Degree Thesis for the Bachelor’s Degree in Mechanical Engineering with specialisation in Production and Engineering Management

Improvement on performance evaluation for a service providing process

(With specific focus on material availability, administrative assistance, service quality and opening hour)

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Abstract
Improvement is an essential act for restricting increasing performance pressure in organizational activities. In this paper, a framework for carrying out performance measurement process in order to strengthen the balanced score card application is developed. The proposed framework is increased to 11 procedural steps with the modification of analytic hierarchy process methods (AHP) within the balanced score card (BSC) problem solving and continuous improvement. The framework was examined with a case study of city library in Sweden. The framework enabled the service providers’ as the decision maker to assess their performance on their service rendering with respect to customer requirement, identify key measures and select the most preferred and improvement means. The motivation for this proposed framework was evident of how the step 4 can be prioritized by addressing the measure to be taken that can lead the organization in improving their performance.

Keywords: Performance evaluation, balanced score-card, decision making tools.
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Tesleem Olanrewaju Oyelakin,
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1. Introduction

This chapter gives an introduction to the thesis report. It is designed to present an overview of the background, the problem discussion, problem formulation which in turn leads to the purpose, the relevance, for this study and finally shows limitations and time frame.

1.1 Background

Lots of disturbances such as demand, market fluctuation, competition and administration failures have lead most establishments or organizations into instability. According to Hayes and Wheelwright, 1984; Skinner, 1969, improvement within establishments, service providing processing is considered to be an important element in a firm’s endeavour to improve solid performance. So therefore, predicting the future prospects of an organization and planning for different related requirement, it is absolutely necessary for the organization to be able to control their demand and market fluctuation, competition and administration failure in order to sustain stability in the global market by increasing their market share (Homayouni et al, 2007). According to Dey et al, 2008, performance management is a way of overcoming the unbearable and incommensurate of organizational activity which consists of measuring performance, planning, implementing and evaluating improvement measure by keeping their intended goals on right tracks. However, the study behind performance evaluation or measurement process is emanated through two phases. The first phase started in the late 1880s, while the second phase in the late 1980s (Ghalayini and Noble, 1996). According to Gomes et al., 2004, in the first phase, the performance measurement process is characterized with a cost accounting orientation which emphasized selective financial indicators, such as profit and return on investment whose approach received considerable criticism due to solely focusing on financial indicators by some critics such as Banks and Wheelwright, 1979; Hayes and Garvin, 1982; Kaplan, 1983 that focusing on financial indicators would encourage organisational short-term thinking.

For many organisations to survive in today’s competitive markets is apparently important to progress on their customer relation, quality of products and services, increase operation effectiveness, reduce waste and costs, and increase profit and market share (El-Haik and Al-Aomar, 2006) which greatly determine their improvement potentials. Consequently, speed, quality and low cost are universal goals in facing the growing competition in business (George, 2003) (Alsyouf et al., 2011). Therefore, in a way to achieve stability and improvement, maintenance management is systematic approaches that can be use to improve, facilitates and enhance the level of being successful in attaining the targeted goals. According to Neely, 2002, performance is concerned, controlled and measured based on scenario i.e what has happened in the past or what is happening in the present environment instances simply by its definition and said to be observable and measurable.

Also, measurement is described as the act of quantifying the performance criteria (metrics) of organizational units, goods and services, processes, people, and other business related activities. Thus, performance measurement is obligatory to up to date endeavour that could only be controlled properly if the effectiveness and efficiencies of an organization activity
can be measured properly at the right time. According to Neely et al, 1995, it is used to quantify both efficiency and effectiveness of activities, a means of monitoring and controlling organizations activities to ensure that they achieve predefined objectives (Brignall and Ballantine, 1996) (Dey et al, 2008). Generally, performance measures can be classified into several categories which include financial, customer and market, safety, quality, time, flexibility and innovation and learning. Early research on performance measurement shows that usual performance measurement models only focused on the achievement of a limited number of key financial measures like earnings per share and return on investment (Johnson and Kaplan, 1987) and many researchers (Brignall et al., 1992; Euske et al., 1993; Fitzgerald et al., 1991; Govindarajan and Gupta, 1995; Gregory, 1993; Lynch and Cross, 1991; Nanni et al., 1992; Neely, 1995; Shank and Govindarajan, 1992) have also highlighted the shortcomings of finance-based performance measurement models. Furthermore, Eccles and Pyburn, 1992, lamented that one of the major limitations of using financial measures of performance is that they are the results of management actions and organizational performance, and not the cause of it. Whilst Emmanuel and Otley (1985) argue that organizational success depends not only on achieving financial measures, but also how well the organization adapts to the environment within which it exists (Dey et al., 2008).

Nevertheless, performance measurement is frequently argued that performance measure should be derived from strategy to reinforce certain strategy objectives (Skinner, 1989) in finding solutions to questions such as efficiency and effectiveness, customer satisfaction and value added (Amaratunga et al., 2002). Galvin and McGlynn, 2003, added that performance measurement is not only to identify the means for improvement but also to develop a pathway for improvement (Dey et al, 2008). Insofar the improvement as to be reached, new performance measurement systems such as balanced score-card (BSC) (Kaplan and Norton, 1992, 1996), the strategic management analysis and report techniques (SMART) system known as performance pyramid (Cross and Lynch, 1988/1989), and the performance measurement questionnaire (Dixon et al., 1990) has been proposed and implemented in the performance measurement (Dey et al., 2008). According to Neely et al., 2000, one common key weakness of performance measurement system adopted by many organizations is being overly narrow or even uni-dimensional in focus. Thus, there is a need for a framework that can help to offer performance measurement for improving performance in the process and how to evaluate the performance measure by applying strategic tools. Amongst all these management frameworks, the balanced score-card is chosen which encompasses all issues related to managing organizational activities for better performance.

Furthermore, balanced score-card (BSC) is one of the strategic performance measurement and management frameworks that can be use within an organization for problem solving and continuous improvement of organizational activities. Also, it is the most widely use tool for complex decision making process. However, there are several approaches such as simple additive weighting (SAW), analytic hierarchy process (AHP) and multiplicative exponential weighting (MEW) that can be adopted in the decision making process.
1.2 Problem discussion
Many associated factors such as resource constraints, services schedules, technical capabilities and missing required diagnostic tools that limit the adequate improvement measure, resulting in quick fixes and temporary patched constitutes to organizational activities and do not address the real causes of the overall assessments. According to Mobley, 2004, some organizations that have program failed because of not having activity that ensures the program execution. Study shows that numerous framework has being available for developing performance measurement system but very few research tried to quantify their effect upon actual performance (Dey et al, 2008). In dealing with these challenges, the new strategic performance measurement and management systems such as balanced score-card (BSC), strategic management analysis and report techniques (SMART) system are tools proposed that can be used to improve organization activities and could of course be a good antidotes for better improvement (Dey et al., 2008). According to Galvin and McGlynn, 2003, these tools identify the means for improvement as well as developing a path way for better improvement. Therefore, balanced score-card is one of the various tools and techniques for performance measurement and management. The tool has 10 framework procedural steps to enhance and improve the performance measurement of an organization activity by identifying multiple factors for performance evaluation, analyze them with the involvement of the concerned stakeholders, quantify performance parameters and suggest improvement measures (Dey et al., 2008).

Furthermore, in the existing balanced score card framework, some gaps are identified which has no explicit definition. Take for instance the step for criteria indicator, there is no clear picture and holistic view of how to determine and calculate the criteria of success factors not to talk of establishing the most priority success factor. Also, there is necessity for monitoring and controlling process after the implementation of the score-card in order to feedback the processes if should in case need arise which is also missing. So therefore, there is need for another method approach to strengthen the known gap in the existing balanced score card tool for reliable improvement. According to Dey et al, 2008, it derives improvement measure; which helps decision makers to improvement measure to catalyst changes. If this is done, the performance measurement will give helpful improvement within the organization activities which in turn align with accomplishment of organizational goals.

1.3 Problem Formulation and Problem Question
The combined application of APH helps BSC model relative performance of any system under study and logical framework plans, implements and evaluates improvement projects dynamically in order to achieve operational excellence (Dey et al, 2008). It is a tool that helps an organisation to achieve and improve the performance measurement of organisational activities process as a result of averting the problem of customer diminishing or bad reputation. Since some gaps as been identified in the existing BSC application which may affects an organizational activity. So therefore, the methodological approach of knowing the right measures that could be used to strengthen the gap in the BSC application is paramount.
In the case of identifying and establishing factors that is most important using BSC, proper service schedule and human technical capabilities could fill the gap of losing customers. According to Dey et al, 2008, services such as library, healthcare or restaurant are complex and challenging to measure. Donabedian, 1980, added that, in the past, this service delivery has been evaluated by three categories of measurement which are structure, process and outcome (Dey et al, 2008). However, the possible ideas in bridging the gap in the existing BSC hereby calls for factors such as human, material resources availability, quality and opening hour for improving organizational activities. These factors are important and play a key role in determining performance measurement for service providing in supporting the accomplishment of improve organizational goals. Thus, the problem formulation of this thesis can be expressed as “How is it possible to improve the execution steps in the existing balanced score-card as well as improving the performance of balanced score-card in addressing the performance measurement related ineffectiveness for a service providing process”

1.4 Purpose
The general purpose of this research work is to present a conceptual framework proposal for performance measurement in service providing process using balanced score-card application in conjunction with the analytic hierarchy process method. The idea of the AHP method is to make pair wise comparison and establish priority factor evaluating the performance measurement with respect to the four factors mentioned above. Hence, in maintaining the number of the facility user or having higher numbers as well as increasing the company credibility which is sine-qua-non by reducing the service downtime and loss of customers or clients.

1.5 Relevance
In recent time service area, business environment, manufacturing activities is comprised of many processes, decisions, and actions (Leachman et al., 2005). So therefore, according to Hayes et al, 1988; Miller and Roth, 1994; Skinner, 1982, implementing effective and correct choice of critical decision can result into enhanced firm’s performance capabilities and strengthen the competitive status of the firm.

The relevance of this report can be seen from the significant of performance measurement used to reinforce important of certain strategies for management system needed to find solution in evaluating performance measure of an organization which in turn trigger its reliability, improve good quality service, time delivery, customer satisfaction and increase employees’ fulfilment. The practical relevance of the result evaluated will be in line with the actual situation for most service providers in order to checkmates uncalled scenarios.

1.6 Limitations and delimitation
This thesis report has different limitations. The major limitation is time management i.e lack of time and unable to get a case company on time that caused a lot of dely. Moreso, the word performance is a very complex word consisting of numerous aspects that can not be treated into details.
1.7 Time Frame
Time frame is a range of preliminary work for executing activities in a proper way. It is simply a milestone that helps to plan the way to carry out work activities in order to meet up with the scheduled or stipulated dates.

Therefore, in order to meet up with the submission dates, the table below shows the time frame for the accomplishment of this research work.

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Table 1: Time frame
2 Research Methodology

In this chapter different methods were explained and selected one in order to disclose the process of the research. The chapter contains the research method, the research strategy, data collection, data analysis, as well as research evaluation.

2.1 What is research?

Research is a way in which new knowledge is invented in order to proffer solution to a problem or answering a question. According to Blaxter et al, 2006, research can be described as a systematic investigation to find answers to a problem.

2.2 Research methods/Research approach

Research method is a clear and direct way of organizing thought that follows a logical “cause and effect” study so that the project can be easily understood and reproduced by others. Before this method can be understood, it should involve four stages. These stages are identification, solution, implementation and validation. These four stages may take the form of qualitative and quantitative approach having good premises in carrying out the research. Qualitative research is a research approach that is considered to generate and develop new theories while quantitative research is the approach that is aimed at verifying and testing previous theories (Bryman & Bell, 2007).

According to Ghauri and Grønhaug, 2005, they classified two different approaches of research by describing the differences between inductive and deductive approach. Both ways are used by the researchers in order to identify and established if their statements are either true or false. If the statement is established as true, it can be used as the basis for theories but once it is identified as true or false, the conclusion can be drawn.

Furthermore, a research work is concluded based on the facts via theories or observations. These facts are established on the perspective of deductive and inductive approaches. A deductive approach is an approach in which the conclusion can be deduced from the premises i.e starting by choosing of a theory and developing a hypothesis from the theoretical background that will later be tested in real life application (Bryman & Bell, 2007). In contrast, the inductive approach is the approach whose conclusion can not be directly infer from the premises. This approach starts by looking into information gathered and later used in developing a theory for the research work (Bryman & Bell, 2007).

2.3 Research strategy

In carrying out a research work, there is a great need to develop a strategy in accordance with some tactics that will enhance its success during the execution of the research paper. According to Chinese philosopher, Sun Zi from Wu (The Art of War) says,” strategy without tactics is the slowest route to victory and Tactics without strategy is the noise before defeat”. So therefore, it is apparently necessary to develop a strategy. Three conditions determine the choice of a particular strategy such as; the type of research question, the control an investigator has over actual behavioural events and the focus on contemporary as opposed to historical phenomena (Yin, 1989).

Basically, there are two types of research approaches that are involved in carrying out a research work. These approaches are inductive and deductive approach. Also, there is
another approach called abductive approach. According to Saunders et al., 2007, abductive approach is the combination of deductive and inductive approaches. When a researcher presumed a hypothesis based on background information and by means of empirical data conclusion will be reached. This process is known as deductive approach. Contrarily, the opposite of deductive is inductive that many other researchers prefer to deductive approach. In the inductive approach “theory is the outcome of research” (Bryman and Bell, 2007). Whilst the abductive approach consists on elaborating the theoretical framework in order to explain a specific case, and later testing this theory on other cases.

In this research paper, the inductive approach is the strategy adopted. This report is an inductive approach because it is based on the studies of existing articles which is a qualitative way.

2.4 Data collection
There are several ways of gathering data in carrying out a research work. These data are collected based on the data type namely primary and secondary source. According to Yin, 2003, there exist mainly six sources of evidence that are commonly used in data collection process. These processes include documents, archival records, interviews, direct observation, participant observations and physical artefacts (Yin, 2003).

However, there are two methods for collecting data. The method takes the forms of qualitative and quantitative. Qualitative method is the collection and analyses of data by words while quantitative method is the data collected via statistics and mathematics i.e. researchers employ measurement (Bryman and Bell, 2007). The qualitative and quantitative method of data collection is of the type of primary source and secondary source respectively. In addition, the combination of quantitative and qualitative approaches leads to mixed methods research (Creswell, 2009). Adopting and implementing both methods will enhance and provides an extensive understanding of research problems.

For this project work, the qualitative method is first used due to no case company but later end up with quantitative method after getting one. Therefore, both data types are used in executing this research paper.

2.5 Data analysis
In the progress of the thesis report, certain phenomenon and updating will be presumed because of the fact being a quantitative method using which are based on the information gathered from article, journal and books for more explanatory in order to come out with better results. Also, the guidance of supervisor and examiner are appreciated in the analysis process due to their vast knowledge in research field.

According to Silverman, 2006, the only way in which the qualitative data analysis can make a significant contribution is by utilizing its theoretical resources in the deep analysis of small bodies of publicly shareable data. Thus, the theory used for analysing the data collected is structured in describing the main problem faced by many service providing organisation.
2.6 Research evaluation
A research work is evaluated based on the importance of different criteria. A criterion helps to know how a theory will survive different tests. On one hand is the validity and reliability on the other hand. According to Bryman and Bell, 2007, he defined validity as “concerned with the integrity of the conclusions that are generated from a piece of research” and reliability as “concerned with the question of whether the results of a study are repeatable”

The collected data for the performance measurement indicators were obtained by the people in charge starting from the head of the department and evaluated using the standard template of AHP in establishing the priority factor and showing the consistency among those factors. Furthermore, these data were gathered via questionnaire and interview in three times occasion before processing it for further analysis. Also, the empirical findings are presented in the form of statements of the respondents in term of figure which will enable the reader to see the “raw data” for further perusal without my interpretation.

Hence, all new research must be reliable in theories. They should be able to go farther than existing ones in solving problems and answering questions. Nevertheless, reliability is connected with quantitative research since it is significant to know whether if a measure is conventional or not (Bryman and Bell, 2007).

2.7 Research generalizing
According to Bryman and Bell, 2007, generalization of results involves when a researcher creates representative sample in order to generalize the results to other groups beyond than the one of the research. The method involving both qualitative and quantitative can be generalized; some of the reasons may be the situation of the case study or the type of the research (Saunders et al., 2007).

However, its finding is based on qualitative and quantitative approach. According to Grazino and Raulin, 2007, generalization is understood to make statement about the overall result obtained from investigations via the information’s gathered during the research process. There are three type of generalization of research result. These generalizations are;

- Generalization of the study results from the participants to the larger population.
- Generalization of the study results over time.
- Generalization of the study results setting to other field settings.

Therefore, the generalizability of the results evaluated can be guaranteed and be acceptable if the conceptual framework developed from the implemented researching approaches and specific methods adapted addresses the causes for performance improvement which are not based only in company’s applied but applicable to all service provider process. Hence, these model may rely on organization learning and training in order to avert different possible of problem.
3 Literature review/Theory
This chapter contains theories used in understanding the concepts about performance measurement via maintenance management on how to measure the performance of a service providing organisation.

3.1 Definition of some concepts:

3.1.1 What is a model?
A model is a presentation of framework which is structured in form of qualitative and quantitative technique. These techniques are one of the influencing factors that affect an organisation’s performance. Therefore, a model is prototype of how real thing look like. According to Stachowiak 1973, a model posses three features namely mapping, reduction and pragmatic feature being information on something, created by someone, for somebody and for some purpose.

3.1.2 What does service mean?
Service simply means the way of rendering help to humanity. According to English dictionary, it is the act of helpful activities by means of providing amenities required by the public, in terms maintenance, repair etc. The services rendered to the public can be from library, shopping, restaurant etc and people involved in rendering those services are known as service provider.

3.1.3 Importance of service
The role of services can not be over emphasized due to its impact in the life of people based on the thought of Albert Schweitzer. According to Albert Schweitzer, services to other people are both responsibility and joy. The service provider may specialised in a particular area of care such as accommodation, education, employment etc or providing service that includes all aspect of mankind.

3.2 Types of Performance Measures
According to Meyer, 2002, the management school approach opinioned that organization covering all major aspects of business or volunteer activities has four types of performance measure. These types of measures are Market valuation, financial measures, non-financial measures and cost measures. These measures are divided into several categories such as financial, customer and market, quality, safety, flexibility, time and innovation and learning (Dey et al, 2008).

3.3 Performance evaluation
Due to increasing competitive pressure resulting from the globalization of manufacturing activities and markets, organisation must be able to measure the different tactics of their performance by reorienting their strategies, operation, processes and procedure to remain competitive. If this is not done, benchmarking efforts geared at deploying the best modern practices will be fruitless (Gomes et al, 2004). According to Leachman et el, 2005, performance is defined as in terms of multiple achievement indicators like waste reduction, operating efficiency, timely delivery, superior quality, motivated employees, customer satisfaction, etc. which is usually reported for each indicator rather than in a consolidated manner through an aggregate index of performance. Most studies on performance focus on
the operating outcomes while overlooking whether the improvement efforts warrant the
time and costs devoted to them (Clark and Fujimoto, 1991; Leachman and Hodges, 1993;

By definition, performance evaluation is simply described as the act of formal determinant
of job related action and their respective outcomes within a particular position or settings.
This is also known as performance measurement. According to Bichard, 1995, Clinton and
Chan, 1998, Schmanner and Vollmann, manager of modern organisation are often
frustrated due to the lack of practical performance system. Hence, there is need for
organization to improve on their performance in order to remain competitive in the global
market.

In order to maintain competitiveness within organization and amongst contemporaries,
performance measures are essential for individual, group and organization to understand the
state of the modern organization in an appropriate way. According to Neely, 2002, the
performance measures generic functions are summarized into four way. These ways are as
shown below:

- To reflect the current state of modern situation.
- To monitor and control operational efficiency.
- To drive improvement programme.
- To gauge the effectiveness of decisions.

3.3.1 Performance measurement in service provision

Nowadays, interest among both academics and practitioner using the performance
measurement system as a tool for delivering strategic objectives is well established in the
management literature (Kaplan and Norton, 1992; Eccles, 1991). The fundamental purpose
of doing measure is to improve in performances. According to Medori, 1998, assessing the
performance challenges facing many organization in business environment is not only
restricted to financial performance measure because the inadequacies of solely using
financial performance measures are well documented (Amaratunga et al., 2002). There are
others ways to do performance measures that can be incorporated into organizational
system to achieve long term goals. Therefore, the strategic performance measurement has
grown up to beyond limit and has become an increasing popular for facilitating decision
and providing incentives. According to Budde, 2008, this huge increasing improvement is
not only triggered by traditional performance measure that represent a firm current position
in a dynamic environment but also numerous concepts that capture the long term effects of
managerial activities. Traditional financial system helps to provides an increasingly limited
use to manager who wants to manage and improve critical business process which has
resulted for many organization to realized that the traditional financial orientation of their
performance measurement system are no longer adequate (Amaratunga et al., 2002)

According to Newing, 1995, traditional financial system places too much emphasis on pure
profit measure and little on the customers, staffs, risk and control aspects of the
organization’s operation although these are the keys drivers of financial results. In dealing
with other aspects of performance measurement for incorporating the non-financial
measure which has been great interest in today’s global economy involves issues such as
employees and customers satisfaction leaving an impact in business performance. For instant, non financial measure are becoming important with increasing demand for providing valuable customer service for public organization such as for National Health Service (NHS) within UK (Amaratunga et al., 2002).

3.3.2 Performance measurement tool and its methods
Performance measurement estimates the parameters under which programs, investments, and acquisitions are reaching the targeted results (Gamble et al., 2007). By so doing, it will give a good performance as a criterion whereby an organization determines its capability. Therefore, performance measurement can simply be described as the process of gathering and reporting information with regard to the performance of an individual, group and organizations based on their outcome in line with what is intended to be achieved. Therefore, the performance measurement process requires the use of statistical data in order to determine the results for improving the performance. This statistical data are used to carry out the performance measurement system tools. These system tools are to aid improvement. There are different performance measurement system tools that are available to improve organization activities. According to Gomes et al., 2004, a large number of performance measurement systems (PMSs) have been proposed and amongst the most widely cited of these PMSs are: the SMART (Cross and Lynch, 1988-1989; Lynch and Cross, 1991), the performance measurement matrix (Keegan et al., 1989), the Balanced Scorecard (Kaplan and Norton, 1992), and the integrated dynamic PMS (Ghalayini et al., 1997). All these tools are to reinforce strategy objectives of organizational activities by finding solution to question such as customer satisfaction, efficiencies and effectiveness and value adding (Amaratunga et al., 2002). Thus, they are modern strategic tools of performance measurement system which has encompasses the idea of financial and non-financial measure of organizational activities.

However, in response to the criticisms associated with traditional financial based measurement systems. A good antidote is balanced score-card. Balanced score-card is a strategic management and performance measurement system tool that has been proposed and appears as one of the most commonly cited performance measurement system that is widely acceptable among scholars and practitioners (Gomes et al., 2004). Hence, balanced score-card will be the focus in carrying out the performance measurement.

3.4 Balanced score-card (BSC)
Balanced score-card is a strategic performance measurement and management for high performance organization, a tool regarded as non-financial measure for measuring organization performance. It is a tool used to cover the effects of managerial activities. Organization can gathered critical non-financial data of organizational activities through balanced score-card by helping to identify problems, improve process and achieve organizational goals in a way that can be understood and used by all other level of the corporation from line manager to senior executives (Amaratunga et al., 2002).

It is said to be conceptually similar to the “Tableau de Bord” used throughout the twentieth century, especially by French companies (Epstein and Manzioni, 1997) (Gomes et al., 2004) as a management framework for measuring the economic and operating performance of an organization (Alsyouf et al., 2011). According to Kaplan and Norton (1992; 1996), balance
scorecard has its performance measures in four different perspectives; namely financial, customers, internal business and learning and growth, tools for managers to incorporate intangibles such as customer satisfaction and employee loyalty and translates strategy into objective and measures. Its implementation was buttressed by frigo and krumwiede, 2000, it does not only translating strategy into operational terms, but also align the organizational strategy by focusing on employees on their role on accomplishment with organization mission (Alsyouf et al., 2011).

Balanced score-card is a strategic performance measurement with framework of 10 procedural steps for determining improvement for organization activities. Part of its steps in the framework can not be done without the conjunction and implementation of another method. For instance, step 4; criteria indicator creates a gap in the existing framework. This gap could only be amends when AHP method is adopted by showing the arrangement of the indicators in a matrix before establishing the priority factor. Moreso, there is also a need for additional step that will guarantee a feedback process if the performance measurement taken could be done in a better way due to additional information. The additional step within the framework will helps to know whether the decision made can be done in a better way or not. The two suggestion introduced in the framework can enhance the result of the balanced score-card with better improvement.

3.4.1 Essence of balanced score-card
Balance is necessary for efficient and effective movement for achieving a prosperous sound and for assisting in maximizing potentials. Thus, performance measurement system should be balanced supporting process against pre-determined objectives without sub-optimization (Amaratunga et al., 2002).

Many organizations had received breakthrough by the implementation in creating a healthy and sound performance with balanced score-card. It improves an organization performance by linking their programme activities and performance goals to organization’s budget, decision making and confidence in organizational performance. Therefore, balanced score-card helps to link short term operational control to the long term vision and strategy of the business with the idea of describing the essential element of business success. It main function is to control organizational operations (Amaratunga et al., 2002).

Its framework enhances and improves the performance measure of organization activities by identifying multiple factors for performance evaluation, analyze them with the involvement of the concerned stakeholders, quantify performance parameters and suggest improvement measures (Dey et al., 2008).

3.4.2 Balanced score-card four perspectives
Balanced score-card has its type of performance indicator in four different ways, namely customer perspective, internal business process perspective, financial perspective and innovation and learning perspectives. The description on each perspective is given below:

3.4.2.1 Customer perspective
Customer perspective is concerned with the organizational abilities to provide quality goods and services, delivery effectiveness and overall customer service and satisfaction. To
this effect, according to Kaplan and Norton, 1992, measuring how an organization is performing from customer perspective has become a serious concern for top management having mission focused on the customer. The balanced score-card demands that manager’s translates general mission statement on customer service into strategic measure that shows what factors that really matter to customers (Amaratunga et al., 2002).

3.4.2.2 Internal business process perspective
Upon when an organization has measured their performance with respect to customer perspectives, business process are responsible and must be able to translate into measure of what the organization need to do internally to meet their customers’ expectations. Therefore, the business process perspective is a subset of organization activities that primarily analyze the organization’s internal process. Thus, internal business processes are the mechanism through which organizational performance expectations are achieved (Amaratunga et al., 2002).

3.4.2.3 Innovation and learning perspective
The customer and internal business process perspectives are the first two perspective indicators organization faced in order to improve on their performance measure. It perspective enables an organization to identify the factors to be consider most significant for excellence among contemporaries i.e competitive success. According to Kaplan and Norton, 1992, organization can achieve competitive success if and only if, they are making continuous improvement on their products and process as well as the ability to invent new process that can expand their capabilities.

In this perspective, issues like employees’ abilities, the quality of information are important factors that constitutes to process success. Processes will only be successful if adequate skilled and motivated employees, supplied with timely information, are driving them by supporting accomplishment of organizational goals (Amaratunga et al., 2002).

3.4.2.4 Financial perspective
This performance measures indicates that whether the above three perspectives strategic choice implemented, executed and adopted contributes to the bottom line improvement of the organization’s strategy. Thereby, shows the result of the earlier strategic choice perspectives made. According to Kaplan and Norton, 1992, financial number will be taken care of, by making fundamental improvement on their operation.

Hence, the word financial perspectives differs within public arena and traditional private sector based on financial objective (Amaratunga et al., 2002).
3.5 Decision making tools
Multiple criteria decision making tool are tools for decision makers where both the economic and non economic elements are considered in the decision making process (Fabrycky and Blanchard, 1999). Also, it is a tool useful in identifying and evaluating incompatible alternative for decision support system. It is defined according to the International body as “the study of method and procedure by which concerns about multiple conflicting criteria can be formally incorporated into the management planning process” (Gang et al, 2011). Therefore, it is an analytical tool that helps decision makers to evaluate and allocates various alternatives in order to achieve a certain goal by assigning weight of important to alternatives that are assessed along with common multiple criteria with respect to overall goal. According to Alsyouf et al, 2011, there are several methods of these tool that are used for decision-making such as simple additive weighting (SAW), multiplicative exponential weighting (MEW) and the analytic hierarchy process (AHP) (Lie and Sharp, 1999; Yang and Kuo, 2003; Al-Najjar and Alsyouf, 2003).

3.5.1 SAW Method
The simple additive weighting (SAW) method is one of the decision making method approach. According to MacCrimmon, 1968; Cheng and Hwang, 1992, SAW basic principle is to obtain a weighted sum of performance rating of each alternative under all attributes. Also, according to Hwang and Yoon, 1981; Kabaasi and Virvou, 2004, the SAW method consists of two basic steps. These steps are;

- Scale the values of all attributes to make them comparable
- Sum up the values of the all attributes for each alternative

However, the SAW method is also known as weighted sum method; the most widely used multiple attributes decision making (MADM) methods.

3.5.2 MEW Method
The multiplicative exponential weighting (MEW) method is another form of MADM method. According to Zanakis et al, 1997, MEW is not often applied due to its practitioner-
unattractive mathematical concepts and its application is theoretically attractive contrast against the SAW method.

3.5.3 AHP Method
AHP stands for Analytic Hierarchy Process, which was officially proposed in the 20th century 70's intermediate stages by American operations research home Thomas plug Wendy. It is a multi criteria decision making (MCDM) method, a mathematical and psychology based process originally developed by Thomas L. Saaty. AHP is a structured technique for organizing and analyzing complex decision that helps to assign weight to different indicators when combining individual indicator performance to one key performance indicator. It is a method used to determine subjective weight for decision making. Its analysis is based on quantitative information characterised by complicated decision problem of essence, influencing factors and internal relations. Thus, it is mathematical for many goals, structural characteristics of multi criteria or without complex decision-making problem provides easy decision method (Qiao Bin et al., 2011).

3.5.3.1 Significance of AHP
AHP is based on three principles namely decomposition, comparative judgement, and synthesis of priorities (Dey et al, 2008,). According to Zanakis et al, 1997, AHP employ a ratio scale to elicit pair wise comparisons of alternatives on each criterion and an additive aggregation to global weight unlike the SAW and MEW that weighted preferences in an interval scale. Thus, its methods help to derives ratio scale from paired comparisons of criteria and as well allows for small inconsistencies in judgements. Furthermore, AHP normalizes weight by dividing them by their sum because normalization of the decision matrix is necessary in order to handle the different types of attributes (Zanakis et al, 1997). The method is based on solution of Eigen value problem with an input and output such as actual measurement e.g price, subjective opinion e.g preference and ratio scale resulted from Eigen vector, consistencies index resulted from Eigen value respectively. Finally, the development of MCDM is mainly based on the analytic hierarchy process for techniques with complex decision (Haarstrick Andreas, 2009).

3.5.3.2 AHP method procedural steps
With respect to overall goal, AHP method involves several steps which processes are as follows,

- Define objective.
- Structure elements in group of criteria, sub criteria and alternatives.
- Make pair wise comparisons of element in each group.
- Calculate the weight and consistencies ratio.
- Evaluate alternatives with respect to the weighting.
- Get a rank from the weighting.

Thus, the mathematical expression below is used to know the number of pair wise comparisons,

\[
\frac{n^2 - n}{2}
\]

Where \(n\) is the number of criteria.
4 Model development

In this chapter, a description of a model to be use is developed to evaluate the performance measurement of a service providing is presented.

The proposed balanced score-card framework will be increased to 11 procedural steps in order to cover the lapses in the existing BSC application. The two modifications suggested are the AHP method and monitoring and controlling process.

4.1 Proposed Framework

4.1.1 Procedural steps for developing the score-card:

Step 1    Define organisation’s vision

- Establish based on shared vision
- Establish based on communication

Step 2    Identify perspectives

- Establish customer perspective
- Establish financial perspective
- Establish innovation and learning perspective
- Establish internal business perspective

Step 3    Vision break down

- Vision with respect to each perspective
- Formulate overall goal

Step 4    AHP Method:

- Identify criteria for success
- Establish priority factor

Step 5    Develop key measures

- Perform cause and effect process

Step 6    Establish comprehensive score-card

Step 7    Score-card breaks down

Step 8    Formulate the goal

Step 9    Develop action plan

- Action plan align to goal
- Action plan align to vision
<table>
<thead>
<tr>
<th>Step 10</th>
<th>Implement balanced score-card</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 11</td>
<td><em>Monitor and control process</em></td>
</tr>
</tbody>
</table>
Step 1
- Organisation’s Vision

Step 2
- Identify Perspectives
- Customers Perspective
- Innovation & Growth Pers.
- Financial Perspective

Step 3
- Vision break down
- Vision with each perspective
- Formulate overall goal

Step 4
- Criteria Indicator
- Identify success factor
- Establish priority factor

Step 5
- Key measure
- Develop key measure
- Perform cause & effect
5 Data Collection
In this chapter, the description of the case company, service providing and is presented. Moreover, the data gathered from interview and observations are inclusive.

5.1 General Information on Studied Case
300m² is a stadbiblioteket in Goteborg. It is one out of the 24 bibliotek in Goteborg which was opened in November 2011 after the closure of stadbiblioteket due to renovation work. It is located in South Harbour street 57, 411 06, Goteborg under the department of culture. The main focus of the stadbiblioteket 300m² is to ensure that the inmate of goteborg are given adequate knowledge or information of what they want. All the 24 biblioteket belongs to the arm of government called socialist party. This party is divided into three parts namely: social demoncrates, miljöpartiet and vänsterpatiet. Stadbiblioteket 300m² is head by Madeleine Bergmark with seven other staffs.

However, the role of stadbiblioteket 300m² is not only service providing but also knowledge disseminating organisation that deem fit in giving the people within Goteborg proper information and see to their immediate knowledge needs. However, statistics shows that the number of users of the bibliotek since inception has always been increasing and during the summer window period it decreases due to vacation of people living in Goteborg. They have geared efforts of increasing the number of users even during summer period for the next season. In achieving this target, (See Appendix 1) they considered some factors more important in their performance measurement in accomplishing success for better improvement.

5.2 Performance indicator for stadbiblioteket 300m²
Based on subjective opinions, stadbiblioteket 300m² gave their criteria indicators for during the performance measurement as follows: material availability, opening hour, administrative assistance, environment, library service quality, loaning period and user needs. Among these entire indicators, four indicator factors were picked as the most important ones for the exercise. Those indicators are: material availability, opening hour, administrative assistance, library service quality. These indicators are important in improving service performance due to their impact in service delivery such as library. According to the BSC application, the mentioned indicators have an impact on the customer and internal business process perspectives. Library services are complex and challenges to measure but the impact of these indicators in service providing has been evaluated by three categories of measurement namely; structure, process and outcome (Dey et al, 2008).

5.2.1 Material Availability
Stadbiblioteket 300m² highlighted this factor as an important factor due to the fact that essence of the library is to have adequate materials available for their users’ e.g books, CD’s, computers, newspaper.

5.2.2 Administrative assistance
This factor takes the form of customer service relation which is the act of given orientation to users and helping them to fix what they are searching for or when in a state of confusion.
5.2.3 **Library service quality**
This involves the amenities aspect of the library such as good internet accessibility, technicality, uninterrupted power failure, conducive rooms and easy flow movement. Good service quality encourages users at all time.

5.2.4 **Opening hour**
This is also important but not as those mentioned above. Improvement has been done earlier by adjusting the opening time from 10am to 8am when they realised the number of people that comes to the library.

Furthermore, all the factors identified were given importance among each other assigned with number of intensity to make the pair wise comparison in determining and establishing the most priority factor.

5.3 **“Stadbiblioteket 300m²” balanced score-card Overview**

Step 1: Organisation’s vision

Stadbiblioteket 300m² visions is to disseminate knowledge to people and highly use of the library with the goal of increasing the number of bibliotek users.

Step 2: Identify perspective

Yes, they viewed the services in one perspective in the four perspective of this tool. Stadbiblioteket 300m² is more concerned with the customer perspective, a little bit of financial perspective and less important about the internal business process and Innovation and growth perspective because of being a service provider.

Step 3: Vision break down

Stadbiblioteket 300m² align the vision with respect to the customer perspective, giving the bibliotek users the services they needed in order to make them satisfied and high lending of materials that could in turn results into many number of users for knowledge enquiries.

Step 4: Criteria indicator

Stadbiblioteket 300m² identify success factors based on what gives their users satisfaction and establish priority out of those factors by comparing with the existing data or information.

Step 5: Key measure

They give out questionnaires periodically to users as their key measure to improve on their performance.

Step 6: Establish score-card

They establish score card based on the feedback from the questionnaire and customer perceptions.
Step 7: Score-card break down

Statistic is use to break down the reply from the questions with respects to their importance and scored by numbers according.

Step 8: Formulate goal

The results from the break down is use to formulate the goal that can lead them to better improvement.

Step 9: Develop action plan

Stadbiblioteket 300m² action plans are develop in line with the goal aimed at increasing the number of users and as well as making the customers satisfied.

Step 10: Implement score-card

The implementation of the score-card is not immediately. They try to double check the performance measurement once again like one month after to show whether the existing results will gives better improvement or the new measurement result.

Step11: Monitor and control process

Stadbiblioteket 300m² do not monitor and control what is implemented from the score card but always try to show improvements in the services delivered to the customers.
6 Analysis

This chapter presents the analysis of performance measurement with the balanced scorecard procedural step using AHP method to calculate and determine on how to establish the priority success factor for improving the service providing.

The balanced scorecard is a management framework for measuring the economic and operating performance of an organization activity (Alysouf et al., 2011). In its framework, the chances of having good result using only balance scorecard approach for the performance measurement is not certain. There is an information missing that is not well explained and no insight on how the process can be executed specifically on step 4 of the framework. However, AHP method will be used to close the lapses in the existing balanced scorecard framework in order to enhance and improve the strength of the outcome performance measurement result. Thus, the framework is modified with the AHP method in step 4 and one additional step is added at the end of the framework. Hence, the framework is increased to 11 procedural steps. The analysis of the modification and additional steps are given below;

6.1 AHP: Analytic Hierarchy Process

AHP is a method which is used to combine individual performance indicator to one key performance indicator. So therefore, each performance indicator of the stadbiblioteket 300m² was given different weight. The pair wise comparison is established for three different participants and arranged in matrix. The different weights for these factors are obtained when the assigned values given are imported into AHP excel sheet calculation as a multiple inputs (See Appendix 2), consolidated into one matrix in order to get the normalized matrix and later calculate for the normalized principal eigen vectors.

6.2 Steps modification:

The steps modified in the existing balanced scorecard framework are;

6.2.1 Step 4: Criteria Indicators

In order to get the factor that is more important, step 4 is modified by using AHP method for calculating and determining how to assign weight to those criteria indicators. This part is divided into two parts which are identifying the success factors and establishing the priority factor.

6.2.1.1 Step 4.1: Identify success factors

Due to the fact that how to identify the success factors is not well emphasized. The doubt might create a gap in the results of the performance measurement process. Therefore, the stadbibliotek 300m² identified the success factors as material availability, Administrative assistance, Library service quality and opening hour. Three different participants within the stadbibliotek 300m² were contacted to compare the above factors and give intensity number for each comparison based on their important with each other. For the pair wise comparison matrix (See Appendix 3).

However, after the pair wise comparison has been set up, the entire participant matrices grids were consolidated into one matrix. This process is derived by the mean of the multiple inputs of the three participants (See Appendix 4). Therefore, the consolidated matrix is
obtained with a mathematical expression called geometric mean and the formular is given below;

Geometric mean; \( b_{ij} = \left( a_{1ij} \times a_{2ij} \times \cdots \times a_{kij} \right)^{1/k} \)

Where \( k \) = number of participants.

\( n \) = number of criteria

6.2.1.2 Step 4.2: Establish priority factor

In establishing the priority factor, each column of the consolidated matrix was added together and gets a sum called sum of the column (See Appendix 5). After calculating the sum of the each column, the grid matrices is divided by respective column sum in order to get the normalize matrix. Upon getting the normalized matrix, the values were computed and later calculate for the normalized principal eigen vector of the matrix through iteration process.

Therefore, the calculated values for the normalized matrix \([N]\) are

\[ \begin{array}{cccc}
4/7 & 20/38 & 52/92 & 231/385 \\
4/28 & 5/38 & 8/64 & 35/330 \\
4/21 & 65/342 & 4/23 & 63/385 \\
4/35 & 30/190 & 28/207 & 7/55 \\
\end{array} \]

Thus, it gives

\[ \begin{array}{cccc}
0.57 & 0.52 & 0.57 & 0.60 \\
0.14 & 0.13 & 0.12 & 0.11 \\
0.17 & 0.19 & 0.17 & 0.16 \\
0.12 & 0.16 & 0.14 & 0.13 \\
\end{array} \]

Figure 2: Normalized matrix

Furthermore, the normalized matrix values are used for the iteration processes. The iteration process helps in calculating and determining the values for the eigen vectors of the matrix. In order to get the eigen vectors, it is done by squaring the normalized matrix \( N \) and subsequent \( Ns \). In case of the first iteration process, the sum of the each row matrix is divided by number of indicators to get the eigen vectors values. However, the iteration process is carried out up to six times to verify the consistency in those values (See Appendix 6).

So far from the first iteration process, the result for the eigen vector is,
The above results show that the performance weighting is given as;

Material availability = 0.568 (56.8%)
Administration assistance = 0.131 (13.1%)
Library service quality = 0.171 (17.1%)
Opening hour = 0.130 (13.0%)

Therefore, the same approach is used for the subsequent iteration processes. The new value of normalized matrix N for the next iteration is then given as:

\[
\begin{bmatrix}
0.567 & 0.568 & 0.568 & 0.568 \\
0.132 & 0.130 & 0.131 & 0.132 \\
0.172 & 0.171 & 0.171 & 0.171 \\
0.130 & 0.131 & 0.130 & 0.129 \\
\end{bmatrix}
\]

Thus, the consecutive iteration results are given in the table below:

<table>
<thead>
<tr>
<th>Factors</th>
<th>Material availability</th>
<th>Administrative assistance</th>
<th>Library service quality</th>
<th>Opening hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process (%)</td>
<td>2\textsuperscript{nd} iteration</td>
<td>3\textsuperscript{rd} iteration</td>
<td>4\textsuperscript{th} iteration</td>
<td>5\textsuperscript{th} iteration</td>
</tr>
<tr>
<td>Material availability</td>
<td>56.51</td>
<td>56.51</td>
<td>56.51</td>
<td>56.51</td>
</tr>
<tr>
<td>Library service quality</td>
<td>17.42</td>
<td>17.42</td>
<td>17.42</td>
<td>17.42</td>
</tr>
<tr>
<td>Opening hour</td>
<td>12.82</td>
<td>12.82</td>
<td>12.82</td>
<td>12.82</td>
</tr>
</tbody>
</table>

Table 2: Iteration results
From the iteration result, the normalized principal eigen vectors of the matrix \((X_1, X_2, X_3, X_4)\) is approximately 57%, 13%, 17% and 13% respectively. Therefore, getting the value for the principal eigen value, the sum of the column of the consolidated matrix is multiplied by the respective each principal eigen value. The principal eigen value is denoted by \(\lambda\) and the results give:

Principal eigen value, \(\lambda = (57 \times 1.8) + (13 \times 7.6) + (17 \times 5.8) + (13 \times 7.9)\)

\[= 102.6 + 98.8 + 98.6 + 102.7\]

\[= 402.7\%\]

\[= 4.02\]

Finally, to get the consistency ratio, see Appendix 7 for the table used in calculating for the value of the consistency index. So therefore,

\[CI = \frac{\lambda - n}{n - 1}\]

\[= \frac{4.02 - 4}{4 - 1} = \frac{0.02}{3} = 0.0066\]

And the consistency ratio is given as \(CR = \frac{CI}{RI}\)

Where \(RI\) is the corresponding value to the number of indicator \(n\),

\[CR = \frac{0.0066}{0.90} = 0.007\]

\[CR = 0.7\%\]

Hence, the consistency ratio is 0.7%.

6.2.2 Step 11: Monitor and control process

The monitor and control process, step 11 is the last step process in the proposed balanced score card framework after the score card has been implemented. This process allows rooms for continuous improvement processes. It is a feedback loop within the framework model that should comes at the end of other steps taken in order to examine if the performance measurement can still be done in a better way.

However, according to Alsyouf et al, 2011, the goal of monitor and control process is to ensure that the focus for improvement goes as planned and the benefit from the improvement are sustained until and unless there is another perception of operating the process in a better way due to factors such as advance in technology and data information. If this occurs, the process needs to be taken all over again from the first step process by implementing the better perception to facilitate and enhance the result from the
performance measurement. Thus, this process is called the feedback process. Taking a look from the model developed, the dash lines represent the feedback monitor and control to the first step of the framework. This feedback loop is very important for the continuous improvement efforts and shows the effectiveness and efficiencies of the process (Alsyouf et al., 2011).

Finally, the effects of the modification made in the existing balanced scorecard application will influence its overall effectiveness by leverage in closing the gaps that will give a holistic view of having good performance measurement in improving an organizational activity.

6.3 Cost effectiveness
Considering the recommended and additional step added to the existing BSC model, the cost effective with regards to the proposed framework will definitely cost more because of the processes involved. However, how much more the proposed framework cost may not seems to be a dilemma and focus but in turn benefits that will bring are highly important in accomplishment to their goal. To the service provider, they are greatly concern about improving the performance in order to have more users. So therefore, if this proposed framework cost them more or less, is not an obstacle insofar their goal will be accomplished. Also, as earlier pointed above, the service provider is concern by dealing with what will give their users satisfaction which is associated with the customer perspective of the BSC application. In the view of less consideration on cost effectiveness, there are many privileges that were given to the customer such as free printing, no computer usage limitation, free scanning.

6.4 Discussion
The different procedures for performance measurement models are routinely deployed based on qualitative and quantitative approach by both the academicians and practitioners for measuring performance of a system holistically in order to advocate an improvement action with respect to any manufacturing or service sector. This study proposes a quantitative way of performance measurement model using BSC application with addition of the AHP method into the decision making framework process. The projected motive of the two modifications made i.e firstly, incorporating the AHP method is derived from its benefit such as systematic filtering of parameter, cost saving on related factors and plan, implement, and evaluates improvement measures. Secondly, the monitoring and controlling process is added to the existing BSC framework to ensure that the performance measurements process is justifiable and to be performing periodically for long time improvement. Hence, it should be reversible and thereby close the gap that can creates problem in achieving and leading to better improvement.

Finally, in overall sense, the modified steps in the BSC application discussed above shows how the success factor is been determined in the decision making process for a service providing organization. This study has proven the priority of taken the material availability as the most important success factor among the four parameters indicated for measuring the operational quality levels of service delivery in improving the library performance. However, based on the modification made, the generalization of this study can also be applicable to other processes and not only service providing organization.
7 Result, Conclusion and Recommendation

This part covers the final reflections of this thesis. In this chapter, the final result of the thesis analysis presented with respect to the data collected from the company. Also, conclusion and recommendation are inclusive.

7.1 Result

As a result from the quantitative approach adopted. The interview with the head and observation from others staffs of the stadbiblioteket 300m² based on subjective opinion using the balanced score card application, the success factor has been calculated and determined. By the intrinsic worth of applying the AHP method with the existing balanced score card framework, the priority factor for the service providing is material availability. In addition, estimating the value for eigen vectors is very essential for calculating the principal eigen value.

The principal eigen value of the matrix has been determined by the eigen values and sum of the column in order to let the action for consistency index and ratio takes place in verifying the performance measurement variation. The values for eigen vectors and principal eigen value are 57, 13, 17, 13 and 4.02 respectively.

Finally, based on the calculation, the consistencies ratio is obtained as 0.7% which shows that the service provider can proceed with the implementation of the performance measurement results.

7.2 Conclusion

The fundamental reason for carrying out performance measurement is to derive a factor that will give continuous improvement, facilitate and enhance operational performance in order to sustain stability and remains competitive. One way of assuring continuous improvement within service providing is paramount to the customer satisfaction or behavioural responses that could be used to identify the criteria indicator for service providing organization. For example, using customer satisfaction index could make the performance measurement analysis more accurate and valid. Furthermore, assuring better improvement within the existing BSC framework can be strengthened by incorporating AHP method for determining and prioritizing the success factor. The AHP method provides a quantitative logical approach for performance measurement which helps formulate projects for ensuring superior performance.

Finally, with the application of AHP method, it thus finds solution on how to identify the success factors and establish the most priority factor. In addition, this study is not only resisted to library services and indicates that the same techniques could be applied in other process operations such as higher education, tourism, shopping moor and restaurant.

7.3 Recommendation

To keep the performance measurement improving, step 4 of the existing balanced score card has to be clearly emphasized on what conditions or requirements are to be taken into consideration for establishing the priority factor. However, the indicator established with the AHP method for the service providing as the success factor should not be paramount forever.
Furthermore, the service provider must also recognize users’ immediate needs in developing their success factors and fashion out periodically performance measurement schedule due to dynamic environment and modern computer age in attaining their goals.
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APPENDICES

Appendix 1: Interview guide

1. What do they want from performance measurement?

2. How do they go about achieving it?

3. Do they establish any perspectives?

4. Is those perspectives classified into the following categories?
   - Customer
   - Financial
   - Innovation & Growth
   - Internal business process

5. How do they break down into each perspective?

6. How do they formulate overall goal?

7. Do they have criteria for success factors, how do they evaluate them?

8. Does any factor seem to be given priority?

9. Is there any key measures?

10. How do they score the key measure?

11. Is there any way for breaking down the scores?

12. How do they formulate goal?

13. Is there any condition for developing action plan?

14. Is the action plan developed aligned with?  - Goal

15. Does it take time to implement the score card?

16. Do they monitor & control the process?

17. Is there improvement?
Appendix 2: Performance Measurement Tool

AHP stands for Analytic Hierarchy Process.

It is a method for performance measurement that shows how to calculate and determine the criteria for success factor for organisation improvement.

Objective: More number of bibliotek Users

Using the given scale below; scale 1 – 9, please compare the importance of the criteria elements with respect to the objective to fill the table below. Which element in each pair is more important, A or B, and how much is the intensity number.

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<td>Two elements contribute equally.</td>
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<td>3</td>
<td>Moderate Importance</td>
<td>One element is slightly favour over another</td>
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<tr>
<td>5</td>
<td>Strong Importance</td>
<td>One element is strong favour over another with experience and judgement.</td>
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<tr>
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<td>Very strong Importance</td>
<td>One element is favoured very strongly over another demonstrating dominance in practice.</td>
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<td>Extreme Importance</td>
<td>The evidence favouring one element over another is of the highest possible order of affirmation.</td>
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Name: Participant 3  
Date: 20120822

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### Appendix 3

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Appendix 4

Consolidated matrices

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### Appendix 6

#### Iteration processes

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<tr>
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</table>

Appendix 6.1d Fourth iteration:

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<tbody>
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<td>0.133</td>
<td>0.133</td>
</tr>
<tr>
<td>0.174</td>
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</tr>
<tr>
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<td>0.128</td>
<td>0.128</td>
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Appendix 6.1e Fifth iteration:

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<td>0.133</td>
<td>0.133</td>
</tr>
<tr>
<td>0.174</td>
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</tr>
<tr>
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<td>0.128</td>
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</tbody>
</table>

Appendix 6.1f Sixth iteration:

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<td>0.133</td>
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</tr>
<tr>
<td>0.174</td>
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</tr>
</tbody>
</table>
Appendix 7

Random index table

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<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
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