

Modeling of development of employee performance factors and dissemination

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Abstract. Key performance indicator (KPI) are generally used by companies as a benchmark to determine how well the performance of companies that can be represented by the employee's performance. The higher performance of the employee, the better the performance of the company as well. Furthermore to be able to establish key performance indicators, there are several steps that need to be done in order to obtain measurements that compatible with the conditions of the company. In this study, key performance indicator development process will be conducted through the stages of designing a questionnaire, distributing questionnaires to the employees of Company, performing factor analysis and then developing a model of KPI. The output of this study are new factors that affect employee performance and a model of KPI that can be used as a reference in forming a company's KPI. Once key performance indicators are formed, companies can take advantage of the knowledge management system for dissemination process of KPI

1. Introduction

In these days, business competition is getting more intense. The implementation of effective management in each business process within a company becomes very important. Business processes can be defined as a set of activities performed for a business purpose that includes the input process, processing information and then generate outputs for the customer in the form of products or services. In a company, generally there are two types of resources, namely physical resources and virtual resources [1]. Physical resources are the primary resources and usually used to support business processes. This resources may include human resources (employees), raw materials, machines and money. Moreover when a company running it's business process, it also required the presence of virtual resources such as collection of data and information including information like management decision [2].

Virtual resources in the enterprise can be realized with the use of information technology which has been growing rapidly nowadays. One example of information technology that can be used by companies to increase competitive advantage is by utilizing the concept of knowledge management. Knowledge management generally used for manage all existing knowledge in the company [3]. It can facilitate the company to run its business and become more innovative. When the concept of knowledge management



is combined with technology, it will generate a knowledge management system which usually contains important information such as the company's business processes, procedures, job descriptions, key performance indicators, best practices and many more [4]. Information systems such as knowledge management systems is built exclusively for the internal organization as a part of learning process [5]. It is intended to increase knowledge of all the member so that a company can be more easily to achieve an operational excellence [6]. Operational excellence in a company frequently linked with the transaction and the process that occurs everyday in it [11]. To identify all the processes within the company has been running well or not, a company needs to monitor and measure the employee performance [12]. This can be done through a mechanism named key performance indicators. Implementation of performance measurement using key performance indicators can be combined with knowledge management system so that the company performance can be monitored in real time [13]. After doing a deep analysis, the authors found that in the company has no key performance indicator at all [14]. Hence, the lack of this performance measurement can be one of the reasons why the company performance is not as expected, the problem can be formulated as follows: What factors are required for the company to build a key performance indicators?, How to build a KPI model that suitable with the company's condition? and What kind of information system can be used to support the implementation of KPI [15].

2. Methodology

The main concept that will be used in this study is balanced scorecard concept. Balanced scorecard is a method that generally used by a company or enterprise to develop measurements both in financial and non financial area [7][8][9][10]. Company or enterprise usually use this concept to transform strategic goals from short term into a long term strategic goals. There are 4 perspectives in balanced scorecard, namely financial perspective, customer, internal business process and learning and growth perspective. Through deep analysis from the previous study, will obtained indicators that describe each perspective in balanced scorecard. These indicators will be used as the basis of designing questionnaire. When the questionnaire has been distributed over the company, the result will be analyzed using factor analysis methodology. Factor analysis is one of the multivariate statistical methods that generally used to find the relationship between variables that are mutually independent on each other [16]. The output from using this methodology are factors that affect the employee performance in the company. These factors actually derived from a set of indicators which have similar characteristic [17]. After knowing the factors then a KPI development model can be formed using regression analysis. All the analysis process in this study will use a software named SPSS to generate an accurate calculation [18]. If the KPI development model has formed, the next step is designing an information system that can help the company to disseminate this KPI to employees (see Figure 1). The information system will be designed using knowledge management concept which will contain company essential informations [19]. This company essential informations may include employee job descriptions, procedures/working instructions, organization structure, and other materials that related with key performance indicator [20]. This is intended to give the employee basic knowledge about company so that the employee understand and be aware with all the regulations to perform their daily work. The following is the research design used in this study describe at figure 1.

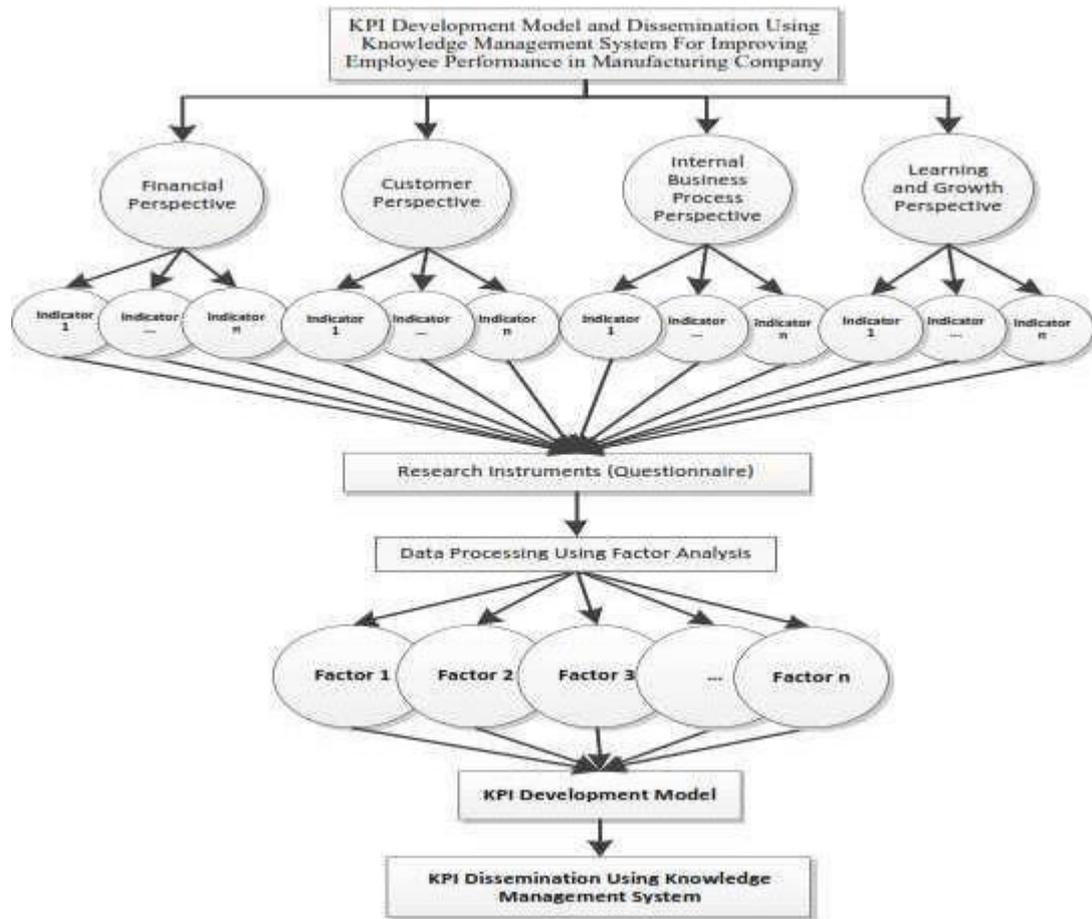


Figure 1. Research Design

3. Results

Based on previous research, there are several indicators for each balanced scorecard perspectives as follows:

1. Financial Perspective

Table 1. Indicators in Financial Perspective

Indicators	References
Growth Strategy	[13], [7], [8], [9], [10]
Cost Reduction/Prod. Improvement	[13]
Revenue Growth and Mix	[7], [8], [9], [10]

2. Customer Perspective

Table 2. Indicators in Customer Perspective

Indicators	References
Product Leadership	[12]
Operational Excellence	[12], [16]
Customer Intimacy	[13]
Customer Satisfaction	[14]

Indicators	References
Customer Complaints	[19]
Customer Relationship	[20], [4]
Market Share	[1]

3. Internal Business Process

Table 3. Indicators in Internal Business Perspective

Indicators	References
Generic Value Chain	[18], [7], [8], [9], [10], [17]
Innovation	[7], [8], [9], [10]
Level of Rework (Manufacturing Excellence)	[7], [8], [9], [10]
Standards and Guideline Compliance	[14], [16], [7], [8], [9], [10]
Safety incidence	[20], [3]

4. Learning and Growth

Table 4. Indicators in Learning and Growth Perspective

Indicators	References
Employee Skills Competency	[5], [15], [11], [17], [2]
Employee Satisfaction	[4], [12], [16], [1]
Employee Productivity	[6], [4]
Employee Retention	[12], [4]
Information System Capabilities	[7], [8], [9], [10], [12], [17], [21]

These indicators are the main base for designing questionnaire. By using this questionnaire, we can examine what factors that affect employee performance using factor analysis. The findings can be formulated as follows:

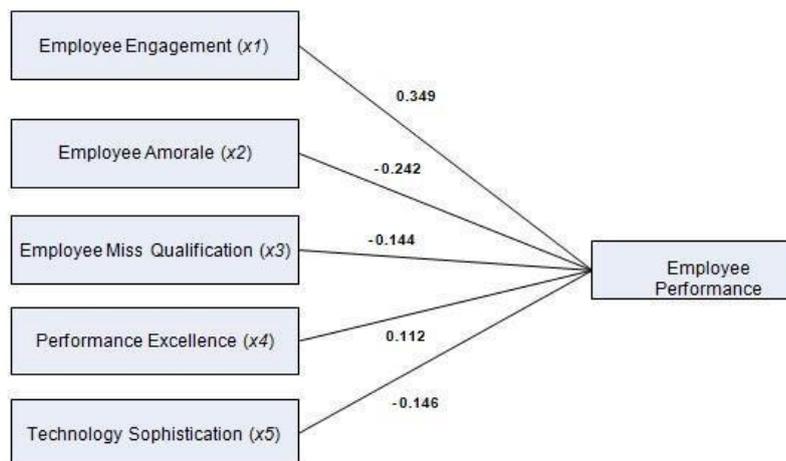


Figure 2. Key Factors for Employee Performance

There are 5 factors that affect employee performance, namely employee engagement (EG), employee amoral (EM), employee miss qualification (EQ), performance excellence (PE) and technology sophistication (TS) (see Figure 2). Employee engagement is derived from 3 indicators that consisting of employee retention, employee satisfaction and reward. Whereas employee amoral is derived from standards and guideline compliance, corporate culture and employee productivity. For the third factors, employee miss qualification, is derived from generic value chain, employee productivity and employee skilss competency. Performance excellence is derived from 4 indicators, namely generic value chain, standards and guideline compliance, corporate culture and employee retention. And the last factor, technology sophisticated, is derived from 1 indicators, namely technology capability. Based on those factors, a KPI development model can be build through this mathematical models :

$$Yx = 5.604 + 0.349 X1 - 0.242 X2 - 0.144 X3 + 0.112 X4 - 0.146 X5 \tag{1}$$

Where:

- $2.76 \leq X_1 \leq 3.58$
- $4.00 \leq X_2 \leq 2.76$
- $2.94 \leq X_3 \leq 2.22$
- $3.98 \leq X_4 \leq 2.50$
- $2.26 \leq X_5 \leq 2.75$

When the KPI development model is simulated, the result can be described as follows:

Table 5. KPI Development Model Simulation

Employee Performance (Y)	Coefisiens	Score					Simulation Condition
		EG	EM	EQ	PE	TS	
5.604	5.604	0	0	0	0	0	Current
2.806	5.604	-2.76	2.76	2.22	-3.98	2.75	Un-Expected
8.855	5.604	3.58	-4.00	-2.94	2.50	-2.26	Expected

4. Discussion

From the table previously (see Table 1.) there are 5 conditions that can be used as comparison for the KPI development model. The current condition in company can be presented as normal condition which are all the finding factors still have no contribution for the employee performance. In normal condition, the score of employee performance in that company is 5.73 and this score is expected to be increased significantly after the company consider those factors in employee performance. When calculated KPI development model in maximum and minimum condition, all the factors upper limit or lower limit will be included in the calculation of mathematics model. Otherwise, the limits score that will be used in the ideal condition are adjusted by operation symbol for each factor. If the operation symbol is minus, then the limit score that will be used is the lower one and vice versa. The opposite concept from ideal condition is used when calculate this model in extreme condition. In this case, the higher score in employee performance is using the simulation with ideal condition which is the score is 10.10. When the key performance indicator has been established, still it is not easy to implement these measurements in the company. There are several factors that need to be considered so that the KPI could be

implemented and accepted by all the member in company. According from the previous research [22], there are some issues when implementing KPI based on balanced scorecard concept in a company:

1. Company's internal processes are not centralized as well and lack of employee understanding of the important processes occurring within the company. These processes often overlooked even though it is the basic foundation to run all the activities in a company. Because of it's importance, even [7][8][9][10] use the internal processes as one of the balanced scorecard perspective
2. The need of right measurements which can help a company to achieve the overall performance objectives. For example, linking the existing measurement with customer satisfaction or increase the company's financial
3. Lack of the understanding between things that measured with the aim of measurements.

Meanwhile, according to the other research by [23], there are several obstacles that generally encountered when implementing balanced scorecard:

1. Company adopts too many indicators in the measurement which can make the company lose their focus and can not found the relationship beetwen those indicators
2. Lack of company senior management commitment
3. The individuals that involve in this measurement are too few
4. Not all members in the company involved in balanced scorecard implementation process so that there are no significant progress at all
5. The development process of measurement is too long

The other studies [24] found important factors that need to be counted when implemented a performance measurement system in small-medium enterprise: 1. Commitment from the owner and manager in company

2. A deep understanding about the main objectives of using performance measurement system in company
3. Employees support
4. Good cooperation between departments in company
5. Using the standard hardware or software in the company

Other than five factors that have been stated previously, there is still one factor that can be a barrier too which is there is no standardized processes in company. The social issues such as employee behaviour and employee lack of trust and openness can also be the one of causes why company failed when implemented balanced scorecard.

5. Conclusion

This study is generally discuss about how to build a key performance indicators through balanced scorecard concept. In addition, the authors want to give a recommendation for disseminating the indicators using knowledge management systems. The very first step in this study is to find out indicators from the previous study for each balanced scorecard perspective. These indicators will be used as base for designing questionnaire. After the questionnaire has been distributed, the study will be continued by using factor analysis. The follows are results of this study:

1. There are 5 factors that indicated affect the employee performance, namely employee engagement, employee amorale, employee miss qualification, performance excellence and technology sophisticated
2. From the factors that have been found, a indicator development model can be formed as follows:

$$Yx = 5.604 + 0.349 X1 - 0.242 X2 - 0.144 X3 + 0.112 X4 - 0.146 X5 \quad (2)$$

The limitations of this study can be stated as follows:

1. Not all the member of company understand about financial and customer aspect which causes only 2 the balanced scorecard can be implemented in the company. The perspectives are internal business process and learning and growth.
2. This study can not guarantee the successfulness of company to improve the employee performance. This is because the results are also dependent on other factors in company such as leadership, managerial commitment, etc.

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