 1.0. [Online]. Available at: <http://www.enterprise-design.eu/files/images/downloads-wissen/bpm/whyarebpmcomplex.pdf>.
- [99] Van der Aalst W.M.P. (2004). Business process management: A personal view, *Business Process Management*, 10(2).
- [100] Van der Aalst, W. M. P., ter Hofstede, A. H. M., Weske, M. (2003). *Business process management: A survey*. in Proceedings of the International Conference on Business Process Management (BPM '03), Van der Aalst, W. M. P., ter Hofstede, A. H. M., and Weske, M, Eds., *Lecture Notes in Computer Science*, 2678, Berlin: Springer.
- [101] Vukomanovic, M, Ceric, A and Radujković, M (2007) BSC-EFQM-based approach for performance benchmarking in construction industry. In: Boyd, D (Ed) *Procs 23rd Annual ARCOM Conference*, 3-5 September 2007, Belfast, UK, Association of Researchers in Construction Management.

- [102] Vukomanovic, M., (2006): *Key performance indicators in project oriented construction system* (M.Sc. thesis), Faculty of civil engineering, University of Zagreb.
- [103] Weske, M. (2007), *Business process management: concepts, languages, architectures*. Heidelberg: Springer.
- [104] Westerveld, E. (2003). The project excellence model: Linking success criteria and critical success factors. *International Journal of Project Management*, 21.
- [105] Williamson, O.E. (1985). *The economic institutions of capitalism*. New York, NY: Free Press.
- [106] WfMC. (1999) WfMC, Glossary, Terminology and Glossary, 3rd Edition. Document No WfMC-TC-1011. Workflow Management Coalition. Winchester.
- [107] Zairi, M. , and Sinclair, D. (1995), Business process re-engineering and process management: A survey of current practice and future trends in integrated management. *Business Process Re-engineering & Management*, 1(1).
- [108] Zeithaml, V. A., Parasuraman, A., and Berry, L.L. (1985), A conceptual model of service quality and its implications for future research, *Journal of Marketing*, 49(5).