IMPACT ANALYSIS OF KNOWLEDGE SHARING USING KNOWLEDGE MANAGEMENT SYSTEM ON EFFECTIVENESS, EFFICIENCY AND INNOVATION: A CASE STUDY OF BANK INDONESIA

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Abstract:

Bank Indonesia (BI) as the Indonesian Central Bank deals with abundant knowledge regarding Indonesian monetary policies. In order to properly manage their knowledge, Bank Indonesia has implemented knowledge management system, abbreviated as BLINK to encourage knowledge sharing amongst their staffs. Unfortunately, the knowledge management system (KMS) which had developed by Bank Indonesia has not been utilized as it was expected since the staffs rarely access their knowledge management system. To date, there never been analysis conducted on BI's knowledge management system impact to the knowledge sharing process. This research analyses the impact of knowledge sharing using knowledge management system in Bank Indonesia. The research covers the process aspects of knowledge management system namely effectiveness, efficiency, and innovation. The research model in this research is based on the Becerra-Fernandez et.al model which was developed in 2004. The system administrators of the BLINK from all departments were became the respondents of the questionnaire. Partial Least Square (PLS) technique is used to analyze data considering it is the most appropriate technique to analyze the total collected data. The result stated that knowledge sharing gives positive impact to the effectiveness, efficiency, and innovation. The suggestion based on result of research is to improve knowledge sharing on IT infrastructure, trust, attitude, reward system, and support of top management.

Keywords: effectiveness, efficiency, innovation, knowledge management, knowledge management system, knowledge sharing, partial least square

1. INTRODUCTION

Global economic crisis in 2008 was the worst economic crisis in modern era. It gave impact to the majority of economic sectors, especially in banking sector (Ali, 2009). In Indonesia, the impact of global economic crisis were decreasing the exchange rate of Rupiah, decreasing the stock exchange value, decreasing the liquidity, stopping the foreign capital flow, and declining the banking sector performance (Bank Indonesia, 2009). Bank Indonesia as the central bank has a crucial role to decide and implement the monetary policy to overcome the impact of global economic crisis in Indonesia. Global Economic Prospect Report stated that the signification of economic condition is not only fragile but also has no certainty after the global economic crisis has started (Kamar Dagang dan Industri Indonesia, 2012). In that condition there is a possibility that global economic crisis could happen any longer. In order to face the global economic crisis, Bank Indonesia needs to manage the knowledge in the organization to make the future decisions. Bank Indonesia has vision to be recognized, nationally and internationally, as a credible central bank through the strengthening strategic values and achieving low and stable rate of inflation (Bank Indonesia, 2008). In addition, Bank Indonesia has missions to achieve and maintain the stability of Rupiah value by maintaining monetary stability and promoting financial system stability for Indonesia's long term sustainable development (Bank Indonesia, 2008).

Law number 23 of 1999 regarding Bank Indonesia has changed the status of Bank Indonesia to become an independent government institution. Syahril Sabirin as the Governor of Bank Indonesia in that time decided to do a transformation. He decided to transform Bank Indonesia to be a knowledge-based organization. Bank Indonesia focused on how to encourage staffs easier in sharing their knowledge among others. Transformation Program Special Unit was formed to organize and monitor knowledge sharing process. There are agents of change to be a role model to do knowledge sharing and monitor knowledge sharing process in its own department. The agent of change is disseminated all over departments in Bank Indonesia.

There are some forums in order to facilitate the staffs to do knowledge sharing, such as Obrolan Santai (Obras), Saluran Pengetahuan (SAPA), and weekly forum. Discussion topic in each forum is about working environment such as Indonesia or global economic issues. These forums facilitate all staffs from any level to discus and share their knowledge. The first knowledge management system in Bank Indonesia was Knowledge Lynx (K-Lynx). K-Lynx facilitates knowledge sharing on the trainings that have been attended by the staffs. The staffs who attended the training will prepare a summary of the training material, therefore the other staffs can read and gather new knowledge from the training reports. However, given that this report is not mandatory, consequently only few staffs share their knowledge on the training material in K-Lynx.

Another knowledge management system which was developed by Bank Indonesia is Knowledge Share. Knowledge Share facilitates staffs to share knowledge about their work experiences during their office term at the particular department. Bank Indonesia has a rotation policy, that a staff could be relocate to another department, so the experience of works from the previous staffs can help the next staffs in such department to do a better performance in the similar task. Knowledge Share is not a necessity to be used because of the change of managerial position. BLINK (Bank Indonesia Layanan Intranet Kita) is a knowledge management system which was developed by Bank Indonesia in order to integrate all departments' website page. All of knowledge can be shared on the departments' website page. The system administrators have the role and responsibility in giving a permission on department level, creating, managing, and updating content; proposing content to all department for the content in the BLINK homepage.

The BLINK has the most complete feature compared to the others knowledge management system used previously in Bank Indonesia. In the implementation, the staffs rarely access the BLINK and only system administrators who frequently access the BLINK. The system administrator has to create, manage, display, and update the content in every department page inside the BLINK. The change of management and working culture are the main obstacles while implementing the knowledge management. There have never been done any analysis on the impact of knowledge management implementation in Bank Indonesia. This research is aimed to analyze the impact of knowledge management implementation on the process aspects such as effectiveness, efficiency, and innovation. This research also does the suggestion analysis about how to improve knowledge sharing process in Bank Indonesia as the knowledge sharing gives opportunities for organization to maximize their resources and capabilities (Mathuramaytha, 2012).

2. LITERATURE REVIEW

2.1. Knowledge, knowledge management, and knowledge management system

Becerra-Fernandez and Sabherwal (2008) stated that knowledge is the implementation of information which is convinced can be used for decision making. Knowledge management is performing the activities included discovering, capturing, sharing, and applying knowledge to enhance in a cost-effective fashion, and also give any impacts for achieving the unit's goal. Knowledge management systems are the integration of technologies and mechanisms that are developed to support the four knowledge management processes. Knowledge management mechanisms are organizational or structural means used to promote knowledge management; whereas technologies are information technologies that can be used to facilitate knowledge management (Becerra-Fernandez, et. al, 2004).

2.2. Knowledge sharing

Knowledge sharing is the process which explicit or tacit knowledge is communicated among individuals (Becerra-Fernandez, et.al, 2004). Reid (2003) stated that knowledge sharing gives opportunities to maximize organization's capabilities to achieve goals and provide solutions and achieve efficiency in order to achieve competitive advantages (Gharakhani & Mousakhani, 2011). Knowledge sharing occurs in individual and organization level. For individual level, knowledge sharing is done by talking with coworkers to help solving task with a more efficient way. For organizational level, knowledge sharing is done by capturing, organizing, reusing, and transferring knowledge based on experience in organization and providing knowledge which is needed by other members in organization (Lin, 2007).

2.3. Impact knowledge management on process aspects

Knowledge management can improve process in organization such as marketing, production, financial report, and public relation (Becerra-Fernandez, et.al, 2004). Becerra-Fernandez, Gonzalez, and Sabherwal (2004) stated that the impact of knowledge management on process aspects consists of three dimensions, namely effectiveness, efficiency, and innovation (Figure 1) (Becerra-Fernandez, et.al, 2004).

- Effectiveness: performing the most suitable processes and making the best possible decision.
- Efficiency: performing the processes quickly and in a low-cost fashion.
- Innovation: performing the processes in a creative and novel fashion that improves effectiveness and efficiency.

Figure 1: Impact of Knowledge Management on Process Aspects
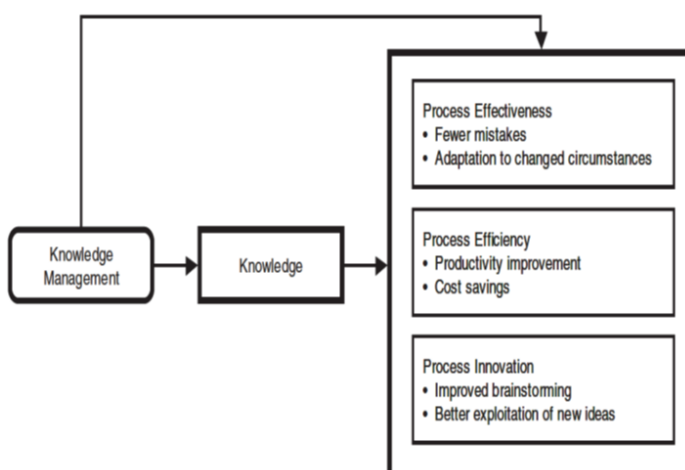
2.4. Assessment of knowledge management

Survey conducted by Ernst & Young (1997) stated that the most important thing faced by organization is the changes of the staffs' attitude which followed by assessment of value and contributions from their knowledge assets (Becerra-Fernandez, et.al, 2004). There are several reasons why assessing knowledge management is important:

- Assessment of knowledge management can help organization to identify KM's contribution.
- Assessment of knowledge management raises comprehension of quality from the effort for implementing KM is comparable with the intellectual capital that produced by KM itself.
- Assessment of knowledge management can help organization to detect the gap between organization knowledge and knowledge which is needed by the organization.

Implementation of knowledge management cannot be separated with KMS. After the KMS is implemented, its success or its effectiveness needs an assessment (Jennex & Olfman, 2004). Turban and Aronson (2001) stated that there are three reasons for assessing the success of KMS (Jennex & Olfman, 2004):

- To provide the background for assessing the knowledge management system in the company.
- To encourage the management to focus about important thing about KM.
- To justify the investment about implementing knowledge management.

2.5. Partial least square

There are two models on Partial Least Square (PLS), namely structural model and measurement model. The structural model indicates the relationship between latent variable, whereas measurement model indicates that the representation of the indicators to its latent variable. Each model has to be measured to achieve the objectives (Latan & Ghozali, 2008).

Table 1: The Measurement Model Evaluation *(Latan & Ghozali, 2008)*

| Validity Type	Parameter	Objective
Internal consistency reliability	Cronbach's alpha (CA) and composite reliability (CR)	Measure the relationship and the context between indicators and its latent variable. The value of CA and CR must be more than 0.700
Indicator reliability	Indicator loading	Measure the consistency of variables measured. Value of indicator loading must be more than 0.707.
Convergent validity	Average variance extracted (AVE)	Measure the level of amount of variance that a latent variable component captures from its indicator relative to the amount due to measurement error. Value of AVE must be more than 0.500.
Discriminant validity	Cross loading and AVE	Measure the uniqueness of indicators of latent variable which represents its latent variable rather than other latent variable. Value of cross loading must be greater than other latent variables.

Table 2: The Structural Model Evaluation (Latan & Ghozali, 2008)

Validity Type	Parameter	Objective
Coefficient of determination	Coefficient of determination (R^2)	Measure the explained variance of latent variable relative to its total variance. R^2 must be more than 0.333.
Path coefficient	Path coefficient (β and p value)	Measure the level of significance of relationship between latent variables. β must be more than 0.100 and p value must be less than 0.050.
Effect size	Effect size (f^2)	Measure the impact of latent variable to another latent variable. f^2 must be more than 0.350.
Predictive relevance	Predictive relevance (Q^2)	Measure the success of prediction. Q^2 must be more than zero.

2.6. Research model and hypothesis

There are four variables in this research model based on model which is developed by Becerra-Fernandez, Gonzalez, and Sabherwal (2004), namely knowledge sharing, effectiveness, efficiency, and innovation (Figure 2). This model is used to analyze the impact of knowledge management implementation on process aspects (effectiveness, efficiency, and innovation). This research focuses on the impact of knowledge sharing process. This research also includes some suggestions to improve knowledge sharing process in Bank Indonesia.

Figure 2: The Research Model and Hypotheses
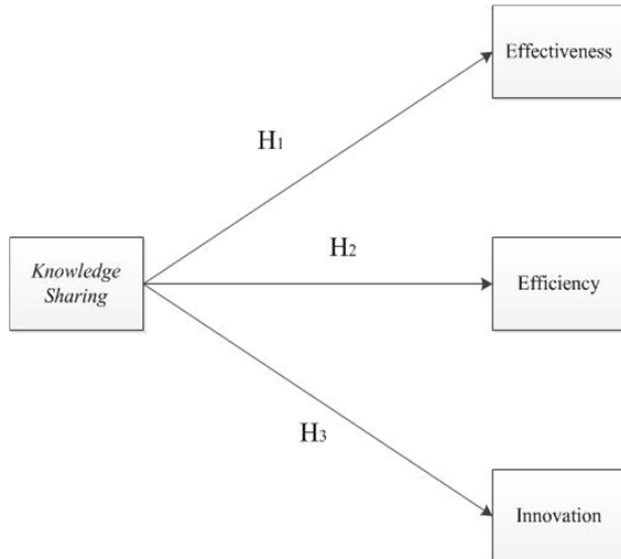
Hypothesis 1. There is an impact of knowledge sharing on effectiveness.
Hypothesis 2. There is an impact of knowledge sharing on efficiency.
Hypothesis 3. There is an impact of knowledge sharing on innovation.

3. METHODS

3.1. Research approach

This research uses two research approaches, namely quantitative and qualitative approach. Survey using questionnaire is done for the quantitative research, whereas interview and document study are done for the qualitative research. The quantitative research is needed as the basis of answering the hypothesis, and the qualitative research is needed as the basis for giving any suggestions about knowledge sharing to Bank Indonesia.

The questionnaire uses Likert scale between 1 to 5. The scale 1 expresses very disagree, scale 2 expresses disagree, scale 3 expresses doubt, scale 4 expresses agree, and scale 5 expresses very agree. The questionnaire consists of 17 questions and is filled by the system administrator of BLINK, The respondents are notified by email to fill in the questionnaire. The tool for filling the questionnaire is the BLINK (knowledge management system owned by Bank Indonesia as research object) because it is usually used by the department when doing a research. Data from survey is analyzed using partial least square (PLS) technique. The tool for analyzing the data is WarpPLS 3.0.

Two staffs from Information System Organizer Department are interviewed to gather the information about knowledge management in Bank Indonesia. The document written by Miranda Gultom (2008) which explains about the background and the initial implementation of knowledge management in Bank Indonesia and the documentation of knowledge management system features are used for supporting the research (Gultom, 2008).

3.2. Population and sample

The population of Bank Indonesia is about 6000 staffs. The samples for this research are the system administrators of the BLINK; about 200 staffs. The system administrators have role to manage the department page on the BLINK, and as the mediator to the other staffs to manage the documents on the BLINK. The system administrators also can do knowledge sharing like other staffs. The system administrator is chosen as the sample of this research because they frequently visit the BLINK rather than other staffs.

4. ANALYSIS

4.1. Demographic data of respondent

The total of the system administrators who received notification to fill in the questionnaire is about 200 staffs. Data is obtained from 51 respondents. There are two invalid data because not all questions were responded by the respondent. The total of data is just one fourth from the total respondents because when questionnaire was disseminated, Bank Indonesia was reorganizing the internal organization. Based on the duration of working in the organization, respondents are divided into four categories: 1-5 years (20 respondents), 6-10 years (18 respondents), 11-15 years (6 respondents), and more than 15 years (7 respondents).

Figure 3: Diagram of Respondent's Duration of Working in The Organization
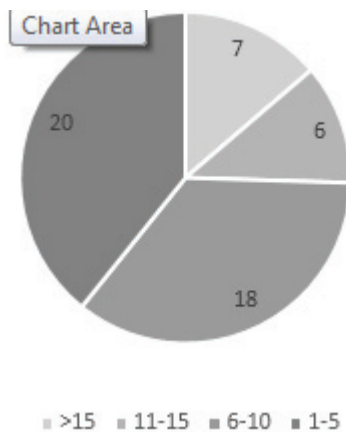
4.2. Measurement model evaluation

The path diagram based on the research model consists of four variables (Figure 4). Each of variables has some indicators. There are five indicators for knowledge sharing (KS), six indicators for effectiveness (EE), four indicators for efficiency (EI), and three indicators for innovation (I).

Figure 4: Path Diagram of the Research
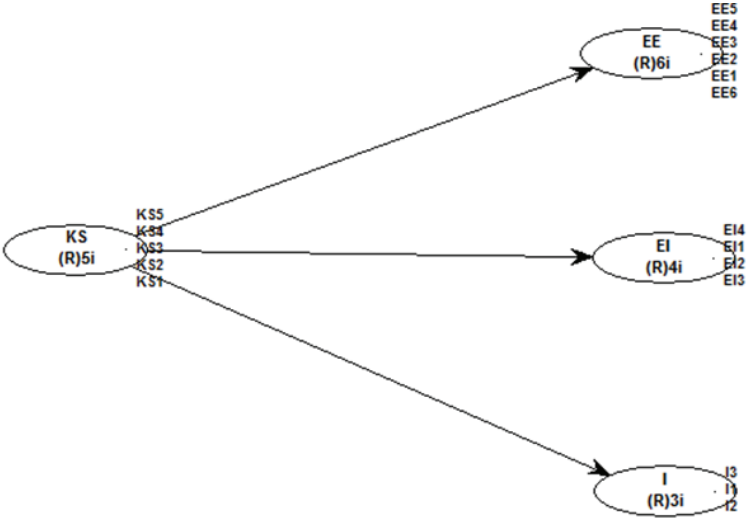
1) Internal Consistency Reliability

The minimum requisite of CR and CA is 0.700. The analysis shows that the range of CR is between 0.937 and 0.957; whereas the range of CA is between 0.910 and 0.946 that said they fulfilled the minimum requisite of internal consistency reliability (Table. 3).

Table 3: Value of Composite Reliability and Cronbach's Alpha

	KS	I	EI	EE
Composite reliability (CR)	0.947	0.944	0.937	0.957
Cronbach's alpha (CA)	0.929	0.911	0.910	0.946

2) Indicator Reliability

The minimum requisite of indicator loading is 0.707. Based on the result from WarpPLS 3.0, it refers that all of indicator fulfilled the minimum requisite of indicator loading that said there is no deleted indicator.

3) Convergent Validity

The minimum requisite of AVE is 0.500. The analysis result shows that that the range of AVE is 0.780-0.850, that said they fulfilled the minimum requisite of convergent validity (Table 4).

Table 4: Value of Average Variable Extraction

	KS	I	EI	EE
Average variable extraction (AVE)	0.780	0.850	0.789	0.786

4) Discriminant Validity

The value of square root of each latent variable is greater than the other latent variables, so they fulfilled the criteria of discriminant validity (Table 5)

**Table 5:** The Comparison Value of Square Root of Variable Latent

	KS	I	EI	EE
KS	(0,883)	0,810	0,724	0,707
I	0,810	(0,922)	0,760	0,806
EI	0,724	0,760	(0,888)	0,760
EE	0,707	0,806	0,760	(0,887)

4.3. Structural Model Evaluation

1) Coefficient of Determination

The minimum requisite of R^2 is 0.333. The analysis result shows that the range of R^2 is 0.50-0.68, so they fullfiled the minimum requisite of coefficient determination (Figure 5).

Figure 5: Result of Structural Model Evaluation
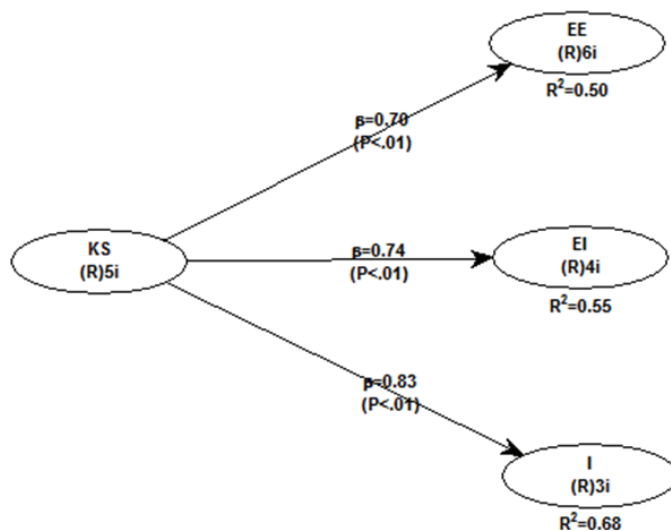
2) Path Coefficients

The minimum requisite of β is 0.100. The analysis result show the range of β is 0.70-0.83 and the maximum value of p is 0.050. All of paths in this research model have $p < 0.10$, which said they fulfilled the criteria of path coefficient (Fig. 5).

3) Effect Size

The minimum requisite of f^2 is 0.350, All of paths has fulfilled the minimum requisite of effect size, in range of 0.510-0.676 (Table. 6).

Table 6: Value of Effect Size

	KS	I	EI	EE
KS				
I	0.676			
EI	0.558			
EE	0.510			

4) Predictive Relevance

The minimum requisite of Q^2 is more than 0. The analysis result shows that the range of Q^2 is 0.514-0.675, which said they fulfilled the criteria of predictive relevance (Table 7).

Table 7: Value of Q-squared

	KS	I	EI	EE
Q-squared		0.675	0.561	0.514

4.4. Hypothesis testing

The hypothesis testing answered three hypotheses which were proposed in this research. Based on both the measurement model evaluation and the structural model evaluation, it shows that all of hypotheses are accepted.

Table 8: Hypothesis Testing

Hypothesis	Path	B	P	f^2	Result
H1	KS→EE	0.70	< 0.01	0.510	Accepted
H2	KS→EI	0.74	< 0.01	0.558	Accepted
H3	KS→I	0.83	< 0.01	0.676	Accepted

5. CONSLUSIONS

5.1. Discussion

All of hypotheses are accepted, so the BLINK can help system administrators to improve process aspects (effectiveness, efficiency, and innovation). It would be better if all or majority of the staffs frequently access the BLINK to get some benefits from the BLINK. There should be an internal policy for accessing and contributing content to BLINK for the staffs, so Bank Indonesia can get more benefit from the BLINK.

Based on the interview result and document study, there are five suggestions in order to improve knowledge sharing process in Bank Indonesia, namely IT infrastructure, trust, attitude, reward system, and support from top management. Bank Indonesia has more than one knowledge management systems, and they could cause duplication about features and functionalities. So, it could be better if there is integration between all knowledge management systems. By integrating the knowledge management systems, the employee can be easier and more comfortable accessing the knowledge.

Bank Indonesia has some forums which can be used to facilitate the staffs to share knowledge, habituate the employee to trust each other about knowledge sharing, and habituate employee's attitude to share their knowledge. The staffs will continue their discussion in online forums to discuss further, so the staffs who cannot attend the forum still can get the new knowledge.

There is no reward system in Bank Indonesia about knowledge management. There are key performance indicators (KPI) about the number of content which is posted by the department's admin in its own page in the BLINK. So if departments fulfill the KPI, they will get a reward from Bank Indonesia. It can encourage all departments to share their knowledge and store it in the BLINK.

In the early implementation of knowledge management, top management encourages staffs to share their knowledge. There are some forums which held by Transformation Program Special Unit, agent of change, development of knowledge management system, and policy about knowledge sharing. But, the changes of top management caused the implementation knowledge management decreased and there is no policy about knowledge sharing. The support from top management is very needed to encourage the staffs to share their knowledge and to contribute the content on knowledge management system and it can be achieved if there is a policy.

5.2. Research limitation

The number of respondents (51/200) is one of the limitations in this research. Should be more number of respondents are available; the result of research would be more reliable. The questionnaire is disseminated online. There is no direction about question in the questionnaire, so there might be a

possibility of bias on the questions. Interview was carried out only with two people due to time limitation, so there is no confirmation from other departments about implementation of knowledge management.

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