

CHAPTER II

REVIEW OF RELATED LITERATURE

2.1. Theoretical Review

Nowadays, information become wider and becomes a necessity for companies to compete with others. Without information, a company can not achieve their goals. It means that an information era has been emerged. The emergence of the information era, however, in the last decades of the twentieth century, has made obsolete many of the fundamental assumptions of industrial age competition. No longer could companies gain sustainable competitive advantage by merely deploying new technology into physical assets rapidly, and by excellent management of financial assets and liabilities.

In return, government regulators protect these companies from potentially more efficient or more innovative competitors. The information age environment for manufacturing companies requires new capabilities for a competitive success. The ability of company to mobilize and exploit its intangible or invisible assets has become far more decisive than investing and managing physical, tangible assets.² Intangible assets are important for companies pertinent to develop customer relationship that retain the loyalty of existing customers and enable new customer segments and market areas to be served effectively and efficiently, introduce innovative service desired by targeted customer segments, mobilize employee skills and motivation for continuous improvements in process capabilities, quality, and response times, while tangible assets only measure the financial condition of companies. Intangible and tangible assets are necessary to improve future

² H.Itami. *Mobilizing InvisibleAssets* (Cambridge, Mass: Harvard University Press, 1987)

performance. Consequently companies need a performance measurement system which combine both assets. Balanced Scorecard is the effective method to give management advancement which has a longterm and future vision to improve company's performance. Then by using it, company could measure the productivity and make an improvement in achieve a current goals. This chapter will describe further about Objective Matrix and the content are : A Performance Measurement System, Traditional Financial Accounting Model, Balanced Scorecard Method and Objective Matrix (OMAX).

2.1.1. Implementing a Performance Measurement System

A performance measurement system attempts to address the needs of the different stakeholders of the organization by creating a blend of strategic measures : outcome and drivers measures, financial and non-financial measures and internal and external measures. The implementation of performance measurement system have four general steps involved , which are :

1. Define strategy

The scorecard builds a link between strategy and operational action. That's way, important that company's goals are explicit and that targets have been developed.

2. Define measures of strategy

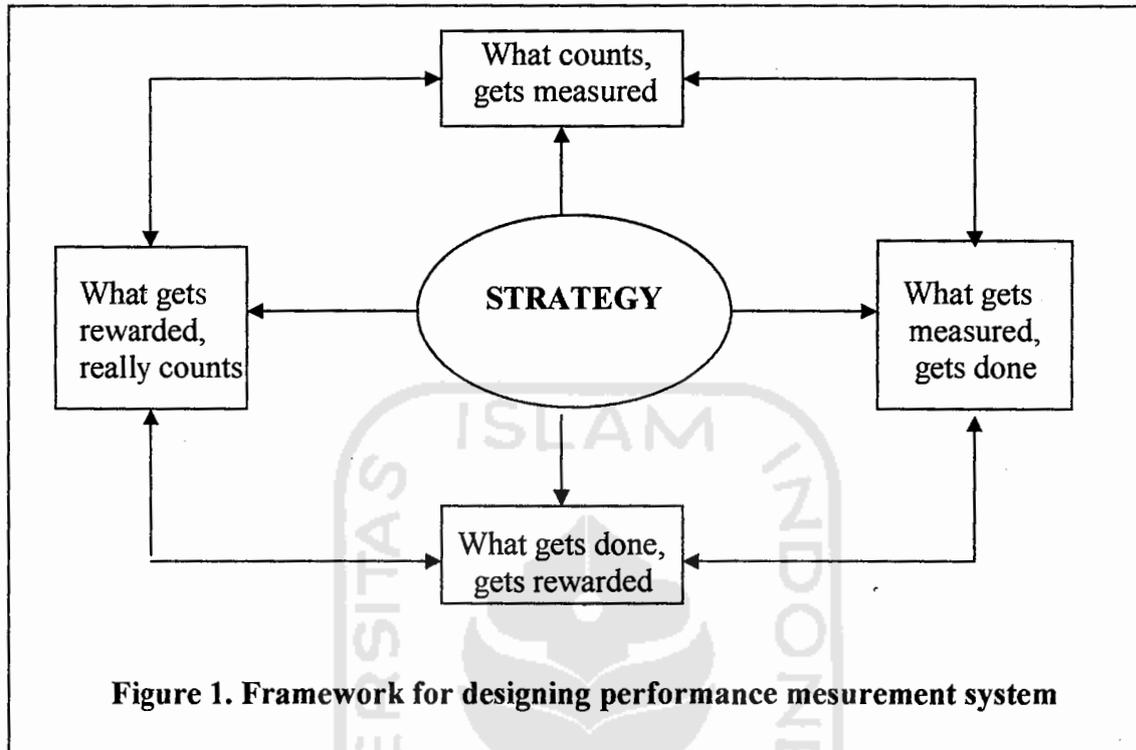
Developing measures is to support the articulated strategy.

3. Integrated measures into the management system

The scorecard must be integrated with the company's formal and informal structures, cultures, and human resources practices.

4. Review measures and results frequently

The scorecard must be consistently and continually reviewed by senior management since its started and runs.



(Source: Olve, Nils-Goran *Performance Drivers*, 1999. p.20)

Performance is the end result of an activity. Every year-end, a company must make an evaluation of its performance. Conventionally, companies evaluate their performance using financial perspective only as a basis for decision making. To avoid its weaknesses, manager must have a good performance measurement system. The characteristic of a good performance measurement system are :

1. Having a relation with the company's goal.
2. Having a balance orientation between a short-longterm orientation.
3. Reflecting the keys of management action.
4. Affecting employees' attitude.

5. Being easy to understood by the employees.
6. Having logic aims and easy measure system.
7. Being consistent and regular application.

Objective of Performance Measurement to get good performance are :

1. Clarify and translate vision and strategy
2. Communicate and link strategic objective and measure
3. Plan, set targets and align strategic initiatives
4. Enhance strategic feedback and learning

2.1.2. Traditional Financial Accounting Model

The financial-reporting process remain anchored to accounting model developed centuries ago for an environment of arm's-length transaction between independent entities. This venerable financial accounting model is still used by information age companies as they to build internal asset and capabilities, and to forge linkages and strategic alliances with external parties.³

Limitations of Traditional Financial Accounting system.⁴ :

1. It may encourage short-term actions that are not in company's long-term interests.
2. Business unit managers may not undertake useful long-term actions in order to obtain short-term profit.
3. Using short-term profit as the sole objective can distort communication between a business unit manager and senior management.
4. Tight financial control may motive managers to manipulate data

³ M.Lebas, Managerial Accounting in France : overview of Past Tradition and Current Practice," European Accounting Review 3, no.3 (1994):471-487.

⁴ Anthony, Robert N. And Govindarajan, Vijay. Management Control System, 10th ed , McGraw-Hill Companies, Inc., New York. (2001):441-443.

All new programs which are improvement programs such as Just in Time (JIT) production and distribution systems, Activity Based Cost Management, Reengineering, Time Based Competition and Total Quality Management have demonstrated success, but many of those programs have yielded disappointing results. The goal of those programs is not always incremental improvement.

2.1.3. Balanced Scorecard

Balanced Scorecard is a multiple linked objective that a company must achieve to compete based on capabilities and innovation, not just tangible physical assets and it translates mission and strategy into objective and measures.⁵

The Objectives of Balanced Scorecard :

1. Clarify and update strategy
2. Communicate strategy throughout the company
3. Align unit and individual goals with the strategy
4. Link strategic objectives to long-term targets and annual budgets
5. Identify and align strategic initiatives
6. Conduct periodic performance reviews to learn about and improve strategy.

2.1.3.1. Implementing of The Balanced Scorecard

The Balanced Scorecard concept was presented by Robert S. Kaplan and David P. Norton. Since 1992, interest in Balanced Scorecard has become widespread. As company around the world transform themselves for a competition that is based on information, their ability to exploit intangible asset has become far more decisive than their ability to invest in and manage physical asset. Balanced Scorecard supplements traditional financial measures with criteria that measured performance form to addition perspective. If there is enabled

⁵ Simon, Robert (2000). *Performance Measurement and Control System for Implementing Strategy*, Prentice Hall, New Jersey.

company to track financial result while simultaneously monitoring progress in building the capabilities and acquiring the intangible assets they would need for future growth.

The Balanced Scorecard translates mission and strategy into objectives and measures. It is organized into four different perspectives: financial, customer, internal business process and growth and learning. In viewing a company from the vital perspectives (figure 2), the Balanced Scorecard is intended to link the short-term operational control to the long termion and strategy of the business.

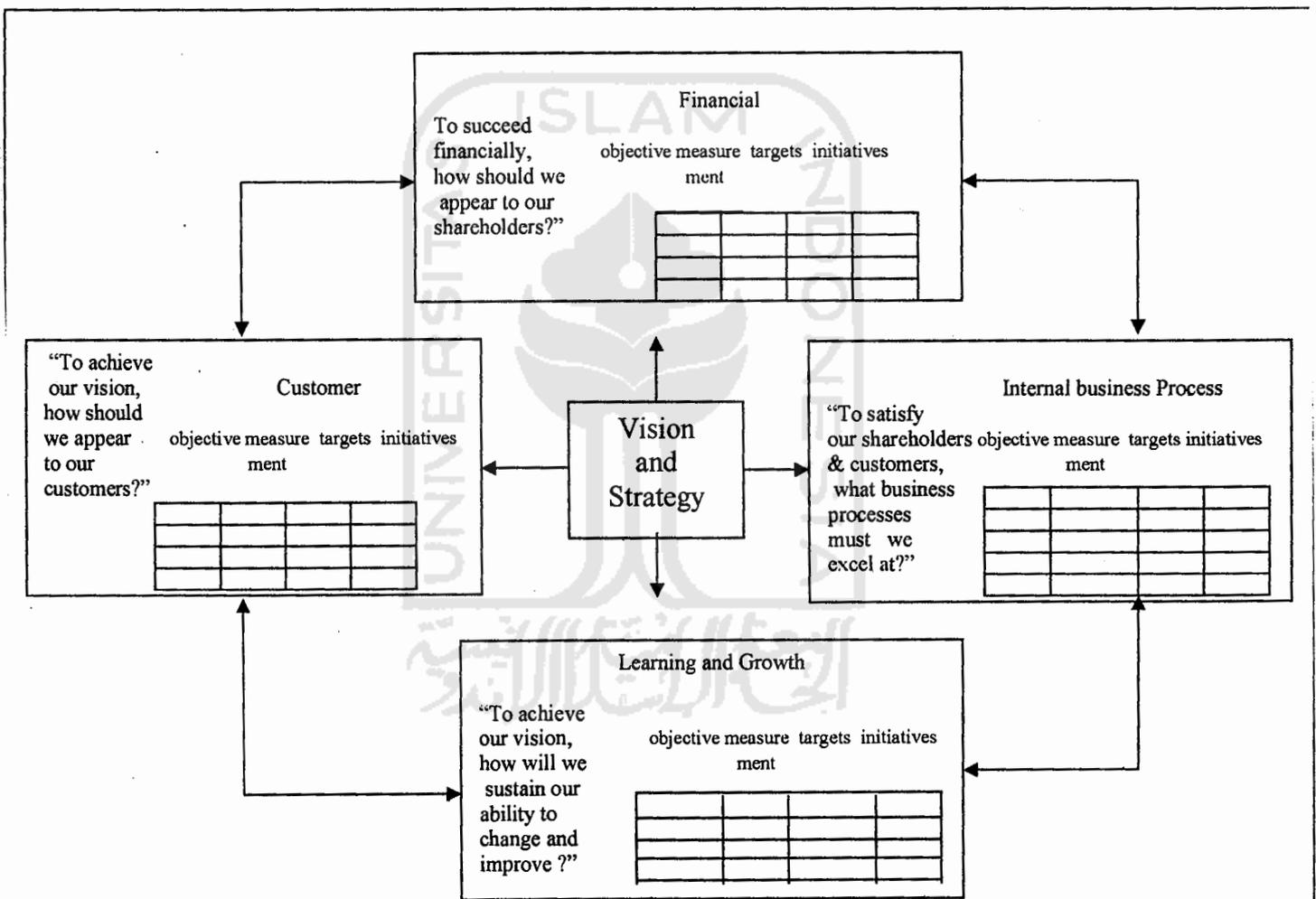


Figure 2. Translating Vision and Strategy : Four Perspective

Source: Kaplan, S. Robert and Norton, David C. *The Balanced Scorecard*, 1996. p. 9)

2.1.3.1.1. Financial Perspective

Financial performance measure indicate whether a company's strategy, implementation, and execution are contributing to bottom-line improvement. Financial objective is typically related to profitability measured. Financial objective can differ considerably at each stage of business's life cycle. Financial perspectives can differ stages of business cycle, consist of :

1. Growth

Growth businesses are at the early stages of their life cycle. Businesses in the growth stage may actually operate with negative cash flows and low current returns on invested capital. The investment being made for the future may consume more cash than can currently be generated by the limited base of existing product, services and customers. The overall financial objective for growth-stage business will be percentage growth rate in revenues, and sales growth in targeted markets, customer groups and regions.

2. Sustain

At this stage, a company still attracts investment and reinvestment. The business is expected to maintain their existing market share and perhaps grow it somewhat from year to year. Most business in the sustain stage use a financial objective related to profitability. This objective can be expressed by using measures related to accounting income.

3. Harvest

Harvest stage is a mature phase of company life cycle. The overall objective for this stage businesses would be operating cash flows (before depreciation) and reduction in working capital requirements.

Three financial themes that drive the business strategy :

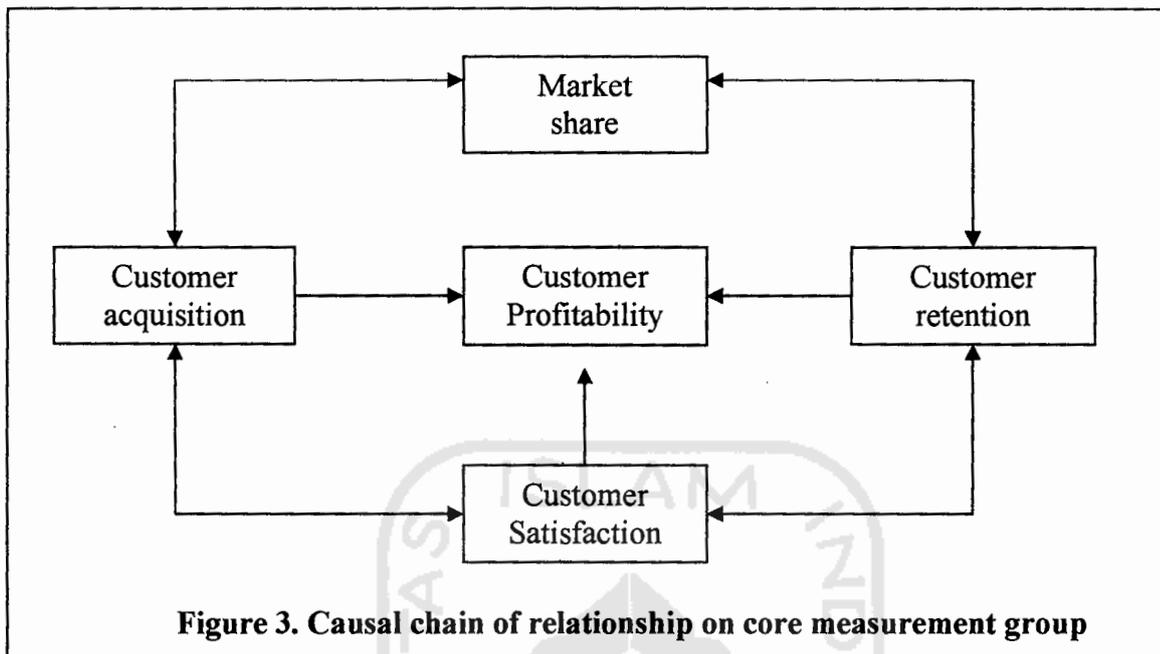
1. Revenue growth and mix
2. Cost reduction/productivity improvement
3. Asset utilization/investment strategy.

2.1.3.1.2. Customer Perspective

Managers identify the customer and market segments in which the business unit will compete and the measures of the business unit's performance in these targeted segments. Customer perspectives typically includes several core measures of successful outcome from well-formulated and implemented strategy, such as customer satisfaction and new customer acquisition. The core measurement group includes :

1. Market share
Reflects the proportion of business in a given market (in term of number of customers, unit volume sold) that a business unit sells.
2. Customer acquisition
Measures, in absolute or relative term, the rate at which a business unit attracts or wins new customers or business.
3. Customer retention
Tracks, in absolute or relative term, the rate at which business unit retains or maintains ongoing relationships with its customers.
4. Customer satisfaction
Assesses the satisfaction level of customers along spesific performance criteria within the value proportion.
5. Customer profitability
Measures the net profit of a customer, or segment, after allowing for the unique expenses required to support that customer. In the customer perspective, a company

must consider about time, quality and prices as the performance drivers. Those factors will influence the result of customer satisfaction.



(Source: Kaplan, S. Robert and Norton, David C. *The Balanced Scorecard*, 1996, p. 68)

2.1.3.1.3. Internal Business Process

Management identifies the processes that are most critical for achieving customer and shareholder objectives. Company typically develop their objectives and measures for this perspective after two perspectives above. Using Balanced Scorecard, managers define a complete internal-process value chain that starts with innovating process, identifying current and future customers' needs and developing new solutions for company needs, proceeds through the operations process, delivering existing products/services to existing customers and ends with postsale service. Internal business process measures focus on internal process that will have the greatest impact on customer satisfaction and achieving an organization's financial objectives. The generic value chain model (figure 3) provides a template that a company can customize in preparing internal business process perspectives and this model

encompasses three principal business processes consist of innovation, operations, and postsale service.

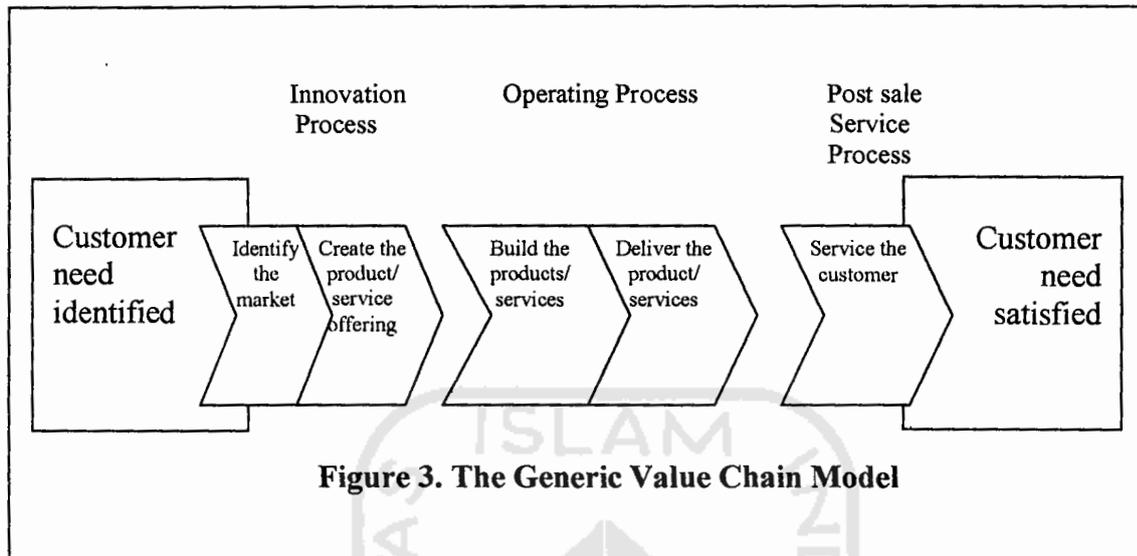


Figure 3. The Generic Value Chain Model

(Source: Kaplan, S. Robert and Norton, David C. *The Balanced Scorecard*, 1996.p.96)

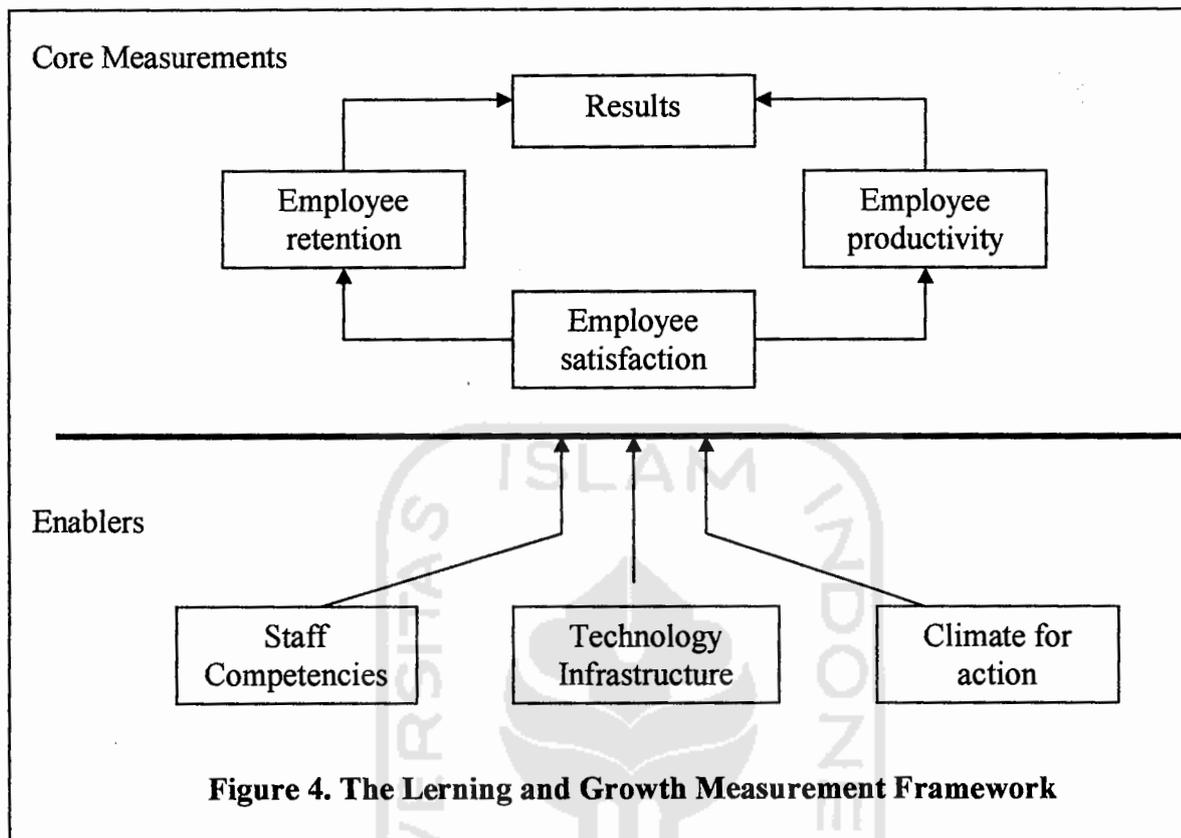
2.1.3.1.4. Learning and Growth

This perspective identifies the infrastructure that the organization must build to create long-term growth and improvement. The objective of this perspective is to provide the infrastructure to enable ambitious objective and as the drivers for achieving excellent outcomes in the first three scorecard perspectives. Three principal categories for learning and growth perspective :

1. Employee capabilities
2. Information system capabilities
3. Motivation, empowerment, and alignment.

Most companies use employee objectives drawn from a common core of three outcome measurements (figure 4) and then supplemented with situation-specific drivers of

the outcomes. Three core employee measurements consist of employee satisfaction, employee retention, and employee productivity.



(Source: Kaplan, S. Robert and Norton, David C. *The Balanced Scorecard*, 1996.p.96)

2.1.3.2. Linking Balanced Scorecard Measures To A Single Strategy

Previous experience prove that the Balanced Scorecards is more than collection of critical indicators or key success factors. The multiple measures on a properly constructed BSC should consist of linked series of objectives and measures that are both consistent and mutually reinforcing. The linkages should incorporate both cause-and effect relationship, and mixtures of outcome measures and performance drivers. The chain of cause and effect should pervade all four perspectives of a Balanced Scorecard. An entire chain of cause-and-effect relationships can be established as a vertical vector through the four Balanced Scorecard perspectives.

2.1.4. Objective Matrix

2.1.4.1. Definition of Productivity

Productivity is the quality or state of being productive. It is a concept that guides the management of a production system and measures its success. Productivity improvement is sought everywhere because it supports a higher standard of living, helps control inflations, and contributes to a stronger national economy.

Organization for European Economic Cooperation (OECE) gave a definition as follows:

“Productivity is the quotient obtained by dividing output by one of the factors of production.”

While Davis (1995) defined this concept as follows:

“Productivity means change in product obtained for the resources expended.”

The definitions clearly explain that the productivity is the measure of how specified resources are managed to accomplish timely objectives stated in terms of quantity and quality.

Depending upon who is defining it, the term definition divided into three basic types of productivity :

1. Partial Productivity

Partial Productivity is the ratio of output to one class input.

2. Total- Factor productivity

Total- Factor productivity is the ratio of net output to the sum of associated labor and capital (factor) inputs. By net output means total output minus intermediate goods and services purchased.

3. Total productivity

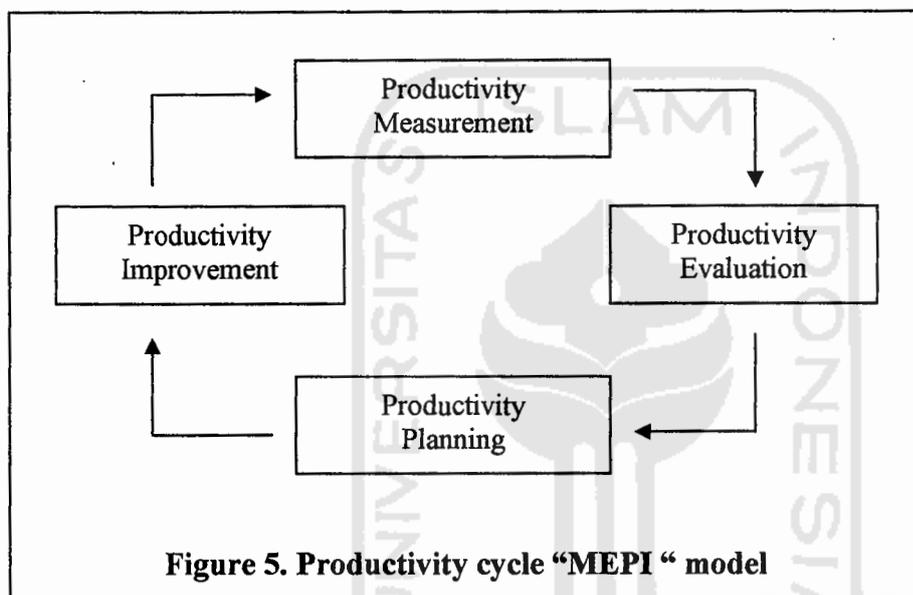
Total productivity is the ratio of net output to the sum of all factors. It measures the joint impact of all inputs in producing the output.

Advantages and limitations of using the three basic types of productivity measures in companies

No	Advantages	Limitation
1	Partial Productivity	
	Easy to understand	If used alone, can be very misleading and may lead to costly mistakes
	Easy to obtain the data	Do not have the ability to explain overall cost increases
	Easy to compute the productivity indices	Tend to shift the blame to the wrong areas of management control
	Easy to sell to management	Profit control through partial productivity measures can be a hits-and-miss approach
	Some partial productivity indicator data	
	Good diagnostic tools to pinpoint areas for productivity improvement, if used along with total productivity indicators	
2	Total factor productivity	
	The data from company records are relatively easy to obtain	Does not capture the impact of materials and energy inputs
	Usually appealing from a corporate economist's viewpoint.	The value-added approach to defining the output is not very appropriate in a company setting because it is difficult for operational managers to relate the value-added output to production efficiency
3	Total productivity	
	Consider all the quantifiable output and input factors, therefore, is more accurate representation in real economic picture of a company	Data for computations are relatively difficult to obtain at product and customer levels, unless data collection systems are designed for this purpose
	Profit control through the use of total productivity indices is a tremendous benefit to top management	Does not consider intangible factors of output and input in a direct sense
	If used in conjunction with partial measures, can direct management attention in an effective manner	
	Sensitivity analysis is easier to perform	
	Easily related to total cost	

David J. Sumanth introduced a productivity cycle called MEPI in order to cover those types above. This model consists of four activities: Measurement, Evaluating, Planning and Improvement. An organization that begins a formal productivity program for the first time

can begin with productivity measurement. Once the productivity levels are measured, they have to be evaluated or compared against planned values. Based on this evaluation, target levels of productivity are planned on both short-and/long term bases. To achieve the planned targets, productivity improvement takes place in formal manner. In order to assess the degree to which the improvement will take place next period, productivity levels must be measured again. This cycle thus continues for as long as the productivity program operates in the organization.



(Sources: David J.Sumanth " Productivity Engineering of Management)

The Productivity cycle concept shows the productivity improvement must be preceded by measurement, evaluation, and planning. All four phases are important, not just productivity measurement or just productivity improvement. Also, this cycle emphasizes the process nature of productivity issue. Productivity program is not a one-time project, but rather a continues, on-going process. In order to know at what productivity level it ought to be operating, it should know at what productivity level it is operating now. Measurement shows the direction for comparisons within the organization and within its industry.

Productivity cycle reflected on Objective Matrix which has an overall process of measurement, evaluating, planning and improvement.

Benefits of Productivity measurement in an organization (Sumanth, 1981) :

1. The organization can assess the efficiency of conversion of its resources so that more good/services are produced for a given amount of expended resources.
2. Resource planning can be facilitated through productivity measurement, both on short-and long-term basis.
3. The economic and non economic objectives of organization can be reorganized by priority in the light of a productivity measurement effort.
4. Planned productivity-level targets for the future can be modified realistically based on the measured levels now.
5. Strategies for improving productivity can be determined based on the extend of the gap between the planned level and the measured level of productivity.
6. Productivity measurement can help in comparing the productivity level between organization within a particular category, either at the industry or at the national level.
7. Productivity values generated as a result of a measurement may be useful in planning the profit levels in organization.
8. Measurement create competitive action
9. Collective bargaining can be accomplishes more rationally once productivity estimates are available.

2.1.4.2. Performance Measurement using Objective Matrix (OMAX) Method

Many organization resist measuring productivity for such reasons as distrust of accuracy, and lack of qualified measurers. Accuracy results from measuring the right things in the right way, when the right things are controllable factors and the proper way is conscientiously. Productivity ratio has many forms because companies produce many different products whether goods or services in different resources. A multidimensional method of measuring productive measurement of company is know as the Objective Matrix (OMAX).

Objective Matrix created in the mid-1970's but five years after, James L.Riggs,P.E., a professor from Department of Industrial Engineering at Oregon State University used it to measure productivity of work units in hospitals and since then, many versions have been developed. Objective Matrix (OMAX) is a partial productivity measurement system which develops to monitoring productivity of each part in order to achieve current objectives. No measurement system can be implemented without careful planning and a commitment from upper management to make it work. Dedication is especially important to an Objective Matrix application because it relies on extensive input from the people in each organizational unit for which a matrix is constructed.

The theory behind the objective matrix is that productivity is a function of several performance perspectives, each with distinct dimensions that vary among the most influential factors. Commensurely reasonable to assume that the productivity of larger organizational units can also represented by an appropriate collection of performance factors. The Matrix consist of measure, performance, score, scale, weight, value, and perspective index. The matrix is used to monitor progress by measuring the performance in each criterion, converting the performance number to a score, multiplying each score by its

weight to obtain a value, and then summing the values to get the performance indicator for the period. The purpose of productivity measurement is to increasing the performance company based on the productivity not to control the operation, profit and salary or make a punishment as the main result even all of them be the effect of productivity.

Characteristic of good measurement :

1. Set objective measurement
2. Output has relationship with input so the result can be measured directly
3. Performance measurement should be measured per criteria not individually
4. The procedures of measurement included in all levels.
5. Measurement must be focus in all criteria which influence the productivity.
6. To attain the performance, productivity indicators needed
7. Weight indicators of each criteria must accordance with the company's goals.
8. Each indicator should have weight value, so a company could be improved swiftly in accordance to the priority. Those values will be used as a device advancement process from period to period.

After designing the whole process of Balanced Scorecard which contained processes of transforming vision, mission, and strategy of a company into few measures and initiatives within their own perspectives, the researcher tried to visualize those process with the help of Objective Matrix (OMAX) to evaluate the company's performance in order to make a decision relation to what perspective should be improve first and to measuring the productivity.

Objective Matrix has several steps of measurement :

1. Selecting productivity criteria

Most people know how their activities affect the productivity of their work unit. They realize which of the function that they perform support the organization's output. These significant functions are the criteria of productive performance. There are a few general categories which encompass most of the factors pertinent to Balanced Scorecard and six generic categories that define a person's, Work unit's or total organization's contribution to productivity which consist of :

1. Quantity - The number of items produced or a measure of the service provided (output maximization).
2. Quality - Precise or inferential indicators of the quality of goods or services produced (customer satisfaction).
3. Timeliness - The extent to which activities or functions are completed on schedule (elimination of delays).
4. Yield - Degree of efficiency of the transformation process (input minimization and waste avoidance).
5. Utilization - The effectiveness with which critical resources are utilized (availability of key people and machines).
6. Group traits - Individual and organizational properties that contribute to productive performance (such as safety, turnover, and absenteeism).

Those criteria will be divided into three perspectives consist of, customer, internal business process and learning & growth perspective. The Matrix measures based on four perspectives which is transfer from Balanced Scorecard result. Those perspectives are computed as follows :

1. FINANCIAL PERSPECTIVE

$$\text{ROI} = \frac{\text{Net Profit}}{\text{Total Asset}} \times 100\%$$

$$\text{ROE} = \frac{\text{Net profit}}{\text{Shareholder's equity}} \times 100\%$$

$$\text{Profitability} = \frac{\text{Net Sales} - \text{CGS}}{\text{Net Sales}} \times 100\%$$

$$\text{Debt Ratio} = \frac{\text{Total Liability}}{\text{Total Asset}} \times 100\%$$

$$\text{Earning Power} = \frac{\text{Earnings before interest \& tax}}{\text{Capital}} \times 100\%$$

$$\text{Turnover Ratio} = \frac{\text{Net Sales}}{\text{Total Asset}} \times 100\%$$

$$\text{Current Ratio} = \frac{\text{Current Asset}}{\text{Current Liability}} \times 100\%$$

2. CUSTOMER PERSPECTIVE

$$\text{Customer Acquisition} = \frac{\text{New Customer}}{\text{Total Customer}} \times 100\%$$

$$\text{Customer Retention} = \frac{\text{Old Customer}}{\text{Total Customer}} \times 100\%$$

$$\text{Customer Satisfaction} = \frac{\text{Satisfied Customer}}{\text{Respondances}} \times 100\%$$

3. INTERNAL BUSINESS PROCESS PERSPECTIVE

$$\text{R\&D cost ratio} = \frac{\text{R \& D}}{\text{Net sales}} \times 100\%$$

$$\text{Defect product percentage} = \frac{\text{Number of defect product}}{\text{Total product}} \times 100\%$$

4. LEARNING AND GROWTH PERSPECTIVE

$$\text{Employee productivity} = \frac{\text{Net sales}}{\text{Total number of employee}}$$

2. Setting performance score

Performance scales in the body of the objective matrix run from 0 to 10. There are thus 11 levels of accomplishment for each criterion : single criterion occupies a column that stretches from the top bottom of the matrix. Levels of accomplishment extend across the body of the matrix, as indicated by the rows marked from 0 trough 10. The assignment of the results expected at each level is the crucial part of scaling, because the results set specific hurdles that reflect the accomplishment of a work unit's productivity objectives. The scale is anchored by designed numbers at three levels :

1. Score 0

The lowest level recorded for the creation ratio over a recent period of time. As the worst ratio that might be occurred or expected during current period.

2. Score 3

Operating results indicative of performance proficiency at the time the rating scale was established, current ratio reading at the time measuring is initiated. As an average ratio which can be measured from current period until one period before the measurement began.

3. Score 10

A realistic estimate of results that can be attained in the foreseeable future, a stimulating productivity objective. As the realistic ratio that is expected in the future.

Performance scale in the body of the objectives matrix run from 0 to 10.

Level 0 and 3 scores are clearly defined benchmarks. Level 10 is the challenge. An overly optimistic objective may later prove to be discouraging by its unattainably, and a conservative goal may inhibit motivation if it is too easily achieved. The scoring

columns for all the criteria are completed by determining the appropriate entries for the cell between the benchmark level.

3. Develop weight value for each perspective

All the criteria of productivity performance do not equal effect on the overall productivity of the work unit. Assigned weight, 100 points distributed among the criteria, reflect management's perceived contribution of each criterion to the organization's productivity objectives. Weight assignment is not a trivial undertaking, it provides an opportunity to direct attention to activities that have greatest potential for improving productivity. The final phase ties together criteria scores and weights to determine a performance index. Results are entered on the performance line of the matrix and translated into scores according to rating scale of each criterion. The weight is calculated as :

$$\text{Weight of each criteria} = \frac{\text{weight ratio (n)} \times 1}{\text{Total weight}}$$

The purpose that company want to achieved are :

1. Clarify input and output
2. Analyze the performance
3. Deal with the criteria's chosen
4. Define the company's process
5. Clarify and describe relationship between those criterion
6. Enhance communication

4. Prepare Objective Matrix Structure

After finishing all weight process and collecting total weight from all perspectives, company goes to the next step by preparing Objective Matrix structure.

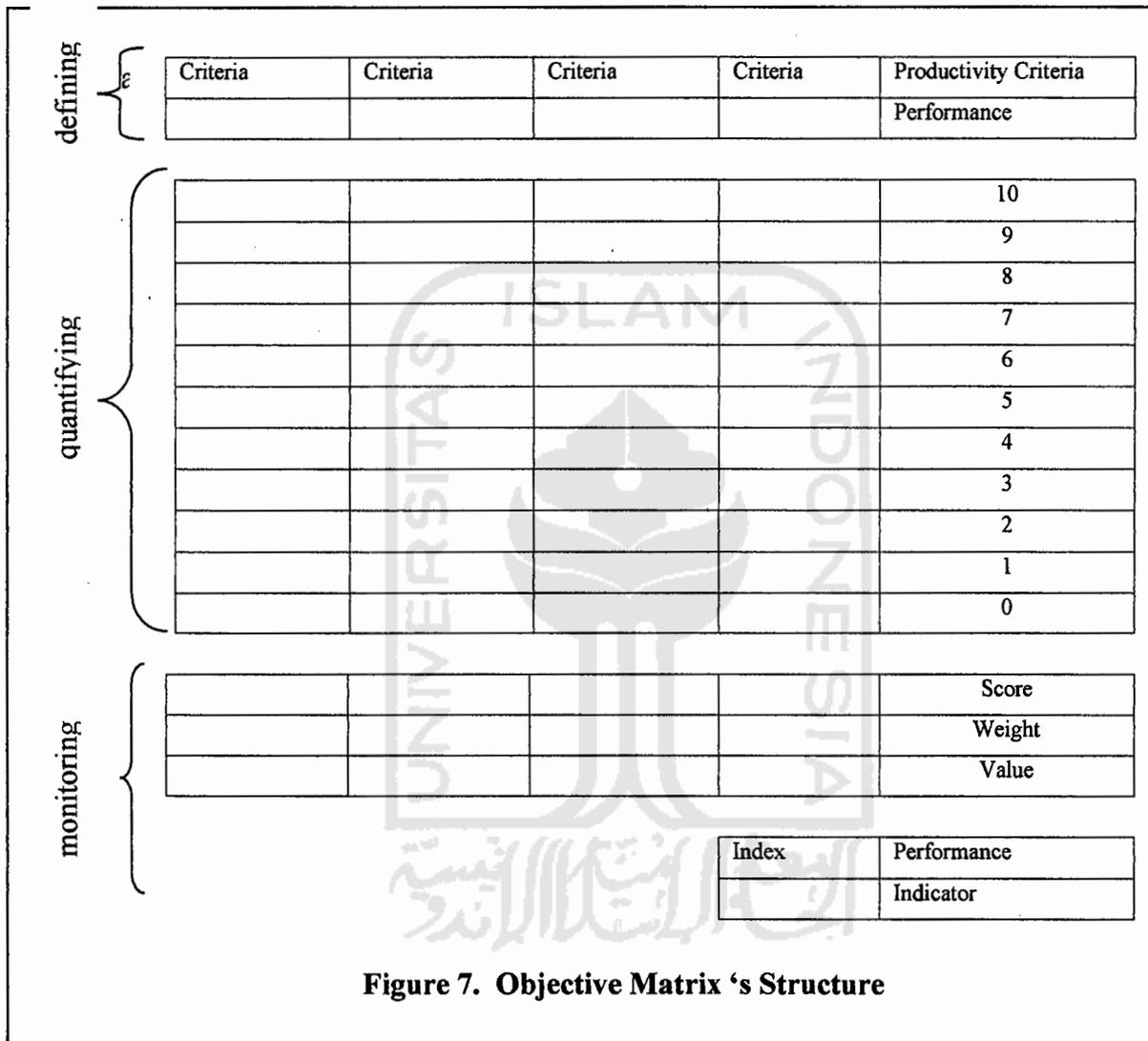


Figure 7. Objective Matrix 's Structure

(Source : Riggs, James L. *Productions System : Planning, Analysis and Control*. John Willey & Sons, Inc., 1987 p.650)

Scores are entered in the score line and are multiplied by the weight immediately below each score to complete the value row. The sum of the numbers in value row is entered in the first box below it. This is a current performance indicator. It is a single number that represents the composite performance of the work unit being monitored. An index

performance percentage is entered in the index box and represents the work unit's productivity during the evaluation period. A series of performance scores must be collected before they can become truly useful. The perspective obtainable by continuous indexing is destroyed by changes in the rating scale or weights. The maximum usefulness results from correctly setting up the matrix the first time and continuing to apply it for several periods.

The Basic Structure of an Objective Matrix with explanation of the functions served by the components identified by letters :

1. Defining

The factors that determine the performance of a work unit are identified as productivity criteria and stated as ratios.

- a. A work unit's actual accomplishments during an assessment period are registered in the performance row.

2. Quantifying

The body of the matrix is composed of 11 levels of achievement, ranging from a score of 0 for unsatisfactory performance to 10 for superior accomplishment.

- a. The prevailing level of performance when the matrix is initiated is considered to have a score 3 for all criterion ratios.
- b. Realistic performance objectives for the work unit to strive for during a prescribed period have a score of 10.

3. Monitoring

A performance indicator is the sum of index obtained by multiplying each criterion's score by its weight. The index is the percentage difference between the current and previous performance indicators.

- a. Importance weights are assigned to all criteria to show then relative impact on the work unit's productivity objectives.
- b. An indication of work-unit productivity is provided by the rate of change of the performance indicator.

5. Develop Improvement Level

The result of OMAX gives companies quantities of index for each perspective, hence, a company could understand which perspective must be improved swiftly in accordance to the priority. The improvement is display as :

$$\text{Improvement Level} = \frac{\text{Perspective Index} - 3.00}{3.00} \times 100\%$$

