Exploring the Impact of Knowledge Sharing and Organizational Culture on Teacher Innovation Capability

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Abstract -- This research aims to measure the effect of tacit and explicit knowledge on teacher innovation capability in Indonesia mediated by organizational culture. Data collection was carried out by simple random sampling to 1080 population of teachers in Kecamatan Panongan Tangerang Indonesia. The returned and valid questionnaire results were 453 samples. Data processing was using SEM method with Smart PLS 3.0 software. The results of this research are tacit knowledge sharing has a positive and significant effect on teacher innovation capability, both directly and through mediating organizational culture. While explicit knowledge sharing only has a positive and significant effect on teacher innovation capability through organizational culture mediation. This novel research is proposing a model to build teacher innovation capability among teachers through tacit & explicit knowledge sharing with organizational culture as mediation. This research can pave the way to improve teacher readiness in facing the education 4.0. era.

Keywords -- Explicit knowledge, knowledge sharing, teacher innovation capability, organizational culture, tacit knowledge

I. INTRODUCTION

A new challenge that is currently affecting education is a dramatic change that has come from industrial revolution 4.0. This industrial revolution requires more qualified, agile, adaptive and responsive human resources to rapid change. The world of education is facing rapid economic, social, political and technological change. Therefore, schools must be flexible to be able to adapt to changing situations and contexts. Schools and other educational institutions need an environment that continues to grow positively and conductively in global human resource competition (Asbari, 2015, 2018; Asbari, Chi Hyun, Wijayanti, Imelda, & Purwanto, 2020; Asbari, Hyun, Wijayanti, Winanti, Fayzhall, et al., 2020; Sopa et al., 2020). Therefore, it cannot be denied that schools need a synergy between teachers and the work environment that is able to make continuous improvements in innovation and performance. The point is that in this era of knowledge economy emerging knowledge societies which need innovation and flexibility as energy to survive the competition. Therefore, the strategic development of educational institutions in the future is to increase knowledge resources, especially teachers, which open space for innovation and growth (Asbari, Fayzhall, Goestjahjanti, et al., 2020; Fayzhall et al., 2020; Goestjahjanti et al., 2020).

To ensure that educational institutions, especially schools can be competitive and adaptive, teachers need to be directed and involved in increasing school performance. Teachers must be empowered and empowering. As a result, schools must manifest into a true organizational culture. Organizational culture that empowers teachers is one of the main elements of school transformation as well as teachers as instruments of civilization. The shape of the school as an organizational culture is very important for educational institutions that operate in environments with rapid and unexpected changes. So that, the speed of response to change, becomes an absolute requirement to create human resources, students who are competitive and win global HR competition.

The knowledge of individual teachers and schools becomes intellectual capital which quickly becomes a new icon that illustrates the economic value of a school. This is the new paradigm adapted from industrial revolution 4.0. Dependence on traditional productive assets such as buildings, land and other

tangible assets is no longer a major investment contribution in the future. Productive and sustainable assets in the future are intangible assets in the form of knowledge inherent in the teacher. This research seeks to understand the effect of the learning and knowledge sharing (tacit and explicit knowledge) of teachers in Indonesia that are associated with increasing the teacher innovation capability.

A. Research Hypothesis

Based on the problem formulation, theoretical research, and conceptual framework of the research hypothesis as follows:

H1: *Explicit knowledge sharing* direct effect on *teacher innovation capability*

H2: *Tacit knowledge sharing* direct effect on *teacher innovation capability*

H3: *Explicit knowledge sharing* direct effect on *organizational culture*

H4: *Tacit knowledge sharing* direct effect on *organizational culture*

H5: *Organizational culture* direct effect on *teacher innovation capability*

H6: *Explicit knowledge sharing* indirect effect on *teacher innovation capability* through mediation *organizational culture*

H7: *Tacit knowledge sharing* indirect effect on *teacher innovation capability* through mediation *organizational culture*

Figure 1. Research Model

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A. Tacit knowledge

Knowledge is classified into two types including tacit knowledge and explicit knowledge (Polanyi, 1966). The definition of tacit knowledge is knowledge that is still in the minds of humans and is very personal (Chen et al, 2018; Holford, 2018; Khoshorour & Gilaninia, 2018; Zebal, Ferdous & Chambers, 2019; Agyemang & Boateng, 2019; Perez-Fuillat et al, 2018), it is difficult to be formulated and divided naturally (Deranek, McLeod & Schmidt, 2017; Wang & Liu, 2019; Asher & Popper, 2019) so that the transformation requires personal interaction (Lee, 2019). This tactical knowledge is rooted in one's actions and experiences, including his ideals, values, and emotions (Boske & Osanloo, 2015; Kawamura, 2016; Hartley, 2018).

Based on this definition, tacit knowledge is categorized as personal knowledge or in other words knowledge is obtained from individuals or personal (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). The experience gained by each teacher is certainly different based on situations and conditions that cannot be predicted. Tacit knowledge is not easily articulated and converted to explicit knowledge (Mohajan, 2016; Prasarnphanich et al, 2016; Addis, 2016; Cairo Battistutti, 2017; Zang et al, 2015; Spraggon & Bodolica, 2017). However, tacit knowledge can be empowered by the process of knowledge spiral 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 school education institution must utilize its teacher's tacit knowledge by encouraging them to share knowledge and keep learning. School educational institutions like this will become more creative, innovative and lead in the education 4.0. era. Schools can facilitate the management and use of tacit knowledge that is outside the awareness of the subconscious mind of each teacher with an embedding and sharing approach (Ma et al, 2018; Ferreira et al, 2018; Borges et al, 2019; Ferraris et al, 2018; Guo et al, 2018; Tsai & Hsu, 2019; Swierczek, 2019; Cantwell & Zaman, 2018).

B. Explicit knowledge

Explicit knowledge is one type of knowledge that is easily 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), easily articulated (Haamann & Basten, 2018) and usually constitute knowledge inherent in schools (Afsar, Masood & Umrani, 2019). In addition, explicit knowledge can be created, written and transferred between school activity units (Lombardi, 2019). The explicit transfer of knowledge among teachers is more easily driven by conducive mechanisms and school culture.

C. Organizational culture

A good organizational culture will be more resilient to crises (Starbuck, 2017). Dimensions such as desire, discipline, decision making, and alignment are presented as important elements of organizational learning (Wetzel & Tint, 2019; Urban & Gaffurini, 2018). Organizational culture is also an important performance indicator for evaluating overall organizational performance (Qi & Chau, 2018) that is able to help build the necessary knowledge resources and maintain school growth and continuity. The ability to access knowledge is a distinguishing factor between one school and another. The success of the strategy of school education institutions is very significant related to the solid knowledge base owned by every school educational institution (Asbary, 2019; Asbary, Purwanto, Maesaroh, Hutagalung, Mustikasiwi, et al., 2020; Asbary, Purwanto, & Budi, 2020 ; Basuki et al., 2020; Bernarto et al., 2020; Fayzhall et al., 2020; Fikri et al., 2020; Goestjahjanti et al., 2020; Kusumaningsih et al., 2020; Nugroho et al., 2020; Prameswari et al., 2020; Pramono et al., 2020; Purba et al., 2020; Purwanto; et al., 2019; Purwanto, Asbary, et al., 2020; Purwanto, Bernarto, et al., 2020; Purwanto, Pramono, et al., 2020; Sutardi et al., 2020; Waruwu et al., 2020; Yanthy et al., 2020).

D. Teacher Innovation Capability

4.0. Industrial era currently requires teacher innovation capability as a competitive advantage in schools (Malik, 2019; Muscio & Ciffolili, 2019; Durana et al, 2019; Lund & Karlsen, 2019; Haseeb et al, 2019; Jakhar et al, 2018; Hamada, 2019; 2019), competitive strategy (Culot, Orzes & Sartor, 2019), the key to face 4.0. industry era (Stachova et al, 2019) part of the quality of 21st century management (Gunasekaran, Sabramanian & Ngai, 2019), has many advantages business (Zambon et al., 2019; Parida, Sjodin & Reim, 2019). Innovation capability is recognized as one of the most important internal resources that can produce superior school educational institution performance (Zouaghi et al, 2018; Santoro et al, 2017; Castela et al, 2018; Ruiz-Torres et al, 2018; Huesig & Endres , 2019). Innovation is an important aspect of quality education (Klaeijssen, Vermeulen, & Martens, 2017) and (Asbary et al., 2019; Asbary, Wijayanti, Hyun, Purwanto, & Santoso, 2020; Asbary, Wijayanti, Hyun, Purwanto, Santoso, Santoso, et al., 2020; Basuki et al., 2020; Putra et al., 2020).

E. Effect of Tacit and Explicit Knowledge towards Teacher Innovation Capability

In the industrial 4.0. era which marked by increasingly fierce competition, sustainability remains an important concern and issue. Teacher innovation capability is driving business sustainability. This performance

depends on the culture of knowledge contained in the organization. Knowledge is consisting of tacit and explicit knowledge. Many researchers discuss teacher innovation capability which concludes that innovation is effected 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) and knowledge process (Imran et al, 2018). This research, would like to examine the effect of tacit and explicit knowledge on teacher innovation capability of teachers in school education institutions in the context of welcoming industrial revolution 4.0. Previous researchers have proven the positive and significant effect of tacit and explicit knowledge on teacher innovation capability (Ganguly et al, 2019; Aulawi, 2018; Rumanti et al, 2018 & 2019; Torres & Liang, 2016; Li et al, 2019). More specifically, many researchers conclude that tacit knowledge has a positive and significant effect on teacher innovation capability (Perez-Luno et al, 2018). All of them is within the scope of business organizations. However, there are researchers who say that formal & informal learning affect teacher innovation capability of teachers in schools (Lecat, Beusaert, & Raemdonck, 2018).

F. Effect of Tacit and Explicit Knowledge towards Organizational Culture

Learning organization becomes one of the strategies for organizations to study the dynamics of their business environment (Senge, 1990; Zhu et al., 2018; Kasim et al., 2018; Darwish et al., 2018). Schools with managed learning routines will produce a collection of knowledgeable individuals, both explicit knowledge and tacit knowledge (Hussain et al, 2018). Some researchers conclude that organizational culture is effected by collaborative culture and knowledge sharing (Nugroho, 2018). Tacit knowledge was found to be a very significant predictor for the development of organizational culture (Muthuveloo, Shanmugam & Teoh, 2017).

G. Effect of Organizational Culture towards Teacher Innovation Capability

Knowledge creation which is conditioned by organizational culture will trigger and spur teacher innovation capability and organizational performance (Asbari, Purwanto & Santoso, 2019; Vijande & Sanchez, 2017; Lin & Lee, 2017). School innovation will be sustainable when it is based on a culture of learning that adds value. This learning culture that makes all teachers interact with each other so that their current knowledge and new knowledge acquired can be effectively transferred, exchanged and combined into school intelligence and knowledge (Lin & Lee, 2017; Lee et al, 2016; Chang & Lin, 2015). An organizational environment that provides excitement at work is an important factor in creating teacher innovation capability of organizational members (Bani-Melhem, Zeffane & Albaity, 2018).

III. METHODS

A. Definition of Variable and Indicator Operational

The method used in this research is quantitative method. Data was collected by distributing questionnaires to all teachers of school education institutions. The instrument used to measure explicit knowledge sharing was adapted from Liebowitz & Chen (2001) and Wang & Wang (2012). Tacit knowledge sharing was adapted from Holste & Fields (2010), Lin (2006), and Wang & Wang (2012). Organizational culture is measured from instruments adapted from Jiménez-Jiménez and Sanz-Valle (2011). Teacher innovation capability was adapted from Lee & Choi (2003). The questionnaire was made in closed designed, except for questions / statements about the identity of respondents in the form of a semi-open questionnaire. Each closed question / statement item is given five answer options, namely: strongly agree (SS) score 5, agree (S) score 4, neutral (N) score 3, disagree (TS) score 2, and strongly disagree (STS) score 1. The method for processing data is by PLS and using SmartPLS software version 3.0. as a tool.

B. Population and Sample

The population in this research was school teachers in Panongan District, Tangerang Indonesia, which numbered 1080 people (Ministry of Education and Culture, 2020). The questionnaire was distributed by simple random sampling technique. The returned and valid questionnaire results were 453 samples (41.95 percent of population).

IV. RESULTS AND DISCUSSION

A. Sample Description

TABLE I
INFORMATION OF DESCRIPTIVE SAMPLE

Criteria		Amount	%
Age (by October 2019)	< 30 years	92	20.31%
	30 - 40 years	238	52.54%
	> 40 years	123	27.15%
Teacher Status	Public (ASN)	171	37.75%
	Private (Swasta)	282	62.25%
Work service as teacher	< 5 years	132	29.14%
	5-10 years	311	68.65%
	> 10 years	10	2.21%
Highest educational certificate	< S1	31	6.84%
	≥ S1	422	93.16%

B. Test Results on Validity and Reliability of Research Indicators

The testing phase of the measurement model includes convergent validity, discriminant validity and composite reliability testing. The results of the PLS analysis can be used to test the research hypothesis if all the indicators in the PLS model have met the requirements of convergent validity, discriminant validity and reliability testing.

1. Convergent Validity Testing

Convergent validity test is done by looking at the loading factor value of each indicator to the construct. For most references, a factor weight of 0.5 or more is considered to have validation that is strong enough to explain latent constructs (Chin, 1998; Hair et al, 2010; Ghozali, 2014). In this research the minimum limit on the size of the loading factor received was 0.5, with the requirement that the AVE value of each construct > 0.5 (Ghozali, 2014).

Figure 2. Valid Model Estimation

Based on the estimation results of the PLS model in the Figure 2, all indicators already have a loading factor value above 0.5 so that the model meets the convergent validity requirements. Apart from looking at the loading factor value of each indicator, convergent validity is also assessed from the AVE value of each construct. AVE value for each contract of this research is above 0.5. So the convergent validity of this research model meets the requirements. The value of loadings, cronbach's alpha, composite reliability and AVE of each construct can be seen in Table 2 below:

TABLE II
ITEMS LOADINGS, CRONBACH'S ALPHA, COMPOSITE RELIABILITY, AND AVERAGE VARIANCE EXTRACTED (AVE)

Variables	Items	Loadings	Cronbach's Alpha	Composite Reliability	AVE
<i>Tacit Knowledge Sharing (TKS)</i>	TKS1	0.721	0.842	0.882	0.556
	TKS2	0.731			
	TKS3	0.726			
	TKS4	0.722			
	TKS5	0.782			
	TKS6	0.790			
<i>Explicit Knowledge Sharing (EKS)</i>	EKS1	0.655	0.794	0.859	0.550
	EKS2	0.763			
	EKS3	0.712			
	EKS4	0.802			
	EKS5	0.765			
<i>Organizational Culture (OC)</i>	OC1	0.694	0.785	0.854	0.539
	OC2	0.703			
	OC3	0.796			
	OC4	0.736			
	OC5	0.738			
<i>Teacher Innovation Capability (TIC)</i>	TIC1	0.697	0.846	0.891	0.621
	TIC2	0.759			
	TIC3	0.835			
	TIC4	0.820			
	TIC5	0.821			

2. Discriminant Validity Testing

Discriminant validity is carried out to ensure that each concept of each latent variable is different from the other latent variables. The model has good discriminant validity if the square of AVE values of each exogenous construct (the value on the diagonal) exceeds the correlation between the construct and the other construct (values below the diagonal) (Ghozali, 2014). The results of discriminant validity testing using the AVE squared value by looking at the Fornell-Larcker Criterion Value obtained as follows:

TABLE III
DISCRIMINANT VALIDITY

VARIABLES	EKS	OC	TIC	TKS
EKS	0.741			
OC	0.646	0.734		
TIC	0.363	0.515	0.788	
TKS	0.512	0.501	0.471	0.746

The results of the discriminant validity test in Table. 3 above show that all constructs have AVE square root values above the correlation value with other latent constructs (through the Fornell-Larcker criteria) so that it can be concluded that the model meets the discriminant validity.

3. Construct Reliability Testing

Construct reliability can be assessed from the value of Cronbach's alpha and composite reliability of each construct. The recommended composite reliability and Cronbach's alpha values are more than 0.7. (Ghozali, 2014). The reliability test results in table 2 above show that all constructs have composite reliability and Cronbach's alpha values greater than 0.7 (> 0.7). In conclusion, all constructs have met the required reliability.

C. Hypothesis Testing

Hypothesis testing in PLS is also called the inner model test. This test includes a test of the significance of direct and indirect effects and measurement of the magnitude of the effect of exogenous variables on endogenous variables. To find out the effect of tacit and explicit knowledge sharing on organizational culture and teacher innovation capability, a direct effect test is needed. The direct effect test is performed using the t-statistic test in the partial least squared (PLS) analysis model using the help of 3.0 Smart PLS software. With the booth strapping technique, R Square values and significance test values are obtained as the table below:

TABLE IV
R SQUARE VALUE

	R Square	R Square Adjusted
OC	0.457	0.455
TIC	0.327	0.323

TABEL V
HYPOTHESES TESTING

Hypotheses	Relationship	Beta	SE	T Statistics	V-Values	Decision
H1	EKS -> TIC	-0.043	0.054	0.810	0.418	Not Supported
H2	TKS -> TIC	0.296	0.049	6.026	0.000	Supported
H3	EKS -> OC	0.528	0.035	15.113	0.000	Supported
H4	TKS -> OC	0.231	0.037	6.278	0.000	Supported
H5	OC -> TIC	0.394	0.047	8.403	0.000	Supported
H6	EKS -> OC -> TIC	0.208	0.030	7.033	0.000	Supported
H7	TKS -> OC -> TIC	0.091	0.018	5.057	0.000	Supported

Based on Table 4 above, the R Square OC value is 0.457 which means that organizational culture (OC) variables can be explained by tacit knowledge sharing (TKS) and explicit knowledge sharing (EKS) variables by 45.7%, while the remaining 54.3% is explained by others variables that are not discussed in this research. Meanwhile, the value of R Square teacher innovation capability (TIC) is 0.327 which means that the teacher innovation capability variable is able to explain the tacit knowledge sharing variable, explicit knowledge sharing and organizational culture by 32.7%, while the remaining 67.3% is explained by other variables not discussed in this research. While Table 5 displays the T Statistics and P-Values which show the effect between the research variables that have been mentioned.

D. Discussion

Based on the results of the research, it can be concluded that tacit knowledge sharing has a positive and significant effect on teacher innovation capability, both directly and through organizational culture mediation. This means that the more positive the tacit knowledge sharing is carried out by the teacher, the more conducive the teacher innovation capability of individual teacher of school education institutions will be. This finding is in line with previous research on business organizations, namely Perez-Luno et al (2018), Terhorst et al (2018), Boadu et al (2018), Che et al (2019). In contrast to the above, explicit knowledge sharing does not significantly effect teacher innovation capability, except through mediating organizational culture. That is, organizational culture becomes a full mediation between explicit knowledge sharing and teacher innovation capability.

The results of this research also concluded that tacit and explicit knowledge sharing had a positive and significant effect on organizational culture. This means that the better the tacit and explicit knowledge sharing of a teacher, the more positive the formation and development of organizational culture in school education institutions. This is in line with the conclusions of Qi & Chau (2018) research on business organizations. This implies that the rarest and most valuable resources in the digital age are not ordinary teachers and mediocre, but teachers who can create new ideas and innovations (Xu, David & Kim, 2018). Teachers are who play a key role in

producing and reusing their knowledge and intellectual property through education and teaching (Al-Kurdi, El-Haddadeh & Eldabi, 2018). For this reason, the scarcity of teachers who have adequate and skilled tacit and explicit knowledge can stifle the power of innovation, competitiveness, growth and flexibility of school education institutions. No doubt, in the future, the talents and responses of school teachers in the process of knowledge sharing will represent an important factor for the nation's future education. School teachers with ideas and innovations will become capital luxury goods and instruments of civilization.

Based on the findings of this research also concluded that organizational culture has a positive and significant effect on teacher innovation capability. Organizational culture also mediates the effect of tacit and explicit knowledge on teacher innovation capability. This is consistent with the conclusion of Martinez-Costa (2018). The research also concluded that school education institutions could manage past experiences to be combined with tacit and explicit knowledge possessed by teachers today. In essence, organizational culture is able to provide positive conditions in the process of knowledge creation. While, knowledge creation and knowledge management are closely related to school performance in the current 4.0 education era.

V. CONCLUSIONS AND SUGGESTIONS

A. Conclusions

The results of this research are tacit knowledge sharing has a positive and significant effect on teacher innovation capability, both directly and through mediating organizational culture. While explicit knowledge sharing only has a positive and significant effect on teacher innovation capability through organizational culture mediation. To add the role of tacit and explicit knowledge sharing as a predictor of teacher innovation capability, schools need to provide autonomy and breadth to share knowledge with teachers. Therefore, schools need to create organizational culture as positive environment that drives the competence and engagement of individual teachers in school education institutions. Indeed knowledge management will run effectively in school education institutions if the individual performance of each teacher is in good condition (Manaf et al, 2017).

Researchers continue to learn about knowledge as an important school resource. It can be said that knowledge sharing, both tacit and explicit knowledge, can significantly improve school performance. Organizational culture transforms individual knowledge into school knowledge. This study concludes that organizational culture acts as a catalyst of the process of knowledge sharing among teachers in schools. This knowledge sharing culture has become crucial in the midst of the development of today's knowledge society. Because in fact, the teacher who carries the obligation to prepare their students to learn and work in this knowledge society.

B. Managerial Implications

Based on the conclusion of this research, the management of school education institutions needs to build maximum involvement of all teachers to conduct knowledge sharing both in the form of tacit knowledge and explicit knowledge. Teacher training in each section of the school is a necessity with the level of intensity, content and context tailored to the key performance indicators of each teacher. In essence, team learning behavior created in the school environment will be a driving force for teacher innovation (Widmann & Mulder, 2018).

The process of sharing knowledge to build teacher innovation capability of school education institutions should not only be limited to the internal processes of the school. However, school management needs to expand the process of building this innovation through efforts to absorb, articulate, utilize and manage knowledge sourced from external school partners such as parents, government, communities, and other educational institutions. School management can activate learning from others when assigning their teachers to attend training, seminars, workshops, visits to other schools, meet with school committees and other strategic partners. Because external knowledge, such as those from trainers, coaches, students' parents, the government, the community, and other educational institutions support the teacher innovation capability of school education institutions.

In addition, commitment to learn and serious to be involved in managing the learning environment are things that need attention. Because school education institutions can become organizational culture when all members of the school educational institutions feel that they enjoy the learning process. Learning process becomes a school culture that encourages innovation (Asbari, Santoso & Purwanto, 2019). The key factors of organizational culture are trust, open communication, high involvement, the presence of industry challenges,

and a creative work atmosphere. The task of school management is to facilitate the fulfillment of these key factors.

C. Limitation

This research has several limitations. First, this research analysis the effect of tacit and explicit knowledge on teacher innovation capability of teachers, both directly and indirectly through organizational culture variables. Because there may be several other variables that affect teacher innovation capability, the researchers strongly recommend finding, exploring and analyzing them. Secondly, this research is conducted in a school educational institution environment and may not be generalized to other industries. Therefore it is highly recommended that further research be carried out on this topic in other industries.

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