Does Knowledge Sharing Increase Innovation Capability? Answer from Indonesian Company

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Abstract--Nowadays, there are a lot of innovations being discussed, conducted in a seminar, written, and explained in a small to a large classroom and also a meeting room. Innovation is related with the essentials of surviving in the middle of industrial era 4.0. Innovation is unable to be separated with the personal knowledge, in which both of them need a good and continuous management. This research aimed to measure the tacit influence and explicit knowledge towards innovation capability as well as answering research questions regarding the impact of knowledge sharing to improve innovation capability in the manufacturing industry. Data collection is done through a simple random sampling technique given to 610 employees in packaging industries in Indonesia. The questionnaire results that were given back and were valid have a number of 393 samples. Data processing was used SEM method with SmartPLS 3.0 software. The result of this research concluded that explicit and tacit knowledge have positive impact towards innovation capability. This new research proposed a model for building innovation capability in packaging industries through tacit and explicit knowledge transfer. This research could pave the way to improve readiness index to packaging industries in facing the era of industrial revolution 4.0.

Keywords: Explicit knowledge, innovation capability, tacit knowledge

I. INTRODUCTION

The new challenges that affect the presence and the continuity of packaging industries nowadays are a dramatic change that came from the industrial revolution 4.0. This industrial revolution requires human resources that are capable, agile, adaptive and responsive towards fast changes. Business organizations also need an environment that positively and conductively grows in competing in global market. Therefore, it cannot be denied that packaging industries need a synergy between the human resource and work environment that would give continuous improvements in innovation and performance. The point is in this economic knowledge era, there will be a presence of a society of knowledge that needs innovation and flexibility as the energy to survive from competition. As a result, strategic development in a company in the future is being in the improvement of knowledge resource that pave the way of innovation and fast growth.

To make sure that business organizations can be competitive and adaptive, the employees need to be taught and involved in building organization's performance. As a result, organizations should be formed into organizational learning. Organizational learning is highly significant for a company's organization that is operating in an environment having unexpected changes. Therefore, speed of the response regarding the changes is formed as an absolute requirement for winning the competition with competitors.

Individual's and organization's knowledge can be formed as an intellectual capital that would quickly become a new icon that describes the economic value as a company's organization. This is the new paradigm of a new industry 4.0. The dependency towards the traditional productive asset, such as raw materials, land, and other tangible assets are no longer a form of main infestation charity in the future. Productive and continuous assets in the future are intangible assets in a form of knowledge. This research seeks to understand the influence of learning process and individual knowledge sharing (tacit and explicit knowledge) of the employees of packaging industries in Indonesia that is related with the improvement of their innovation capability.

A. Research Hypothesis

According to the formulation of problem, theoretical analysis, and conceptual framework of this research hypothesis is mentioned below:

H1: Explicit Knowledge is directly influencing the Innovative Capability

H2: Tacit Knowledge is directly influencing the Innovative Capability

Figure 1. Research Model

II. LITERATURE REVIEW AND HYPOTHESES

A. Tacit Knowledge

Knowledge can be classified as two types covering: tacit knowledge and explicit knowledge (Polanyi, 1966). Tacit knowledge can be defined as a knowledge that is present in the human mind and tend to be personal (Chen et al, 2018; Holford, 2018; Khoshorour & Gilaninia, 2018; Zebal, Ferdous & Chambers, 2019; Agyemang & Boateng, 2019; Perez-Fuillerat et al, 2018), it is hard to be formulated and is naturally divided (DeranEX, McLeod & Schmidt, 2017; Wang & Liu, 2019; Asher & Popper, 2019) so in the transformation, it needs personal interaction (Lee, 2019). This tacit knowledge is present and rooted in an action or even other people's experiences including idealism, values, as well as emotions (Boske & Osanloo, 2015; Kawamura, 2016; Hartley, 2018).

According to the definition, tacit knowledge can be categorized as personal knowledge or, in other words, a knowledge that is obtained from individuals. (Nonaka & Toyama, 2015; Munoz et al, 2015; Stewart et al, 2017; Razmerita et al, 2016; Jaleel & Verghis, 2015; Wang et al, 2016; Serna et al, 2017; Jou et al, 2016; Rothberg & Erickson, 2017). Experience obtained by every employee is surely different from each other based on the situations and conditions that are unable to be predicted. Tacit knowledge is not easy to be articulated and converted into explicit knowledge (Mohajan, 2016; Prasarnphanich et al, 2016; Addis, 2016; Cairo Battistutti, 2017; Zang et al, 2015; Spraggon & Bodolica, 2017). Nevertheless, tacit knowledge can be empowered by the knowledge spiralization process or SECI Model (Li, Liu & Zhou, 2018; Nonaka & Hirose, 2018; Chatterjee et

al, 2018; Sasaki, 2017; Lievre & Tang, 2015; Stanica & Peydro, 2016; Norwich et al, 2016; Hodgins & Dadich, 2017; Balde et al, 2018; Okuyama, 2017; Huang et al, 2016).

Every organization should utilize tacit knowledge of the employees by pushing them to share knowledge and keep learning. Companies like this could be more creative and innovation in being a leader in this industrial era 4.0. Organization could facilitate the process and use of tacit knowledge that are present outside the consciousness that is placed in the bottom of the mind by the approach of embedding and sharing (Ma et al, 2018; Ferreira et al, 2018; Borges et al, 2019; Ferraris et al, 2018; Guo et al, 2018; Tsai & Hsu, 2019; SwierczEX, 2019; Cantwell & Zaman, 2018).

B. Explicit Knowledge

Explicit knowledge is one of the types of knowledge that is easy to be documented and formed (Choi & Lee, 2003; Sousa & Rocha, 2019; Borrego et al, 2019; Wokcik et al, 2019; Cifariello, Ferragina & Ponza, 2019; Che et al, 2018; Tang et al, 2016; Bashir & Farooq, 2019; Attia & Salama, 2018), easy to be articulated (Haamann & Basten, 2018) and is usually a form of knowledge that sticks in the organization (Afsar, Masood & Umrani, 2019). On the other side, explicit knowledge could be created, written, and transferred in between the organization's unit (Lombardi, 2019). Transfer of explicit knowledge in between employees is easier to be pushed by the mechanism and organization's culture that is conducive.

C. Innovation Capability

In this industrial era 4.0, innovation capability is needed as the organizational competitive advantage (Malik, 2019; Muscio & Ciffolili, 2019; Durana et al, 2019; Lund & Karlsen, 2019; Haseeb et al, 2019; Jakhar et al, 2018; Hamada, 2019), competitive strategy (Culot, Orzes & Sartor, 2019), the key to face the industrial era 4.0 (Stachova et al, 2019), the part of management quality in the 21st century (GunasEXaran, Sabramanian & Ngai, 2019), provide many benefits to the business (Zambon et al, 2019; Parida, Sjodin & Reim, 2019). Innovation capability is recognized as one of the most significant internal resource that could result to company's performance that excels (Zouaghi et al, 2018; Santoro et al, 2017; Castela et al, 2018; Ruiz-Torres et al, 2018; Huesig & Endres, 2019).

D. The Impact of Tacit and Explicit Knowledge towards Innovation Capability

In this industrial era 4.0, it is marked by the tight competition, continuity stayed as a form of attention and significant problem. Innovation Capability can be formed as a pusher of business continuity. This performance is dependent by the culture of knowledge that is embedded in an organization. Knowledge includes tacit and explicit knowledge. There are a lot of researchers discussing innovation capability, which can be concluded that innovation is influenced by leadership (Samsir, 2018; Schuckert et al, 2018; Villaluz & Hechanova, 2019), employee involvement climate (Naqshbandi, Tabche & Choudhary, 2019) *knowledge sharing* (Kim & Shim, 2018) *knowledge search* (Wang, Chen & Chang, 2019) collaborative culture (Yang, Nguyen & Le, 2018) *knowledge process* (Imran et al, 2018). This research aims to examine the influence of tacit and explicit knowledge towards innovation capability in packaging industry in order to welcome the industrial revolution 4.0. Previous researchers found prove regarding the positive and significant impact of tacit and explicit knowledge towards innovation capability (Ganguly et al, 2019; Aulawi, 2018; Rumanti et al, 2018 & 2019; Torres & Liang, 2016; Li et al, 2019). To be more specific, there are many researchers concluded that tacit knowledge positively and significantly impacts the innovation capability (Perez-Luno et al, 2018).

III. METHODS

A. Definition of Operational Variable and Indicator

Method that was used in this research is census survey method together with correlational research approach. Data collection is done by spreading questionnaire to every permanent employee in a particular company. Instrument that was used to measure the explicit knowledge sharing adapted by Liebowitz & Chen (2001) dan Wang & Wang (2012) using 6 items (EX1-EX6). Instrument that was used to measure the tacit

knowledge is adapted by Holste & Fields (2010), Lin (2006), and Wang & Wang (2012) using 6 items (TC1-TC6). Innovation capability is measured by using 5 items (IC1-IC5) that is adapted by Lee & Choi (2003). Questionnaire is closely designed except for questions/statements regarding respondent's identity, which is in a form of semi-opened questionnaire. Every items of closed questions/statements were given five answer options, which are strongly agree (SA) 5 points, agree (A) 4 points, neutral (N) 3 points, disagree (DA) 2 points, strongly disagree (SDA) 1 point. Method used in data preparation was by using PLS as well as software SmartPLS version 3.0 as the tool.

B. Population and Sample

Population in this research is the employee from one of the packaging industry in Indonesia, which has around 610 people. Questionnaire was spread by simple random sampling technique. Questionnaire results that were returned validly was 393 samples.

IV. RESULTS AND DISCUSSION

A. Sample Description

Table 1. Descriptive Sample Information

	Criteria	Total	%
Age	< 30 years old	88	22.4%
	30 - 40 years old	166	42.2%
	> 40 years old	139	35.4%
Years of Service	< 5 years	41	10.4%
	5-10 years	232	59.1%
	> 10 years	120	30.5%
Last Education	Bachelor	41	10.4%
	Senior High/ College	301	76.6%
	≤ Junior High	51	13.0%

B. Validity Test Result and Research Reliability Indicator

Stages on testing model of measuring involve convergent validity test, discriminant validity, and composite reliability. PLS analysis result could be used to test for research hypothesis if all indicators in PLS model has meet the requirements of convergent validity, discriminant validity and reliability test.

C. Convergent Validity Testing

Convergent validity test is done by seeing the value of loading factor of each indicators towards the construct. In most reference, with factor weighing from at least 0.5 is considered having validity that is strong enough to explain the latent construct (Chin, 1998; Ghazali, 2014; Hair et al., 2010). In this research, minimum limit of loading factor that is accepted is 0.5, with the condition of AVE score for every construct, which is > 0.5 (Ghazali, 2014).

Figure 2. Validity Model Estimation

According to the result above, IC4 should be taken out since the score is below 0.5 and impacted the AVE to be below 0.5 as well. After IC4 is taken out, every indicator left has loading factor values and AVE above 0.5, so the model has fully met the requirements of convergent validity. Therefore, other than seeing each of the indicator's loading factor value, convergent validity also being assessed from the AVE score in every construct. PLS Model is stated as fully meeting the convergent validity if the AVE score in every construct is >0.5 (Ghozali, 2014). AVE score in every construct is shown in the table below:

Table 2. Items Loadings, Composite Reliability, and Average Variance Extracted (AVE)

Variables	Items	Loadings	Cronbach's Alpha	Composite Reliability	AVE
<i>Tacit Knowledge (TACIT)</i>	TC1	0.745	0.819	0.869	0.525
	TC2	0.716			
	TC3	0.723			
	TC4	0.704			
	TC5	0.716			
	TC6	0.744			
<i>Explicit Knowledge (EXPLICIT)</i>	EX1	0.726	0.832	0.877	0.543
	EX2	0.750			
	EX3	0.741			
	EX4	0.699			
	EX5	0.747			
	EX6	0.758			
<i>Innovation capability (INNOVATION)</i>	IC1	0.768	0.727	0.869	0.525
	IC2	0.756			
	IC3	0.719			
	IC5	0.723			

D. Discriminant Validity Test

Discriminant validity is done to ensure that every concept of each latent variables are in contrast with the other latent variables. A model has a good discriminant validity if the quadratic value of AVE in each exogeneous construct (value on the diagonal) exceeds the correlation between the construct with the other construct (value below diagonal) (Ghozali, 2014). Result of discriminant validity research is done by the quadratic value of AVE, which means by seeing the Fornell-Larcker Criterion Value that is obtained the same way as shown below:

Tabel 3. Discriminant Validity

VARIABLES	EXPLICIT	INNOVATION	TACIT
EXPLICIT	0.737		
INNOVATION	0.526	0.742	
TACIT	0.467	0.453	0.725

Discriminant validity test result shown in the Table 3 above indicates the whole construct having square root value of AVE above correlation value with the other latent construct (through Fornell-Larcker Criterion), so it can be concluded that a model has meet a discriminant validity.

E. Construct Reliability Test

Construct reliability can be assessed from the value of Cronbach's alpha and composite reliability from each construct. Value of composite reliability and Cronbach's alpha is suggested to be more than 0.7 (Ghozali, 2014). Reliability test result in the Table 2 above shows that all construct has composite reliability value and Cronbach's alpha value higher than 0.7 (> 0.7). In conclusion, all construct has met the reliability that is required.

F. Hypothesis Examination

Hypothesis test in PLS is also denoted as inner model test. This test covers significance test that has a direct and indirect impact as well as how large is the measurement of the exogenous variable impact towards the endogenous variable. To discover the effect of tacit and explicit knowledge sharing towards organizational learning and innovation capability, it needs a direct impact test. Direct impact test is done by using T-Statistic test in an analysis model called Partial Least Squared (PLS) with the help of SmartPLS 3.0 software. With the bootstrapping technique, R square value and significance test value can be obtained as shown in the table below:

Table 4. R Square Value

	R Square	R Square Adjusted
INNOVATION	0.331	0.328

Table 5. Hypotheses Testing

Hypotheses	Relationship	Beta	SE	T Statistics	P-Values	Decision
H1	EXPLICIT -> INNOVATION	0.401	0.047	8.566	0.000	Supported
H2	TACIT -> INNOVATION	0.266	0.057	4.655	0.000	Supported

According to the Table 4 above, R Square value for INNOVATION is 0.331, which means that the innovation capability (IC) variable may be explained by the tacit knowledge (TC) variable and explicit knowledge (EX) that have a percentage of 33.1%, while the rest 66.9% is explained by other variable that is not discussed in this research. Meanwhile, Table 5 showed T-statistics and P-Values which indicate the effect of the variables mentioned above.

G. Discussion

According to the research results, it can be concluded that explicit knowledge and tacit knowledge give positive and significant impact towards innovation capability. This means that the more positive the explicit and tacit knowledge done by the employees, the more conducive the individual innovation capability of the employees in the company. This research is parallel with the previous research done by Perez-Luno et al (2018), Terhorst et al (2018), Boadu et al (2018), Che et al (2019), as well as the conclusion made by Qi & Chau (2018). This matter hinted that the rarest and the most valuable resource in the digital era is no longer an ordinary labor and mediocre, but an individual that is able to create an idea and new innovation (Xu, David & Kim, 2018). With this reason, the scarcity of labor that has adequate and skilled tacit and explicit knowledge could immobilize innovation power, competitiveness, growth and flexibility of the company. There is no doubt that, in the future, talent and response of the individual in the process of knowledge sharing will represent the most important factor in a production. People with ideas and innovations will be the most valuable 'item' as the capital of competition. This research also concluded that a company could manage a past experience to be combined with tacit and explicit knowledge had by the employees nowadays. The point is that knowledge creation and knowledge management is related with this industrial performance era 4.0.

V. CONCLUSIONS AND SUGGESTIONS

A. Conclusions

By adding the role of tacit knowledge as a predictor of innovation capability, an organization should give onotomy and the spaciousness to share to every of the employees. Therefore, organization needs to create an organization's environment as positive environment that spur competency and engagement of the employees in the company. In fact, knowledge management will flow effectively in the company if the individual performance of the employees is proper (Manaf et al, 2017).

Every researcher keeps learning about the knowledge as an important organization's resource and can be mentioned as knowledge transfer, both tacit or explicit knowledge could improve the organization's performance significantly (Thomas, 2019). Organizational learning changes the individual's knowledge to organization's knowledge. This research concluded that organizational learning has a role as a catalyst of the knowledge sharing process between the packaging employees.

B. Managerial Implications

Based on the conclusion of this research, the company's management of packaging industry needs to build a maximum involvement of every employee to do knowledge sharing, which can be in a form of either tacit or explicit knowledge. SECI Model can be used to carry out this process. Employee's practices in every division of organization is referred as an essential with the level of intensity, content, and context that are corresponded with the key performance indicator of each employees.

The process of sharing knowledge to build innovation capability of a company is unlimited in the process of internal organization. However, management should widen the process of building this innovation through absorbing, articulating, utilizing and managing the knowledge that is sourced from external partners, such as customer, contractor, supplier, university and educational institution, as well as industrial society in a large scale. Management could activate *learning from others* when giving an employee a task to visit a supplier, customer, university, or even other strategic partners. This is because of the external knowledge, such as the one originated from the supplier, client, contractor, and consultant that are supporting the power of innovation capability of a company (Simao & Franco, 2018).

C. Limitation

This research has a number of limitations. Firstly, this research analyzed about the influence of tacit and explicit knowledge towards innovation capability, there are may be a few of other variables influencing innovation capability, such as leadership, organizational environment, employee's commitment, etc. The author highly recommends to search, explore, and analyze. Secondly, this research is done in packaging industry and may be unable to be generalized to other industries. Therefore, it is recommended to do a further research regarding this topic in other industries.

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