The Impact of KMS Success on Corporate Productivity: A Case Study at an IT Services Company

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ABSTRACT

As a class in IS that manage organizational knowledge, the positive contribution of KMS success to business performance has been published by many researcher. However, there are reports that casted a doubt on such a claim. This study is one of another exploration on the subject that aimed at investigating correlation between a company's KMS success level and business performance represented by productivity measurement. The company under this study is a publicly-listed company in the IT services industry which have 27 branch offices and over than 70 service point throughout the country. The KMS success level is measured using the KMS success model provide by Wu and Wang based on DeLone and McLean IS success model. We using the Spearman Rank Correlation Test as a non-parametric statistical hypothesis testing method. A nagative correlation was found between KMS success level and total factor productivity, although there is a positive correlation to profit-based productivity measure. By investigating the result, we discovered an interesting observation that might explain why some studies did not find positive correlation between KMS success and business performance measures. In this case, we found that there was a time lag between the KMS success level improvement and its impact to productivity level of the company.

KEYWORDS

IS Success Model, KMS Success Model, Knowledge Management System, Business Performance, Productivity

1. INTRODUCTION

Many research has been stated that knowledge is an important asset and potential strategic resource that gives company a basis for business competitive advantage [1][2][3][4][5][6][7]. Thus, many organizations are developing IS that are designed specifically to facilitate knowledge management; these are termed knowledge management systems (KMS). As a class of IS that manage organizational information and knowledge, KMS developed to support and enhance the organizational processes of knowledge and information creation, storage and retrieval, transfer, and application [1]. Positive contribution of KMS success to business performance has been much published and claim that there is positive relation between KM strategy in strategic alignment to business performance [8]. However, there have been many researchers who casted a doubt on such a claim as they did not find such a positive correlation.

The objective of this study is to investigate the correlation between an organization's KMS success and a number of the organization's business performance by measuring the productivity. The KMS success itself measures using Wu and Wang KMS success model [1] while the productivity measures using Total Factor Productivity (TFP) that also used by Nash [9]. We also use profit-based productivity that used as productivity indicator by the object of this study. A publicly-listed company whose business is in the IT services industry is chosen as object of the case study. At the request of the company, we do not disclose the company's name and,

instead, we use an arbitrary name, ZZ, as the name of the company. The vision of ZZ's is to become the best document, information, and communication technology based business solution provider in Indonesia. By the end of 2011, ZZ had 27 offices throughout the country [10]. We obtained the company's financial reports for year 2009 to 2011 and excluded the report for year 2008 because the financial market crash in 2008 had significantly affected the company's financial performance and resulting in data that is out of its normal pattern.

2. LITERATURE REVIEW

A study by Chen, Huang, and Liu [3] shows that KM strategy has a positive contribution to business performance. By drawing the concept of strategic alignment, that study proposed a KM strategic alignment model (KMSAM) within which business strategy, HRM strategy, KM strategy, and IT strategy are coexisted. Figure 1 shows the KM strategic alignment model (KMSAM). The study found that the strategic alignment between KM and IT with other resources or strategies used in managing business activities must be considered for business performance.

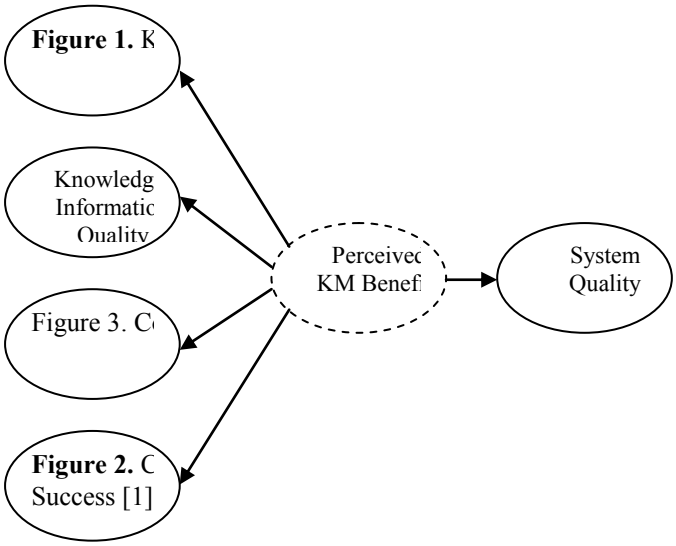

Figure 1. KM strategic alignment model (KMSAM) [3]

A study by Yuwono and Vijaya [11] shows the impact of IT governance maturity level on business productivity. The study shows how to measure correlation between IT governance maturity level with organization's productivity. Also a study by Nash [9] that measuring the impact of an organization's maturity in aligning its IT and its business on the organization's productivity and profitability. The organization's productivity was measured using Total Factor Productivity (TFP), and its profitability was measured using Sales Level, Enterprise Value to Sales, and Net Profit Margin.

3. KMS SUCCESS MEASURE

A study by Wu and Wang [1] attempted to determine whether a correlation exist between five dependent variables to measures KMS success. The variables consist of information quality, system quality, perceived KM benefit, user satisfaction, and system use. The system use itself set as final result at right hand position of the model. The KMS success model shows in figure 2. This model was design based on DeLone and McLean's IS success model [12]. The measurement was performed by using questionnaire for those variables. There are 29 questioners as summary from all constructs and measures were based on items in existing instruments, KMS literature, and input from KMS experts.

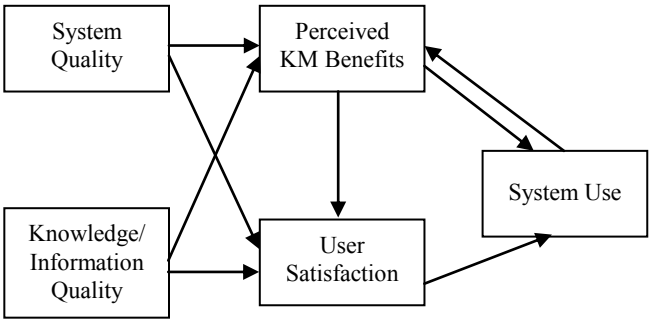

Figure 2. Correlations between five variables of KMS Success [1]

4. PRODUCTIVITY MEASURE

Productivity is a ratio of production output to input required to produce it. The commonly used to measure the productivity is *total factor productivity* (TFP). This productivity index measures the percentage change in revenue amount per employee profit per employee by taking into account changes in the company's revenue and asset. The definition of TFP used in this study is same as that of Nash [9] as well as that of Yuwono and Vijaya study [11], as follow:

$$TFP = \Delta RE - (\Delta AE \times K)$$

Where:
ΔRE is the percentage change in revenue amount per employee,
ΔAE is was the percentage change in assets per employee, and
K is was a constant representing the effect of IT investment on productivity.

We use K = 0.25 based on the data from the APO Productivity Databook 2011, published by the Asian Productivity Organization [13]. Since the study is only concerned with the trend over time, it is worth nothing, while the choice of K has no impact on this study result.

The company in our case study, ZZ, defines its productivity index by divided profit to man power as follow; referred here as *corporate productivity index* (CPI):

$$CPI = IFO/MP$$

Where:
IFO is the income from operation or operating income, defined as revenue subtracted by operation expenses, and
MP is the number of employee or man power used to produce the income.

5. METHODOLOGY

The study is conducted as follows. First, we measure the KMS success level by using company's survey data for each time periods, i.e., 2009, 2010, and 2011. Items in the questionnaire were measured using a five-point Likert scale ranging from (1) strongly disagree to (5) strongly agree.

After that, we calculate the value and summarize it. However, since the time references of the study are in the past, historical maturity data is required. Such data is available as the company had been annually, measuring the user satisfaction level of company's information management (IM) services. The data that needed in this study is only concern with the change of KMS success level over time.

The final step of the study is to measure the correlation between the KMS success level, and the company's CPI and TFP, on the other hand, a non-parametric statistical hypothesis testing using the Spearman rank correlation coefficient [14] is used to measure the significance of the correlation. The hypotheses being tested are:
H1: the company's KMS success level correlates positively with the corporate productivity index.
H2: the company's KMS success level correlates positively with the company's total factor productivity.

6. KMS SUCCESS LEVEL

The KMS success level of ZZ is the average measured value of all construct definition and measure from Wu and Wang KMS success model [1].

In order to calculate the value, we use annual company's survey data that relevant to the reference model. This is performed for each of the time periods, i.e., 2009, 2010, and 2011. As described earlier in the discussion of methodology, we need to use ZZ's KMS success level data for each time period from company's survey data. Table 1 shows the recapitulation of KMS success construct measure that accommodates in company's survey data.

It is important to note that there are some reference construct measures are not implemented fully by company's survey data. In this study, we treat such partial data as full data. We can do so since the study is only concern with

the change of KMS success level over time instead of the precision of the KMS success level measurement. As long as the KMS success levels for the periods are calculated consistently there should be no problem.

Figure 3 shows the company's increase in its KMS success level over the years. There are some improvements to the company's KMS that impact on its KMS success level as can be seen in Figure 3.

7. BUSINESS PRODUCTIVITY

To compute the business productivity, we gather needed data from company's annual report. Table 2 shows the summarize values of the productivity component.

Table 1. Productivity components and its values for year 2009, 2010, and 2011

Construct definition and measure		2009	2010	2011
Q3	KMS is stable	V	V	V
Q4	The response time of KMS is acceptable	V	V	V
KQ5	The knowledge or information provided by KMS is important and helpful for my work	V	V	V
KQ6	The knowledge or information provided by KMS is meaningful, understandable, and practicable	V	V	V
KQ7	The knowledge classification or index in KMS is clear and unambiguous	V	V	V
KQ8	KMS provide contextual knowledge or information so that I can truly understand what is being accessed and easily apply it to work		V	V
US1	I am satisfied that KMS meet my knowledge or information processing needs		V	V
US4	Overall, I am satisfied with KMS	V	V	V
PKB1	KMS helps me acquire new knowledge and innovative ideas			V
PKB3	KMS enable me to accomplish tasks more efficiently	V	V	V
SU2	I use KMS to help me record my knowledge	V	V	V
SU3	I use KMS to communicate knowledge and information with colleagues		V	V
SU4	I use KMS to share my general knowledge	V	V	V

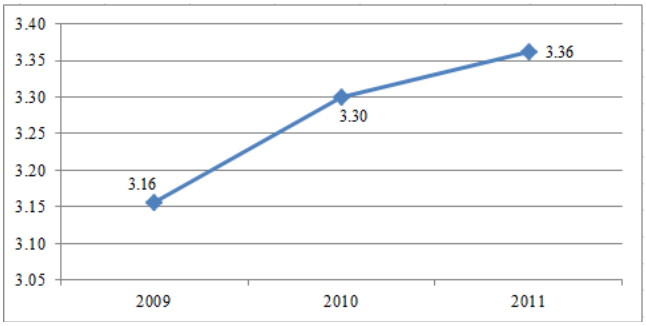

Figure 3. Company's KMS success level for year 2009-2011

Table 2. Productivity components and its values for year 2009, 2010, and 2011

Productivity Component	2009	2010	2011
Revenue	1335.24	1565.57	1724.64
IFO	113	158	169
Total Assets	775	584.84	624.56
MP	958	959	960
CPI: IFO / MP	**92.13**	**121.51**	**122.02**
ΔRE	30.03%	10.23%	3.64%
ΔAE	-7.80%	19.74%	7.35%
K	0.25	0.25	0.25
TFP: ΔRE – (ΔAE × K)	**31.97%**	**5.30%**	**1.80%**

Figure 4 shows the company's increase CPI over the years.

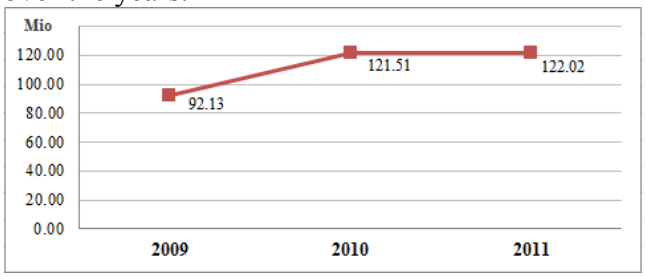

Figure 4. Company's CPI for year 2009 to 2011

The company's and TFP trajectories from year 2009 to 2011 are shows in figure 5.

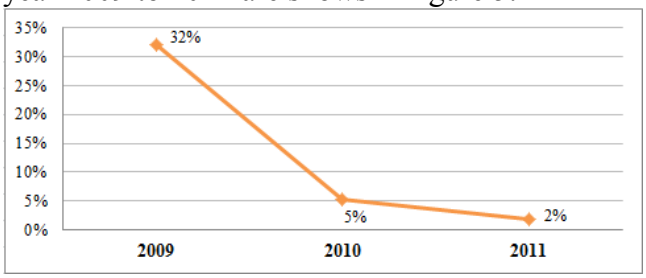

Figure 5. Company's TFP for year 2009 to 2011

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8. THE CORRELATION

In order to determine whether there is a significant correlation between company's KMS success level and its productivity indicators; we compute the Spearman's rank correlation coefficient for each of the hypotheses.

The Spearman's rank correlation coefficient, ρ, measures the strength of the correlation between two lists of rank order. The correlation coefficients are computed for the rank orders shown in Table 3.

Table 3. Rank orders used in the spearman's rank correlation coefficients computation

Year	KM success rank	CPI rank	TFP rank
2009	1	1	3
2010	2	2	2
2011	3	3	1

A very strong correlation, having $\rho = 1.0$, is found between the company's KMS success level and its CPI. However, there is no correlation between the maturity level and the company's TFP, with $\rho = -1.0$. Therefore, hypothesis H1 is accepted, and hypothesis H2 is rejected.

9. CONCLUSION

This study shows that the impact of increasing levels of KMS success in general cannot be directly perceived, so it cannot be measured and directly compared with the business productivity within the annual period. This single case study also has demonstrated that one should not make a presumption that let alone improving KMS success will result in business performance improvement. However, it is an interesting observation that the data seems to suggest that there is a time delay to perceived business benefit. It could be take months or years of continuous improvement to become effective and also needs some more research to explore time delay affect in this measuring model.

This study also shows that company's productivity also affected by another factors besides KMS strategy and performance as drawn in KMSAM model (figure 1), such as IT strategy, HRM strategy, and business strategy.

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