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TRANSLATING CUSTOMER SERVICE EXPECTATIONS INTO SUPPORTING BUSINESS PROCESSES

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Executive Summary

Over the last few years, there has been tremendous growth in the diversity of products and services offered to customers across all industries. With this increased choice of products and services, the bargaining power of buyers is rising. The products and services offered by the different companies do not vary much, regardless of which companies are selling them. Customers are in the position where they can choose from an array of products and services from more than one company. This shift of power from company to customer forces companies to focus on customer retention and loyalty through improved customer experience.

The dissertation introduces a framework for enhancing customer experience through improved business processes. The Enhanced Customer Experience Framework (ECEF) is developed by integrating various well known techniques into one comprehensive framework.

As long as fifty years ago, researchers found it neccesary to design techniques that can assist companies in taking care of frustrated and unsatisfied customers. Many of these techniques had merit, and partly succeeded in increasing customer satisfaction. One of these techniques was developed in 1966 by Dr Yoji Akao, with the goal of integrating the voice of the customer into the technical design of products and services. Today this tool is known as Quality Function Deployment (QFD). QFD is used extensively in the ECEF to determine the relationship beween business processes and customer requirements, and to prioritise business processes from a customer perspective. Another technique or methodology is Business Process Reengineering (BPR), developed in 1990. The methodology of BPR – together with the steps associated with benchmarking –provides a useful process that may be followed when reengineering business processes to fit customer needs. The last technique that is integrated into the ECEF is simulation modelling, which can be used to test the impact of process improvements on customer experience.

The ECEF consists of seven stages, with sequential activities taking place in every stage. The Framework developed in this dissertation is partially validated against empirical data obtained from the telecommunications industry. In South Africa the telecommunications industry is faced with the threat of new entrants as one of the largest competitive forces. In 2001 a third Telecommunications Company was introduced in South Africa and the market share that always belonged to only two companies was redistributed between three companies. For all three companies to be competitive, they had to invest in delivering quality service to customers. The ECEF may assist managers in enhancing the quality of their service delivery. By designing business processes to deliver products and services according to the needs of the customer, companies will be able to enjoy the strategic competitive advantage of customer loyalty.

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CD Contents

The following files are contained on the CD

- List of relevant stakeholders
- Relevant Survey Data
- Simulation Models

List of Abbreviations

Abbreviation	Description
BPR	Business Process Reengineering
BSC	Balanced Scorecard
CEM	Customer Experience Management
CIT	Critical Incident Technique
ECEF	Enhanced Customer Experience Framework
KPI	Key Performance Indicator
VCA	Value Chain Analysis
QFD	Quality Function Deployment

1. Introduction and Background

In modern times it is more difficult to be and remain competitive in the business environment. Customers have increasing numbers of products to choose from and multiple channels through which they may satisfy their needs. In such an environment it is vital to ensure customer satisfaction and maintain the satisfaction through offering quality products and services.

1.1 Proposed Research Topic

The importance of having a customer-focused approach to doing business is emphasized by Blumenthal [8]: "Good customer service is a critical differentiator for organisations and it offers a strategic competitive advantage to those enterprises that embrace it and make it central to their product offering".

With the passage of time, marketing departments have used various tools such as surveys and mystery shopping to measure customer experience and customer satisfaction. Unfortunately, the results of the surveys are rarely integrated with the operations departments' efforts at improvement. According to Meyer et al. [31], few people responsible for the different aspects of a company's offerings have thought about how their separate decisions influence and shape customer experience. Many companies do not see the need to worry about customer experience. Others collect and quantify data on customer experience, but fail to circulate the findings – and those that do circulate them fail to make anyone responsible for making use of the information. Meyer et al. [31] are of the opinion that the first step a company must take to be successful in delivering an exceptional customer experience is to embed the fundamental value proposition into every feature of that company's offerings. Only when companies succeed in designing their processes to deliver products and services according to the needs of the customer, will they enjoy strategic competitive advantage in the form of customer loyalty.
The purpose of the dissertation is to address the identified gap between customer feedback and the operational efforts of the company. The manner in which it will be done is by developing a conceptual framework through which companies can enhance their customer experience by improving their internal business processes based on customer feedback.

1.2 Organisational context

The Telecommunications industry has a significant social, cultural, and economic impact on modern society. In 2006, estimates placed the telecommunications industry's revenue at $1.2 trillion or slightly below 3 percent of the gross world product.
Ross [38] described the telecommunications industry as assisted transmission over a distance for the purpose of communication. According to the Industry Handbook [1] the telecommunications industry can be seen as the world's largest machine, strung together by complex networks, telephones, mobile phones and Internet-linked Personal Computers. In the past the

telecommunications industry consisted of an association of large national and regional operators, but this has changed during the past decade. Today government monopolies are privatized and they face a plethora of new competitors. Over past years, there has been tremendous growth in the diversity of products and services offered to customers. According to the Industry Handbook [1], the fastest growth comes from services delivered over mobile networks. With the increased choice of products and services, the bargaining power of buyers is rising. In industry today, the products and services offered by different companies do not vary much, regardless of which companies are selling them. Customers are in the position where they can choose from an array of products and services from more than one company. This leads to customers seeking the lowest prices from companies offering the most reliable services. Customer needs vary between customer segments, while some customers require low prices; others like the corporate customer rely heavily on the quality and reliability of their telephone calls and data delivery. For the corporate market, price is a less sensitive issue while the reliability of business processes, like for example the billing process, is the important issue. Strict competition in the telecommunications industry forces companies to focus on customer retention and loyalty.

For this reason the telecommunications industry in South Africa is in dire need of a process improvement framework that can enhance the ability of the industry to satisfy customer needs and enhance customer experience. Using the telecommunications industry for the validation of the conceptual framework should thus be an appropriate choice.

1.3 Problem statement

In a survey by Schmitt [39], customer focus was identified as the single most important differentiator between the best and worst companies in an industry. Despite this knowledge, many companies still fail to deliver an exceptional experience to the customer. According to Schmitt [39] customers are still being treated as if of no account or as an afterthought to the companies' important concerns. Companies need service delivery processes that not only meet customer requirements, but also exceed these requirements to deliver an exceptional customer experience.

The research objectives of the dissertation can be summarised as follows:

1) To develop a conceptual framework through which companies can enhance their customer experience by improving their internal business processes.
2) To investigate the use of the traditional Quality Function Deployment diagram (QFD) in establishing the causal relationship between business processes and customer feedback.
3) To expand on the traditional concept of QFD and investigate the use of the tool to measure process performance from a customer perspective.
4) To investigate the use of simulation modelling as an optimisation technique to understand the cause -effect relationship between customer experience and operational performance.
5) To test the framework against empirical data to assess the validity of the approach.

1.4 Research design

The research project will be designed according to a theory or model-building approach. According to Mouton [32], model-building studies are aimed at developing new models and theories or refining existing models and theories. During the studies, a comprehensive set of theoretical propositions are developed that are ultimately tested against empirical data. This dissertation aims to develop a new conceptual framework. According to Eisenhardt [17], conceptual frameworks and theory are typically based on combining previous literature, common sense and experience.

The research statement for the dissertation is expressed as: *Develop a conceptual framework through which companies can enhance their customer experience by improving their internal business processes based on customer feedback*

The statement leads to the following research questions:

1) How can internal business processes be improved to meet the ultimate strategic goal of exceptional customer experience?
2) Will QFD suffice to establish the causal relationship between business processes and customer information?
3) How can process performance be measured and improved from a customer perspective?
4) Can simulation modelling be used as a technique to analyse the cause -effect relationship between customer experience and operational performance?

The conceptual framework developed in this dissertation is tested against empirical data obtained from the telecommunications industry. The telecommunications industry in South Africa has generated a large amount of internal business processes over the last few years. It is not feasible to address all the specific processes mapped by the telecommunications companies in this particular research project. Selected business processes that can be seen as the key processes in the telecommunications industry are included in the testing of the conceptual framework. The Enhanced Telecommunications Operations Map (eTOM) is used to map the selected business processes. The eTOM documents business processes in a drill down methodology, using a layer paradigm, from top-layer processes at the customer relations level, down to processes at the supplier/partner interaction level. Using the eTOM framework enhances the ability of the conceptual framework to be used generically across the entire telecommunications industry.

1.5 Research methodology

This dissertation is completed in five chapters by following an iterative process to design and test a conceptual framework for process improvement.

1) *Introduction and background*: The purpose of this chapter is to introduce the research topic and the problem that is addressed. The research questions are formulated and an overview of the research design is given.

2) *Literature review*: The purpose of this chapter is to understand the different components of the framework in their individual existence.
3) *Conceptual framework*: The objective of this chapter is to identify the Stages of the framework through which business processes may be improved. A framework building approach will also be discussed together with data gathering techniques such as customer surveys and questionnaires. This chapter also investigates the ability of QFD to translate customer feedback into appropriate supporting processes, prioritising the required process improvements whilst setting the required performance criteria. Expanding on the traditional concept of QFD, chapter three of the dissertation also investigates the use of the tool to measure process performance by linking customer expectation to current performance. Simulation models are discussed to support decision making regarding process performance improvements. The objective of the simulation models is to enable the operations manager to study the impact on customer experience through the causal relationships with process performance by testing the various improvement initiatives identified through the conceptual framework.
4) *Model Validation*: Chapter four of this dissertation includes an application of the conceptual framework on the telecommunications industry in South Africa. In this chapter, the framework is build with data obtained from the eTOM framework. Data on customer experience are gathered from existing sources within the telecommunications companies or through surveys and interviews.
5) *Conclusions and Recommendations*: Chapter five concludes the research dissertation by highlighting the efficiencies and shortcomings of the conceptual framework and by making recommendations on future improvement of the framework.

1.6 Chapter summary

The purpose of this chapter is to introduce the proposed research topic that is addressed in the research dissertation. The organisational environment is discussed together with the problems that are addressed within this environment. An overview is given of how the research will be designed and executed. The following chapter attempts to answer the research questions identified in chapter one by referring to various literature sources.

2. Literature study

2.1 Introduction

Customer experience management (CEM) emerged as a strategy in 1998. Delivering superior customer experience has since became more important due to decreasing sustainability of price differentiation and increasing demands from customers on their service providers. The goal of CEM is to increase the value delivered to customers by designing or redesigning operational activities and business processes to focus on the needs of the customer. A methodology that is closely related to this goal is the methodology of Business Process Reengineering (BPR), introduced in 1990 [16]. The goal of BPR is similar to the goal of CEM. According to Hammer [23] the goal of BPR is to redesign business processes to maximize customer value. Unfortunately it is not always easy to relate operational activities in the form of business processes to customer value. There still exists a gap in the integration between what the customer wants and what the customer experiences. This gap can be attributed to the lack of considering customer needs and wants during the technical redesign of business processes. Dr. Yoji Akao developed a tool in 1966 that integrates the voice of the customer with the technical design of products and services. Today this tool is known as Quality Function Deployment (QFD). This chapter investigates four main concepts that can be useful in addressing the problem statement outlined in chapter one. The first concept that is researched is CEM. CEM is used to satisfy customer needs. The second concept addressed in this chapter is the methodology of BPR with the purpose of gaining some understanding of the process that may be followed when reengineering business processes to fit customer needs. QFD is discussed as a tool that may be used to align business processes to customer experience, consequently integrating the concept of CEM and BPR. The last concept that is investigated in this chapter is simulation modelling and the use of thereof to test the impact of process improvements on customer experience.

2.2 Customer experience management

Section 2.2 of this chapter discusses the concept of CEM including the definition of customer experience, the measurement of customer experience and the different measuring techniques that may be used. The section attempts to illustrate the strategic importance of CEM to satisfy customer needs.

2.2.1 Customer experience defined

In the 1970s, there was a strong focus on the quality of products and services. The focus shifted in the 1980s to customer satisfaction as the explicit goal of any organisation. According to Gustafsson and Johnson [21], the focus has recently shifted beyond quality and customer satisfaction to focus directly on customer loyalty as the key to profitability. Over the years, organisations have made the mistake of focusing on only one of the concepts at a time, not realising that they are entirely interdependent. The concepts represent a system that must be measured and managed as a whole

to maximise results. Gustafsson and Johnson [21] propose that companies follow a systems approach to customer satisfaction. This may be accomplished by forming explicit linkages that extend from internal processes to customer perceptions to customer satisfaction to loyalty and ultimately to bottom-line performance. Figure 2.1 is a framework defined by the authors to demonstrate the systems approach they propose. The framework includes four general areas: internal quality, external quality and satisfaction, customer loyalty and retention and financial performance. Internal quality includes production and maintenance processes. In the case of a service or retailing environment, internal quality includes the service offered, the physical surroundings, and the satisfaction of employees and the resulting service quality they provide [21]. External quality in the framework represents what customers see and feel in the purchase and consumption experience. Loyalty can be seen as the customer's intention or predisposition to buy, while retention is the behaviour itself [21]. Quality, satisfaction and loyalty ultimately affect financial performance, both directly and indirectly. According to Gustafsson and Johnson [21], recent research suggests that the direct link between internal quality and financial performance might be more positive for products than for services. This is because improving service quality often leads to an increase in personnel and operating and contact hours, which increases operating cost. The indirect link between external quality, value, customer satisfaction, and financial performance can be attributed to fact that a satisfied customer will remain loyal to the company, which in turn generates future sales [21]. Customer satisfaction will also have a direct influence on financial performance; a satisfied customer is less likely to demand expensive product repairs or replacements or to invoke service guarantees. According to Gustafsson and Johnson [21], word-of-mouth publicity will come through perceived quality and satisfaction rather than through loyalty and this will also generate more sales and increased profits. The reason why satisfaction, rather than loyalty will lead to word-of-mouth publicity is that satisfaction is news, something to talk about, while loyalty is a background state which goes without saying unless something happens to damage it. The direct effects of loyalty and retention on performance include revenues from repeat sales, reduction in cost of finding new customers, and revenues generated through cross-selling [21].

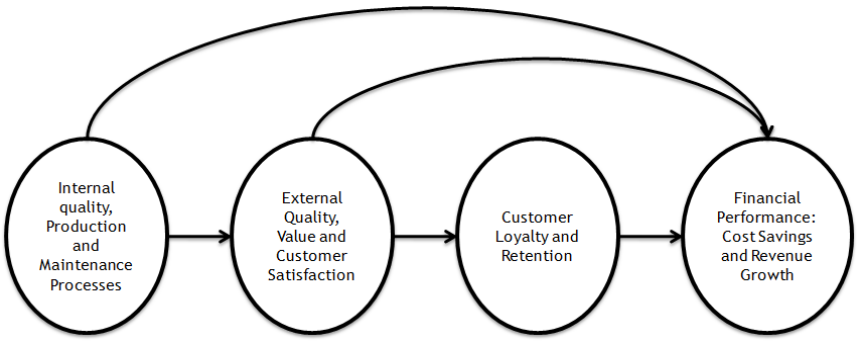


Figure 2.1 - A framework for linking quality to performance (adapted from Gustafsson and Johnson [21])

The term customer satisfaction is well-known in any organisation and companies understand that customer satisfaction and loyalty are essential to their success. Unfortunately, all companies do not

understand how to achieve customer satisfaction. Gustafsson and Johnson [21] define satisfaction as the external customer perceptions of the purchase-consumption experience. According to Meyer et al. [31] customer satisfaction is a result of a series of customers' experiences and the net result of good and bad customer experiences. They defined customer experience as follows: "Customer experience is the internal subjective response customers have to any direct or indirect contact with a company. Direct contact generally occurs in the course of purchase, use, and service delivery and is usually initiated by the customer. Indirect contact mostly involves unplanned encounters with presentations of a company's products, services, or brands. It takes the form of word-of-mouth recommendations or criticisms, advertising, news reports, reviews, and so forth." Customer experience is shaped by every aspect of a company's offering from direct contact in the customer care department to advertising, packaging product features and also the use, reliability and maintainability of the products or services. According to Bitran [7] there are several dimensions of service quality that shape the experience of the customer. The dimensions are:

- *Reliability* which refers to the ability to perform the promised service consistently and accurately.
- *Tangibles* that encompass the physical appearance of the facility, employees, equipment and communication materials.
- *Responsiveness* which includes the ability and willingness of the server to assist customers and provide timely service.
- *Assurance* comprising of several lower level dimensions like competence, courtesy, credibility and security.
- *Empathy* which refers to the caring and individualised attention provided to the customer.

In a survey done by Bain and Company, referenced by Meyer et al. [31] where customers from 362 companies were interviewed, it was found that only 8 percent of all the customers described their experience as superior while 80 percent of the companies believed that they delivered a superior experience [31]. The results of the survey prove that the need for improvement and focus on customer experience is urgent.

2.2.2 Customer experience measurement and improvement

2.2.2.1 Measure prior to improvement

Before a company can improve its customer experience, it must understand the current experience delivered to its customers by measuring the experience. This section discusses what is needed to improve customer experience, and addresses various measurement tools that can be used to measure customer experience.

Meyer et al. [31] are of the opinion that a company can improve its customer experience by creating value for the customer through delivering products and services according to customer needs. According to Payne et al. [33], the value creation process transforms the outputs of the

strategy development process into programs that both extract and deliver value. There are three key elements to the value creation process:

1) Determine the value a company can provide their customers.
2) Determine the value the company can receive from their customers.
3) Successfully manage the exchange of value.

To determine whether the value proposition specified by the company will indeed result in superior customer experience, a company should undertake a value assessment to quantify the relative importance that customers place on various attributes of a product or service [33]. According to Gustafsson and Johnson [21], an organisation can assess the value delivered to their customers with an effective customer measurement and management system, as seen in Figure 2.2. The system they propose continually pursues three key activities, which include gathering customer information, spreading that information throughout the organisation, and using the information to maintain, improve, or innovate products and processes.

The first activity listed in figure 2.2 is to *identify the purpose and goals of the system*. During this Stage, customers are grouped into segments that reflect their interests and purchasing patterns. The company must then decide which segments to include in the measuring system as segmentation plays an integral role when gathering customer information. According to Gustafsson and Johnson [21] the drivers of satisfaction and loyalty may be different from segment to segment and it is very important to identify the unique needs associated with each customer segment. They defined market segmentation as the process of identifying and targeting unique populations of customers. Market strategies must be tailored to meet the individual needs of every market segment.

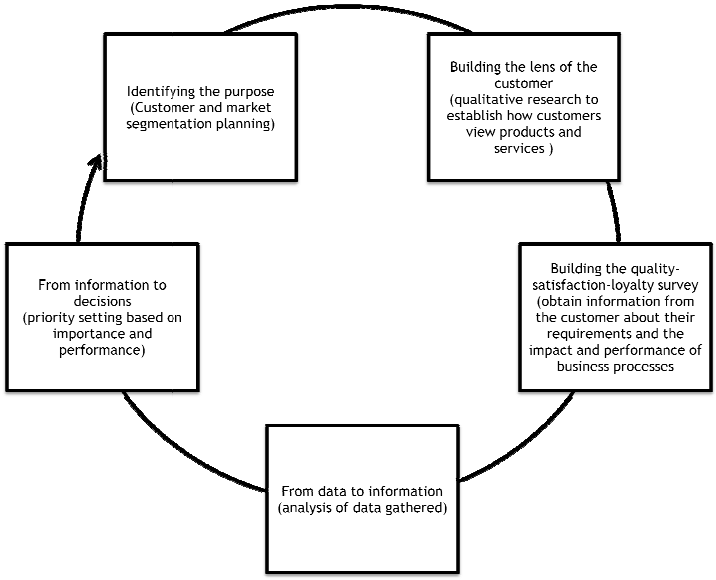


Figure 2.2 - A process model for creating a customer measurement and management system (adapted from Gustafsson and Johnson [21])

Gustafsson and Johnson [21] propose the following four steps that can be followed to identify the different market segments:

1) Group customers into segments based on customer needs, benefits sought, or personal values served.
2) Identify or describe the segments according to their behaviours, lifestyles, or demographics.
3) Evaluate the attractiveness of each segment in terms of, for example, profit potential, risk, capacity utilization, and competencies required serving the segment.
4) Determine strategically which segments to target and pursue and, as a result, which segments to measure, analyse and manage separately.

The needs of the different segments must be measured separately and care must be taken not to average across segments since this may result in a profile of an average customer that does not exist. In the case where the same survey is applicable to more than one segment, data on importance and performance levels must still be analysed separately for each group [21].

The following step in measuring customer value given in Figure 2.2 is to *build the lens of the customer* by using qualitative research in the form of surveys and interviews. The lens of the customer will help a company to understand how customers view their products and services. It is important to gather solid information about the concrete product or service attributes that customers value. Gustafsson and Johnson [21] propose that companies use the Critical Incident Technique (CIT) to build the lens of the customer. CIT is a process that can be followed to obtain customer requirements for a specific product or service. The requirements are called satisfaction attributes according to the CIT technique and are grouped into benefit categories or benefit clusters. An example of a benefit cluster would typically be the quality of service or store layout. The satisfaction attributes associated with quality of service will then represent all the customer requirements relevant to quality of service such as friendliness of employees. The process for CIT research is defined by Gustafsson and Johnson [21] in the form of 11 steps. The steps are listed below:

1) Assess and compile all relevant secondary customer information that already exists within the company.
2) Make initial visits to different customers to attain firsthand observations of the customer' world.
3) Develop interview protocol.
4) Select and brief interviewers.
5) Arrange and conduct interviews.
6) Transcribe and sort responses by level.
7) Sort by attribute categories.

8) Write satisfaction attributes.
9) Sort the attributes according to benefit clusters.
10) Write benefit clusters.
11) Resolve all differences.

According to Ramaswamy [35], it is extremely important to identify all the customer needs since they represent the voice of the customer. Four methods are identified which may be used to obtain customer needs:

- Surveys and market research.
- Group interviews.
- One-on-one interviews.
- Observation.

These methods may be helpful when developing interview protocol. Ramaswamy [35] also suggests that customer requirements must be grouped into categories. If a qualified team conduct the interviews, it may be possible that they extract two or three hundred needs from thirty hours of interviewing. The target should then be to reduce these needs to approximately thirty needs grouped into two or three levels. The can be done by combining duplicates, discarding ambiguous or incomplete statements, and grouping very detailed statements into higher-level categories. Such activities will form part of the data analysis step in the customer measurement and management system.

The third step shown in Figure 2.2 is to *build the satisfaction loyalty survey*. During this Stage, it is important to decide which survey method to use when gathering additional customer information. The data gathering techniques listed by Gustafsson and Johnson [21] are:

- One-on-one interview surveys.
- Telephone surveys.
- Web-based surveys.
- Written surveys.

During this Stage, it is also important to establish the importance ratings of the satisfaction attributes and benefit clusters. The quality of service may be far more important to the customer than the store layout. According to Gustafsson and Johnson [21], importance measures can be obtained directly from the customer or be derived statistically from attribute performance ratings of overall satisfaction. There are three types of direct measures commonly used in marketing research [21]:

- *Direct scale rating*: The importance of the satisfaction attribute is rated on a scale ranging from "not at all important" to "very important".
- *Point allocation method*: Customers distribute a specific number of "points" among a given set of attributes with the most points allocated to the most important attribute.
- *Paired comparison rating*: Customers rate the relevant importance of attribute pairs.

The fourth step in the measuring system of Figure 2.2 is to *analyse the data* obtained in the previous step and to determine what can be done to improve customer satisfaction. The impact of each improvement must be assessed to determine the effect on "bottom line" performance.

The fifth and final step associated with Figure 2.2 is to *set priorities for quality improvement* and to implement the improvement initiative accordingly.

Customer information obtained must present a clear picture of the current experience of the customer as well as what the customer would like to experience and more importantly, what they expect to experience. According to Meyer et al. [31], information on customer experience can be collected at "touch points". These are instances of direct contact either with the product or service itself, or with a representative of it by the company or some third party. The "touch points" can also be seen as the customer interface, described by Bitran [7] as the environment in which service is delivered. According to him, the customer interface involves all contact with the customer, including interactions that are person-to-person, via mail, telephone, fax, computer, or some combination of the above. Meyer et al. [31] specifies three patterns of customer experience information:

- Past patterns, which are transactions occurring in large numbers and completed by individual customers.
- Present patterns, where the continuing relationship with the customer is envisioned.
- Potential patterns, which are uncovered by ferreting for opportunities.

Past pattern information can be gathered through various techniques such as surveys and questionnaires. A sales person would for example hand a customer a brief questionnaire on the quality of the service just received. The attempt to determine the quality of the experience directly follows the experience itself, giving companies the opportunity to receive an uninterrupted flow of information [31]. Present pattern information can also be gathered with the help of surveys and questionnaires but the type of questions will be different, questions may extend to the customer's awareness of alternative suppliers or new features which the customer may desire. Potential pattern information often emerges from interpretation of customer data as well as observation of customer behaviour. The type of information may be used to support the product or service development process [31]. Bitran [7] is of the opinion that customer experience should be measured in three main areas, named "elements of service encounters". The elements are given in

Figure 2.3, which is a framework proposed by Bitran [7]. The phases of service encounters as illustrated in the framework represent a business process usually followed when delivering a service to the customer. Each of the phases has different customer expectations and requirements associated with it [7]. Current customer experience must be measured separately for each of the phases. The pervasive elements referred to in the framework are the elements of a service that are present throughout all the phases of a service encounter. The elements play a vital role in the quality of service delivery. Waiting time is one of the three elements that influence customer experience. Bitran [7] identifies two types of waiting time. The first type is the time spent in a queue between any of the six phases of a service encounter. The second type is the waiting time experienced by the customer while being served. Bitran refers to this waiting time as in-process-time. When the waiting time of the customer is measured and analysed it is important to consider the perceptions of the customer. According to Bitran [7], a minute in the customer perception may feel like an hour if the customer is agitated or it may feel like ten seconds if the mind of the customer is otherwise preoccupied. Bitran [7] lists the different scenarios that compare the environment to the perception of waiting time.

- Unoccupied time feels longer than occupied time.
- Pre-process waits feel longer than in-process waits.
- Anxiety makes waits seem longer.
- Uncertain waits are longer than known, finite waits.
- Unexplained waits are longer than explained waits.
- Unfair waits are longer than equitable waits.
- Customers are prepared to wait longer for more valuable services.
- Solitary waits feel longer than group waits.

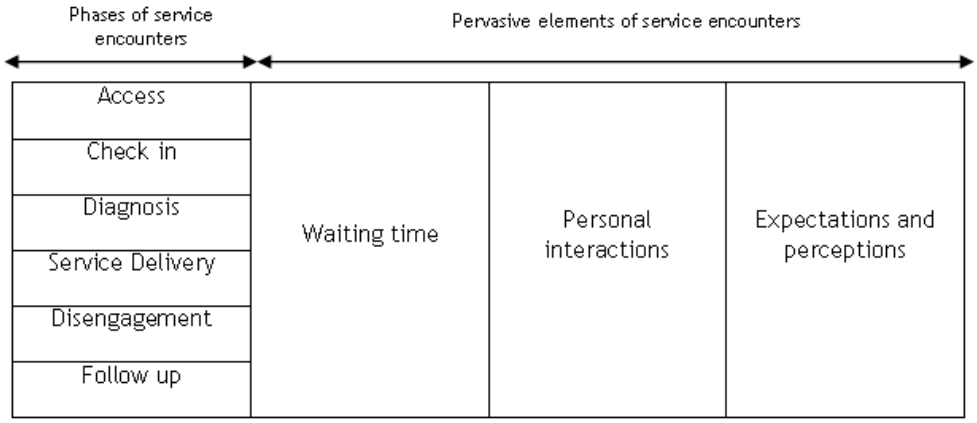


Figure 2.3 - Framework for analysing service encounters (adapted from Bitran [7])

The second element of service encounters addresses personal interactions. A dynamic relationship exists between the customer, the server, and management. The customer experience will be shaped by the attitude of the server towards the customer. If the server is friendly, respectful, and competent, the customer will have a pleasant experience. Management must ensure that all servers

are trained to behave appropriately towards any customer. According to Bitran [7] management must also ensure that they treat both the customer and the server with the necessary respect and set an example to their employees on how one should behave. The last elements of the service encounter specified in the framework are the expectations and perceptions of the customer. The expectation of the customer will shape the perception the customer has of a specific service delivered. If the service fails to adhere to the expectations of the customer, the customer will form an unfavourable perception of that service. According to Bitran [7] it is vital for a company to manage the expectations of the customer. This can be done by understanding the psychological reasons behind customer expectations. Bitran [7] lists the following sources that can be used to grasp the expectations of the customer:

- Customer complaints.
- Customer desires in similar industries.
- Customer panels.
- Transaction based or key client studies.

From the above paragraph, it is clear that measuring customer experience can assist in identifying the areas where operational activities must be improved. It is vital to understand that customer experience measurement should not be a process in which people from different parts of the company decide what they would like to see in a survey. Even before gathering customer information, it is important to understand which population or market segments to study, what type of data collection methods to use and how to retrieve sample information from the target populations [21].

2.2.2.2 Customer data gathering techniques

Hunter [24] identifies eight data gathering methods that may be used to measure current customer experience; the methods together with their suitability are discussed in following three tables:

Method	Description	Data collection timeline	Data	Cost	Advantages	Disadvantages
Telephone survey	A standard questionnaire is developed, a sample selected, and interviewers make the phone calls and record the data	Two weeks	Quantifiable (objective)	High	If correct procedures are followed, data can be generalised to a larger population	Somewhat rigid: minimal flexibility
Mail survey	A paper survey is distributed to customers through mail	Months	Quantifiable (objective)	Low	If correct procedures are followed, data can be generalised to a larger population	Slow data collection; low response rates
Focus groups – in person	A discussion of 5 to15 people, usually for two hours, guided by a moderator	One day	Qualitative (subjective)	Low-medium	Can be customised; opportunity to probe for in depth answers. Visual aids can be used	Cannot be generalised to larger population

Table 2.1 - Eight types of data collection (adapted from Hunter [24])

Method	Description	Data collection timeline	Data	Cost	Advantages	Disadvantages
Focus groups - online	A recent development that consist of a dozen or so people who log onto an Internet chat site at the same time. A moderator leads the group. The moderator types in questions and participants respond and a dialogue among participants ensues.	One day	Qualitative (subjective)	Low-medium	Can be customised; requires no travel time for participants or sponsors; visual aids can be used	Cannot be generalised to larger population; requires some technical expertise; best suited for younger age groups
On-on-one interviews	A dialogue between the interviewer and interviewee	Several days	Qualitative (subjective)	Low	Can be customised; opportunity to probe for in depth answers. Visual aids can be used	Cannot be generalised to larger population. Interaction that results from a group is eliminated.

Table 2.2 - Eight types of data collection (adapted from Hunter [24]) - Continued

Method	Description	Data collection timeline	Data	Cost	Advantages	Disadvantages
Intercepts	Consist of approaching an individual in a public location to obtain specific information	Several days	Both	Medium	Under specific circumstances, data can be quantified to a limited population	Ability to generalise to a larger population is limited; limited topics
User testing	The methodology requires asking individuals to use a product, often while they are being observed.	Months	Both	Medium	Provides input on user friendliness	Unsuitable for certain research; appropriate for limited topics
Customer complaints	Obtaining input from customers who complain	Months	Qualitative (subjective)	Low	Provides specific input	Cannot be generalised to larger population; limited topics

Table 2.3 - Eight types of data collection (adapted from Hunter [24]) - Continued

For the purposes of relating customer requirements to business processes, the primary data gathered from the customer should include customer needs as well as importance ratings associated with such needs. According to Chan et al. [11] customer needs is usually expressed in customers' vocabulary. The needs can best be collected by focus groups or individual interviews. Griffin and Hauser [22] suggests that individual face-to-face interviews may be more cost effective than focus groups. Accordingly only 20 to 30 customers should be interviewed to obtain 90 to 95 percent of all the possible customer needs. Chan et al. [11] is of the opinion that using mail/telephone surveys will not be appropriate for collecting qualitative data such as customer

needs. This is due to the difficulties in controlling the scope of responses received from the surveys. Relative importance ratings associated with customer needs are best measured using mail/telephone surveys, since an adequate number of customers must be surveyed to provide statistical significance [11]. According to Chan et al. [11] focus groups and individual interviews are usually not suitable for collecting quantitative information about the relative importance of customer needs due to high cost.

2.2.2.3 Improvement through learning and growth

Another concept which is worth exploring and which will contribute to an improved customer experience is the Service Profit Chain. The service profit chain as defined by James et al. [25] establishes relationships between profitability, customer loyalty, and employee satisfaction, loyalty and productivity. The links of the service profit chain can be defined as follows: Profit and growth are stimulated by loyal customers; such loyalty is a direct result of satisfied customers. Satisfaction of customers is influenced by the value or quality of services provided to customers. Value is created by employees that are satisfied, loyal and productive. Employee satisfaction is largely due to high quality support services and policies that enable employees to deliver value to the customers (See Figure 2.4).

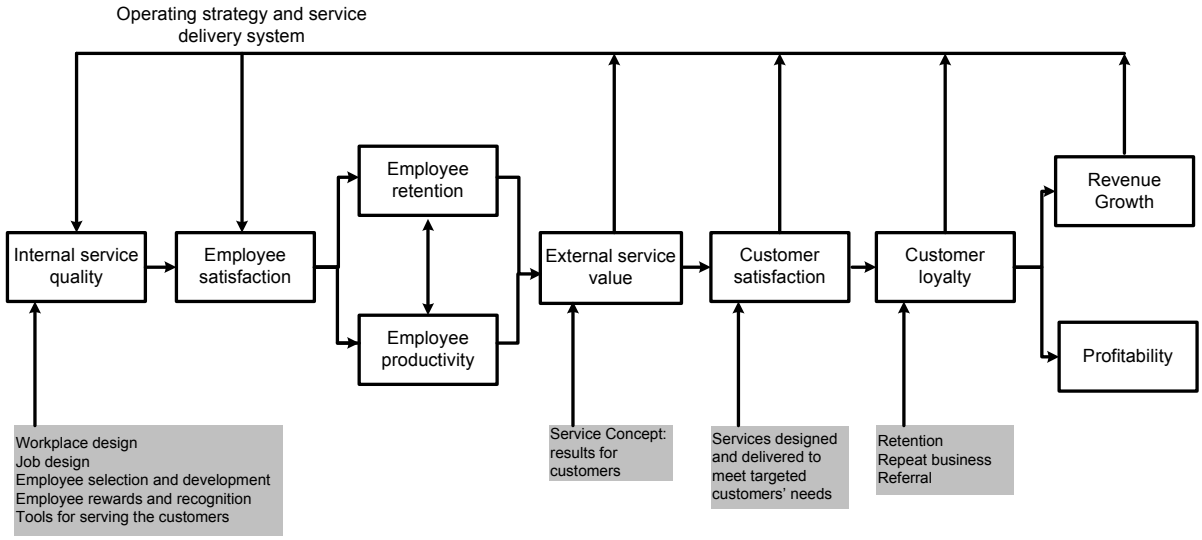


Figure 2.4 - The links in the service profit chain (Adapted from James et al. [25])

The service profit chain is helpful in showing the importance of quality designed business processes and systems that will enable employees to serve customers rapidly and efficiently. Business processes such as employee training, workplace design and job design will have an indirect impact on customer experience through the direct relationship with employee satisfaction. The processes must be designed with employee as well as customer requirements in mind.

From this section it can be concluded that customer experience and consequently customer satisfaction can be improved through improved business processes designed to meet the needs of the targeted customer. Gustafsson and Johnson [21] propose that companies must know how to link

their customers' needs with the processes of their organisation to create the best possible customer experience. The following section investigates business process reengineering by looking at the linkage between business processes and customer requirements.

2.3 Business Process Reengineering (BPR)

The second main concept addressed in this chapter is the methodology of BPR with the purpose of gaining some understanding of the process that must be followed when reengineering business processes to match customer needs.

The following research question was identified in chapter one:

> *How can internal business processes be improved to meet the ultimate strategic goal of customer satisfaction?*

This section attempts to answer the question by referring to various sources of literature concerning BPR. The traditional approaches to BPR are discussed to gain an understanding of how the methods can be combined with customer experience management concepts. Different tools are investigated that may be used to link the perspective of the customer with business process design and improvement.

2.3.1 Business process reengineering defined

Gladwin and Tumay [20] defines business processes as all service processes and processes that support production, for example order management, engineering changes and product design. Accordingly, a business process consists of a group of logically related tasks that use the resources of the organisation to provide defined results in support of the organisation's objectives. A similar definition for service processes is defined by Ramaswamy [35]. He describes service processes as the business transactions that take place between a donor or service provider and a receiver or customer to produce an outcome that satisfies the customer. An accurate understanding of the needs of the customer is critical to the success of any business process design. Services that are engineered without a clear understanding of what the customer requires will fail in the market place. The needs must reveal the "voice of the customer" which must be a personal, nontechnical statement of what the customer expects from the service [35].

The concept of BPR first emerged in 1990 when it was introduced by Michael Hammer in an article published in the Harvard Business Review [23]. The article claims that the challenge for managers is to obliterate non-value adding work. It states that companies should consider redesigning their business processes to maximize customer value, while minimizing the consumption of resources required for delivering their product or service.

2.3.2 Business process reengineering methodology

In 1990, Davenport and Short [16] also published an article on business process redesign that portrayed a similar idea. They prescribe a five-step approach to business process reengineering that may be seen as the BPR methodology. The steps are listed below:

1) *Develop the business vision and process objectives:* In this step, it is important to understand the business vision or the objective that drives the reengineering of a specific business process. A typical example would be to improve customer satisfaction.
2) *Identify the processes to be redesigned:* The most important processes or the business processes that conflicts with the overall business objective must be identified. The processes must then be prioritised according to redesign urgency.
3) *Understand and measure the existing processes:* The current processes must be measured to identify areas for improvement and to avoid repeating past errors.
4) *Identify Information Technology (IT) Levers:* The capability of existing IT systems will have an impact on the ability to redesign business processes.
5) *Design and build a prototype of the new process:* The new process must be seen as a prototype with consecutive iterations.

Benchmarking forms an integral part of reengineering since it allows visualization and development of processes, which are known to be in operation in other organizations. The next section discusses benchmarking in greater detail.

2.3.3 Business process benchmarking

After the manifestation of BPR, many consulting firms embarked on this new trend and developed BPR methods. Many authors dedicated their time and effort in researching this new phenomenon. One of the authors, Camp, investigated BPR by making use of benchmarking. Camp [10] is of opinion that it is of vital importance to link business processes to business goals that leverage priorities. According to him the first step after identifying the business goals is to identify all the key business processes of the organisation, which is discussed in greater detail later in this chapter. Camp [10] is of the opinion that there is an intermediate step between identifying business processes and prioritising the processes. The intermediate step is worth considering to visually display the linkage to organisational goals on the one hand and the business processes on the other. This picture will be helpful in understanding the direct relationship between business processes and goals where customer satisfaction is one of the main goals.

2.3.4 Business process reengineering from a customer perspective

The business process reengineering and benchmarking steps proposed by Davenport and Short [16], Camp [10] as well as Ramaswamy [35] are discussed in detail in the following sections. Although the steps address the traditional concept of business process reengineering, the focus of the

dissertation mainly falls on the reengineering of processes from a customer perspective and tools and techniques proposed by different authors to execute the steps.

2.3.4.1 Identify the processes to be redesigned

The method suggested by Camp [10] for identifying business processes, is to create an overhead view of the organisation. This can be done in two ways; the first method involves describing the existing organisation in terms of functions and mapping the functions from beginning to end across a flow chart. In the second method, the current organization is disregarded completely and the logical flow of work is described. The logical flow includes the logical progression of developing and producing products and services and delivering them to customers. All the functions identified in the logical flow can be seen to be key business processes. A better-known method that works in the same way as the second method described by Camp, is value chain analysis.

The use of Value Chain Analysis (VCA)

According to Chase et al. [13] the value chain provides a structure to capture the linkage of organisational activities that create value for the customer and profit for the firm. The value chain can be useful in identifying all the key business processes needed to deliver value to the customer. The processes include service processes that have a direct influence on customer experience as well as support processes such as employee training, procurement and stock management. As seen from the service profit chain perspective, support processes are just as important as service processes due to the indirect impact it has on customer satisfaction.

After all the key business processes are identified, Camp [10] suggests that the reengineering team documents the processes. Accordingly, the minimum requirements associated with documenting processes are listed:

- Picture of the process.
- Narrative description of the process.
- Description of the process steps.
- Description of the practice of the process steps.

After all the key business processes have been identified, the next step is to determine the visual linkage between the processes and customer requirements [10].

2.3.4.2 Link business processes to goals that leverage priorities

Visualising goals and processes with the help of a Balanced Scorecard (BSC)

The Balanced Scorecard was introduced by Robert Kaplan and David Norton in 1992 as a performance management tool. The goal was to help executive teams describe their strategies and dramatically improve the quality of their insight. According to Chase et al. [13], the Balanced Scorecard facilitates great precision in defining the customer value proposition and the fact that

internal business processes, competencies, and technologies must be linked to that value proposition. The value proposition is defined in the customer perspective of the Balanced Scorecard and represents the measures that the organization will embark on to satisfy customer needs. It involves measuring the current value delivered to customers in terms of time, quality, cost and service and aligning the metrics to customer requirements to increase the value delivered to the customer. According to Kaplan and Norton [27], the internal business process perspective will include all the processes necessary to deliver on the value proposition of customers in targeted market segments and to satisfy customer expectations. From the strategy map, it is clear that there exist many relationships between the internal business process perspective and the customer perspective. The relationship can be seen as a linkage between the goal of customer satisfaction and business processes. Two methods are identified in existing literature that may be used to link the goal of customer satisfaction to internal business processes. These methods are the tree diagram and QFD.

The use of the tree diagram in linking business processes to goals that leverage priorities

The tool suggested by Camp [10] for displaying a visual relationship between customer satisfaction and business processes is the tree diagram. The best way to view the tree diagram is horizontally with the organisation's goals representing the roots of the tree. From the roots, an increasing number of branches cascade outwards in increasing levels of detail and understanding. Figure 2.5 shows the tree diagram as designed by Camp [10].

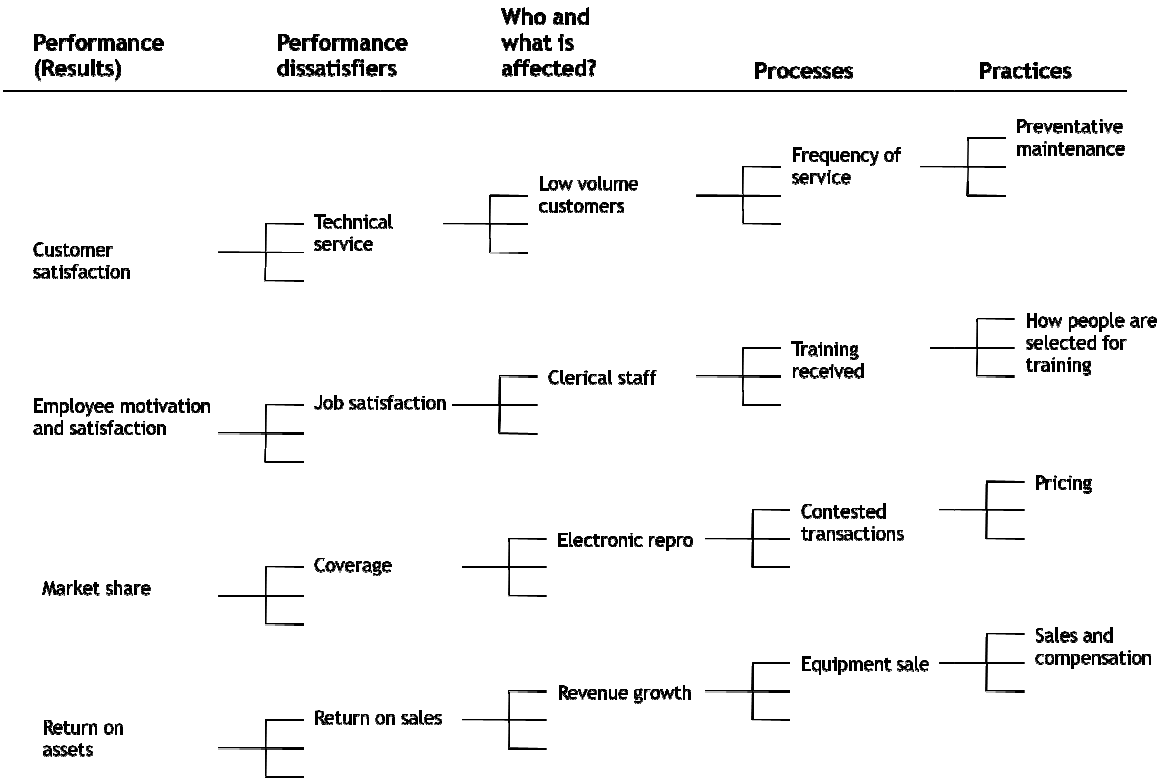


Figure 2.5 - Tree diagram of business processes linked to organisational goals (adapted from Camp [10])

An alternative method for establishing the relationship between the customer perspective and the internal business process perspective is via QFD. This ability of QFD is discussed in section 2.4.1. After the linkage between the customer perspective and the internal business perspective has been obtained, the next step is to prioritise the business processes [10].

2.3.4.3 Prioritise business processes to affect priorities and improve business results

Camp [10] states that only 15 to 20 percent of all identified processes can be pursued at any one time since most companies lack the resources to improve all processes at once. The remaining processes must be scheduled for improvement over an extended horizon.

According to Gustafsson and Johnson [21] the areas in the business that can be seen as priority to improve are those that are important to customers and on which, simultaneously, the company is performing poorly. The opinion is that managers should identify the priority areas of high importance and low performance [21]. As an output of the prioritisation of service or product attributes managers can categorize and display the drivers of satisfaction and loyalty using the strategic satisfaction matrix defined by Gustafsson and Johnson [21].

Low impact and strong performance Maintain or reduce investment or alter target market	**High impact and strong performance** Maintain or improve performance - competitive advantage
Low impact and weak performance Inconsequential do not waste resources	**High impact and weak performance** Focus improvements here - competitive vulnerability

Figure 2.6 - Strategic satisfaction matrix (Adapted from Gustafsson and Johnson [21])

Each category will have a different associated market action implication. Resources must be focused where impact is high and performance is weak. Improvements within this category will have the greatest impact on customer satisfaction and consequently on loyalty and profitability. The category where impact is low and performance is high indicates areas where resources might have been wasted in the past because the benefits and attributes were not important to the customers. It is also possible that customers view the areas as basic but necessary. To them the product and service characteristics are such an integrated part of the service or product that they are receiving that they ignore it as long as it continues to exist. Gustafsson and Johnson [21] refer to this area as the "slippery slope" as it has no real impact on customer satisfaction as long as it continues to perform well. The upper left quadrant of the matrix represents the company's competitive advantage; in this area, performance must be maintained or improved to ensure customer satisfaction. The last quadrant where impact and performance are weak, products, and services should not be improved, since it will be a waste of resources. Various tools are available

that can assist managers in prioritising business processes, one of the tools are discussed in the following paragraph.

The use of the tree diagram in prioritising business processes

The tree diagram can serve as the base for making line-of-sight decisions on which processes would leverage the goal the most and therefore be the priority process to improve [10]. The tree diagram visually displays the relationship between organisational goals and business processes and also identifies the areas where customers are dissatisfied. To this end customer satisfaction is shown on the first level as an organisational goal, the next level of detail shows the items that customers are dissatisfied with, for example technical service. Next the tree diagram displays who or what is affected by the dissatisfiers, as can be seen in the example in Figure 2.5, it is all the low volume customers. The process called frequency of service is identified as the process that directly influences the dissatisfiers and consequently the goal of customer satisfaction. As a further addition to the tree diagram, the practices that need improvement can also be seen in Figure 2.5 as preventative maintenance. By developing a tree diagram, a company will be able to identify processes that perform below the expectation of the customer. After the processes are identified, customers can be asked to rate them according to quality. Processes can then be prioritised according to this rating to identify the processes with the lowest performance based on the findings of the tree diagram as well as the customer rating. Although the tree diagram is useful in assisting managers to divide business processes amongst the four strategic categories in the strategic satisfaction matrix based on their performance, it can become a tedious and complex task. A different method to rate performance that may be simpler and more efficient is discussed in section 2.4.2.

Due to the shortcomings of the tree diagram, a different method must be considered to prioritise business processes. QFD can be used to relate customer requirements directly to business processes, thus processes can be prioritised according to the impact of the processes on customer requirements. The ability of QFD to prioritise business processes is discussed in greater detail in section 2.4.

Additional tools and considerations

The strategic satisfaction matrix is a primary input to the decision process regarding which processes to improve, but there are also other factors to consider when prioritising business processes [21]. The factors include:

1) Paying attention to strategies and competencies.
2) Benchmarking impact and performance.
3) Involving management in considering cost.
4) Asking where the market is heading.

It is important to consider the first factor which is strategy and competencies. The strategic market plan of a company will typically lead that company to focus on particular segments of customers to leverage core competencies. While prioritising the key business processes, management must decide whether the areas identified for improvement will be the areas in which core competencies and competitive advantage can be achieved [21].

Benchmarking impact and performance must also be considered when prioritising business processes. It is important for the company to understand the impact and performance of their processes in relation to the processes of the competitors. If the competitors are also performing below standard on a specific process with high impact, it may not be critically important to improve that process as it may still be a competitive strength, at least in the short run. It is however unwise to ignore the absolute levels of impact and performance since they highlight the vulnerabilities of the company and create an opportunity where competitors may enter or improve to take customers away [21].

The third factor to consider is cost [21]. Cost must be taken into account when prioritising processes. Managers must consider the relative costs associated with making improvements when deciding which processes to improve. Cost can also be used as a tiebreaker when prioritising two processes with equally low performance and high impact. In such a case, managers may identify which of the two processes is more cost effective to improve.

The last factor to consider is to ask where the market is heading [21]. Something which is currently of low importance may become more important to the customer as the market evolves. If a particular process was identified as a process with low impact and high performance, it should not immediately be discarded. Managers must attempt to establish if the process may become more important and whether the performance of the process will be adequate when it becomes more important.

The current performance of the high priority processes must be measured to identify specific areas for improvement. The next step after prioritisation is to measure identified processes to establish areas for improvement [16].

2.3.4.4 Understand and measure the high priority processes

The BSC may be seen as a performance measurement tool. Consequently, it defines several generic measures which may be used to assess the current performance of business processes from a customer perspective. The measures typically include: customer satisfaction, customer retention, new customer acquisition, customer profitability, and market and account share in targeted segments [27]. By measuring the above, a company will determine whether their performance is desirable from a customer perspective. Both the tree diagram as well as QFD is helpful in identifying the areas in which to improve business processes. After the areas are identified, the next step is to improve the business processes in these areas, but before this can be done, the

desired performance level in these areas must be established [35]. This can be done by taking a step backwards and identifying how the processes should have been designed in the first place. Design requirements should be identified according to customer needs.

2.3.4.5 Specifying design performance standards

The desired performance level from a customer perspective must be determined prior to attempting process improvements [35]. Before processes can be improved to improve customer experience, it should be determined what customers would like to experience or more importantly what they expect to experience. Business processes may be seen as all service processes or processes that support production [20]. In 1996 a book appeared on the design and management of service processes [35]. The book highlights the importance of obtaining the desired performance level of a service process before designing new service processes or improving existing service processes. The desired standard for a service attribute indicates the customers' expectations for the performance of the particular attribute [35]. The expectations of the customer usually stem from their prior experience with similar services and can be determined with a realistic assessment of their needs. Ramaswamy [35] identified two methods with which to obtain the desired performance level of a service attribute. The first method is to obtain quantitative information from the customer through interviews. The interviewer may ask the customer questions such as: "In your opinion, what is an acceptable number of times to call service maintenance a year?" The interviews may also be conducted by asking multiple-choice questions. Although the method is useful in obtaining quantitative answers for some attributes, it is not always accurate. According to Ramaswamy [35], the second method he proposes is much more accurate. It involves estimating the desired performance level indirectly by examining the extent to which the performance of similar services in the market satisfies customer needs. For this method, QFD can be used to determine the desired performance level through benchmarking. Section 2.4.3 discusses the ability of QFD to benchmark in greater detail.

The difference between the desired standard from a customer perspective and the design standard depends on the degradation in customer satisfaction that the company is willing to accept. According to Ramaswamy [35] the amount of dissatisfaction arising from the deterioration in performance depends on the relationship between performance and satisfaction. Some of the relationships are given by the performance / satisfaction functions in Figure 2.7. For example, Figure 2.7 (ii) presents a situation where the process itself is expressed by a range. The customer cannot qualitatively differentiate performance levels within this range and any company that performs within this range will provide equal satisfaction. Safety will typically be an example of Figure 2.7 (iii) where small deviations from the desired performance level will result in a large deterioration in customer satisfaction. The performance / satisfaction relationship must be taken into account when setting the design standard for a process. It will not always be possible to perform at the desired performance level. It might be too expensive or the technology required may be absent, but it is important to determine the maximum deviation from the desired

performance level where customer needs will still be satisfied. After the desired, as well as the acceptable, performance level have been determined, business processes should be improved to achieve the performance level specified by the customer. Section 2.5 discusses the use of simulation modelling to improve business processes as well as testing the improvement initiatives on customer experience.

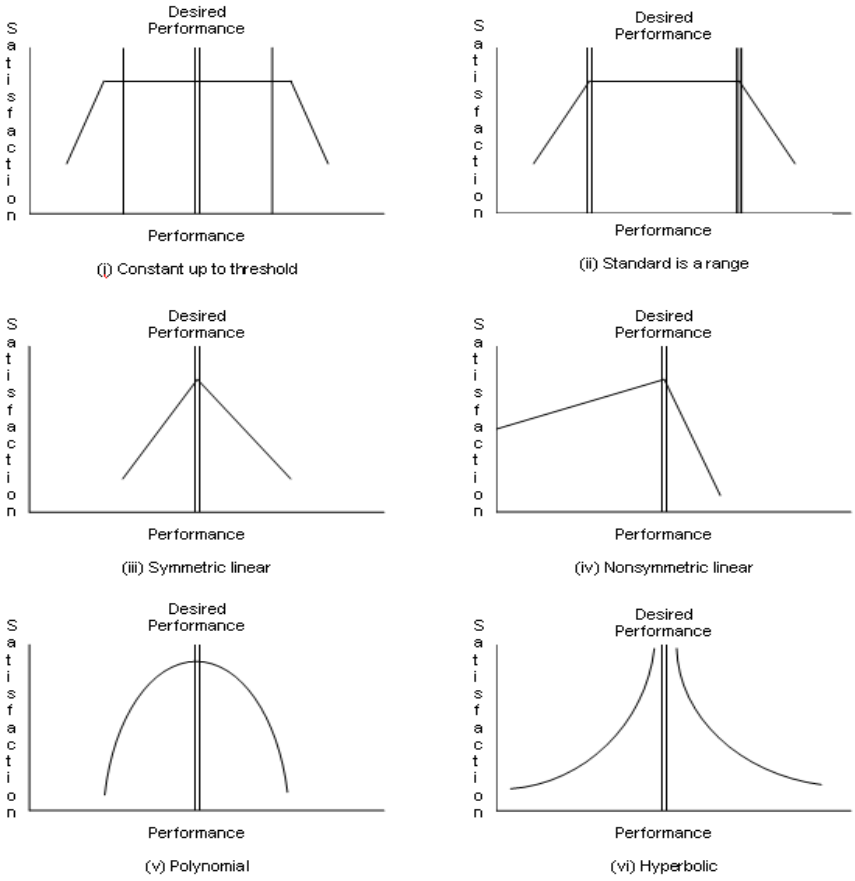


Figure 2.7 - Different functional forms for the performance/satisfaction functions (Adapted from Ramaswamy [35])

2.4 Quality Function Deployment

This section discusses QFD as a tool that may be used to align business processes to customer experience, consequently integrating the concept of CEM and BPR.

The second research question identified in chapter one is addressed:

> *Will QFD be sufficient to establish the causal relationship between business processes and customer information?*

This question is addressed by discussing the ability of QFD as a tool to assist managers in executing the steps associated with BPR. In section 2.3 it is mentioned that QFD may be used to link business processes to goals that leverage priorities, section 2.4.1 discusses this specific ability of QFD. The

use of QFD to prioritise business processes and to establish the desired performance level for each business process is also discussed in this section.

2.4.1 The use of QFD in linking business processes to goals that leverage priorities

Although the linkage between customer satisfaction and business processes re-emerged in the work of Kaplan and Norton in 1992, it was not novel. The need to relate the goal of customer satisfaction to business processes emerged in the early 1960s when Dr. Yoji Akao and Shigeru Mizuno introduced the concept of Quality Function Deployment (QFD).

The tool became popular for its flexibility as an all – inclusive group decision making technique. The well-known technique provides the baseline mechanism for achieving the causal relationship between customer requirements, products and services and business processes. Akao explained the reason behind the development of QFD with the following words: "Time was when a man could order a pair of shoes directly from the cobbler. By measuring the foot himself and personally handling all aspects of manufacturing, the cobbler could assure the customer would be satisfied." [30]. QFD was developed to bring this personal interface to modern manufacturing and business [30]. “In today's industrial society, where the growing distance between producers and users is a concern, QFD links the needs of the customer (end user) with design, development, engineering, manufacturing, and service functions” [30]. The use of QFD can benefit companies in many ways and can thus be seen as the ideal tool to relate customer needs to technical decisions. According to Youssef and Zairi [44], the benefits reaped by companies employing QFD include the following:

- QFD helps to define product specifications that meet the customer’s requirements, while paying attention to the competitors.
- QFD ensures consistency between the customer’s requirements, and the measurable characteristics of the product or service.
- QFD is able to inform and convince all those responsible for various stages of the process of the relationship between the quality of the output of each phase and the quality of the finished product.
- QFD ensures consistency between the planning and the production process.
- QFD helps to minimize mistaken interpretations of priorities and objectives because planning takes place at an earlier stage.
- QFD translates customer requirements into meaningful (technical) requirements at each stage of the development and production processes.
- QFD brings people together from various disciplines and facilitates the formation of teams capable of meeting customer requirements.

It is however important to understand that there are various prerequisites associated with QFD that must be taken into account. The following prerequisites apply [44]:

- QFD is not only about building charts; the existing resources and process capability must be used to satisfy customer requirements.
- QFD will only be a success when key people and senior management are committed to contributing to the input since the technique is upstream and has strategic implications.
- QFD is very dependent on resources such as people, time, and financial resources. Resource implications have to be carefully examined.
- QFD must be integrated gradually as part of a larger move towards change, ideally a total quality management program which drives for efficiency.

Although QFD is mainly employed to evaluate and improve product characteristics, it can also be used for non-tangible services including the service industry, software products, IT projects, business process development, government, healthcare, environmental initiatives, and many other applications [30]. QFD can readily be used to establish the direct relationship between the customer perspective and the internal business perspective of the BSC. The relationship can be determined through the relationship mapping of 9 (strong), 3 (medium) or 1 (weak) between customer requirements and business processes or engineering characteristics. Figure 2.8 is an example of a QFD [13].

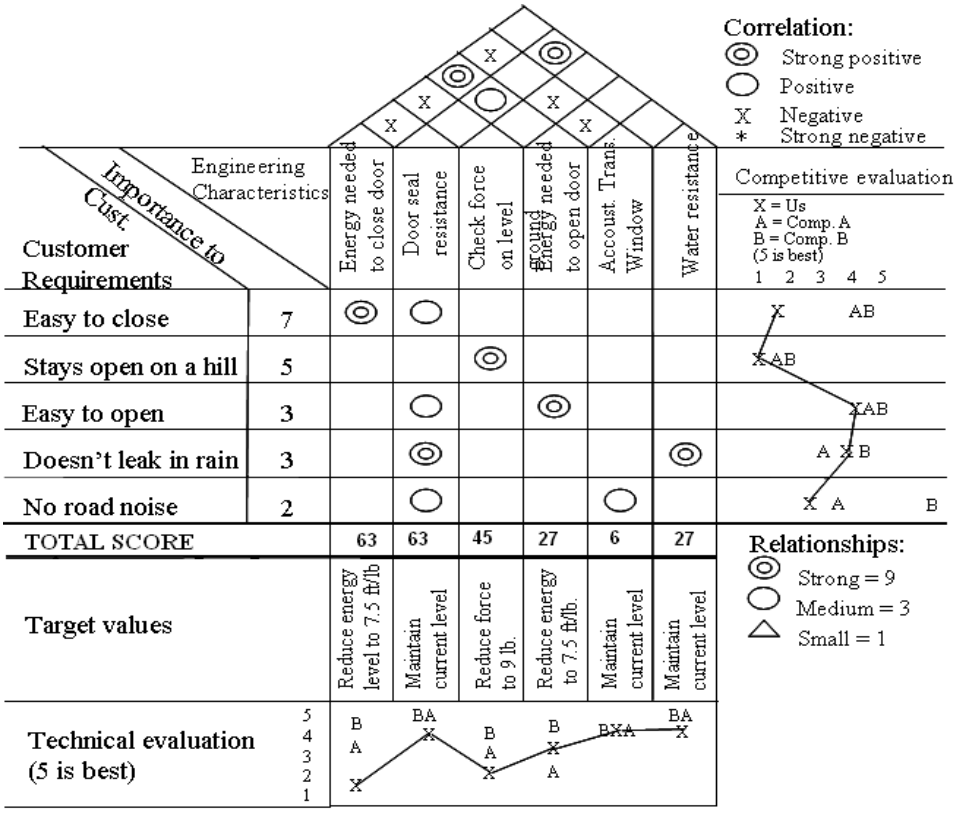


Figure 2.8 - House of Quality Matrix for a car door (Chase et al. [13])

2.4.2 The use of QFD in prioritising business processes

QFD can be used to relate customer requirements directly to business processes. By doing this processes can be prioritised according to the impact of the processes on customer requirements. As

a base, QFD translates the voice of the customer into the appropriate supporting product characteristics, prioritising the required product and service characteristics whilst setting the required performance criteria for the products and services. According to Chase et al. [13], the QFD process begins by studying and listening to customers, through market research, the consumers' product needs and preferences are defined and broken down into categories called customer requirements. Cohen [15] defines these customer requirements as the "whats", what must be achieved to satisfy customer needs. According to him these "whats" must be prioritised by the development team by making a series of judgements based in part on market research data. After customer requirements are defined through customer surveys and interviews, they are weighted based on their relative importance to the customer [13]. The next step in the QFD process is to define a set of technical characteristics directly related to the customer requirements. These characteristics can also be referred to as the "Hows" and are a set of potential responses aimed at achieving the "Whats" [15]. An evaluation of the characteristics should support or refute customer perception of the product. After the QFD diagram has been developed, it will readily serve to identify the processes with a high impact on customer requirements. The business processes can then be categorized based on their impact in the four strategic categories of the strategic satisfaction matrix.

QFD is identified in this section as a tool with which a company can prioritise their business processes according to their impact on customer requirements. QFD can also be used to explicitly consider cost information when translating the voice of the customer into appropriate business processes [21]. QFD can also be used for benchmarking, according to Chase et al. [13], one of the steps in the QFD procedure is to ask customers to rate the company's products against those of the competitor. This helps the company to understand the performance of their products in relation to others. This can also be true for business processes where customers can be asked to rate the service they received against that of the competitor. This provides a much simpler way than the tree diagram to prioritise business processes according to performance. The ability of QFD also enables the use of QFD in establishing desired performance standards.

2.4.3 The use of QFD in establishing desired performance standards

During the development of QFD, customers may be asked to rate the service delivered by the competitors (customer benchmark). The desired performance level can then be estimated by considering the customer benchmark and the actual performance or technical benchmarks of the competitor. Figure 2.9 is an example of a QFD with customer benchmarks [35]. Figure 2.9 indicates that customer needs are better satisfied by competitor two, as competitor two is rated higher on the more important needs. Therefore, it is safe to assume that an ordering interval of 5 minutes is closer to customers' desired performance level than competitor 1's interval of 10 minutes. This provides a benchmark for ordering interval and represents the desired performance standard that must be reached and/or maintained.

	Customer importance	Time between menu delivery and order	Customer benchmark 1	Customer benchmark 2
Enough time to read the menu	2	●	4	3
Can order quickly	4	●	2	5
Order additional items quickly	3	○	2	5
Technical benchmark 1		10 min		
Technical benchmark 2		5 min		

Figure 2.9 - Customer and technical benchmarks (Adapted from Ramaswamy [35])

The following section discusses the use of simulation modelling to execute the final step of BPR.

2.5 Simulation modelling

2.5.1 Introduction to simulation modelling

This section discusses the last concept that is investigated in this chapter namely simulation modelling and the use thereof to test the impact of process improvements on customer experience.

The following research question is identified in chapter one that is answered in this section:

> *Can simulation modelling be used as a technique to analyse the cause -effect relationship between customer experience and operational performance?*

As previously discussed in this chapter, customer experience can be enhanced by delivering products and services according to customer needs. Products and services are delivered through business processes and the business processes must be designed according to what the customer wants.

In section 2.2.1, it was recommended that a systems approach be followed to satisfy customer needs. According to Van Ackere, Larsen, and Morecroft [43], a systems thinking approach is appropriate when improving business processes to fit customer needs. Various techniques offered by Systems Engineering can be used to model and improve business processes. The techniques

include simulation, decision theory, queuing theory, optimization and utility theory. Gladwin and Tumay [20] argue that analysis and modelling tools can be broken down into three categories:

- *Flow diagramming tools*, which helps to define processes and workflows by linking text descriptions of processes to symbols
- *Case tools*, which provide a conceptual framework for modelling hierarchies and process definitions by providing linear, static, and deterministic analysis capability
- *Simulation modelling tools,* which provide continuous or discrete-event, dynamic and stochastic analysis capability.

Gladwin and Tumay [20] argue that although 80 percent of re-engineering projects make use of flowcharting tools to determine the current as well as "to-be" state of the business, the tools do not have sufficient capability. Most of the process-modelling tools focus on modelling the current state of the business and lack the ability to accurately predict the outcome of proposed changes to that process. They state that static modelling tools are deterministic and independent of process sequence. The tools are not able to model physical elements of a system such as the facility or office layout and the flow of entities through the facility. Simulation tools are the only tools that provide ways to model entity flow and dynamic behaviour of business processes [20]. Bhaskar et al. [5] is of the opinion that if a process does not contain significant randomness in either its environment or its internal features, basic mathematical analytical techniques will be sufficient for re-engineering. If a process however contains any random content that is relevant to the re-engineering effort, simulation tools must be employed. In contrast to other modelling tools, simulation is well suited to handle the stochastic and time-varying nature of processes as well as the non-linear interactions between process elements [5]. Swain [41] also recommends simulation tools and states that simulation is the tool of choice for modelling complex systems and validating analytical models before proceeding to optimization. A very important aspect that must be considered when improving business processes is to test the impact of the improvement initiatives on customer experience. Bhaskar et al. [5] states that simulation has been able to provide quantitative estimates of the impact that process redesign are likely to have on key performance measures. It can thus be argued that simulation modelling will be the most appropriate tool to use when improving business processes as well as testing the impact of such improvements on customer experience.

An area of particular interest is computer simulation. Computer simulation is an attempt to model a real-life or hypothetical situation on a computer so that it can be studied to see how the system works [38]. By changing variables and parameters, predictions may be made about the behaviour of the system. According to Smith [40], computer simulation can be applied in every system imaginable, including factories, communications and computer networks, integrated circuits, highway systems, flight dynamics, national economies, social interactions, and imaginary worlds. In

all of the environments, simulating the system has proved to be more cost effective, less dangerous, faster, or otherwise more practical than experimenting with real systems.

Simulations can be referred to as either discrete event or continuous, based on the manner in which the state variables change [40]. Both the terms are explained by Smith [40]: "Discrete event refers to the fact that state variables change instantaneously at distinct points in time. In a continuous simulation, variables change continuously, usually through a function in which time is a variable. In practice, most simulations use both discrete and continuous state variables". Robinson [36] gives a detailed definition of discrete-event simulation; according to him, discrete-event simulation is when the operation of a system is represented as a chronological sequence of events. Each event occurs at an instant in time and marks a change of state in the system. Discrete event simulation will typically be used to simulate business processes. The following section discusses the simulation software that can be used to simulate discrete events.

2.5.2 Simulation Software

Due to the growing popularity of simulation, consumers have been demanding tools that can support their needs. The following software packages are a selection which can be used for simulation:

- *Rockwell Automation – ARENA:* The ARENA product family is able to support users over a breadth of applications. ARENA is also scaled to satisfy different user requirements throughout the project life cycle and can integrate effectively with corporate modelling and database systems. ARENA can be used very effectively to simulate internal business processes such as order fulfilment and service processes [37].
- *MapleSim Software*: MapleSim is a much faster and more powerful tool that can be used to simulate demanding multi domain systems [29]. MapleSim can be used effectively to model complex engineering systems faster and also allows for the simplification of complex systems [29].
- *Flexsim Simulation Software*: One of the most powerful tools to use for modelling, analyzing, and visualising any imaginable process is Flexisim. Flexsim enables the user to build 3D models and to analyse a system by identifying backups and bottlenecks [18].

2.6 Chapter summary

During the 1970s there was a strong focus on the quality of products and services. From this initial focus the orientation moved to a broader view, incorporating the customer's view of quality. Ulaga and Chacour [42] contend that the concept of value analysis emerged in the 1950s when L.D. Miles developed a set of techniques aimed at identifying and removing unnecessary cost while still satisfying customer needs. Even then, Miles stated that orientation towards customers' needs and wants should be an integral part of product development. From this it is clear that the focus on customer satisfaction is not a recent phenomenon: it has gradually become more popular through

the years, eventually representing the most important goal of any organisation. In today's environment, customer satisfaction is related to competition. Chapter one asserts that customers have increasing numbers of products to choose from and multiple channels through which they may satisfy their needs. In such an environment it is vital to ensure customer satisfaction, and to maintain the satisfaction through offering quality products and services through customer focused processes. This chapter identifies various tools and techniques that are traditionally used to design and improve business processes. The main goal of the dissertation is however to improve business processes mainly from the customer perspective. The concept of customer experience management is discussed to gain an understanding on how the concept may be used to reach this specific goal. The investigation of BPR provides insight on the process that may be followed to redesign business processes. QFD is discussed as a tool that may be used to link the business processes to customer requirements in order to redesign the business processes to fit customer needs. Finally simulation modelling is discussed as a method to test the impact of process improvements on customer experience.

The following chapter develops a framework that may be used to enhance customer experience by improving business processes. The framework will incorporate many of the techniques discussed in this chapter, including BPR, QFD and simulation modelling. The useful and valuable traits of each of the techniques will be integrated into one comprehensive framework that may enable companies to deliver an exceptional service to their customers.

3. Conceptual framework

3.1 Introduction

Over the last five decades, principles and techniques were designed to help companies take care of frustrated and unhappy customers. Many of the methods had merit and succeeded partly in increasing customer satisfaction. One of the techniques is QFD, developed in 1966 with the goal of aligning the voice of the customer with the technical characteristics of products and services. Another technique or methodology is BPR, developed in 1990. BPR together with benchmarking aimed at improving business processes in terms of cost, quality, service and speed. The BSC was developed in 1992 to help companies align their operational activities with their operational strategy. All of these techniques had their useful and valuable traits and were discussed in detail in chapter two of the dissertation.

This chapter discusses the integration of some of these techniques into one comprehensive framework that may be used to improve customer experience and consequently customer satisfaction through improved business processes. It is accomplished by defining a step by step procedure for linking the customer experience to business processes and translating the needs of the customer into technical design characteristics for each process. Gladwin and Tumay [20] defined business processes as a group of logically related tasks that use the resources of the organisation to provide defined results in support of the organisations' objectives. Ramaswamy [35] gave a similar definition as seen chapter two, section 2.3.1. According to him every process must produce an outcome that satisfies the customer. From literature it is clear that the business processes of an organisation must be linked to the organisations objectives or goals, one of the most important goals being the goal of customer satisfaction. This link may be obtained by reengineering business processes to reflect the needs of the customer.

The research dissertation is mainly concerned with improving existing processes to fit the needs of the customer and the term reengineering is thus appropriate. Throughout chapter two, BPR is discussed as a methodology that may be used to define the process of reengineering. Benchmarking is also discussed in chapter two since it forms an integral part of reengineering. It allows for visualization and development of processes, which are known to be in operation in other organisations. When the steps associated with BPR and benchmarking are integrated with QFD, a framework can be derived that can be applied in service-oriented companies. The conceptual framework that is developed in this chapter is named the Enhanced Customer Experience Framework (ECEF). The ECEF will be helpful in linking business processes with key performance indicators (KPIs), associated with each process, to customer requirements. The framework defined in this chapter is based on various concepts defined in chapter two, these concepts provide a process for building the framework, various principles and methods can be derived from these concepts.

- Business Process Reengineering (BPR) methodology developed by Davenport and Short [16] provides a process as well as the principles for the framework.
- Business Process Benchmarking defined by Camp [10] provides various process steps for the framework.
- The service design and management model defined by Ramaswamy [35] provides insight on how benchmarking can be used to determine the current as well as desired performance level for each business process.
- The customer measurement and management system defined by Gustafsson and Johnson [21] provides the method for gathering customer data for the QFD diagram.
- A framework for analyzing the quality of the customer interface defined by Bitran [7] provides further principles associated with determining customer requirements that can be used for the QFD diagram.

All of the concepts may be integrated into one comprehensive framework. The ECEF is shown in Figure 3.1. The Tools and techniques that will be used to develop the ECEF are listed below:

- CIT as the process for gathering customer information.
- Customer information gathering techniques used in conjunction with CIT.
- Value chain analysis for the identification of critical business processes.
- QFD and the strategic satisfaction matrix for the prioritization of business processes based on their importance and performance from a customer perspective.
- Simulation models for testing possible alternative improvement initiatives.

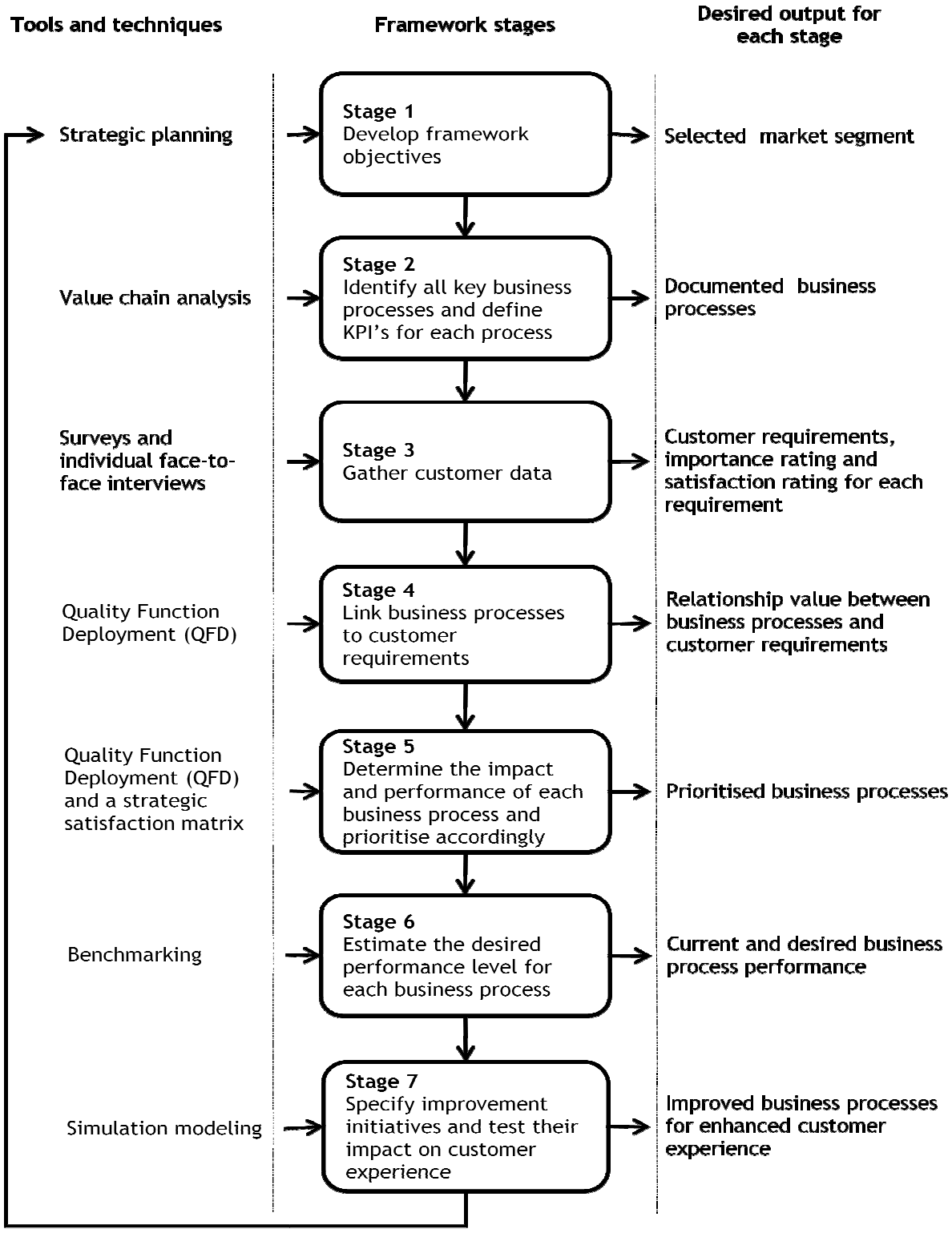


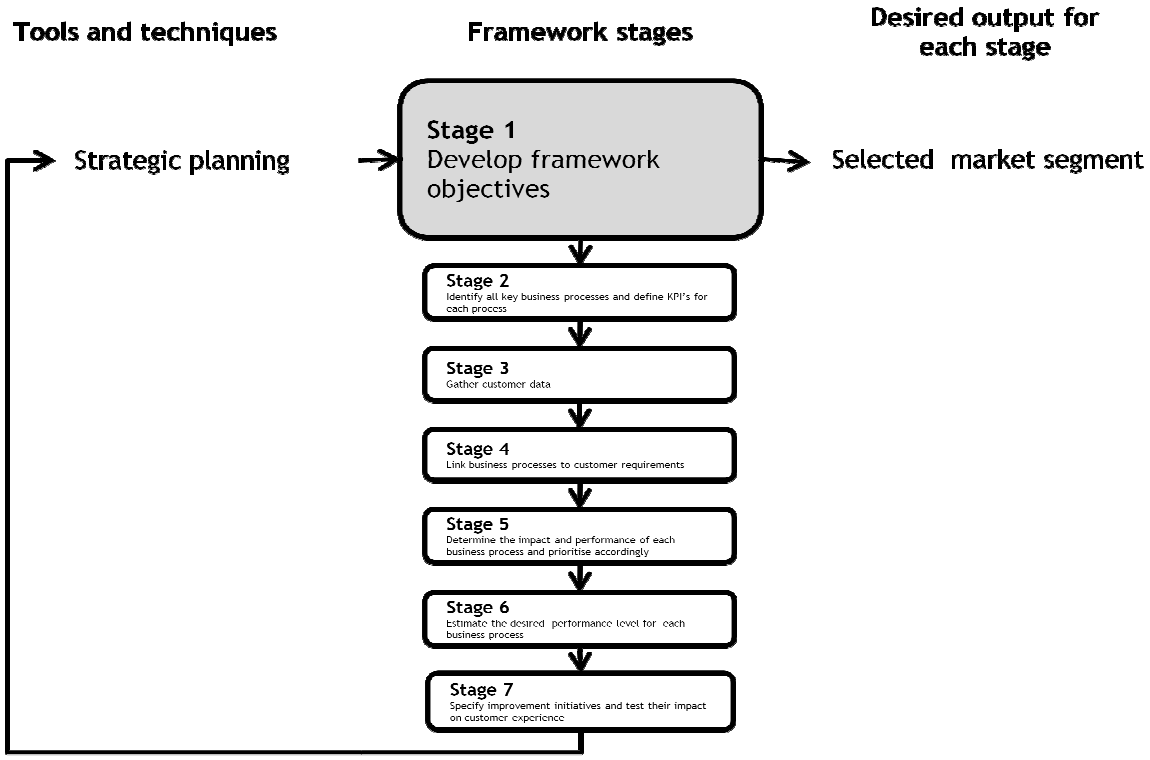
Figure 3.1 - Enhanced Customer Experience Framework (ECEF)

3.2 ECEF Stages

The framework shown in Figure 3.1 will consist of seven Stages from conception through the improvement life cycle of the business process. The Stages can be seen as the process steps that

must be followed in building the framework. Each Stage must be viewed as a phase with several activities taking place sequentially during the improvement life cycle. It is important to realise that the improvement life cycle is an ongoing iterative process with reassessment taking place during and after Stage seven. After one set of identified key business processes have been improved, the next set of processes must be identified and prioritised and the life cycle continues.

3.2.1 Stage one: Develop framework objectives



Stage one of the ECEF was constructed by making use of the following model components observed in existing models:

- *Identify the purpose (strategy and planning)* adapted from the customer measurement and management system defined by Gustafsson and Johnson [21].
- *Develop the business vision and process objectives* adapted from the Business Process Reengineering (BPR) methodology defined by Davenport and Short [16].

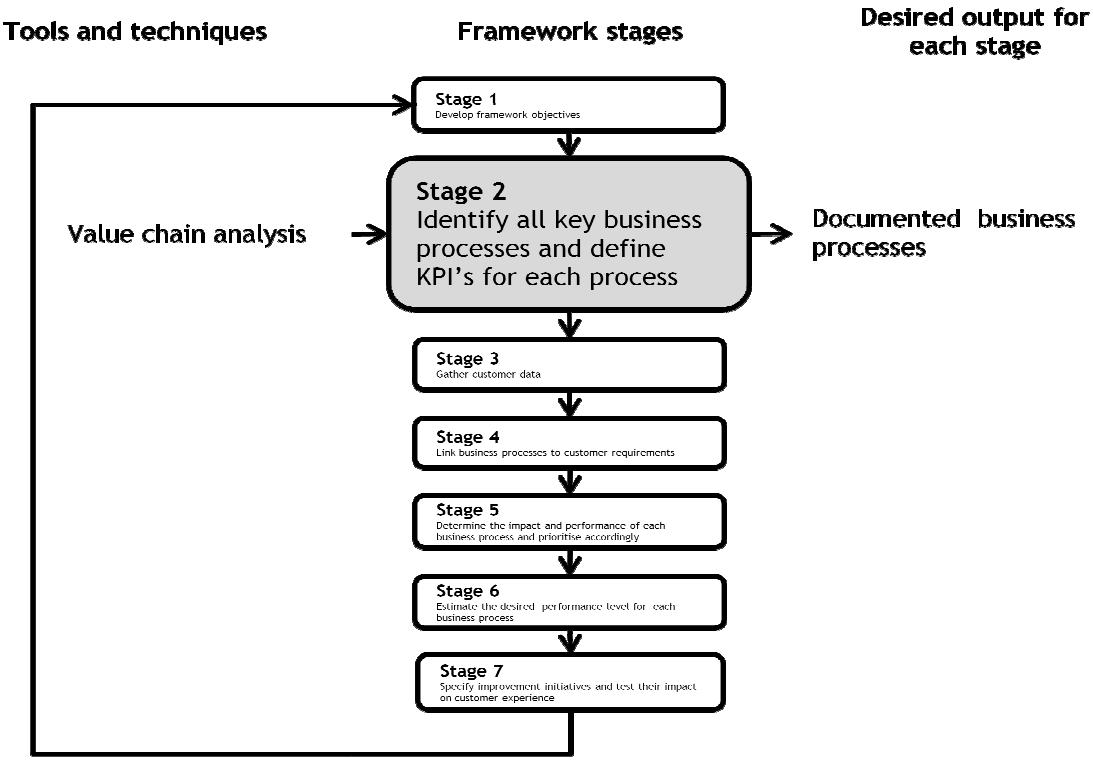
According to Davenport and Short [16], it is important to understand the business vision or the objective that drives the reengineering of a specific business process. The ECEF focuses on improving customer experience through improved business processes. The ultimate objective would thus be to establish where the company went wrong from a customer perspective and where improvement is needed to ultimately improve customer experience. According to Gustafson and Johnson [21], the customer measurement and management system starts with defining the purpose of the system. This includes the strategic planning of the company towards customer experience

measurement. When developing objectives for the specific framework, the company's strategy must be taken into account. The objectives for the ECEF are listed below:

1. Measure customer experience in selected customer segments.
2. Improve customer acquisition and retention in selected customer segments.
3. Align customer experience to relevant business processes.
4. Measure and improve the performance of relevant business processes.

Before the objectives can be documented, the company must decide which market segment to focus on. As mentioned in chapter two, section 2.2.2.1, Gustafsson and Johnson [21] propose that customers be grouped into segments based on customer needs, benefits sought, and/or personal values served. After the customer segmentation has been obtained, companies can, at a strategic level, determine which segments to target and pursue and, as a result which segments to measure, analyse and manage separately. The attractiveness of each segment can, for example, be measured in terms of profit potential, risk, capacity utilization, and competencies required in serving the segment. Companies can also decide to choose the customer segment where customers' complaints and dissatisfaction is the greatest. The strategic choices concerning which market segment to target can be made by conducting group discussions with all relevant stakeholders.

3.2.2 Stage two: Identify key business processes and define KPIs for each process



In this Stage, it is important to identify and document all the business processes in the organization that will have a direct or indirect impact on customer experience in selected market segments. The following model components are used to construct this Stage.

- *Identify the processes to be redesigned* adapted from Business Process Benchmarking defined by Camp [10].
- *Identify the processes to be redesigned* adapted from Business Process Reengineering (BPR) methodology defined by Davenport and Short [16].

When products and services are delivered directly to the customer according to a specific business process, the process can be seen as a customer-facing or a front office process that will have a direct influence on customer experience. These processes must be seen as key business processes and must be documented as such. The service profit chain discussed in chapter two, section 2.2.2.3, highlights the importance of business processes like employee training, workplace design, and job design that have an indirect impact on customer experience through the direct relationship with employee satisfaction. The processes must also be identified as key business processes of the organisation. Various methods can be helpful in assisting managers to identify key business processes. Some of the methods were discussed in chapter two, section 2.3.4.1. According to Chase et al. [13], the value chain provides a structure to capture the linkage of organisational activities that create value for the customer and profit for the firm. The value chain may be useful in identifying all the key business processes needed to deliver value to the customer. Before analysing the value chain of the company, it is important to assess all existing sources of information within the company. If a detailed list of internal business processes does not exist, a value chain analysis can be conducted. After all business processes have been identified, the critical few should be selected for reengineering. Camp [10] states that only 15 to 20 percent of all identified processes can be pursued at any one time as most companies lack the resources to improve all processes simultaneously. The number of resources and time available for the reengineering effort will determine the number of processes chosen to reengineer. According to Davenport and Short [16], the processes chosen must consist of the most important processes or the business processes that conflict with the overall business objective of the firm. The business objective of the ECEF is to enhance customer experience. It is thus vital to identify all the business processes that currently conflict with this objective. According to Bitran [7], analysing data on customer complaints can help to identify the areas and consequently the processes with which customers are not satisfied.

Understanding process performance from a customer perspective is vital for the development of the ECEF, the measurement thereof will be discussed in Stage five. Process performance from a technical perspective is also important to consider and can sometimes differ substantially from the perspective of the customer. Business processes are designed according to the technical perspective, the goal of the ECEF is to link these two perspectives to do the technical redesign of business processes while considering the perspective of the customer. The technical performance of business processes are usually measured by defining Key Performance Indicators (KPIs) specified by the design team. KPIs are specified for each process based on the business objectives for that specific process. Measuring the KPI will give an indication of whether the process still meets the

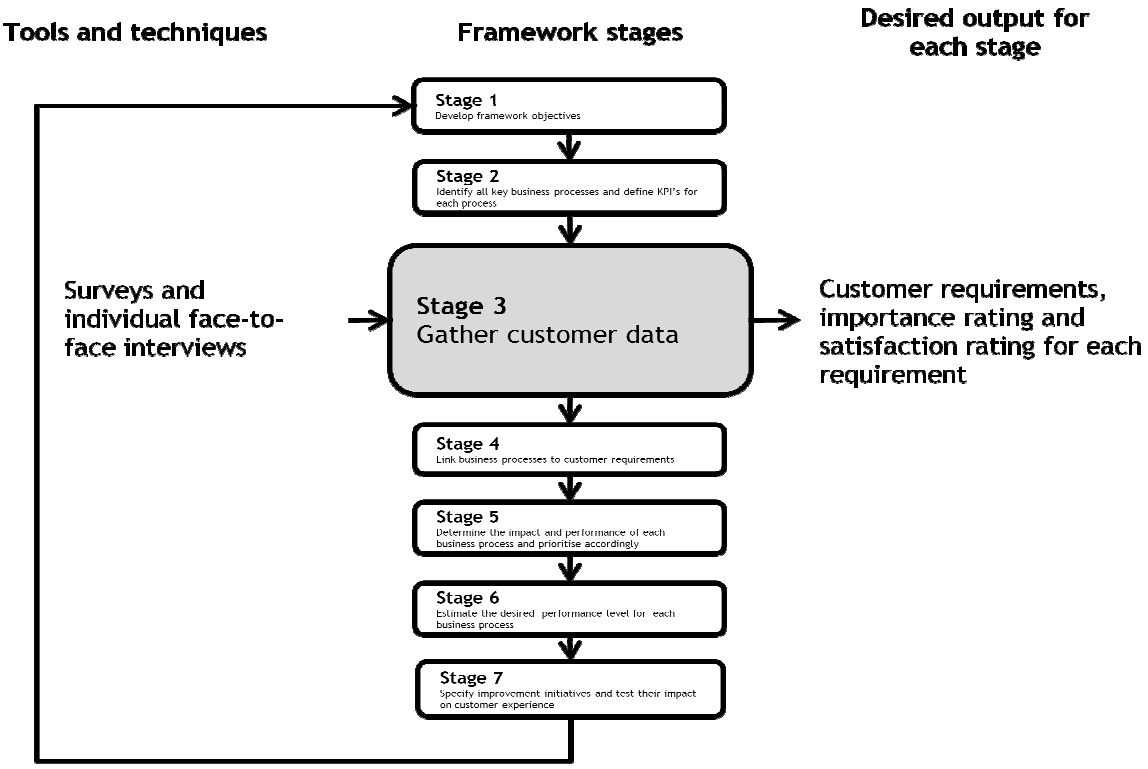
specified business objective. During this Stage of the framework, KPIs for each of the key business processes must be specified. The KPIs must be based on the business objective specified in Stage one and serve as a technical evaluation for each process.

For the purpose of the ECEF, the identified business processes must be documented; this will simplify the process of defining requirements for each process in the next Stage. According to Camp [10], the minimum requirements associated with documenting a process are as follows:

- Picture of the process.
- Narrative description of the process.
- Description of the process steps.
- Description of the practice of the process steps.

The ECEF requires that all chosen processes must be documented in the form of a process map to simplify the analysis of each process.

3.2.3 Stage three: Gather customer data



In this Stage, customer data must be gathered to obtain all the customer requirements together with the importance ratings of the requirements for each business process identified. The following framework components can be associated with this Stage:

- *Building the lens of the customer* adapted from the customer measurement and management system defined by Gustafsson and Johnson [21].

- *Building the quality-satisfaction-loyalty survey* adapted from the customer measurement and management system defined by Gustafsson and Johnson [21].

It is important to identify existing sources of information within the company. Relevant secondary information may be compiled and assessed to determine whether the information can be used as input for the QFD procedure. If relevant data does exist, it should be used instead of conducting new surveys since this will save time and money. If relevant secondary data does not exist, new information should be gathered. In chapter two, Meyer et al. [31] specify three patterns of customer information:

- *Past patterns*, which are transactions occurring in large numbers and completed by individual customers.
- *Present patterns*, where the continuing relationship with the customer are envisioned.
- *Potential patterns*, which are uncovered by probing for opportunities.

Potential pattern information often emerges from interpretation of customer data as well as observation of customer behaviour and may be used to inform the product or service development process [31]. The goal of the ECEF is to redesign business processes to enhance customer experience. Potential pattern information derived from customer data will thus be useful to obtain. For a company to obtain such information, customer experience must be measured. It is vital to obtain a detailed view of how customers currently view the processes through which they receive a specific product or service. According to Gustafsson and Johnson [21], building the lens of the customer will assist in obtaining this detailed view. By using qualitative research in the form of surveys and interviews customer experience and customer expectation can be measured. The first step in this Stage of the framework is to decide on a suitable method for gathering customer data. Data collection methods can be differentiated based on various factors. Hunter [24] describes eight types of data collection methods, as discussed in chapter two, section 2.2.2.2. The method chosen will depend on various factors such as [24]:

- Time available for collecting data.
- The type of customer data required.
- The topic associated with the data.
- The cost associated with the data collection method.
- The advantages and disadvantages associated with each method.

Choosing a suitable data collection method will also depend on the specific industry environment, the current customer base, and the sample size chosen from the customer base. For this specific framework, customer data must be obtained about the needs or requirements of the customer as

well as importance ratings of the needs. Ramaswamy [35] specified four data collection methods that are particularly useful in obtaining customer needs:

- Surveys and market research.
- Group interviews.
- One-on-one interviews.
- Observation.

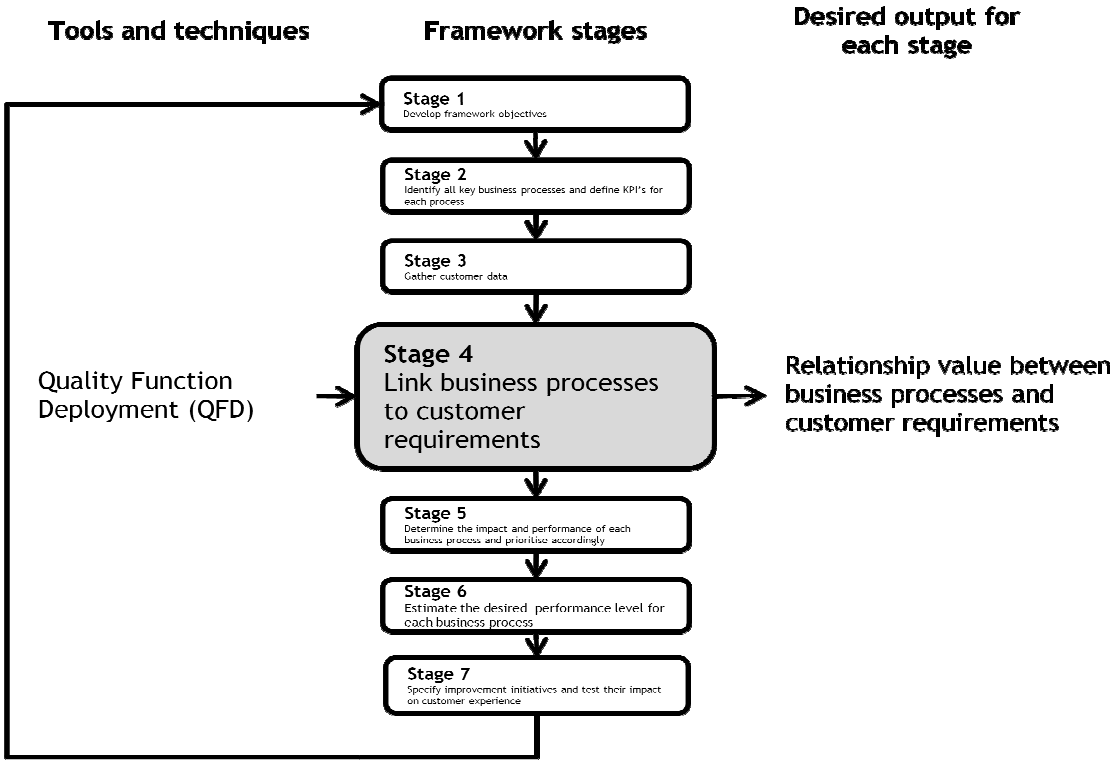
Depending on the factors discussed above, one of the techniques may be used to obtain data for the ECEF. As discussed in chapter two, Chan et al. [11] propose the use of focus groups or individual interviews. Griffin and Hauser [22] suggest that individual face-to-face interviews may be more cost effective than focus groups. Only 20 to 30 customers should be interviewed to obtain 90 to 95 percent of all the possible customer needs [22]. From this, it may be concluded that individual face-to-face interviews will be the best approach in obtaining customer needs. Low level customer requirements identified by the customer must be grouped into high level customer requirements to ensure a manageable set of requirements that will serve as input to the QFD diagram. Grouping customer needs into categories will help to analyse the needs [11]. The Affinity Diagram or cluster analysis may be used to group customer requirements [11].

To ensure a complete set of requirements, three pervasive elements of service encounters developed by Bitran [7] may be considered. The elements are the areas in the service process in which customer requirements should be measured. Customer requirements for each phase of service delivery should be obtained in terms of waiting time, personal interaction, and expectations and perceptions of the customer. During this Stage, it is also important to establish the importance ratings of the customer requirements. According to Gustafsson and Johnson [21], importance measures can be obtained directly from the customer or may be derived statistically from attribute performance ratings of overall satisfaction. The three types of direct measures commonly used in marketing research are discussed in chapter two. Taking into account that QFD is used to relate the customer requirements to business processes, the *direct scale rating* as discussed in chapter two is the most appropriate technique for obtaining importance ratings. In the QFD process, relative importance ratings associated with customer needs are usually measured using a 5-or 7- or 9-point scale, where 5 represents moderate importance and 9 represents extreme importance. More elaborate scales, such as the 1-to-10 scale and anchored scale, may also be used [22]. The method proposed for measuring the direct scale rating of relative importance ratings associated with customer needs is mail/telephone surveys, since an adequate number of customers must be surveyed to provide statistical significance [11]. The importance ratings are measured by asking customers to reveal their perceptions on the relative importance of the requirements and then averaging their perceptions [11]. Information on the performance of each requirement must also be obtained during this Stage. Satisfaction ratings may be obtained by asking the customers to rate the

relative performance of the company on each requirement and then to aggregate the customers' ratings [11].

After the appropriate data collection method is chosen, the next step is to plan the process for gathering the above mentioned customer information. The interview used for gathering the information must be designed and consensus on the content of the interview must be obtained from all the relevant stakeholders. The process for CIT research, defined by Gustafsson and Johnson [21] may be used as a process for gathering customer needs. The process is discussed in section 2.2.2 as a process that is useful in gathering customer requirements and grouping the requirements at a higher level. The customer data gathering process shown in Figure 3.7 is used for the ECEF. The process is based on the process for CIT research.

3.2.4 Stage four: Link business processes to customer requirements



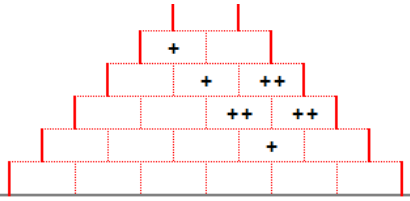
In this Stage, the business processes identified in Stage two must be linked to their associated customer requirements identified in Stage three. The following framework components are used to construct this Stage.

- *Link business processes to business goals that leverage priorities* adapted from Business Process Benchmarking defined by Camp [10].

In chapter two, section 2.3.4.2, the strategy map defined by Kaplan and Norton [27], better known as the Balanced Scorecard is identified. The strategy map is very useful in mapping the key business processes and the high-level customer goals of an organization. It however fails to describe the

relationships between them in sufficient detail. The balanced scorecard lacks the ability to relate business processes to detailed customer requirements thereby creating the opportunity to describe the relationships using different tools. The tree diagram and QFD as discussed in chapter two, can be used to establish the relationships. In section 2.3.4.2, the tree diagram is visualized on its side with the organisation's goals representing the roots of the tree. From the roots there are an increasing number of branches that cascade outwards in increasing levels of detail and understanding. The tree diagram is useful in visually displaying the relationships between the customer perspective and the internal business process perspective as seen in the strategy map. The quantity of information displayed in the tree diagram is however limited. The tree diagram only identifies processes that have a relationship with a dissatisfier, consequently it fails to display the relationship between all key business processes and organisational goals and only focuses on processes of low performance. QFD is not limited to processes with low performance but can relate any identified set of business processes to any number of requirements. The information obtained from QFD is sufficient to establish whether the relationship between a given process and a set of requirements is a weak or strong relationship. According to Youssef and Zairi [44], there are also many other benefits associated with QFD as discussed in section 2.4.1. Such benefits together with the application of QFD to non-tangible services like business process development, makes it the appropriate tool for this specific framework.

This Stage consists of the QFD diagram with relationship mapping between identified business processes and customer requirements. According to Chan et al. [12], the relationship value defined in the QFD must be determined carefully and collectively by technicians. The technicians referred to by Chan et al. [12] can be any group of people with the necessary knowledge of the set of business processes defined. The relationship can be determined by analysing to what extent the business process could technically relate to and influence the customer requirement [12]. The relationship is usually defined using a 1-or 3- or 9-point scale, where one represents a weak relationship, three represents a moderate relationship and nine represent a strong relationship. The relationship can also be represented by a 1-10 point scale where one represents a weak relationship and 10 a strong relationship. The relationship values can be defined during a group discussion or a workshop with the relevant technicians. Figure 3.2 shows an example of a generic QFD diagram. The relationship value is specified by a 1-or 3- or 9-point scale depending on the strength of the relationship and can be seen beneath the business processes. In the example there exists a very strong relationship between "process A" and "customer requirement 1". It indicates that process A will have an impact on customer requirement 1, the activities performed during process A will determine whether customer requirement 1 will be satisfied or not.



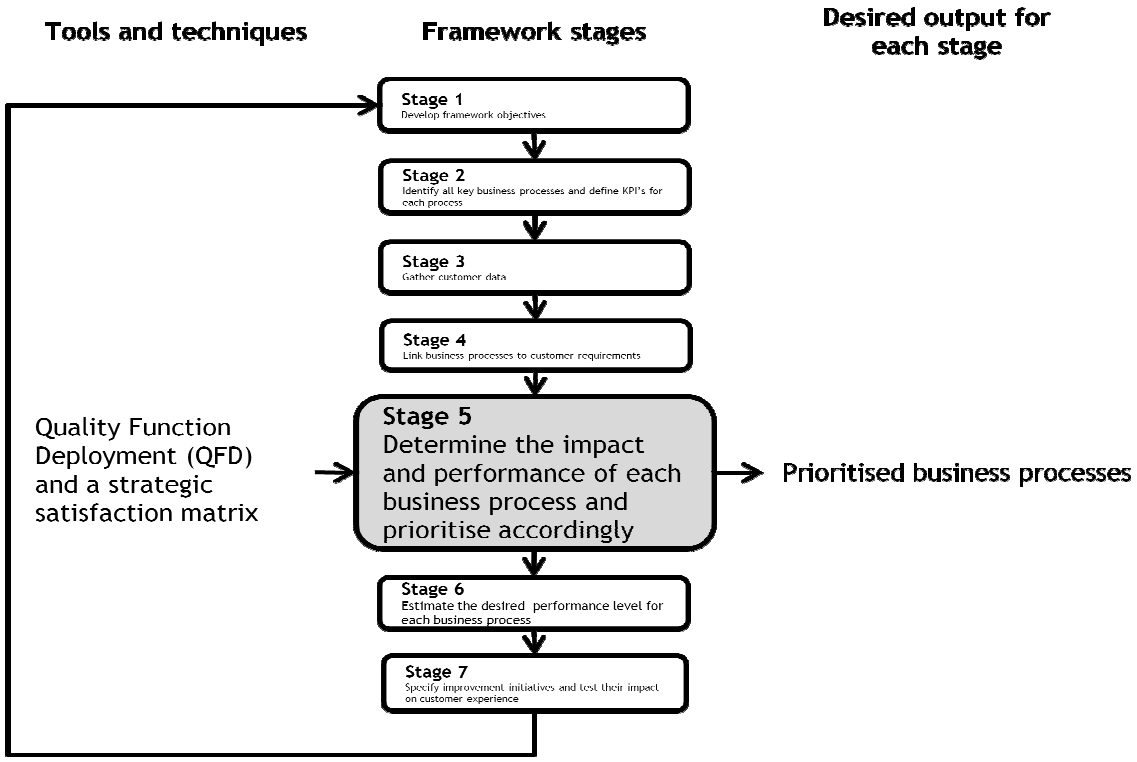
		Core Processes							Competitive Evaluation			
									Satisfaction rating			
Customer Requirements	**Importance Rating**	Process A	Process B	Process C	Process D	Process E	Process F	Process G	Producing company	Competitor 1	Competitor 2	Target
Customer requirement 1	5	9							25%	80%	60%	100%
Customer requirement 2	3					1			50%	90%	70%	100%
Customer requirement 3	3			3					20%	85%	50%	100%
Customer requirement 4	3		9						40%	50%	75%	100%
Customer requirement 5	3						3		60%	79%	60%	100%
Customer requirement 6	1				9				20%	65%	47%	100%
Customer requirement 7	5		3						40%	87%	69%	100%
Customer requirement 8	5							9	20%	84%	60%	100%
Customer requirement 9	1				1				20%	57%	50%	100%
Customer requirement 10	5							1	20%	60%	60%	100%
Customer requirement 11	3					9			80%	70%	80%	100%
Customer requirement 12	3			1					60%	90%	50%	100%
Customer requirement 13	1	3							60%	40%	90%	100%
Raw score		48	42	12	10	30	9	50				
Relative %		24%	21%	6%	5%	15%	4%	25%				
Importance Rank		5	4	1	1	3	1	5				

Importance Rating:
1 = Low Importance
3 = Moderate Importance
5 = High Importance

Relationships:
9 = Strong
3 = Moderate
1 = Weak
0 or Blank = No Relationship

Figure 3.2 - QFD relating business processes to customer requirements

3.2.5 Stage five: Prioritise business processes based on their impact and performance



After the linkage between the customer perspective and the internal business perspective is established, the following step according to Camp [10] is to prioritise the business processes. This Stage will be carried out by making use of the following model components:

- *From information to decisions (priority setting)* adapted from the customer measurement and management system defined by Gustafsson and Johnson [21].
- *Prioritise business processes to affect priorities and improve business results* adapted from Business Process Benchmarking defined by Camp [10].

According to Gustafsson and Johnson [21] the areas in the business that can be seen as priority to improve are those that are important to customers and in which, at the same time, the company is performing poorly. Chapter two suggests that managers should identify the priority areas of high importance and low performance. For the purpose of the ECEF, business processes can be categorised and displayed according to their importance and performance by making use of the strategic satisfaction matrix defined by Gustafsson and Johnson [21]. This matrix was initially defined to assist managers in prioritising product and service attributes that need improvement, but may also be particularly useful in prioritising business processes. The business processes of the company may be divided into four strategic categories depending on their impact on customer satisfaction as well as their performance. In the previous chapter, two methods, the tree diagram and QFD, are identified from existing literature that can be used to prioritise business processes according to the strategic categories. Although the tree diagram is useful to a certain extent in

identifying processes with low performance, it cannot be used to prioritise processes based on their impact on the customer. The approach suggested by Camp has various shortcomings such as the lack of information regarding the strength of the relationships or the importance of the dissatisfiers, where dissatisfiers can also be seen as a requirement that has not been met. It is vital to grasp the magnitude of the impact a specific process will have on the requirements of relevant stakeholders. This may be determined by the strength of the relationship between the process and the requirements, i.e. the stronger the relationship, the higher the impact. The importance rating of each requirement, not limited to dissatisfiers, is also vital since it is more important to improve processes that have an impact on customer requirements with high importance from the stakeholder's perspective. To prioritise business processes, by linking the processes to organisational goals, a tool is needed that can display the relationship together with the strength of the relationship and the importance of each goal. The tool has been identified as QFD.

The use of QFD to measure process importance from a customer perspective

After Stage four has been completed and all the business processes are related to their associated requirements, prioritisation of business processes based on their impact on customer experience is automatically completed. In Figure 3.3, the row labeled "Raw Score" shows the total score each process has obtained and is a direct representation of the impact the process has on customer requirements. Calculation of the "Raw Score" is given by equation (1).

The following variables are assigned to elements identified in Figure 3.2:

$y_i \triangleq$ *Importance rating of requirement i,* $\forall i \in \{1…n\}$

$x_{ij} \triangleq$ *Relationship value between requirement i and process j,* $\forall i \in \{1…n\}$, $j \in \{1…n\}$

The above variables can then be used to calculate the "Raw Score"

$$Raw\ Score = \sum_{i=1}^{n} y_i x_{ij} \quad \forall j \in \{1…n\} \tag{1}$$

For the purpose of the ECEF, the score will be used to prioritise business processes based on their impact. According to the example, process G is the process with the highest priority. Process G can be assigned to the strategic satisfaction matrix in one of the "High impact" categories depending on the performance of this process.

The performance of a process from a customer perspective can be measured by obtaining and analysing data from the customer. Chapter two, section 2.2.2.1, specifies that data should be obtained about the current experience of the customer to identify areas where the company performs below expectation. The information can also be obtained from customer complaints,

where a specific complaint can be related to a specific business process. The tree diagram can be used as a tool to relate complaints to business processes. According to Camp [10], the tree diagram can serve as the base for making line-of-sight decisions on which processes would leverage the goal most and therefore be the priority process for improvement. Unfortunately, it can become a very long and complex task. A more efficient method is presented by QFD.

The use of QFD to measure process performance from a customer perspective

As discussed in section 2.4.2, the traditional QFD provides space for a performance rating on how well the company as well as competitors satisfy a specific need. The rating on how well the company satisfies a specific need can be referred to as the satisfaction rating for that specific need or requirement and can be obtained from the customer through mail/telephone surveys [12]; the rating is obtained in Stage three. The rating on how well the competitors satisfy a specific need is not relevant for this Stage and is obtained in Stage six. Based on the satisfaction rating specified by the customer, the company will be able to identify the process performance from a customer perspective. This may be done by expanding on the traditional concept of QFD and using this tool to obtain a quantitative performance score for each process. The process performance can be determined by calculating the "Current score" as well as the "Target score" and comparing the two scores to obtain the "Process performance". The "Current Score" is calculated with the current satisfaction ratings specified by the customer for the producing company. The "Target score" can be determined by using the target customer satisfaction ratings. For demonstration purposes, the target rating is specified as 100 percent performance for this particular example. The "Target Score" should be specified by the producing company and will depend on the amount of degradation in customer satisfaction that they are willing to accept. Figure 3.3 shows an illustrative example where the current as well as the target score for business processes are determined. The "Target score" is calculated by using equation (2):
The following additional variable may be assigned according to Figure 3.3:

$z_i \triangleq$ *Target satisfaction rating of requirement* i , $\forall i \in \{1 \ldots n\}$

$$\text{Target Score} = \sum_{i=1}^{n} y_i \, x_{ij} \, z_i \qquad \forall j \in \{1 \ldots n\} \tag{2}$$

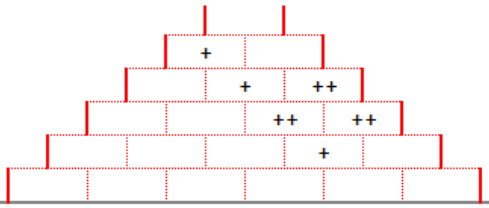
Figure 3.3 presents the QFD diagram where process performance is determined by calculating the "Current Score" based on actual satisfaction ratings from the producing company. The "Current Score" and "Process performance" is calculated using equation (3) and (4).

An additional variable may be assigned according to Figure 3.3:

$s_i \triangleq$ *Satisfaction rating for the producing company of requirement* i , $\forall i \in \{1 \ldots n\}$

$$Current\ Score = \sum_{i=1}^{n} y_i\, x_{ij}\, s_i \qquad \forall j \in \{1 \ldots n\} \tag{3}$$

$$Process\ Performance = \frac{Current\ Score}{Perfect\ Score} \tag{4}$$



		Core Processes							Competitive Evaluation			
									Satisfaction rating			
Customer Requirements	Importance Rating	Process A	Process B	Process C	Process D	Process E	Process F	Process G	Producing company	Competitor 1	Competitor 2	Target
Customer requirement 1	5	9							25%	80%	60%	100%
Customer requirement 2	3					1			50%	90%	70%	100%
Customer requirement 3	3			3					20%	85%	50%	100%
Customer requirement 4	3		9						40%	50%	75%	100%
Customer requirement 5	3						3		60%	79%	60%	100%
Customer requirement 6	1				9				20%	65%	47%	100%
Customer requirement 7	5		3						40%	87%	69%	100%
Customer requirement 8	5							9	20%	84%	60%	100%
Customer requirement 9	1				1				20%	57%	50%	100%
Customer requirement 10	5							1	20%	60%	60%	100%
Customer requirement 11	3					9			80%	70%	80%	100%
Customer requirement 12	3			1					60%	90%	50%	100%
Customer requirement 13	1	3							60%	40%	90%	100%
Raw score		48	42	12	10	30	9	50				
Relative %		24%	21%	6%	5%	15%	4%	25%				
Importance Rank		5	4	1	1	3	1	5				
Current score		13.05	16.8	3.6	2	23.1	5.4	10				
Target score		48	42	12	10	30	9	50				
Process performance		27%	40%	30%	20%	77%	60%	20%				

Figure 3.3 - Prioritising processes according to their performance from a customer perspective

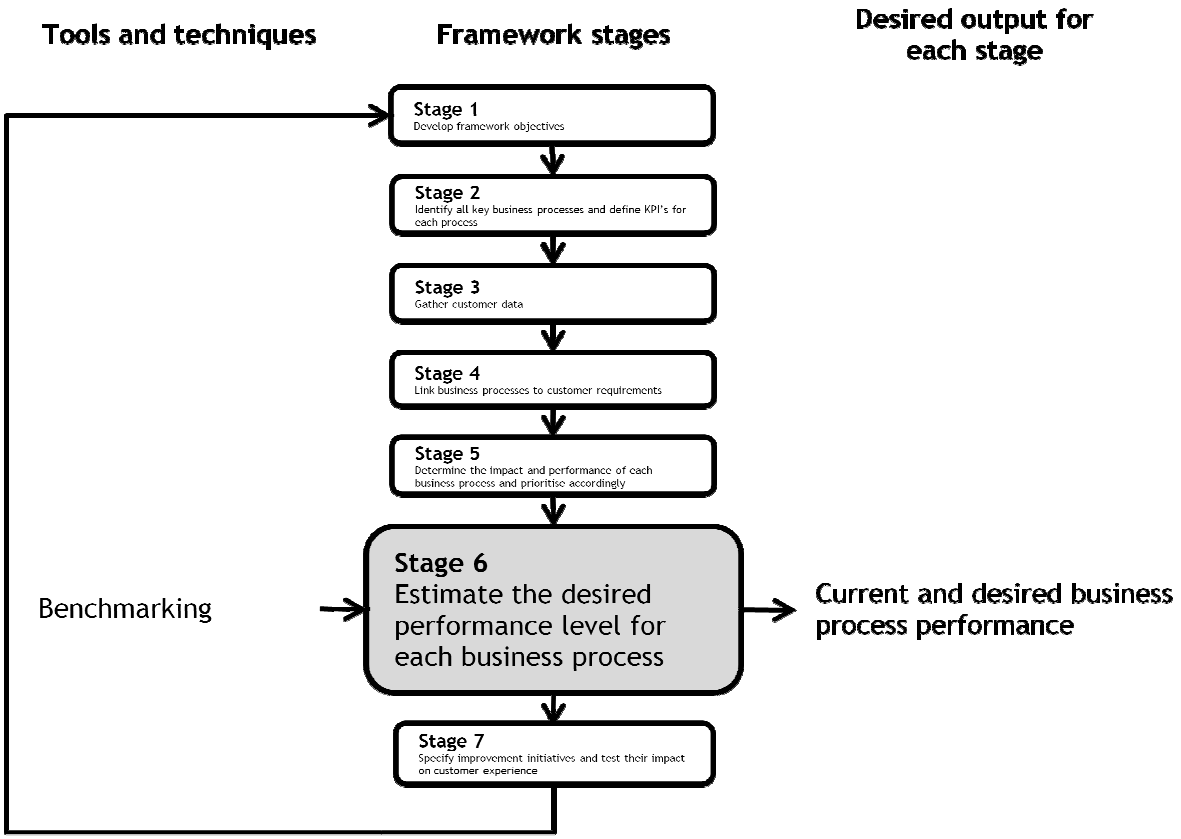
The critical business processes identified in Stage two, that form part of the QFD diagram in Figure 3.3, can now be prioritised based on the process performance calculated in this Stage. Figure 3.3 shows process D and process G has a performance score of 20 percent, making them priority to improve due to their low performance. Process G can be placed on the strategic satisfaction matrix in the "High impact and low performance" category. It is vital to remember that the "Current Score" cannot be used to prioritise business processes based on performance since each process has a different number of requirements associated with it. It is more likely that the process with the most requirements will end up with the highest "Current Score" and it gives no indication of how that process actually performs.

According to Gustafsson and Johnson [21], there are also other factors to consider when prioritising business processes. The factors include:

1) Paying attention to strategies and competencies.
2) Benchmarking impact and performance.
3) Involving management in considering cost.
4) Establishing where the market is heading.

QFD can be used to explicitly consider cost information when translating the voice of the customer into appropriate business processes. QFD can also be used for benchmarking, according to Chase et al. [13]; one of the steps in the QFD procedure is to ask customers to rate the company products against that of the competitor. This helps the company to understand the performance of their products in relation to others. This can also be valid for business processes where customers can be asked to rate the service they received against that of the competitor, this will be discussed in more detail in the next section. From this, it is clear that QFD, if applied correctly, may be useful in prioritising business processes.

3.2.6 Stage six: Determine the desired performance level for the business processes



In this Stage, the desired performance level from a customer perspective must be estimated prior to attempting process improvements. The following existing model and framework component will be used:

- *Specifying design performance standards* adapted from the service design and management model defined by Ramaswamy [35].
- *Analysing the quality of the customer interface* defined by Bitran [7].

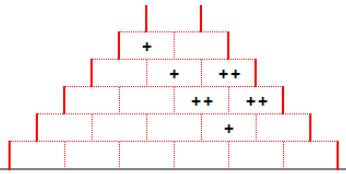
As seen in section 2.4.3, Ramaswamy [35] proposes the use of QFD as the most accurate method to determine the desired performance level. It involves estimating the desired performance level indirectly by examining the extent to which the performance of similar services in the market satisfies customer needs. The first step associated with this Stage is to identify competitors that deliver similar products and services to the market. Customers can be asked to rate the service delivered by the competitors on a scale from 1-10. The service provided by the producing company is already measured in Stage five. The desired performance level can then be estimated by looking at the customer benchmark and the actual performance or technical benchmarks of the competitor. The expectations of the customers are a critical factor to consider when determining desired performance [7]. As seen in chapter two, the following methods may be used to understand the expectations of the customer:

- Customer complaints.
- Customer desires in similar industries.
- Customer panels.
- Transaction based or key client studies.

It is concluded that Customer desires in similar industries or customer benchmarks and the actual performance or technical benchmarks of the competitor can be very useful to determine desired performance. In this Stage, it is vital to obtain as much information as possible about the satisfaction ratings of customer requirements for the competitors. A mail/telephone survey can be used to obtain satisfaction ratings, since an adequate number of customers must be surveyed to provide statistical significance [12]. After the satisfaction ratings have been obtained, a technical benchmark must be specified for each process. The technical benchmarks can be obtained by measuring the KPI, specified in Stage two for each process, for the producing company as well as the competitors. The KPIs are based on the business objective of enhanced customer experience and can thus directly be linked to the customer requirements associated with each process. Figure 3.4 is an example of a QFD diagram where total process time can be seen as the technical benchmark or KPI specified for process B. As shown in Figure 3.4, the total process time for competitor two is four hours. The satisfaction rating obtained from customers for the associated requirement is 75 percent, which is much greater than the satisfaction rating obtained for the producing company as well as competitor one. It may thus be assumed that four hours is closer to the performance level desired by customers. The technical benchmarks for competing companies

may be obtained through mystery shopping or public data sources. The technical benchmarks together with the satisfaction rating obtained from customers can then be used to establish the desired performance level.

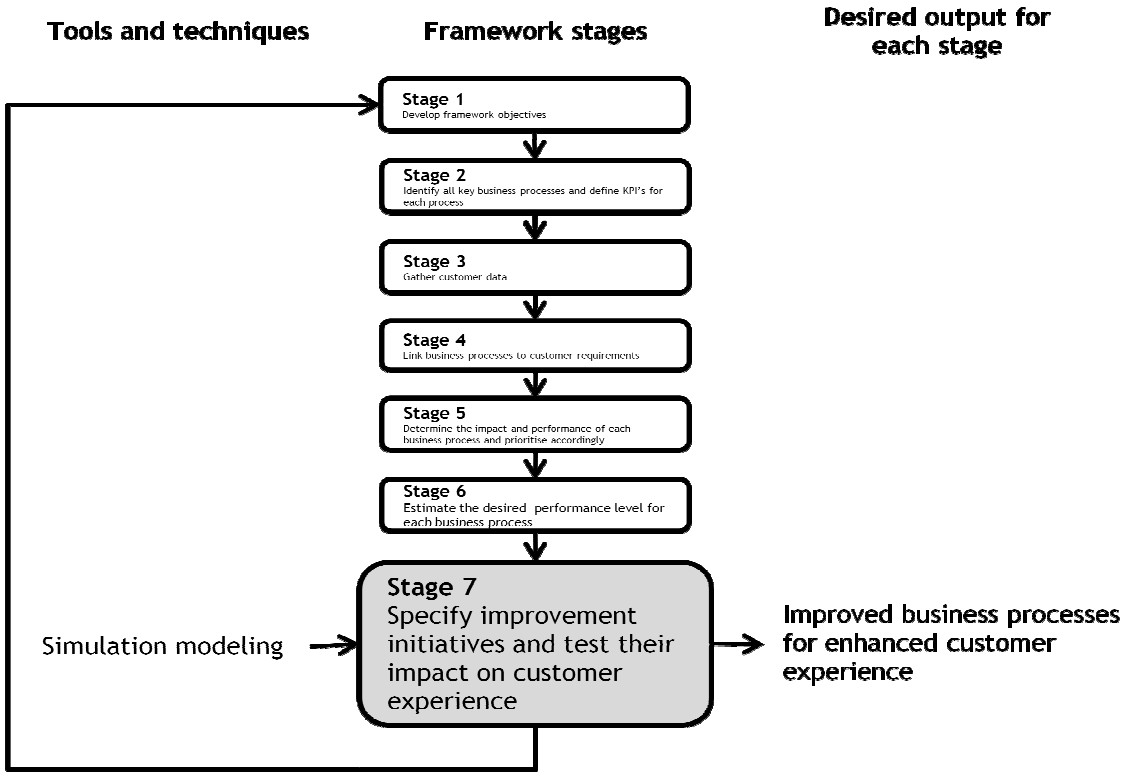
A target performance level as well as a lowest perceived performance level must also be specified. The two performance levels may be obtained by interviewing customers. The target performance level is that level of performance that corresponds to the target satisfaction rating. The lowest perceived performance level is that level of performance that corresponds to the lowest perceived satisfaction rating, it is thus the worst performance or the lowest perceived performance where customer satisfaction is at its lowest. The difference between the desired performance level and the target performance level is that the desired performance level specifies the minimum performance level at which Company A must perform to still be competitive. The target performance level specifies the best possible performance that will guarantee the target satisfaction of the customer.
It is however not always possible to reach or maintain the target performance level, but it is necessary to reach the desired performance level. At the end, the design performance level will lie somewhere between the target performance level and the desired performance level. The difference between the desired performance level from a customer perspective and the design performance level will depend on the degradation in customer satisfaction that the company is willing to accept.



		Core Processes							Competitive Evaluation				
									Satisfaction rating				
Customer Requirements	**Importance Rating**	Process A	Process B	Process C	Process D	Process E	Process F	Process G	Producing company	Competitor 1	Competitor 2	Target	Lowest perceived
Customer requirement 1	5	9							25%	80%	60%	100%	0%
Customer requirement 2	3					1			50%	90%	70%	100%	0%
Customer requirement 3	3			3					20%	85%	50%	100%	0%
Customer requirement 4	3		9						40%	50%	75%	100%	0%
Customer requirement 5	3						3		60%	79%	60%	100%	0%
Customer requirement 6	1				9				20%	65%	47%	100%	0%
Customer requirement 7	5		3						40%	87%	69%	100%	0%
Customer requirement 8	5							9	20%	84%	60%	100%	0%
Customer requirement 9	1				1				20%	57%	50%	100%	0%
Customer requirement 10	5							1	20%	60%	60%	100%	0%
Customer requirement 11	3					9			80%	70%	80%	100%	0%
Customer requirement 12	3			1					60%	90%	50%	100%	0%
Customer requirement 13	1	3							60%	40%	90%	100%	0%
Raw score		48	42	12	10	30	9	50					
Relative %		24%	21%	6%	5%	15%	4%	25%					
Importance Rank		5	4	1	1	3	1	5					
Current performance		13.1	16.8	3.6	2	23.1	5.4	10					
Target performance		48	42	12	10	30	9	50					
Relative %		27%	40%	30%	20%	77%	60%	20%					
Technical benchmark	Producing company	2	48	30%	3	6	24	5					
	Competitor 1	0.5	24	80%	0.5	8	16	1					
	Competitor 2	1	4	50%	1.5	6	22	2					
	Target performance	0.3	2	90%	0.2	5	2	0					
	Lowest perceived performance	8	60	10%	8	20	48	20					
Key performance indicators		In store process time (hours)	Total process time	Staff efficiency	Time in system (hours)	Total cost to process (% of total)	Time to respond (hours)	Lead time to order fulfillment (days)					

Figure 3.4 - Determining the desired performance level for each process with the use of QFD

3.2.7 Stage seven: Specify improvement initiatives and test their impact on customer experience



The following model components were used to construct Stage seven:

- *Understand and measure the existing processes* adapted from business Process Reengineering (BPR) methodology defined by Davenport and Short [16].
- *Design and build a prototype of the new process* adapted from Business Process Reengineering (BPR) methodology defined by Davenport and Short [16].
- *Analysing the quality of the customer interface* defined by Bitran [7].

This Stage is concerned with specifying and testing various process improvement initiatives that may enhance customer experience by satisfying customer requirements. The satisfaction ratings determined in Stage five, give a clear indication of the areas where processes should be improved. The areas may typically include the customer requirements with a low satisfaction rating. After the areas are identified, the next step is to generate a few alternative improvement solutions through workshops with both marketing as well as process specialists. For example if customer waiting time is identified as an improvement area, possible solutions could include increasing employee knowledge, increasing the number of sales consultants, or increasing system capability. The alternatives may then be analysed and, if possible, simulated to identify the best possible solution. For the purposes of the ECEF, simulation modelling is used to test the impact of some of the improvement initiatives on customer experience. As seen in chapter two, ARENA Basic simulation software is sufficient when modelling and analysing business, service or manufacturing processes or

flows that are not material handling intensive. For the purpose of the ECEF ARENA is used to simulate the business processes.

The simulation models focus on improving the KPIs, specified for each process according to a specific business objective. The KPIs should be measured for the producing company as well as the competitors and the measurement is known as the technical benchmark for that specific process. Each technical benchmark can be related to one or more of the customer requirements associated with that process through the relationship values specified in Stage four. Simulation modelling will help in identifying and choosing improvement initiatives that may improve the technical benchmark for each process. The satisfaction ratings will also be improved as a result of the relationship between the technical benchmarks and the customer requirements. The increase in satisfaction for each requirement will depend on the performance/satisfaction function associated with that specific KPI and customer requirement. Figure 3.5 illustrates this phenomenon by showing the relationship between the KPI, total process time, and the satisfaction rating associated with customer requirement 4.

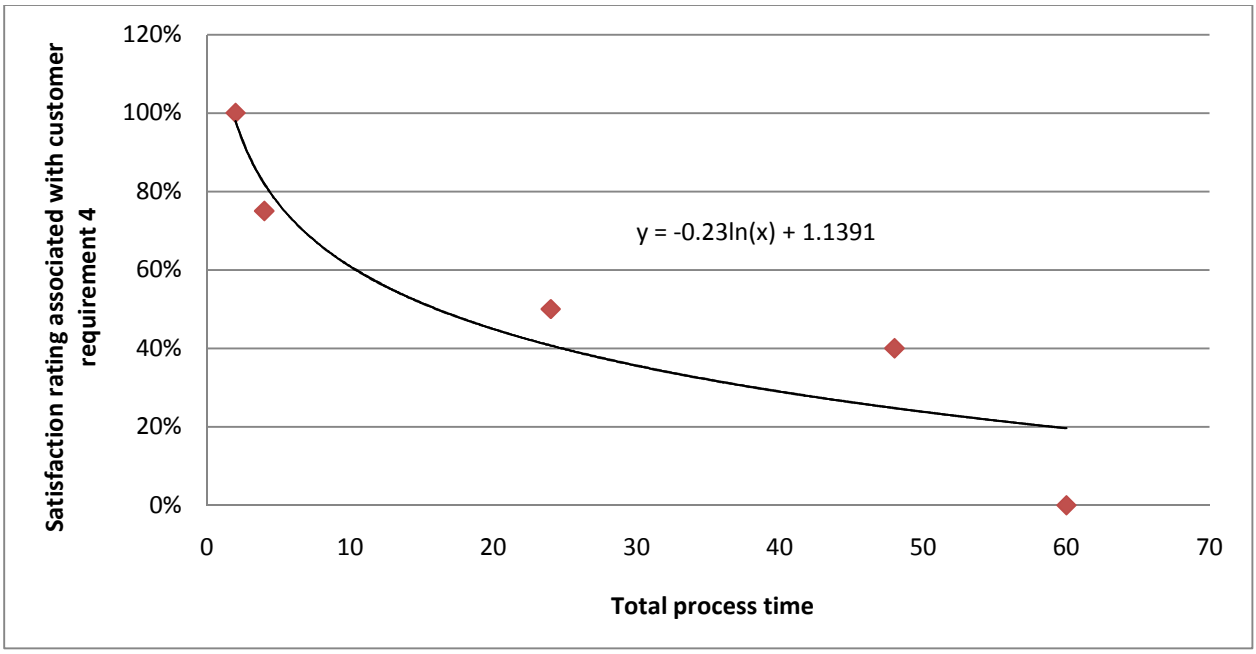
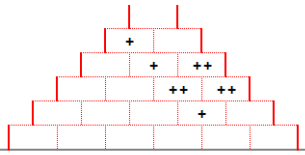


Figure 3.5 - Relationship between process KPI and customer satisfaction

A performance/satisfaction function may be determined for each process based on the technical benchmarks of each process with associated satisfaction ratings. The performance level of each KPI is measured for all three companies and the target as well as the lowest perceived performance is determined in Figure 3.4. The performance levels are shown in Figure 3.4 as the technical benchmark. The satisfaction ratings for the associated customer requirements are also shown in Figure 3.4. The five performance ratings together with the five satisfaction ratings for each KPI may be plotted graphically to determine the performance/satisfaction function. The function may be obtained by fitting least squares to the data points. For demonstration purposes a logarithmic trend

line is assumed. The use of only five data points may cause the performance/satisfaction function to be unreliable. To make the function more reliable, customers may be surveyed to obtain forecasted satisfaction ratings for alternative performance levels. The additional data points obtained from the survey may then be plotted together with the five data points available to obtain a more reliable function. Figure 3.6 illustrates the satisfaction rating (y) associated with the improved technical benchmark obtained from simulation modelling. As seen from the figure the satisfaction rating associated with customer requirement 4 increases from 40 percent to 77 percent with a decrease in total process time from 48 hours to 5 hours.



		Core Processes							Competitive Evaluation						
									Satisfaction rating						
Customer Requirements	Importance Rating	Process A	Process B	Process C	Process D	Process E	Process F	Process G	Producing company	Competitor 1	Competitor 2	Target	Lowest perceived	y	
Customer requirement 1	5	9							25%	80%	60%	100%	0%		
Customer requirement 2	3					1			50%	90%	70%	100%	0%		
Customer requirement 3	3			3					20%	85%	50%	100%	0%		
Customer requirement 4	3		9						40%	50%	75%	100%	0%	77.00%	y = -0.23ln(x) + 1.1391
Customer requirement 5	3						3		60%	79%	60%	100%	0%		
Customer requirement 6	1				9				20%	65%	47%	100%	0%		
Customer requirement 7	5		3						40%	87%	69%	100%	0%		
Customer requirement 8	5							9	20%	84%	60%	100%	0%		
Customer requirement 9	1				1				20%	57%	50%	100%	0%		
Customer requirement 10	5							1	20%	60%	60%	100%	0%		
Customer requirement 11	3					9			80%	70%	80%	100%	0%		
Customer requirement 12	3			1					60%	90%	50%	100%	0%		
Customer requirement 13	1	3							60%	40%	90%	100%	0%		
Raw score		48	42	12	10	30	9	50							
Relative %		24%	21%	6%	5%	15%	4%	25%							
Importance Rank		5	4	1	1	3	1	5							
Current performance		13.1	16.8	3.6	2	23.1	5.4	10							
Target performance		48	42	12	10	30	9	50							
Relative %		27%	40%	30%	20%	77%	60%	20%							
Technical benchmark	Producing company	2	5	30%	3	6	24	5							
	Competitor 1	0.5	24	80%	0.5	8	16	1							
	Competitor 2	1	4	50%	1.5	6	22	2							
	Target performance	0.3	2	90%	0.2	5	2	0							
	Lowest perceived performance	8	60	10%	8	20	48	20							
Key performance indicators		In store process time (hours)	Total process time	Staff efficiency	Time in system (hours)	Total cost to process (% of total)	Time to respond (hours)	Lead time to order fulfillment (days)							

Figure 3.6 - Testing the impact of improvement initiatives on customer satisfaction with the use of QFD

For the purpose of the ECEF, simulation modelling will be used to test the impact of some of the improvement initiatives on customer experience. This is done since flowcharting tools do not have sufficient capability. Section 2.5 asserts that most process modelling tools focus on modelling the current state of the business and lack the ability to accurately predict the outcome of proposed changes to the process. Gladwin and Tumay [20] state that static modelling tools are deterministic and independent of process sequence and can thus be deemed insufficient. The tools are not able to model physical elements of a system such as the facility or office layout and the flow of entities through the facility. Accordingly simulation tools are the only tools that provide ways to model entity flow and dynamic behaviour of business processes. Most business processes are represented by logically related sequential tasks and can best be modelled using discrete-event simulation. Section 2.5.1 suggests that discrete-event simulation is when the operation of a system is represented as a chronological sequence of events. Each event occurs at an instant in time and marks a change of state in the system. The improvement initiatives defined can be seen as an event that marks a change in the state of the system. The impact of the change can then be measured and monitored.

However, not all improvement initiatives can be tested using simulation modelling. Improvement initiatives defined for improving personal interaction between server and customer for example improving friendliness of staff, knowledge and competence of staff etc. cannot be tested by means of simulation modelling. This is due to the qualitative, subjective and psychological nature of the services. According to Bitran [7], the services can be seen as intangible, heterogeneous and simultaneous. The intangible nature of the services makes it difficult to measure; this is due to the psychological nature that is not often observable, much less measurable. The services are also heterogeneous because customers as well as sales consultants are diverse individuals that cannot be completely standardised and controlled. Simultaneity refers to the fact that services are produced and consumed at the same time. It is not possible to inspect the service before it is delivered as management cannot be present at all times. They have no other choice but to rely on the workers to conduct customer interaction satisfactorily [7]. According to Bitran [7], psychology greatly affects customer expectation and consequently customer experience. The psychological factors must be taken into account when training employees to service the customer. Customer requirements regarding the friendliness, knowledge and competence of staff can only be satisfied by the sales consultant, interacting with the customer. Improvement initiatives relevant to the requirements will focus on improving the training process and can only be tested through trial and error.

3.3 Framework building procedure

The previous section gave an overview of each of the seven framework Stages. Each of the Stages can be constructed by following a number of sequential steps as given in Figure 3.7.

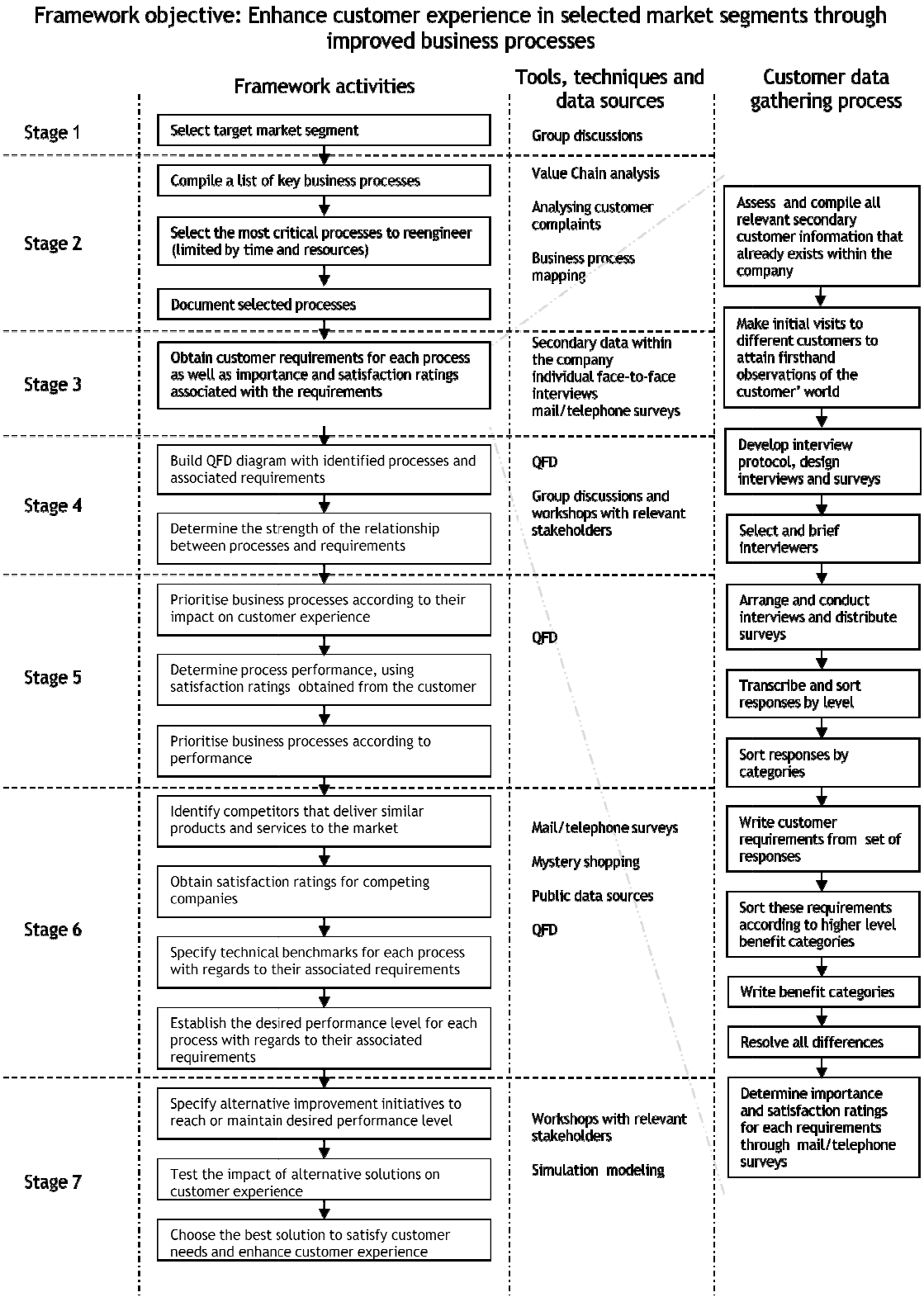


Figure 3.7 - Framework-building procedure for enhancing customer experience through improved business processes

3.4 Design prerequisites for the framework

For the ECEF to be executed successfully, six design prerequisites must be considered throughout the construction Stages. The design prerequisites are mainly derived from the prerequisites for QFD defined by Youssef and Zairi [44]

1. Plan and carefully examine resource implications in terms of people, time, and financial resources before constructing the framework.
2. Use existing resources and expertise within the firm to obtain customer and process data.
3. Ensure the commitment and involvement of key people and senior management.
4. Ensure the availability of a facilitator to assist the teams in progressing positively with the use of QFD.
5. Take existing process capability into account when testing improvement initiatives.
6. Manage change within the company to ensure continuous involvement and productivity.

3.5 Chapter summary

The framework discussed in this chapter consists of seven Stages as shown in Figure 3.7, with sequential activities taking place in every Stage. The activities forming part of the ECEF mainly resolves around linking customer feedback to business process improvement and measuring the performance of business processes from a customer perspective. The advantage of the ECEF lies in the quantitative measure of performance for each process, solely measured from a customer perspective. The information can then be used to prioritise improvement initiatives according to highest impact on customer experience. The ECEF can be useful in assisting mangers to satisfy customer needs. By designing business processes to deliver products and services according to the needs of the customer, companies will be able to enjoy the strategic competitive advantage of customer loyalty.

4. Application

4.1 Introduction

Customers in the telecommunications industry are in the position where they can choose from an array of products and services from more than one Telecommunications Company. South Africa has three major cellular networks: Vodacom, MTN and Cell C. Other than the three cellular giants, there is one fixed line network. All four companies are competitors for voice traffic. Quality of service is imperative in the industry as it serves as a differentiator [3]. The power shifting from company to customer forces companies to focus on customer retention and loyalty through improved customer experience. The ECEF, introduced in chapter three may assist companies to enhance their customer experience by delivering quality service through customer centred business processes. The ECEF can be seen in Figure 3.1. As mentioned previously; the framework consists of seven stages. The Stages can be seen as the ECEF process steps, followed to build the framework and are discussed in detail in chapter three. In chapter four the conceptual framework developed in chapter three is empirically validated using data obtained from the telecommunications industry.

4.2 The Telecommunications industry in South Africa

The strategic position of the telecommunications industry in South Africa may be analysed, using Porter's five forces model. The model places emphasis on five potential competitive forces [26]:

- The threat of new entrants.
- The threat of substitute goods or services.
- The bargaining power of customers.
- The bargaining power of suppliers.
- The degree of rivalry amongst existing competitors.

The rise in bargaining power of customers is mentioned in chapter three. The one barrier against the rise in power was to retain customers with their cell phone numbers. The barrier is now destroyed in that customers can keep their numbers even if they move to a different network. It is becoming more difficult to retain customers. In South Africa the telecommunications industry is faced with the threat of new entrants as one of the largest competitive forces. In 2001 a third Telecommunications Company was introduced in South Africa and the market share that always belonged to only two companies was redistributed between three companies. For all three companies to be competitive, they had to invest in delivering quality service to customers. Unfortunately, as mentioned in chapter one the telecommunications industry has not yet succeeded in giving customers what they feel they need. Telecommunication Companies are in dire need of service delivery processes that not only meet

customer requirements, but also exceed the requirements to deliver an exceptional customer experience.

4.3 Partial validation strategy of the ECEF

The ECEF is partially validated in this chapter by applying the framework stages to data obtained from one of the three major cellular networks in South Africa. For the purpose of confidentiality, the company will be referred to as Company A. This chapter attempts to enhance the customer experience of Company A by improving their business processes. The other two major cellular networks are referred to as Company B and Company C and are the two main competitors of Company A.

There are certain limitations to the validation of the ECEF:

- Due to unavailability of data, not all the data used in this chapter could be obtained from Company A. Certain data points are estimated by the author for illustration purposes and the output can thus not be applied directly to Company A.
- For the purpose of the partial validation, only one "what-if" scenario is determined for each process and is tested through simulation.
- The main goal of the framework is to improve business processes and to measure the impact of the improvements on customer satisfaction and consequently customer experience. The cost involved in implementing the improvements do not form part of the ECEF, thus the costing analysis of improvement initiatives do not form part of the partial validation.
- For the purpose of the partial validation, only one KPI is specified for each process that may be associated with one of the customer requirements of that process.

4.4 Application of framework stages

4.4.1 Stage one: Develop framework objectives

The framework developed in chapter three focuses on improving customer experience through improved business processes. The ultimate objective is to establish where the company went wrong from a customer perspective and where improvement is needed to ultimately improve customer experience. The first step in the development of the framework is to understand the strategic planning of the company towards customer experience measurement. The company's strategy must be taken into account when developing objectives for the company specific framework.

Company A has recently invested in ensuring a consistent approach to Customer Experience analysis across all "touch points" and initiatives. They defined the following strategic objectives that must be met to ensure a consistent customer experience across all "touch points":

- Create a customer centred organisation.
- Implement Customer Relationship Management (CRM) and various other initiatives that may enhance customer experience.
- Align overall customer management strategy with end-to-end enterprise wide processes.
- Overcome boundaries that affect customer service and processes created by a silo-based organisation.

Before the objectives can be documented, the company should decide which market segment to focus on. In chapter three it is mentioned that customers can be grouped into segments based on customer needs, benefits sought, or personal values served. After the customer segmentation is obtained, companies can, on a strategic level, determine which segments to target and pursue and, as a result which segments to measure, analyse and manage separately. The attractiveness of each segment may be measured in terms of factors such as profit potential, risk, capacity utilization, and competencies required to serving the segment. Companies may also decide to choose the customer segment where customers' complaints and dissatisfaction are the greatest. Such strategic choices concerning which market segment to target can be made by conducting group discussions with relevant stakeholders. For the purpose of validating the ECEF, the post-paid consumer segment is chosen. The segment is chosen mainly due to the quantity of information and data available for the segment as well as the number of customer complaints received.

4.4.2 Stage two: Identify key business processes and define KPIs for each process

At the outset it is important to identify and document all the business processes in the organisation that have a direct or indirect impact on customer experience in a selected market segment. A value chain analysis may be done to identify a list of high level business processes for company A. As mentioned in section 2.3.4.1, Chase et al. [13], suggests the value chain as a structure to capture the linkage of organisational activities that create value for the customer and profit for the firm. The value chain may be useful to identify all the key business processes needed to deliver value to the customer. Figure 4.1 shows a typical value chain for a company such as Company A. Data for value chain analysis are obtained from existing sources of data within Company A.

Figure 4.1 - Value chain for Company A

After the value chain is defined for Company A, business processes may be determined that deliver each of the value adding activities to the customer. The following table is a list of identified high level business processes for Company A:

Process ID	Process name
A	End to end Network Roll-out
B	Product Lifecycle
C	Handset Repair
D	Stock Provision
E	Credit Vetting & Activations
F	Campaign (Promo) Management
G	Distribution Footprint
H	Post-activation Service Management
I	Customer Upgrades & Retention
J	Number Management
K	HR (Resource Recruitment
L	In-Store Customer Service Process
M	Employee training
N	Billing and payment

Table 4.1 - Identified high level business processes for Company A

The processes are related to the activities depicted in the value chain. The following figure illustrates where each of the above listed processes will take place in the value creation process:

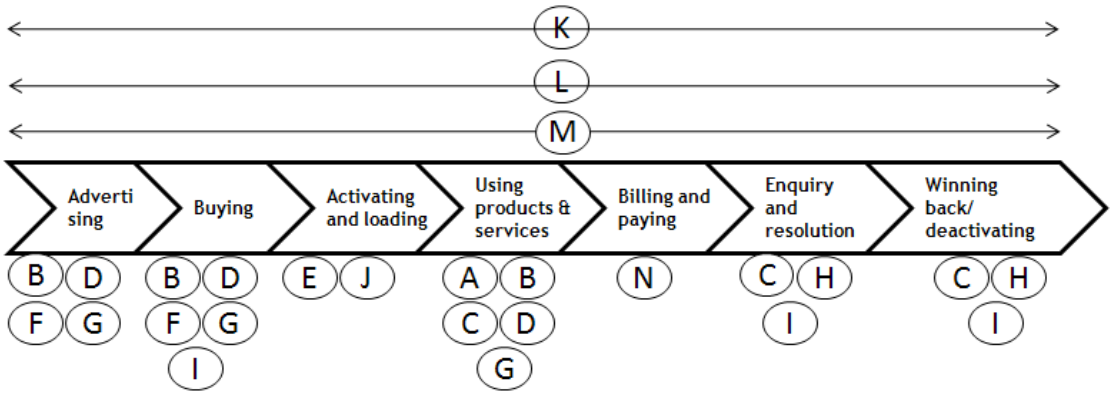


Figure 4.2 - Business Processes delivering value in the value chain

The business objective of the ECEF is to enhance customer experience. It is vital to identify all the business processes that currently are in conflict with this objective. Analysing data on customer complaints may help to identify the areas and consequently the processes with which customers are not satisfied. Customer complaint data within Company A can then be used to choose a sample of processes that should be reengineered first. According to relevant stakeholders the following four processes are in dire need of improvement from a customer perspective:

- The Repair Process.
- The New deal process.
- The Upgrade Process.
- The In-Store Customer Service Process.

These processes may be mapped and existing problems surrounding the processes documented. While mapping the processes, the performance of each process should also be taken into account. Understanding process performance from a customer perspective is vital for the development of the company specific framework. Process performance from the technical perspective is also important and can sometimes differ substantially from the perspective of the customer. The current business processes of Company A are designed according to the technical perspective. The goal of the framework is to link the two perspectives to do the technical redesign of business processes while considering the perspective of the customer. The technical performance of the four business processes may be measured by defining Key Performance Indicators (KPIs) for each process that may be associated with one of the customer requirements. The KPIs should be specified by the design team. KPIs are specified for each process based on the business objectives of enhancing customer satisfaction with regard to a specific customer requirement. Measuring the KPI will give an indication of whether the process satisfies the specific customer requirement. The KPIs serve as a technical evaluation for each process. For the purpose of framework validation the assumption is made that improving the specified KPI will lead to the desired outcome of increased customer satisfaction. The assumption is tested in Stage seven with the aid of simulation modelling. The process maps, existing problems as well as identified process KPIs are discussed in the following sections.

4.4.2.1 The Repair Process

The current repair process conflicts with the objective of satisfying the customer. Customer satisfaction regarding the repair process is low due to lengthy repair time and lack of communication between the repair centres and the customers. The employees working directly with the customers do not have sufficient information to report on the progress of the repair and consequently it causes frustration to the customers.

Problems experienced with the repair process include:

- Time to complete repairs can take months. This can be frustrating to the customer as the customer is left without a phone but is still required to pay monthly fees.
- Faulty phones are transported to the repair centre via couriers; the couriers can take up to 3 weeks for delivery.
- 30% of repairs are returned with the same problem.
- The repair centres do not always have the required spares to repair a phone. The time it takes waiting for the spares also poses a problem.
- Phones can only be repaired at one centralized location called the High Volume Repair Centre (HVRC), and dealerships have no capacity to repair the phones immediately.

Figure 4.3 shows the repair process mapped using information gathered from eTOM and relevant stakeholders.

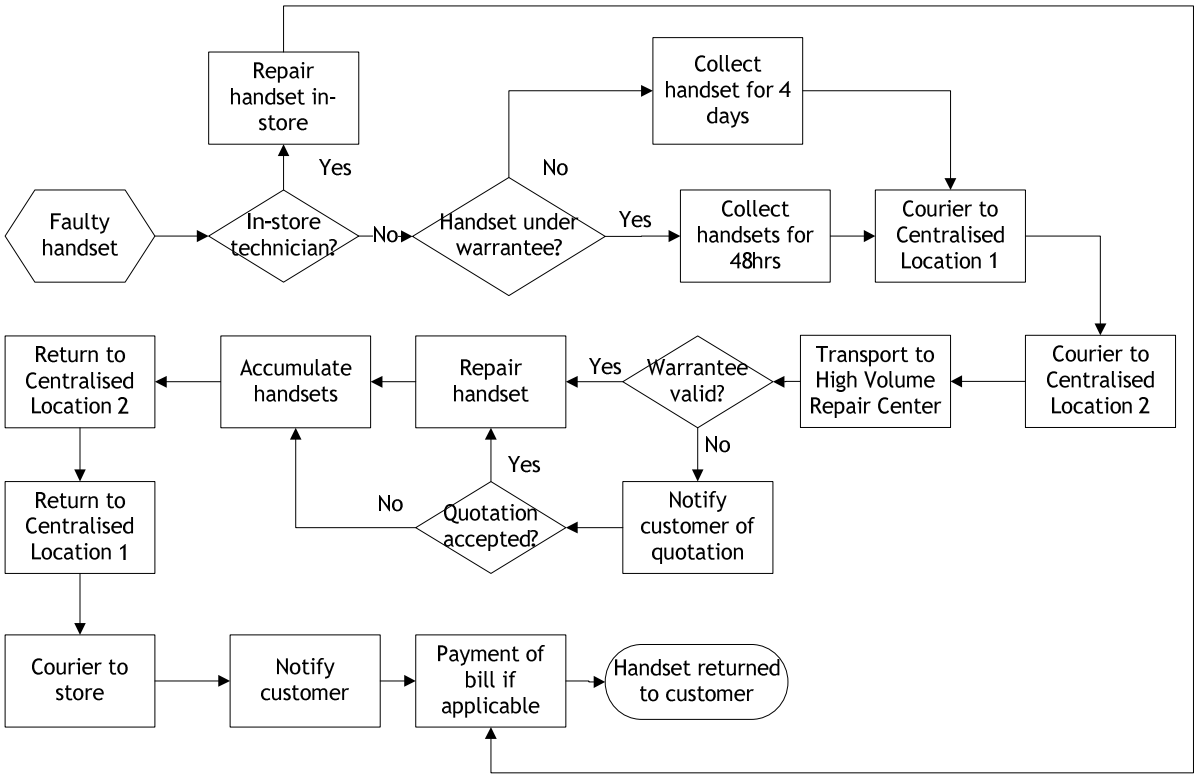


Figure 4.3 - The Repair Process

The KPI associated with the repair process is the time it takes to return the repaired handset to the customer. The time is measured from the time the customer hands the faulty phone in until the customer collects the repaired phone from the service centre.

The following elements have an influence on the time it takes to return a phone:

- Location of the repair centre.
- Transportation of phones.
- Waiting time for spare parts.
- In-store repairs versus sending away of phones.

4.4.2.2 The New deal process

In many instances the new deal process is the first interaction between a new prospective customer and Company A. The process may determine the continuing loyalty of the customer in years to come and should be conducted according to customer needs. The first step in the process is to deliver accurate information to the customer regarding available new deals. The sales consultant working with the customer should be able to analyse customer needs and assist the customer in making the right choice. The post activation bouquet of services delivered by Company A should be explained to the customer to ensure that the customer makes an informed choice. After the customer decides to apply for a new contract, the relevant forms are completed to capture the details of the new customer. Credit vetting is done to check the financial status of the customer and to determine whether or not a customer qualifies for a new contract.

Various problems experienced with the new deal process include:

- Phones offered with new contracts may not always be available and service centres have no control over the stock received and kept in inventory.
- Although special offers are promoted, service centres do not always have the stock offered with the special promotions.
- Stock cannot be transferred between service centres.
- Activation of a new contract is not immediate.

The new deal process is mapped in Figure 4.4 with information obtained from eTOM and relevant stakeholders.

The KPI specified for the new deal process is the time it takes to complete a new deal process. The time is measured from application to activation. The time is dependent on the time it takes to credit vet a customer and the activation of the sim card. If the contract can be approved or rejected by the click of a button and activation can be immediate, the new deal process would take approximately 30 minutes. Currently the new deal process takes up to two days and activation only occurs 24 hours after contract approval. The following elements have an influence on the time it takes to complete a new deal:

- Number of sales consultants available to assist the customers.
- Validation process.
- Time taken to complete all the relevant forms.
- Availability of stock.

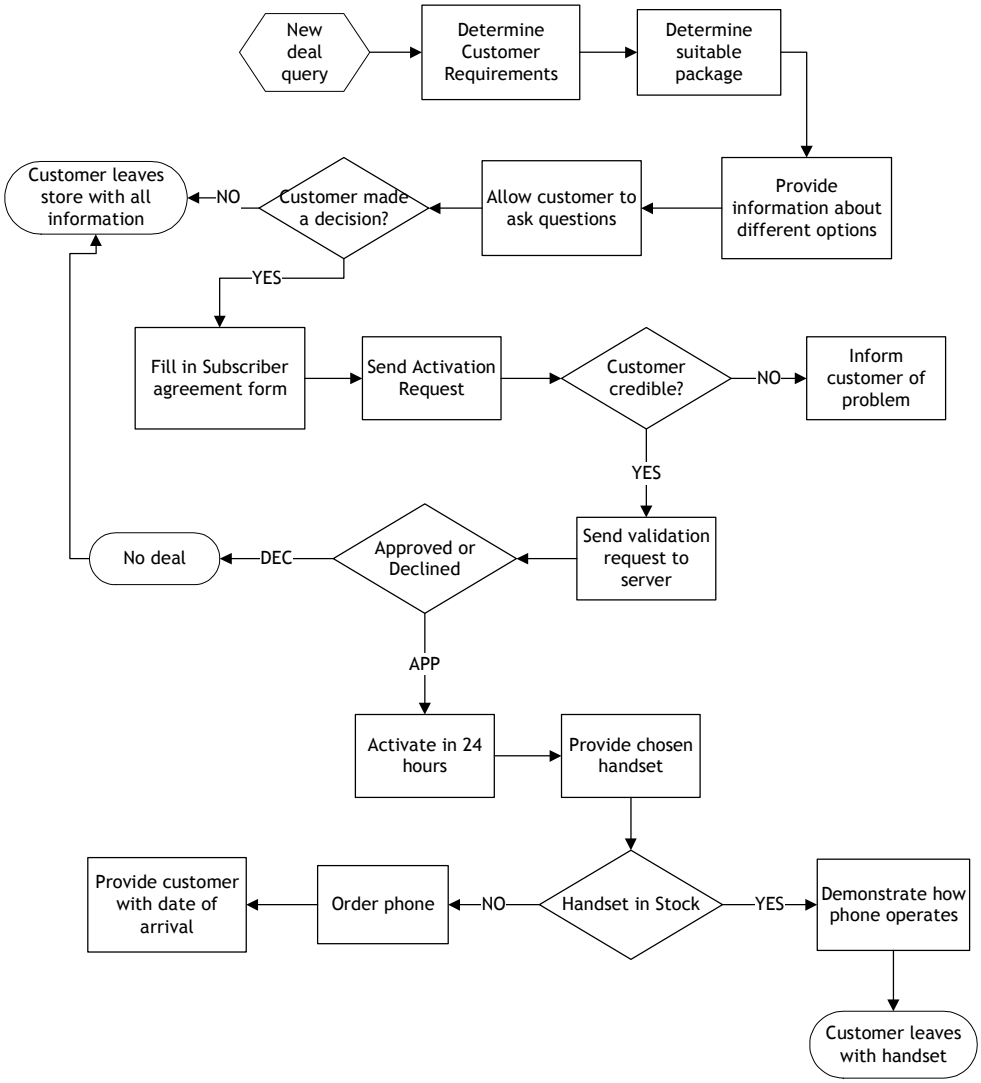


Figure 4.4 - New deal process

4.4.2.3 The Upgrade Process

Although the upgrade process is fairly simple when compared to other processes, it is vital for customer retention. A customer can upgrade every two years or as early as four months prior to the expiry date of the contract.

Problems that may occur when a customer requests an upgrade include:

- Phone requested is not in stock and should be ordered.
- System is offline and upgrade cannot be completed.
- Assistants are not helpful when the customer is indecisive due to a lack of knowledge.

The complete process map for an upgrade is shown in Figure 4.6. The process followed to determine whether a customer is eligible for an upgrade is shown in Figure 4.5.

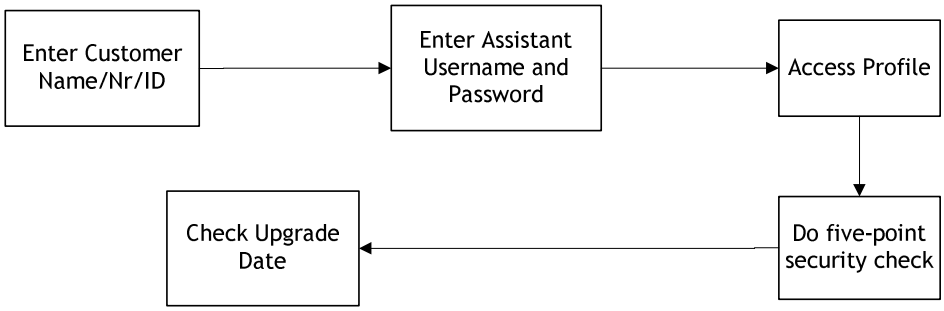


Figure 4.5 - Determine whether a customer is eligible for an upgrade

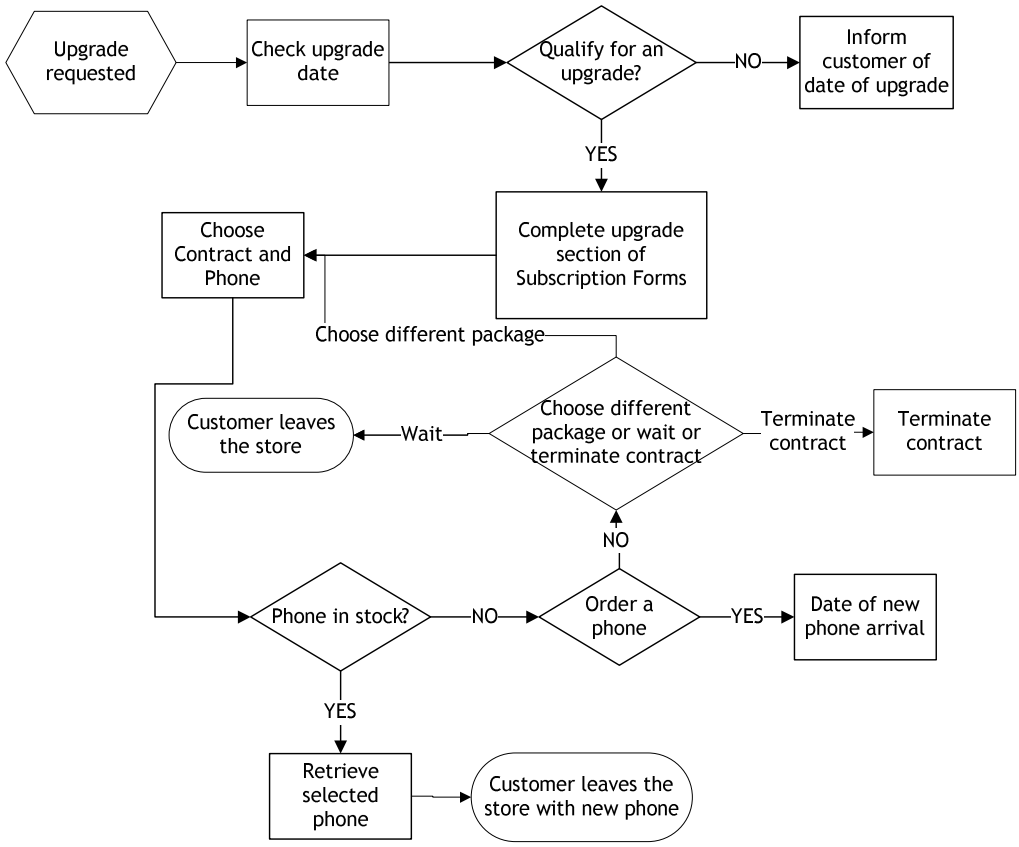


Figure 4.6 - The Upgrade Process

The KPI associated with the upgrade process is the number of upgrades done successfully. The KPI was chosen due to the number of customers that cancel their contract due to an unsuccessful upgrade. The factors that influence the success of an upgrade are:

- The availability of stock.
- The range of price plan options and phones offered.

4.4.2.4 The In-Store Customer Service Process

The in-store customer service process has a significant impact on customer experience. The process represents the entire in-store encounter with the customer and should be managed with extreme care. The process encompasses the entire time the customer spends in the system. Unfortunately the current queue length in many stores leads to frustrated and unhappy customers. The main problem that should be addressed is the long waiting times experienced by customers. Figure 4.7 shows the in-store customer service process. Information for the process map was collected from relevant stakeholders.

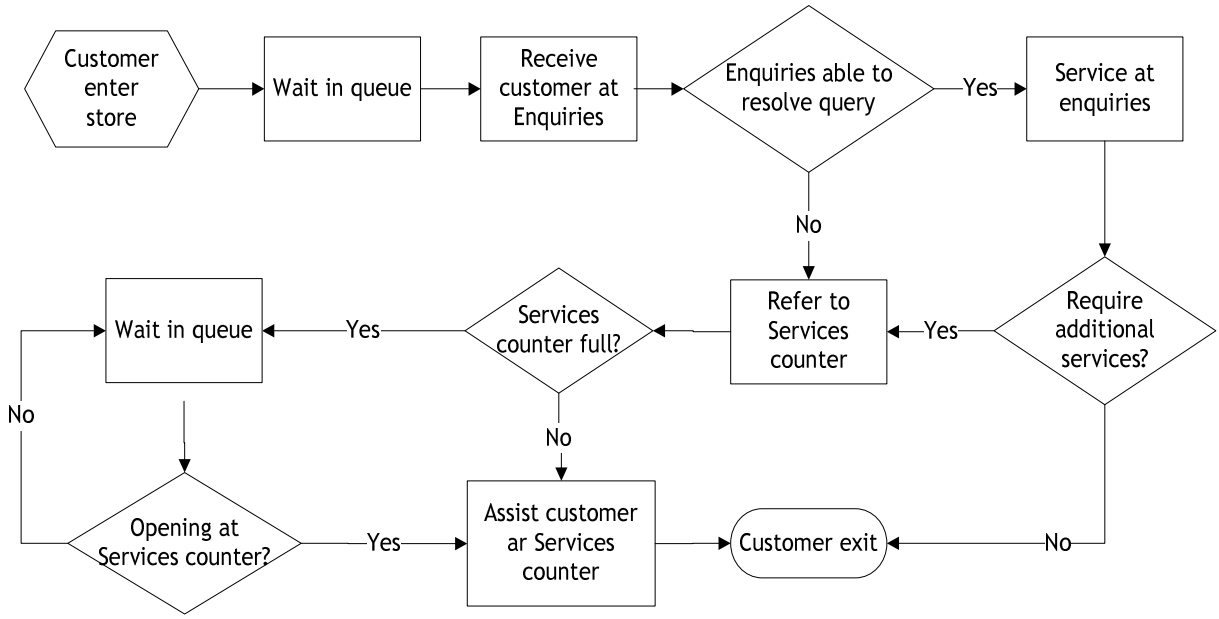


Figure 4.7 - The In-Store Customer Service Process

The KPI identified for the process is the total time the customer spends in the queue waiting for assistance. The time is influenced by various factors such as:

- Queue length.
- Number of sales consultants.
- Time a customer spends in service.
- Number of customers entering the store.

After all the processes have been mapped and KPIs have been specified for each process, Stage two of the framework is completed. The next step is to gather customer data.

4.4.3 Stage three: Gather customer data

In this Stage, customer data should be gathered to obtain all the customer requirements together with importance ratings of the requirements for each business process identified.

The customer data required for the ECEF may be obtained through the process of CIT research as defined in chapter two. The different surveys discussed in chapter three may be used to gather customer requirements, importance ratings as well as satisfaction ratings. It is however important to identify existing sources of information within the company. Relevant secondary information should be compiled and assessed to determine whether the information may be used as an input for the QFD

procedure. If relevant data exists, it should be used instead of conducting new surveys since it will save a significant amount of time and money. Company A has large quantities of customer information available from previously conducted surveys. In 2008 Company A gathered valuable information from their customers through surveys and questionnaires. Information was gathered from 2081 randomly selected customers distributed over Company A, B and C. The following table shows the sample selected for each of the three companies.

Company name	Amount surveyed
Company A	1240
Company B	730
Company C	111
TOTAL	2081

Table 4.2 - Sample surveyed

The sample demographics for the survey illustrated in Figure 4.8 gives a good indication of the random nature of the sampling. Although the information was gathered in 2008, and may be of little value to Company A since it is outdated, the data obtained may be used to validate the framework presented in chapter three. By using the secondary data, the use of the framework can be illustrated within a real life organisation. Since Company A has reliable and complete secondary data, the existing data sets are used to validate the ECEF. As discussed in chapter three, potential pattern information often emerges from interpretation of customer data as well as observation of customer behaviour. The data can be used to inform/support the product or service development process.

In this Stage the existing customer data within Company A should be interpreted to obtain potential pattern information that may be used as an input for the QFD diagram. The QFD diagram can then be used to guide the reengineering of business processes.

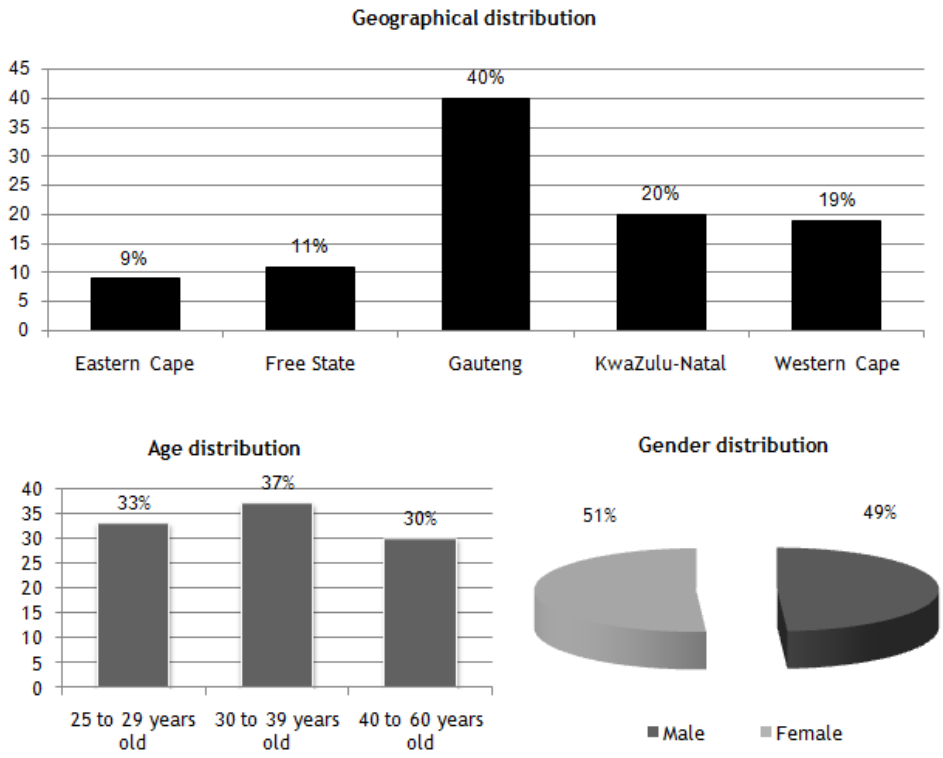


Figure 4.8 - Sample demographics

The data required by the QFD diagram are listed below:

- Customer requirements associated with each identified business process.
- Importance ratings associated with each requirement.
- Satisfaction ratings associated with each requirement for the producing as well as competing companies.

The main goal of the survey conducted by Company A was to establish the key influencers of customer satisfaction and loyalty. The survey was conducted through random sampling and made use of individual face-to-face interviews. The survey consists of factors and attributes that drive customer loyalty in South Africa and include a rating on how well the company as well as competitors satisfy each specific factor. The research objectives of the survey are as follow:

- Understanding customers' expectations and uncovering the relationship between Company A's products and services, factors and attributes that drive customer loyalty in South Africa.
- Measuring the importance of the factors and attributes for strategic improvement across customer segments.

- Measuring Company A's performance on each factor and attribute and clearly understand to what extent customers' expectations in the post paid segment are met.

From these objectives it is clear that the data gathered in 2008 through the satisfaction and loyalty survey can easily be interpreted to obtain the data needed for the QFD diagram. The factors and attributes surveyed may be interpreted as customer requirements. The importance and performance determined for each factor can therefore be used as importance and satisfaction ratings for each requirement. From the survey the customer requirements, importance and satisfaction ratings are obtained and are given in Appendix A.

4.4.4 Stage four: Link business processes to customer requirements

In this Stage, the business processes identified in stage two are linked to their associated customer requirements identified in stage three. As discussed in section 2.4 and 3.2.4, the most suitable tool to use when linking processes to requirements is the QFD diagram due to its ability to relate any identified set of business processes to any number of requirements. The information obtained from QFD is detailed enough to establish whether the relationship between a given process and a set of requirements is a weak or strong relationship. This Stage consists of the QFD diagram for Company A with relationship mapping between identified business processes and customer requirements. The relationship mapping is determined by analysing to which extent a specific business process could technically influence the customer requirement. The relationships are defined using a 1-or 3- or 9-point scale, where one represents a weak relationship, three represents a moderate relationship and nine represent a strong relationship. A group of people from Company A that possessed the necessary knowledge on the defined set of business processes was interviewed during a workshop to obtain the relationship mapping. The importance of each requirement was determined through the survey on a scale from 0 - 100 percent where 0 percent represents zero importance and 100 percent represents absolute importance. Figure 4.9 shows a portion of the QFD diagram for Company A which illustrates the relationship between the business processes and requirements.

		Business Processes			
Customer Experience Requirements	**Importance rating**	Repair process	New deal process	Upgrade process	In-store customer service process
Reliability of products and services	68	3			
Time taken to resolve the problem	66	9			
Initial feeling when joining the network	65		9		
Amount/Adequacy of information received	45		9		
Time taken from signing the contract to being able to make the first call	39		9		
Ease of the activation process	35		9		
Availability of preferred phone	59			3	
Time spent waiting	58			9	
Amount of information available to guide in decision making	57			9	
Range of cell phones offered	50			9	
Knowledge of staff	68				9
Helpfulness and courteousness of staff	68				9
Total time spend in the store	66				9
Time spend waiting in the queue	51				9
Raw score		798	1656	1662	2277
Relative %		12%	26%	26%	36%
Importance Rank		1	3	3	5

Importance Rating:	**Relationships:**
0 = Low Importance	9 = Strong
50 = Moderate Importance	3 = Moderate
100 = High Importance	1 = Weak
	0 or Blank = No Relationship

Figure 4.9 - QFD relating business processes to customer requirements for Company A

4.4.5 Stage five: Prioritise business processes based on their impact and performance

During this Stage the business processes should be categorised and displayed according to their importance and performance by making use of the strategic satisfaction matrix defined by Gustafsson and Johnson [21]. As mentioned in section 3.2.5 the matrix is particularly useful in prioritising business processes by dividing them into four strategic categories depending on their impact on customer satisfaction as well as their performance. Measuring the impact of a process on customer satisfaction is a fairly simple process. After Stage four is complete and all the business processes of Company A are

related to their associated requirements, prioritisation of business processes based on their impact on customer experience is automatically completed. In Figure 4.9, the row labeled "Raw Score" gives the total score each process has obtained and directly represents the impact the process has on customer requirements. The calculation of the "Raw Score" is given by equation (1) in section 3.2.5. In Figure 4.10 the business processes of Figure 4.9 are prioritised according to impact.

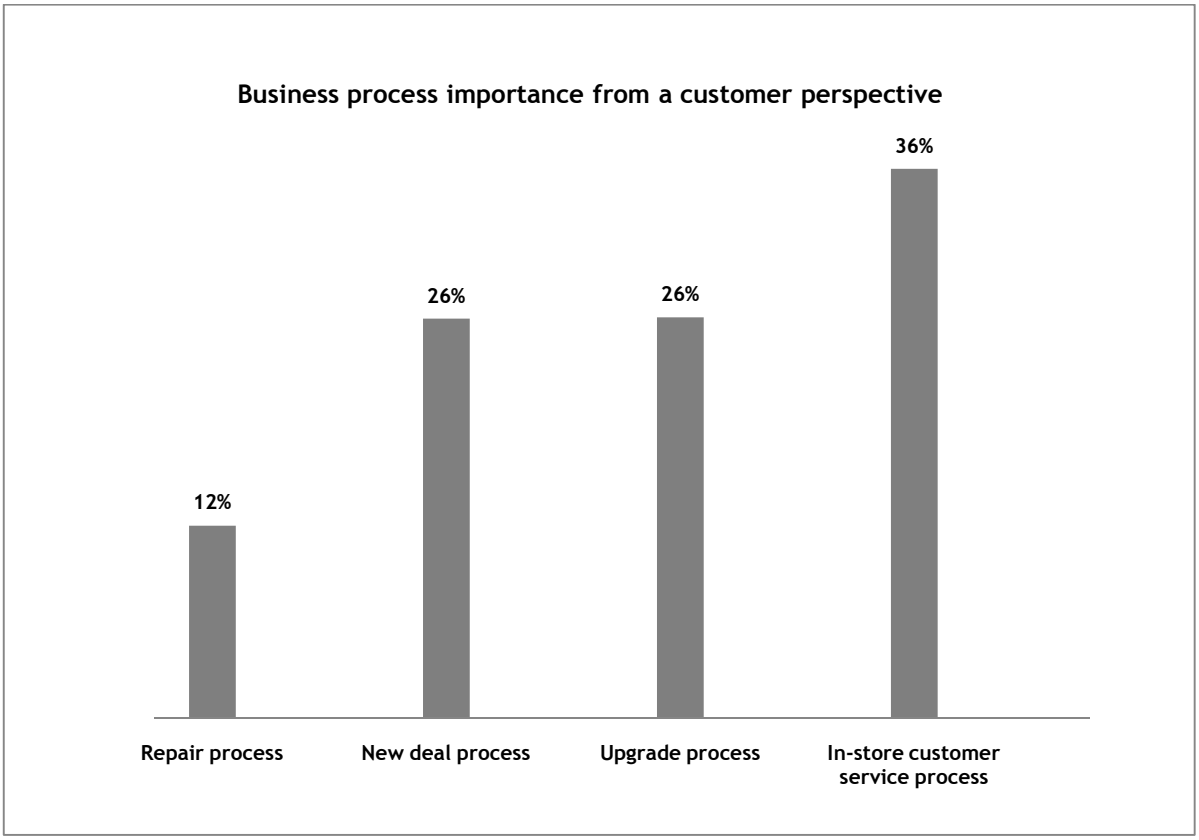


Figure 4.10 - Relevant importance of business processes from a customer perspective

The performance of the processes from a customer perspective can be measured by using the satisfaction ratings obtained by the survey. The survey rating obtained on how well the competitors satisfy each need is not relevant for this Stage and is used in Stage six. Based on the satisfaction rating specified by the customer (0 – 100 percent), it becomes possible to identify the process performance for Company A from a customer perspective. Section 3.2.5 explains how this can be done by expanding on the traditional concept of QFD and using the tool to obtain a quantitative performance score for each process. Both the "Current score" as well as the "Target score" should first be determined by using the calculations discussed in section 3.2.5. The calculations are based on formulas that should form part of the QFD diagram. The formula for calculating the "Target score" contains the values specified by Company A as the target satisfaction ratings. Due to the unavailability of data, the target

satisfaction ratings could not be obtained. For purposes of demonstration, the target ratings are set at a 100 percent. This example is thus only used for demonstration purposes and the output does not apply in practice. Figure 4.11 shows the QFD diagram for Company A where the process performance of each business process is determined. The "Target score", "Current score" and "Process performance" are calculated using equations (2), (3) and (4) of section 3.2.5

		Business Processes				Satisfaction rating (%)	
Customer Experience Requirements	**Importance rating**	Repairs process	New deals process	Upgrades process	In-store customer service process	Company A	Target
Reliability of products and services	68	3				82	100
Time taken to resolve the problem	66	9				79	100
Initial feeling when joining the network	65		9			80	100
Amount/Adequacy of information received	45		9			90	100
Time taken from signing the contract to being able to make the first call	39		9			78	100
Ease of the activation process	35		9			84	100
Availability of preferred phone	59			3		79	100
Time spent waiting	58			9		74	100
Amount of information available to guide in decision making	57			9		85	100
Range of cell phones offered	50			9		82	100
Knowledge of staff	68				9	83	100
Helpfulness and courteousness of staff	68				9	79	100
Total time spend in the store	66				9	79	100
Time spend waiting in the queue	51				9	68	100
Raw score		798	1656	1662	2277		
Relative %		12%	26%	26%	36%		
Importance Rank		1	3	3	5		
Current performance		63654	137088	133116	177282		
Target performance		79800	165600	166200	227700		
Process performance		80%	83%	80%	78%		

Figure 4.11 - Prioritising processes according to their performance from a customer perspective for Company A

The four chosen business processes identified for Company A, can now be prioritised based on the process performance calculated in this Stage.

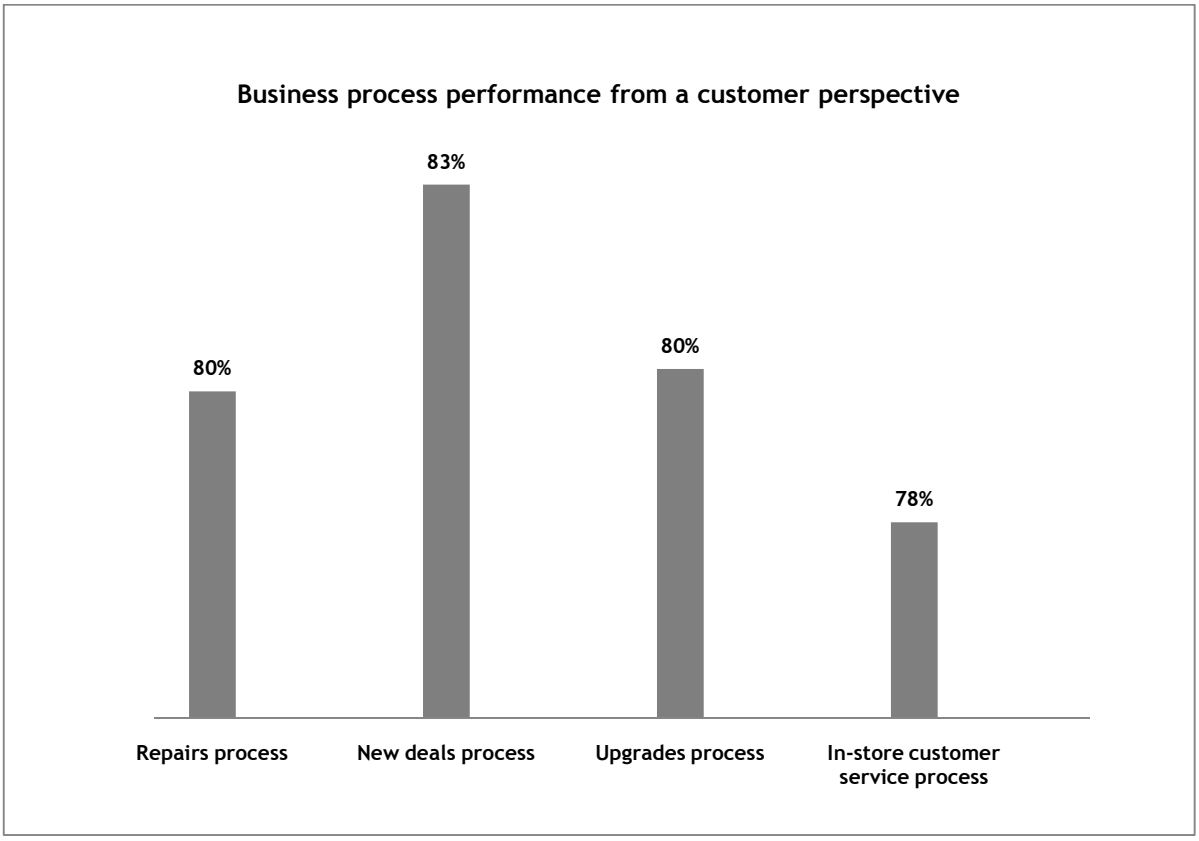


Figure 4.12 - Performance of business processes from a customer perspective

The processes can be plotted in the strategic satisfaction matrix to fully prioritise the four processes based on their impact and performance. The matrix indicates which process should be focused on first. According to Gustafsson and Johnson [21] resources should be focused where the impact is high and performance is weak. Improvements within this category will have the greatest impact on customer satisfaction and consequently on loyalty and profitability. In this case there are no processes that fall within this category. The four selected processes for Company A fall within the upper two quadrants. The in-store customer service process is the highest on the priority list as it has the highest impact and the weakest performance. From the matrix it may be assumed that customer satisfaction will be enhanced when improving the in-store customer service process. Improvement efforts should thus be focused on this process first and subsequently on each of the other processes according to their matrix position.

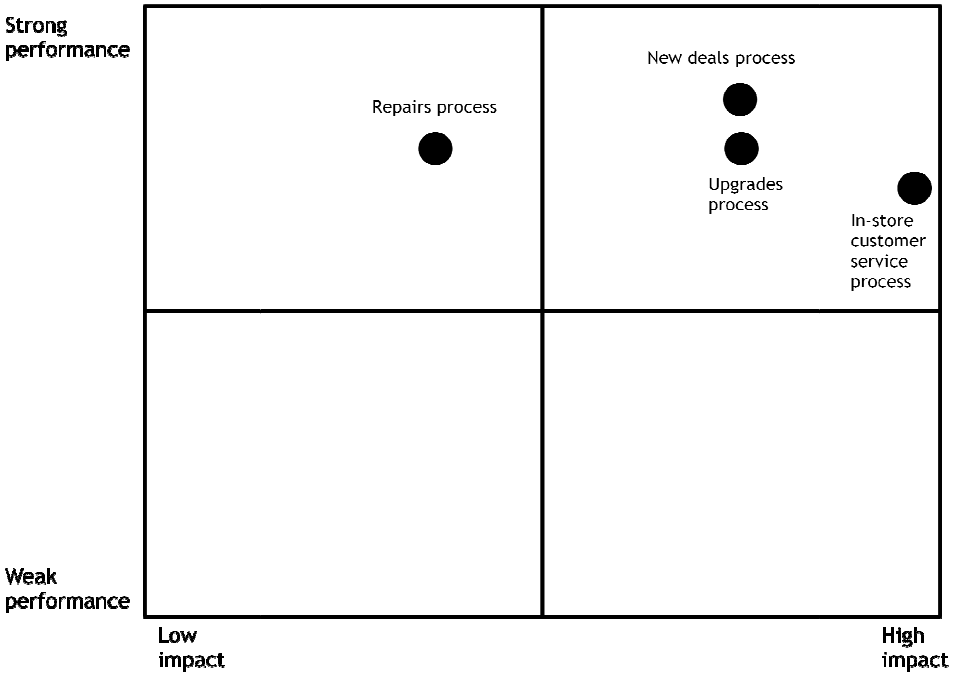


Figure 4.13 - Strategic satisfaction matrix for Company A

4.4.6 Stage six: Estimate the desired performance level for the business processes

In this Stage, the desired performance level from a customer perspective should be estimated prior to attempting process improvements. In section 3.2.6 QFD is identified as the most accurate method to estimate the desired performance level. In this Stage the desired performance level is estimated by examining the extent to which the performance of similar services in the market satisfies customer needs. The desired performance level is thus determined through benchmarking.

The first step associated with Stage six is to identify the competitors of Company A that deliver similar products and services to the market. As discussed in section 4.1 there are two other telecommunication companies that deliver similar products and services to customers, the two competitors will be referred to as Company B and Company C. In the satisfaction loyalty survey done for Company A in 2008, customers were asked to rate the service delivered by the competitors on a scale from 0-100 percent. After the satisfaction ratings are obtained, a technical benchmark should be specified for each process. The technical benchmarks may be obtained by measuring the KPI, specified in section 4.4.2, for each of the four processes, for Company A as well as the competitors. The estimated measurements are based on data obtained from relevant stakeholders. The KPIs can be linked to one of the customer requirements associated with each process. The desired performance level can thus be estimated by looking at the customer benchmark and the actual performance or

technical benchmarks of the competitors. The QFD in Figure 4.14 shows competitor satisfaction ratings as well as the technical benchmarks for each process.

		Business Processes				Competitive Evaluation				
						Satisfaction rating (%)				
Call Center Customer Experience Requirements	Importance rating	Repairs process	New deals process	Upgrades process	In-store customer service process	Company A	Company B	Company C	Target	Lowest perceived
Reliability of products and services	68	3				82	85	78	100	0
Time taken to resolve the problem	66	9				79	80	70	100	0
Initial feeling when joining the network	65		9			80	83	68	100	0
Amount/Adequacy of information received	45		9			90	92	85	100	0
Time taken from signing the contract to being able to make the first call	39		9			78	80	78	100	0
Ease of the activation process	35		9			84	87	78	100	0
Availability of preferred phone	59			3		79	81	78	100	0
Time spent waiting	58			9		74	74	71	100	0
Amount of information available to guide in decision making	57			9		85	86	78	100	0
Range of cell phones offered	50			9		82	85	73	100	0
Knowledge of staff	68				9	83	84	75	100	0
Helpfulness and courteousness of staff	68				9	79	80	76	100	0
Total time spend in the store	66				9	79	80	70	100	0
Time spend waiting in the queue	51				9	68	69	65	100	0
Raw score		798	1656	1662	2277					
Relative %		12%	26%	26%	36%					
Importance Rank		1	3	3	5					
Current performance		63654	137088	133116	177282					
Target performance		79800	165600	166200	227700					
Process Performance		80%	83%	80%	78%					
Technical benchmark	Company A performance	3	1	50	60					
	Company B performance	1	0.5	80	30					
	Company C performance	4	1	30	70					
	Target performance	0.1429	0.0208	90	0					
	Lowest perceived performance	12	7	0	120					
Key performance indicators		Total repair time (weeks)	New deals process completion time (days)	Number of upgrades done successfully (%)	Total time spend waiting in the queue (minutes)					

Figure 4.14 - Determining the desired performance level for each process

From Figure 4.14, the total time it takes to repair a phone is three weeks for Company A and the satisfaction rating for the associated requirement is 79 percent. The highest satisfaction rating is obtained for Company B where customers rated the time taken to resolve the problem as 80 percent; the corresponding technical benchmark for the rating is one week. The performance level of one week is thus closer to the performance level desired by customers and the desired performance level can be estimated at less than one week. The desired performance level for each process can now be estimated based on customer satisfaction ratings (see table 4.3):

Process name	Key performance indicator	Desired performance level
Repair process	Total repair time	< 1 week
New deal process	Process completion time	< 0.5 days
Upgrade process	Number of upgrades done successfully	> 80%
In-store customer service process	Total time spend waiting in the queue	< 30 minutes

Table 4.3 - Estimated desired performance level for each process

Figure 4.14 shows that a target performance level as well as a lowest perceived performance level must also be specified. These performance levels may be obtained by interviewing customers of Company A. For the purpose of this dissertation, the target as well as the lowest perceived performance levels is estimated by the author for the purpose of illustrating how the performance/satisfaction rating may be obtained. The survey done by Company A in 2008 does not contain sufficient information on the two measures and therefore an estimated value for both the target performance level and the lowest perceived performance level are used. The target performance level is the level of performance that corresponds to a 100 percent satisfaction rating. The lowest perceived performance level is the level of performance that corresponds to a zero percent satisfaction rating; it is thus the worst performance or the lowest perceived performance where customer satisfaction reaches zero percent. The difference between the desired performance level and the target performance level is that the desired performance level specifies the minimum performance level at which Company A must perform to remain competitive. The target performance level specifies the best possible performance that will guarantee a 100 percent satisfaction from the customer. The design performance level will also depend on the amount of money the company is willing to spend. In

the next Stage simulation models are used to test possible improvement initiatives for each of the four processes. "What-if" analysis can be done with improvement initiatives to determine how the processes may be improved to reach the desired performance level.

4.4.7 Stage seven: Specify improvement initiatives and test their impact on customer experience

4.4.7.1 Specify improvement initiatives

This Stage specifies and tests various process improvement initiatives defined for Company A which may enhance customer experience by satisfying customer requirements. The satisfaction ratings determined in Stage five, give a clear indication of the areas where processes may be improved. The areas typically include the customer requirements with a low satisfaction rating. In stage two KPIs are defined for each process, the KPIs are specified for each process based on the business objectives for that specific process and on the problems experienced with each process. Figure 4.14 shows that the KPIs may be associated with the customer requirement that has the lowest satisfaction rating excluding the upgrade process. The KPI for the upgrade process is chosen as the number of successful upgrades since the time to complete the upgrade is usually not long and much dependent on the customer. The customer must select a phone and decide whether or not to upgrade. If the phone the customer requires is not in stock, it will result in an unsuccessful upgrade. The availability of the preferred phone is also rated as more important to customers than the time it takes to upgrade. Although the KPIs chosen can be associated with a specific customer requirement, the association may be weak due to a moderate relationship between the process and customer requirement. In such a case the improvement of the KPI may only contribute moderately to the improvement of the satisfaction rating of the associated requirement. Table 4.4 shows the KPIs chosen with their associated customer requirements. In this Stage improvement initiatives in the form of "what-if" scenarios are defined for each process. The "what-if" scenarios are specified with the aim to improve the performance of each process with regard to the KPIs chosen for each process and are shown in Table 4.5. The improvement in performance also then has an impact on the satisfaction rating of each associated requirement. The "what-if" scenarios must be tested with simulation models to determine the extent to which each process may be improved. Various "what-if" scenarios can be identified and tested to determine the best possible improvement initiative for each process. The different improvement initiatives may also be analysed to determine the cost associated with each alternative to help choose the best initiative. For the purpose of the partial validation, only one "what-if" scenario for every process is determined and tested through simulation. The costing analysis of the improvement initiatives does not form part of the partial validation. The following improvement initiatives may contribute to higher customer satisfaction.

Process name	Key performance indicator	Associated customer requirement
Repair process	Total repair time	Time taken to resolve the problem
New deal process	Process completion time	Time taken from signing the contract to being able to make the first call
Upgrade process	Number of upgrades done successfully	Availability of preferred phone
In-store customer service process	Total time spend waiting in the queue	Time spent waiting in the queue

Table 4.4 - Process KPIs with associated customer requirements

Process name	Key performance indicator	What-if scenario/improvement initiatives
Repair process	Total repair time	Decrease the time it takes to transport faulty phones to and from the repair centre
New deal process	Process completion time	Decrease activation time to immediate activation
Upgrade process	Number of upgrades done successfully	Improve stock management to ensure the availability of phones when and where needed
In-store customer service process	Total time spend waiting in the queue	Increase the number of consultants

Table 4.5 - "what-if" scenarios/improvement initiatives specified for each process

The above Scenarios may be simulated to identify their impact on customer experience. To capture all the necessary detail to analyse the improvement initiatives specified, four different simulation models are built, using ARENA software. The data for the models were assembled through one-on-one interviews with a store manager of Company A. Data were also obtained by questioning selected

customers of Company A. For the purpose of the dissertation the simulation models are basic models with a low degree of detail.

The following models are given in Appendix B:

- Repair process model
- New deal process model
- Upgrade process model
- In-store customer service process model

The following assumptions are made:

- Customers arrive at the store according to a random distribution.
- A triangular distribution for process times is used as input parameter for all the models.

Scenario 1: Decrease the time it takes to transport faulty phones to and from the repair centre
Currently, the transportation of phones to and from the repair centre takes up to 10 days. Decreasing transportation time will definitely result in a decrease in total repair time and will have a significant impact on customer satisfaction. The following results are obtained from the simulation model:

Transportation Time	10 days	7 days	72 hours	48 hours
Minimum Waiting Time (hours)	0.00	0.00	0.00	0.00
Maximum Waiting Time (hours)	790.37	495.94	339.76	209.94
Average Waiting Time (hours)	251.56	149.61	102.69	63.0616
Minimum Time in System (hours)	1.4757	1.4757	1.4757	1.4757
Maximum Time in System (hours)	1190.69	732.25	496.27	309.73
Average Total Time in System (hours)	550.89	328.70	226.80	141.93

Table 4.6 - Results associated with a decrease in the transportation time of the repair process

Currently it takes approximately 550 hours to complete the repair process. During the process, the phone to be repaired spends on average 240 hours with the courier that transports the phones to and

from the repair centre. In the model the time that phones spend with couriers are reduced from 240 hours to 48 hours. The improvement is significant and has a considerable impact on the waiting time of customers as well as the complete process time or time in the repair system. The complete process time decreases from three weeks to one week. Based on the information yielded by the model, Company A can consequently decide whether it is worth implementing the initiative. The impact of the initiative on customer satisfaction is quantified in the next section.

Scenario 2: Decrease activation time to immediate activation

The activation of a new sim card or new contract in the new deal process, currently takes 24 hours. If this is changed to immediate activation, the time to complete the new deal process is significantly reduced. The waiting time of customers to use their new phones is also decreased, resulting in higher customer satisfaction. The following results are obtained from the simulation model:

Activation Time	24 hours	12 hours	immediate
Maximum Process Time (hours)	24.8869	12.8869	0.8869
Maximum Waiting Time (hours)	0.3863	0.3863	0.3863

Table 4.7 - Results associated with immediate activation

If the improvement initiative is implemented, the time it takes to complete a new deal process will be reduced significantly. If the activation is done immediately the total time it takes to complete the new deal process is 53 minutes. If the activation takes 24 hours, as it currently does the total time increases to 24 hours and 53 minutes. The next section provides the method that may be used to test the impact of the improvement on customer satisfaction. Company A can decide whether they wish to implement the initiative based on the information that may be derived through the method explained in section 4.4.7.2.

Scenario 3: Improve stock availability for the upgrade process

Often the reason for an unsuccessful upgrade is the unavailability of phones when and where customers need them. Although unavailability of stock is not the only reason for an unsuccessful upgrade, it is definitely the prime cause. Improving stock management in dealerships will impact the number of successful upgrades done. It will also beneficially affect the waiting time of the customer and the total time spent in the system. The following results are obtained from the simulation model.

Availability of phones	30%	50%	80%	100%
Percentage of successful upgrades	20%	44%	64%	72%
Percentage of unsuccessful upgrades	80.0%	56.0%	36.0%	28.0%
Minimum Time in System (hours)	0.2896	0.2839	0.2893	0.3941
Maximum Time in System (hours)	0.5610	0.5275	0.5497	0.5736
Average Time in System (hours)	0.3857	0.4096	0.4380	0.4709

Table 4.8 - Results associated with improved stock management

The percentage of times a requested phone is in stock is increased from 50 percent of the time to always being available. The number of successful upgrades is dependent on the number of customers requesting an upgrade on a given day. The number of customer requesting an upgrade is set at 25. It is important to note that not all the upgrades that fail are due to unavailability of stock, but the percentage of successful upgrades increased significantly with an increase in availability of stock. The percentage of successful upgrades increased to 72 percent. The time a customer spends in the system increased, since if the phone is in stock resulting in a successful upgrade, the process takes longer to complete. This is in contrast to the customer leaving immediately when an upgrade is unsuccessful. A tradeoff opportunity thus exists between the cost involved in improving stock management and the profit involved with an increase in the number of upgrades. Company A should assess the tradeoff value carefully before deciding to implement the initiative.

Scenario 4: Increase the number of consultants

An average of three sales consultants are used at present to serve customers in dealerships. The number is increased to observe the impact on the queue length, waiting time, total time in system and the process completion time. The following results are obtained from the simulation model:

Number of consultants	3	4	5	6
Minimum Queue Length	0	0	0	0
Maximum Queue Length	7	5	3	3
Average Queue Length	0.7437	0.1747	0.031	0.011
Minimum Waiting Time (hours)	0.00	0.00	0.00	0.00
Maximum Waiting Time (hours)	1.43	0.7081	0.4234	0.2417
Average Waiting Time (hours)	0.186	0.0433	0.0081	0.0025
Minimum Time in System (hours)	0.1181	0.0961	0.0871	0.0871
Maximum Time in System (hours)	2.0239	1.525	1.3608	1.0444
Average Time in System (hours)	0.764	0.624	0.5871	0.5782

Table 4.9 - Results associated with increasing the number of sales consultants

The number of sales consultants is increased from three to six consultants. The improvement affects the queue length and therefore also the time spent in the queue. Accordingly the current maximum waiting time is approximately one hour and 24 minutes and customers encounter queues with a maximum length of 7 persons. If four sales consultants are employed, the improvement is remarkable with a maximum waiting time of approximately 40 minutes and a queue length of five persons. When six sales consultants are employed the maximum waiting time is 14 minutes and the queue length decreases to a maximum of three persons. The improvement initiative is worth serious consideration when viewed from a customer perspective.

4.4.7.2 Testing the impact of improvement initiatives on Customer satisfaction ratings

After the scenarios are simulated, the impact of the proposed improvement on customer satisfaction should be determined. The satisfaction ratings of the associated customer requirements may be improved due to the relationship between the technical benchmarks and customer requirements. The relationship may be described by using a performance/satisfaction function, examples of these functions defined by Ramaswamy [35], can be seen in section 2.3.4.5. The increase in satisfaction for each requirement depends on the functional form associated with the specific KPI and customer requirement. A performance/satisfaction function may be determined for each process based on the technical benchmarks of each process with their associated satisfaction ratings. The performance level of each KPI is measured for all three companies and the target as well as the lowest perceived

performance is determined in section 4.4.6. The performance levels are shown in Figure 4.14 as the technical benchmarks. The satisfaction ratings for the associated customer requirements are also shown in Figure 4.14. The five performance ratings together with the five satisfaction ratings for each KPI may be plotted graphically to determine the performance/satisfaction function. The use of only five data points may cause the performance/satisfaction function to be unreliable. To make the function more reliable, customers may be surveyed to obtain forecast satisfaction ratings for alternative performance levels. The additional data points obtained from the survey may then be plotted together with the five available data points to obtain a more reliable function. The impact an improvement initiative may have on customer satisfaction is demonstrated in the following example. Due to a lack of additional data points, only five data points are used to obtain the performance/satisfaction function in the example. The example can thus only be used for demonstration purposes and the output cannot be applied.

Testing the impact of a decrease in the transportation time on satisfaction ratings

The KPI related to the repair process is the total time it takes to repair a phone from when the customer books in the phone until the repaired phone is delivered to the customer. The performance levels associated with the KPI together with the satisfaction rating of the associated customer requirement is plotted in Figure 4.15. Due to insufficient information, only five data points are plotted.

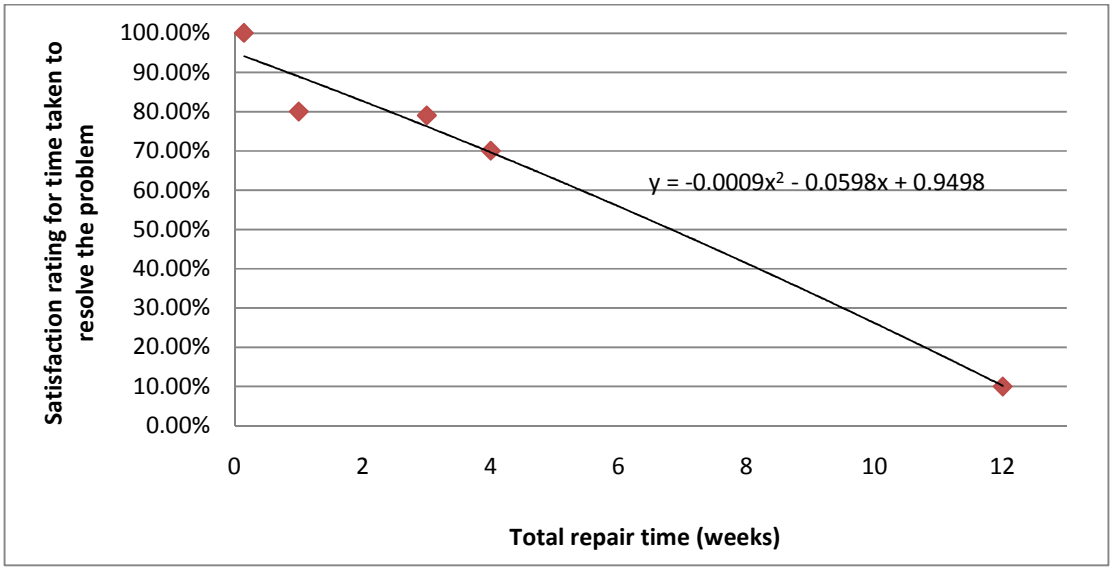


Figure 4.15 - Performance/satisfaction function for a decrease in transportation time in the repair process

The equation associated with the functional form may be obtained by using the least square method.

$$y = -0.0009x^2 - 0.0598x + 0.9498 \quad [6]$$

In the previous section the performance of the KPI is improved from 3 weeks to 1 week; the corresponding satisfaction rating may now be calculated using equation [6] where y represents the new satisfaction rating and x represents the new average time it takes to repair a phone.

Figure 4.16 illustrates the new satisfaction ratings (y) associated with the improved technical benchmark obtained from simulation modelling. As seen from the figure the satisfaction rating improved from 79 percent to 89 percent. This is greater than the satisfaction rating obtained from Company B's customers for the performance level of one week. This may be due to the fact that customers from Company A have a lower expectation than Customers from Company B, which means that a higher performance level will score a higher satisfaction rating from Company A customers than from Company B customers. If Company A should decide to implement the improvement initiative, customer satisfaction may increase significantly. Company A should consider the cost involved in decreasing transportation before they decide to implement the improvement initiative. From a customer perspective it may be worth the effort to implement if the cost involved is not too high.

						Competitive Evaluation					
						Satisfaction rating (%)					
Call Center Customer Experience Requirements	Importance rating	Repairs process	New deals process	Upgrades process	In-store customer service process	Company A	Company B	Company C	Target	Lowest perceived	New satisfaction rating
Reliability of products and services	68	3				82	85	78	100	0	
Time taken to resolve the problem	66	9				79	80	70	100	0	89
Initial feeling when joining the network	65		9			80	83	68	100	0	
Amount/Adequacy of information received	45		9			90	92	85	100	0	
Time taken from signing the contract to being able to make the first call	39		9			78	80	78	100	0	
Ease of the activation process	35		9			84	87	78	100	0	
Availability of preferred phone	59			3		79	81	78	100	0	
Time spent waiting	58			9		74	74	71	100	0	
Amount of information available to guide in decision making	57			9		85	86	78	100	0	
Range of cell phones offered	50			9		82	85	73	100	0	
Knowledge of staff	68				9	83	84	75	100	0	
Helpfulness and courteousness of staff	68				9	79	80	76	100	0	
Total time spend in the store	66				9	79	80	70	100	0	
Time spend waiting in the queue	51				9	68	69	65	100	0	
Raw score		798	1656	1662	2277						
Relative %		12%	26%	26%	36%						
Importance Rank		1	3	3	5						
Current performance		63654	137088	133116	177282						
Target performance		79800	165600	166200	227700						
Process Performance		80%	83%	80%	78%						
Technical benchmark	Company A performance	3	1	50	60						
	Company B performance	1	0.5	80	30						
	Company C performance	4	1	30	70						
	Target performance	0.1429	0.0208	90	0						
	Lowest perceived performance	12	7	0	120						
Key performance indicators		Total repair time (weeks)	New deals process completion time (days)	Number of upgrades done successfully (%)	Total time spend waiting in the queue (minutes)						

Figure 4.16 - Testing the impact of improvement initiatives on customer satisfaction for Company A with the use of QFD

As shown in Figure 4.16, only the satisfaction rating of the customer requirement associated with the specified KPI was improved. It is not necessary to improve all the satisfaction ratings for the purpose of validating the framework. When the framework is implemented at a company, the rest of the requirements can be linked to different KPIs associated with each process. Each time the performance of a specified KPI is improved, the satisfaction rating of the associated requirement may be improved and tested with the framework.

4.5 Design prerequisites for the framework

The following design prerequisites are adhered during the validation of the framework:

1. Existing resources and expertise within Company A are used to obtain customer and process data
2. Commitment and involvement of key people and senior management enabled workshops and interviews with relevant stakeholders from Company A

The following additional design prerequisites must also be adhered to in order to successfully implement the framework in any service oriented industry:

1. Plan and carefully examine resource implications in terms of people, time, and financial resources before constructing the framework
2. Ensure the availability of a facilitator to facilitate the teams' progress with the use of QFD.
3. Take into account existing process capability when testing improvement initiatives
4. Manage change within the company to ensure continuous involvement and productivity

4.6 Chapter summary

The framework (ECEF) introduced in chapter three is validated by testing the framework against empirical data obtained from the telecommunications industry. In this chapter data obtained from customer interviews were used to identify process reengineering opportunities for Company A. The key business processes of Company A are identified together with KPIs for each process. The performances of the KPIs are improved by identifying various improvement initiatives in the form of "what-if" scenarios. The impact of the process improvements on customer satisfaction may be tested and quantified in stage seven of the ECEF and is demonstrated by means of an example. By following the seven consecutive stages prescribed in the ECEF, the customer satisfaction of Company A customers may be increased significantly.

This chapter validates that the ECEF may be useful in assisting mangers to satisfy customer needs. The ECEF may be used as a valuable framework to redesign business processes to deliver products and

services according to the needs of the customer. This will enable companies to enjoy the strategic competitive advantage of customer loyalty.

5. Recommendations and Conclusions

5.1 Recommendations

Due to the unavailability of reliable data, the ECEF is only partially validated in chapter four of the dissertation. The lack of additional data points leads to the use of only five data points to obtain the performance/satisfaction function in the example of section 4.4.7.2. The example can thus only be used for demonstration purposes and the results cannot be applied. Least squares regression is used in this dissertation to capture the relationship between process KPIs and customer satisfaction. It is assumed that the least square method will provide the function that best fits the data obtained, it is however important to note that this assumption must be tested. It is recommended that further empirical research is performed to analyse the impact of improvement initiatives on customer experience.

Today the basic QFD diagram is used in many organisations, but in 2006 and onwards more focus has been placed on the problems associated with the use of the traditional QFD. According to Büyüközkan [9] the QFD process may involve various inputs in the form of linguistic data, which may be inherently vague, such as human perception, judgment and evaluation on the importance of the customer's requirements. The design requirements and/or relationship strengths are usually also subjective and uncertain. The authors suggest that fuzzy set theory and group decision-making techniques should be incorporated in QFD to address this problem. Chen [14] suggests the use of asymmetric triangular fuzzy number Coefficients to solve the problem of planning under uncertainty. It is suggested that these ideas are explored further to improve the accuracy of the QFD's used for the ECEF.

The reliability of the ECEF may be tested through the application of the framework in a different service oriented environment. It is recommended that the ECEF is applied in an environment such as the insurance or banking industry to test the reliability of the framework.

5.2 Conclusions

5.2.1 A critical analysis of the advantages and disadvantages associated with the ECEF

There are many advantages associated with the ECEF that makes it an appropriate framework for enhancing the customer experience. The use of QFD in the framework can assist managers with the following:

- To define product specifications that meets the customer's requirements, while paying attention to the competitors.
- To ensures consistency between the customer's requirements, and the measurable characteristics of the product or service.

- To inform and convince all those responsible for various stages of the process of the relationship between the quality of the output of each phase and the quality of the finished product.
- To ensures consistency between the planning and the production process.
- To help minimize mistaken interpretations of priorities and objectives because planning takes place at an earlier stage.
- To translates customer requirements into meaningful (technical) requirements at each stage of the development and production processes.
- To bring people together from various disciplines and facilitates the formation of teams capable of meeting customer requirements.

By integrating the methodology of BPR into the framework companies will be able to redesign their business processes by obliterating non-value adding work. BPR helps to maximise customer value, while minimizing the consumption of resources required for delivering their product or service. The redesign of business processes is tested through simulation models, which leads to more advantages such as:

- Managers are able to study the dynamic behaviour of business processes.
- The results obtained are accurate compared to analytical models.
- Simulation is able to provide quantitative estimates of the impact that process redesign are likely to have on key performance measures.
- Simulation makes it easy to perform “what-if” analysis to determine the best improvement initiative.

Although the integration of these three tools allows the ECEF to enjoy the combined advantages associated with these tools, it also leads to certain disadvantages that may be associated with the ECEF:

- QFD is dependent on accurate customer data; if relevant secondary information does not exist surveys must be conducted. These surveys may be very expensive to conduct in terms of time and effort.
- QFD is dependent on the commitment of key people and senior management to contribute to the input. If their commitment cannot be obtained and maintained the technique may have serious negative strategic implications.
- QFD is very dependent on resources such as people, time, and financial resources.
- QFD as well as BPR must be integrated gradually and resistance to change must be taken into account. Employees’ concerns must be managed carefully

- Implementing the ECEF may lead to higher demands on employees, employees must be motivated to do whatever it takes to satisfy the needs of the customers.
- It may be expensive to build simulation models to test the impact of process improvements.
- It may sometimes be difficult to interpret the results yielded by the simulation models.
- It may not always be possible to obtain reliable data as input for simulation models and this can lead to inaccurate results that may have a significant negative impact on customer experience.

5.2.2 The worth of the ECEF

In the current business environment, customers need to be the centre of management concern [25]. James et al. [25] state that when companies make customers paramount to their business strategies, a radical shift occurs in the way they manage and measure success. New economics of service demand innovative measurement techniques that can assist managers in building customer satisfaction and loyalty and at the same time measure the corresponding impact on profitability and growth [25]. James et al. [25] is of the opinion that the lifetime value of a loyal customer can be enormous. The value can be enhanced when referrals are added to the economics of customer retention and repeat purchases of related products. From this it is clear that customer retention is extremely important. Customer retention is dependent on customer satisfaction and the manner in which customers experience the products and services of the company. If a company can succeed in satisfying customer needs, they will be able to retain their customers.

Chapter one of the dissertations asserts the inability of companies to deliver an exceptional service. The aim of the dissertation is to develop a conceptual framework through which service oriented companies can enhance their customer experience by improving their internal business processes. The research objectives identified in chapter one refers to the investigation of QFD and simulation modelling as tools that may be used to satisfy the previously mentioned aim. A detailed literature review in chapter two reveals the worth of QFD in establishing the causal relationship between business processes and customer feedback. QFD may also be used to measure process performance from a customer perspective and is able to provide a quantitative performance measure for business processes. Literature also reveals that simulation tools are the only tools that provide ways to model entity flow and the dynamic behaviour of business processes [20]. Various other techniques such as BPR and benchmarking are identified in chapter two. These techniques together with QFD and simulation modelling are integrated into one comprehensive framework developed in chapter three.

The framework named the ECEF is a conceptual framework that aims to enhance customer experience by redesigning business processes. The research objectives of the dissertation are reached through the development of the ECEF in chapter three and the partial validation of the ECEF in chapter four. Due

to limited data the ECEF is only partially validated in chapter four by testing the framework against empirical data obtained from the telecommunications industry. Due to the strict competition faced by the telecommunications industry in South Africa and the low differentiation between the products they offer, they had to invest in delivering quality service to their customers. Exceptional customer service may serve as a differentiator between the existing telecommunications companies. In Chapter four the ECEF is applied to identify and prioritise key business processes and to align the processes to the needs of the customer. The ECEF is effectively utilised to identify feasible improvement initiatives and test the impact of the initiatives on customer experience. The seven consecutive stages outlined in the ECEF are validated through the results obtained in chapter four. The results in chapter four proved that the customer satisfaction of Company A customers may be increased significantly through the application of the framework.

The ECEF may assist managers in enhancing the experience of their customers which in turn will lead to a satisfied customer. A satisfied customer will remain loyal to the company, which in turn generates future sales. Customer satisfaction will also have a direct influence on financial performance since a satisfied customer is less likely to demand expensive product repairs or replacements or to invoke service guarantees. Customer satisfaction will lead to word-of-mouth publicity and this will also generate more sales and increased profits. The advantages associated with a satisfied customer are endless and in this the worth of the ECEF is proven.

6. References

[1] Anonymous. *The Industry Handbook*. Available online at http://www.investopedia.com/features/industryhandbook/ Retrieved on 20 June 2009

[2] Anonymous: *Turning data into information, SnapSheets XL Software - QFD, FMEA, and Pugh*, available online at http://www.sigmazone.com/SnapSheetsXL.htm. Retrieved on 3 March 2010

[3] Band, C, Pampallis, A, van der Wal, RWE, (2002), *Service quality in a cellular telecommunications company: a South African experience*, Managing Service Quality, vol. 12, no. 5, pp. 323-335

[4] Banerjee, S. (2008). Clarablog - *Customer Experience, Text Mining, and all that...* Available online at http://experienceintelligence.blogspot.com. Retrieved on 23 January 2009

[5] Bhaskar, R. et al., (1994). *Analysing and re-engineering business processes using simulation*, Proceedings of the 1994 Winter simulation Conference, 1206-1213.

[6] Bellinger, (2004), *Systems Thinking "A journey in the realm of systems"*. Available online at www.systems-thinking.org/modsim/modsim.htm. Retrieved on 12 February 2009

[7] Bitran, G. (1993), *Framework for analysing the quality of the customer interface*, European management journal Vol. 11, No. 4, pp. 385-396.

[8] Blumenthal, A. (2008). *User centric Enterprise Architecture*. Available online at http://usercentricea.blogspot.com/2008/04/customer-experience-management-and.html. Retrieved on 2 February 2009.

[9] Büyüközkan, G, Feyzioğlu, O, and Ruan, D. (2007). *Fuzzy group decision-making to multiple preference*. Department of Industrial Engineering, Galatasaray University, C¸ Cirağan Cad. Elsevier, Computers in Industry 58, 392–402

[10] Camp, R. (1995). *Business process benchmarking*. ACQC.

[11] Chan, L.K. et al., (1999). *Rating the importance of customer needs in quality function deployment by fuzzy and entropy methods*, International journal of production research., vol. 37, no. 11, 2499 - 2518

[12] Chan, L.K. and Wu, M.L. (2004), *A systematic approach to quality function deployment with a full illustrative example*. Department of Management Sciences, City University of Hong Kong.

[13] Chase, Richard B. et al. (2006). *Operations management for competitive advantage with global cases*. New York, McGraw-Hill/Irwin.

[14] Chen, Y, Fung, R.Y.K, and Tang, J. (2005) *Estimating the functional relationships for quality function deployment under uncertainties*. Department of Manufacturing Engineering & Engineering Management, City University of Hong Kong. Elsevier, Fuzzy Sets and Systems 157 , 98–120

[15]Cohen, L. (1995). *Quality Function Deployment: How to make QFD work for you?*, Addison Wesley Longman, Massachusetts, USA.

[16]Davenport, T.H. and Short, J.E. (1990). *The new industrial engineering information technology and business process redesign*, Sloan Management Review, 11-27.

[17]Eisenhardt, K.M. (1989), *Building Theories from Case Study Research*, Academy of Management Review, 14, 532-50

[18]Flexsim Software website: www.flexsim.com. Visited on 10 May 2009.

[19]Gartner Group (2001), CRM Economics: *Figuring Out the ROI on Customer Initiatives*, white paper, Stamford, CT

[20]Gladwin, B., and Tumay, K. (1994). *Modelling business processes with simulation tools*, Proceedings of the 1994 Winter Simulation Conference, 114-121.

[21]Gustafsson, A. and Johnson, M.D. (2000). *Improving customer satisfaction, loyalty, and profit: An integrated measurement and management system*, San Francisco, Jossey-Bass Inc.

[22]Griffin,A. and Hauser, J.R., (1993), *The voice of the customer*, Marketing Science, **12**(1), 1-27.

[23]Hammer, M. (1990). *Reengineering work: Don't automate, obliterate*, Harvard Business Review, 104-112.

[24]Hunter, P. (2009), *Choosing the Best Method for Listening to the Customer*. Available online at http://www.databasesystemscorp.com/tech-phone_survey_31.htm. Retrieved on 19 June 2009.

[25]James, L.H. et al., (1994). *Putting the Service-Profit-Chain to work*, Harvard Business Review.

[26]Jain, SC, (1997), *Marketing Planning and Strategy*, 5th ed., South-Western College Publications, Cincinnati, OH.

[27]Kaplan, R.S. and Norton, D.P. (1996). *Linking the Balanced Scorecard to strategy*, California Management Review, Vol 39, No 1: 53-79.

[28]Lawrie, G. (2004). *Development of the 3rd generation Balanced Scorecard, Evolution of the Balanced Scorecard into an effective strategic performance management tool*. 2GC Limited.

[29]MapleSim Software website: www.maplesim.com. Visited on 10 May 2009.

[30]Mazur, (2008). *QFD Institute, The official source for QFD*. Available online at http://www.qfdi.org/what_is_qfd/what_is_qfd.htm. Retrieved on 11 February 2009.

[31]Meyer et al. (2007). *Understanding Customer Experience*, Harvard Business Review.

[32]Mouton, J. (2001). *How to succeed in your Master's & Doctoral Studies*, A South African Guide and Resource Book. Pretoria, J.L. Van Schaik

[33]Payne et al. (2005). *A strategic framework for customer relationship management*, Journal of Marketing, Vol 69, 167-176.

[34]Pidd, M. (1998). *Computer simulation in management science*. Fourth edition. Wiley.

[35]Ramaswamy, R. (1996). *Design and management of service processes: Keeping customers for life*. AT&T.

[36]Robinson, S. (2004). *Simulation - The practice of model development and use*. Wiley.

[37]Rockwell Automation website: www.ARENAsimulation.com. Visited on 10 May 2009

[38]Ross, D. (2007), *The Spanish Armada*. Britain Express.

[39]Schmitt. (2003). *Customer experience management: a revolutionary approach to connecting with your customers*. John Wiley and Sons.

[40]Smith, Roger D. (1998), *Simulation article*, Encyclopedia of Computer Science, 4th edition, 2006.

[41]Swain, J.J. (1993). *Flexible tools for modelling*, OR/MS Today, December, 62-65.

[42]Ulaga, W. and Chacour, S. (2001). *Measuring customer perceived value in business markets, a prerequisite for marketing strategy development and implementation*, Industrial Marketing Management Vol 30, 525-540.

[43]Van Ackere, A., Larsen, E.R., and Morecroft, J.D.W. (1993). *Systems thinking and business process redesign: An application to the Beer Game*, European Management Journal Vol 11: 412-4.

[44]Youssef, M.A. and Zairi, M. (1995), *a Main pillar for successful total quality management and product development*, International Journal of Quality & Reliability Management, vol 12, no 6, 9-23

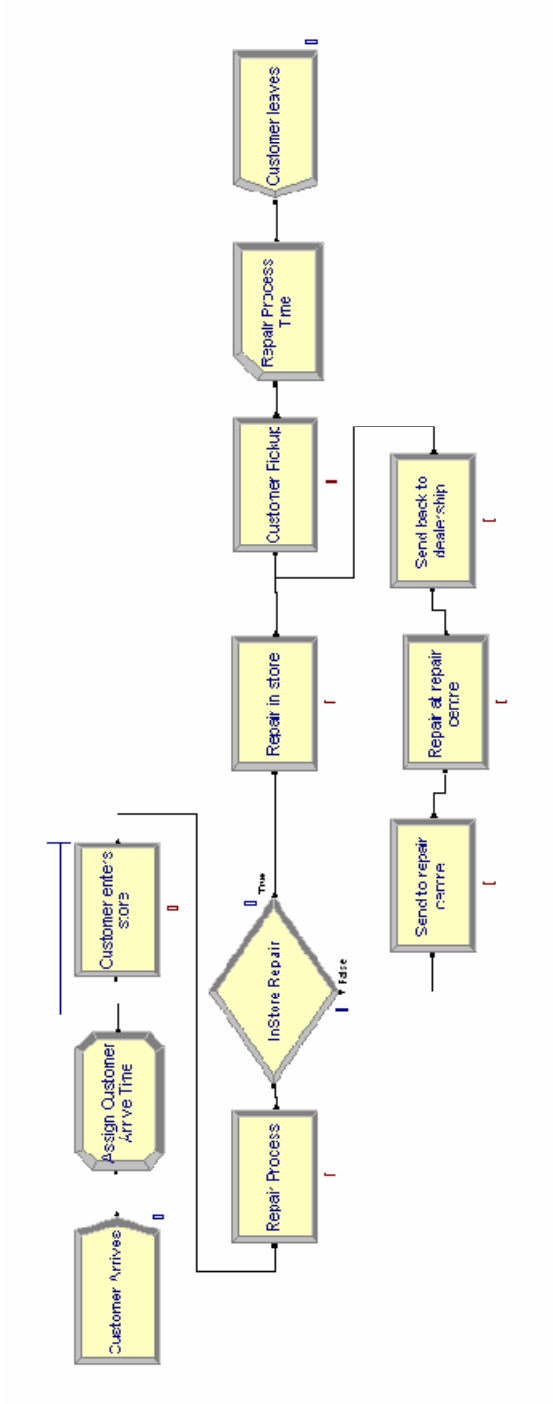
Appendix A - Customer requirements associated with business processes with importance and satisfaction ratings

Business process	Customer Requirement	Importance rating (0-100)	Satisfaction rating for Company A (0% - 100%)	Satisfaction rating for Company B (0% - 100%)	Satisfaction rating for Company C (0% - 100%)
The Training Process	Knowledge of staff	68	83	84	75
	Helpfulness and courteousness of staff	68	79	80	76
	Knowledge of personnel on problem resolution	52	81	82	73
	Time taken to speak to a consultant	51	68	69	65
The Repair Process	Reliability of products and services	68	82	85	78
	Time taken to resolve the problem	66	79	80	70
The New deal process	Initial feeling when joining the network	65	80	83	68
	Amount/Adequacy of information received	45	90	92	85
	Time taken from signing the contract to being able to make the first call	39	78	80	78
	Ease of the activation process	35	84	87	78

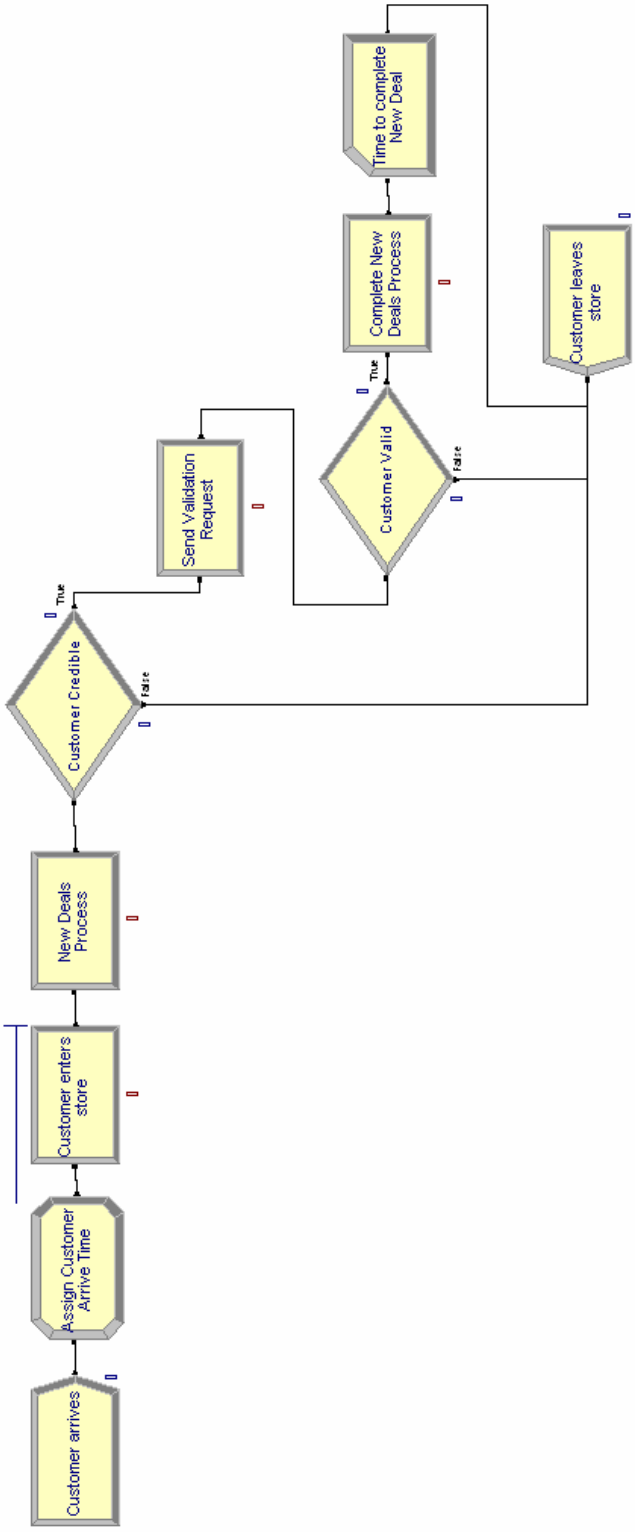
Business process	Customer Requirement	Importance rating (0-100)	Satisfaction rating for Company A (0% - 100%)	Satisfaction rating for Company B (0% - 100%)	Satisfaction rating for Company C (0% - 100%)
The Upgrade Process	Availability of preferred phone	59	79	81	78
	Time spent waiting	58	74	74	71
	Amount of information available to guide in decision making	57	85	86	78
	Range of cell phones offered	50	82	85	73
The In-Store Customer Service Process	Knowledge of staff	68	83	84	75
	Helpfulness and courteousness of staff	68	79	80	76
	Total time spend in the store	66	79	80	70
	Time spend waiting in the queue	51	68	69	65

Appendix B – Simulations Models

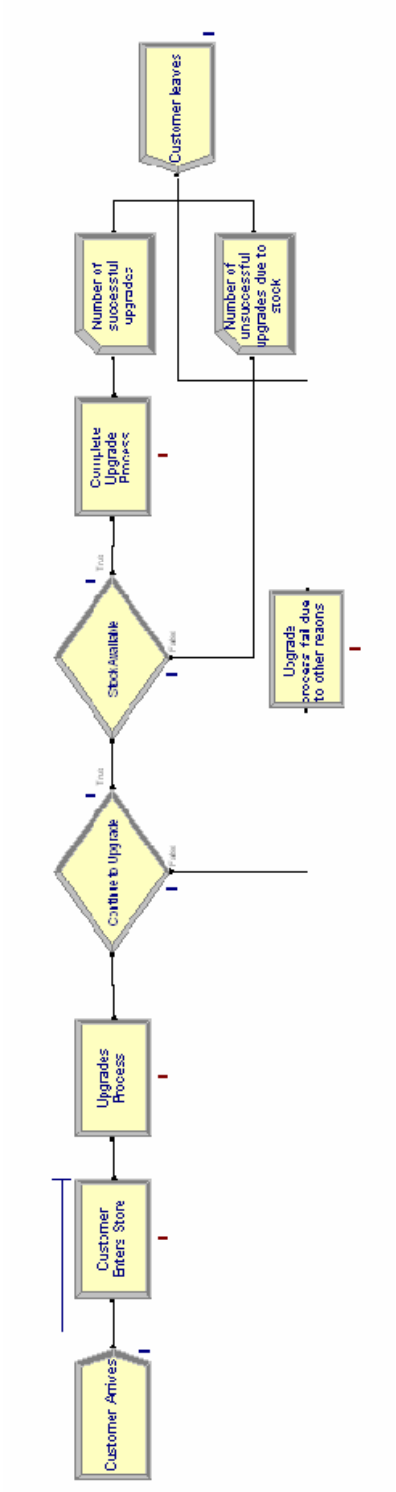
The Repair Process Model



The New Deal Process Model



The Upgrade Process Model



The In-store Customer Service Process Model