

ROLE OF KNOWLEDGE SHARING IN INTELLECTUAL CAPITAL AND COMPANY PERFORMANCE: CHALLENGES IN INDUSTRY 4.0 ERA

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ABSTRACT

This research aims to examine the effect of intellectual capital toward financial and operational performance with knowledge sharing as mediating variable in industry 4.0 era. Populations in this research were commercial banks listed in Indonesia Stock Exchange during 2016-2018 periods. Samples were taken by purposive sampling technique and obtained 60 data from 20 commercial banks with certain criteria. This research used both secondary data from annual financial reports and questionnaires were also developed to gather information from respondents. Data were analyzed using path analysis with SmartPLS 3.00. The result showed that intellectual capital has positive effect toward both financial performance and operational performance. Tacit knowledge sharing and explicit knowledge sharing fully mediating the effect of Intellectual capital toward financial performance. While, tacit knowledge sharing and explicit knowledge sharing partially mediating the effect of intellectual capital toward operational performance.

Keywords: Industry 4.0, intellectual capital, knowledge sharing, performance

Introduction

Industry is an integral part in business sector. It was developed and today, global economic is facing the forth industrial revolution, commonly known as industry 4.0. This era marked by the changing era of economic, social, political, and the most obvious thing is the changing of technology (lasi, et.al. 2014). Industry 4.0 affects the operational of company where digital and computer are dominating the company process (Lansiti, et al. 2014). According to Shah and Shah (2012), companies urge to change their strategy and policies to be more ready in facing the rapid changes of worldwide competition, globalization, sophisticated technology, and social movement. Indonesia also needs to adapt with this revolution industry in order to compete in worldwide economic sector. Indonesia, both its government and companies also needs

to adapt with this revolution industry in order to be ready compete in worldwide business sector. One of the companies that cannot be separated from technology is bank. The existence of digital service such as digital branch, internet banking, and automatic teller machine are several proves that technology is tightly attached on it. Banks is one of the largest financial companies in Indonesia since the bank's assets domination is taking up to 78% in Indonesian financial system, so no wonder if Levine (2002) categorized Indonesia as bank based country.

To be able in managing the company, future oriented company needs to develop its intangible capital in addition to tangible capital. Intangible capital, better known as intellectual capital has three major integrated parts such as human capital: concern in human resource development, structural capital: concern in structural and company development, and relational capital: concern in tighten stakeholders' relationship. Recently, company developed integrated digital system, technology, massive structural network, and tighten the relationship with stakeholders to maintain and enhancing the intellectual capital value (Kamukama. 2013) According to Bataneh and al Zoabi (2011), transfer knowledge and competencies including in intellectual capital concern. The well-managed information happens when dynamic and sustainability knowledge transfers among the member of the company exist.

To assure the role of intellectual capital in company more effective, company must hiring competent people to fulfill the fit position. But it doesn't enough. They must be encouraged to transfer knowledge and assure the proper information will not stop and shared to other member. According to Wang and Wang (2012) better knowledge management help enhancing the company's performance. Furthermore knowledge transfer and sharing can be classified as company's value (Masa'deh. 2015). In addition, Obeidat (2017) stated that besides knowledge sharing is proven enhancing the company performance, it is also proven take mediating role in the relationship between intellectual capital and performances.

Performance is always become an important concern for all companies in any sector. Company performance is consisting of two aspects: financial performance and operational performance. Companies always do best efforts to reach maximum result of its financial and operational performance. Financial performance is become financial indicator of how good the company managed its assets, equity, investment and many other financial indicator to gain profit which can be seen on its financial reports. These reports can be interpreted as financial ratios. While operational performance can be defines as how good the company managed its cost, quality, shipping, flexibility, and innovation

The main objective of this research is to examine if there any effect of intellectual capital toward performance, both financial and operational of commercial banks in Indonesia. Furthermore, the examination also considered to know is there any mediating effect of knowledge sharing in the causal relationship of intellectual capital and performances. Lots of previous researches examined intellectual capital, knowledge sharing, and performance. But an empirical study focusing on knowledge sharing's role as mediating variable on the relationship between intellectual capital and performance is yet to do, as far as author know. By discussing this topic, we hope the result is have good implications and being additional literature for interest parties such as companies, government, society, student and further researches for the sake of all parties facing 4.0 industry.

Literature Review and Hypothesis Development

Intellectual Capital

Intellectual capital (IC) is a never ending issue in industries and other economic sector. IC firstly stated by John Kenneth Galbraith in 1969 (Bontis. 2004). Bontis (2004) admitted that a form of IC is elusive ,but once it is discovered and exploited , it may provide an organization with a new resource base from which to compete and win. Ulum (2008) defines "IC includes all the processes and the assets which are not normally shown on the balance sheet and all intangible assets (trademark, patents, and brands) which modern accounting methods consider"

Intellectual capital consisting of three elements, such as:

a. **Human Capital (HC)**

Human Capital (HC) is human with their ability and competency (employee) to produce goods or service and their ability to communicate with customer or other parties. Include in HC are education,experience, skills, creativity, and attitude. Qualified HC can empower the company since they can support the creation of structural capital and customer capital. Bontis (2004) stated that human capital is the perfect combination of knowledge,skills, ability to do some innovation, and finish tasks include company value,culture, and philosophy.

b. **Structural Capital (SC)**

Structural Capital (SC) is infrastructures owned by the company to fulfill market's needs. Include in SC are building, operational system, training, patent etc. Sawarjuwono in 2005 (cited in Hapsari. 2015) defines SC or organizational capital is a company potential treasure

c. **Customer Capital (CC) / Capital Employed**

Capital employed is the relation between the company and parties related to such as government, supplier, customer, etc. Stated by Sawarjuwono in 2005 (cited in Hapsari. 2015) capital employed is the real value of IC because it creates market penetration, market range and loyalty. Customer capita also identify as the company's ability to understand what market wants.

Financial Performance

According to Hapsari (2015), financial performances as management control and evaluation tools in making betterment and be ready to compete in market. By seeing financial report, investor can decide whether they want to invest or find other alternatives and in the same time, management can do some evaluations. This performance as a result of accounting process used to measure performance, effectiveness and company's efficiency to gain profit. Beside, good financial report and performance shows to stakeholder (investor, customer, supplier, and other related parties) that company has credibility, and encourages its sustainability.

For the company, financial performance is the final economic objective which is reflected on financial market indicator (Obeidet. 2017). Financial ratios, which gained from financial report are using to measured financial performance. Those ratios such as Return on Asset (ROA), Return on Investment (ROI), Return on Equity (ROE), Earning per Shares (EPS), profit margin and value per employee. Lin (2007) also stated that ROI and sales growth as proper and immensity step to gained company's profitability

Operational Performance

Feng (2007) stated that operational performance pointing on internal company performance such as customer satisfaction, product quality, and productivity. Operational performance is how the company well-measured its operation and process (Manikas and Terry. 2010). Since this is non-financial aspect, this performance can be classified as social relationship between stakeholders (Luo, et al. 2012) especially in the industry 4.0 era where the competition and technology are growing rapidly. Operational performance can be determined using 5 indicators such as: quality, shipping, innovation, flexibility and cost (Peng, et al. 2011). Somehow this performance tightly attached to financial performance because they are in line and connected.

Knowledge Sharing

Knowledge is consisting of important information relevant to the needs of the organization. Environment of the organization are somehow uncertain, easy to change, and unstable depend on its challenges (Bimpitsos and Petridou, 2012). Knowledge leading to core competency and provides resource which needed by the organization to innovate and compete in global industry 4.0 (Chiang *et al.*, 2011). That's why to make sure the existence of organizations knowledge sustain, it should be shared and transferred among the member of organization in order to survive in dynamic and competitive era (Shannak, 2012; Obeidat *et al.*, 2016). Several studies such as Altamony, et al (2012), Shannak, et al (2012), Kanaan, et al (2013), and Obeidat, et al (2016) stated that knowledge transfer and sharing is an important form of the company to help company survive and sustain in dynamic business circumstances. In Nonaka and Takeuchi study on 1995 (cited in Wang and Wang, 2012) proposed the Socialization, Externalization, Combination, and Internalization (SECI) model which could explained two kinds of knowledge sharing. Firstly is explicit knowledge sharing that is easily recognized since it can be codified and transmitted such as formal language, procedures, company's handbook, and information technology system. Secondly is tacit knowledge sharing is known as face to face interaction such as the willingness to individuals' capacity and eager to share what they know and use what they learn to others (Lin, 2007).

Hypothesis development

Intellectual Capital and Performances

The quality of intellectual capital value in the company consisting on its effect of three major elements such as human resource, structural development, and great bonding relationship on company performance. Performance itself can be classified as financial performance and operational performance. The value of intellectual capital can be said as performance reflection which shows company progress such as prestige, cases, efficiency, operational performance, and financial performance.

Financial Performances as management control and evaluation tools to a company making betterment and to compete in market (Sabah, 2011). The company who has a unique value can lead the market since the customer will easy to acknowledge them. The previous researches done by Wang et al (2014), Hapsari (2015), and Obeidet, et al (2017) have shown that IC have a positive effect toward organization performance affect the financial performance. The contrary result given from previous researches done by Firer and Stainbank, (2003) and Kamath (2008) which stated that there is no relationship or no effect point of intellectual capital and

company performance. Furthermore Kujansivu and Lonngvist (2008) stated that intellectual capital affects the productivity but zero effect to company profitability. These gap findings makes author proposed following hypothesis:

H1. Intellectual capital has positive effect toward financial performance.

H2. Intellectual capital has positive effect toward operational performance.

Knowledge Sharing and Performance

Companies must easily adapt in globalization and industry 4.0. Considering that age of the company is known as intellectual company age, intangible assets called as a knowledge taking a vital role in organization (Akhavan et al., 2013). Wang, et. Al (2012) and Obeidat (2017) stated that knowledge sharing directly is taking crucial role in enhancing the value of company performance and also mediating the effect of intellectual capital toward company performance. Several researches from Altamony, et al. (2012), Shannak, et al. (2012), Kanaan, et al (2013) and Obeidat, et al. (2017) stated that knowledge sharing is a trigger that encourage company to run effectively and important key to survive in digital and competitive atmosphere.

The contrary result shown from previous researches done by Law and Ngau (2008), Hsu (2008), and Wang et. al (2012) found that knowledge sharing indirectly affects the company performance but somehow the value of performance may arise by the knowledge sharing outcomes. As fas as author know, only few research in investigating knowledge sharing's role in mediating the causal relationship of intellectual capital and performance. Author wants to know whether the intellectual capital in banking should be mediated by knowledge sharing to gain both financial performance and operational performance. The limited literatures and gaps findings makes author proposed following hypothesis:

H3a. Tacit knowledge sharing mediate the effect of intellectual capital toward financial performance.

H3b. Explicit knowledge sharing mediate the effect of intellectual capital toward financial performance.

H4a. Tacit knowledge sharing mediate the effect of intellectual capital toward operational performance.

H4b. Explicit knowledge sharing mediate the effect of intellectual capital toward operational performance.

Research Methodology

Survey

Type of this research was the quantitative. The survey was designed by adopting from previous published literatures and primary data were developed to reach the aim of this research. Questionnaires were developed to gain the data. We also did pilot test before spreading the real questionnaire. Respondents are asked to evaluate their opinion and judgment by marking on statements and questions assessed by 5-points Likert Scale of “1” represent strongly disagreement and “5” represent strongly agreement.

The Population in this research consisted of banks in Indonesia. Samples were taken by purposive sampling with certain criteria such as : 1) Listing in Indonesia Stock Exchange during 2016-2018 periods, 2) including in Business Bank Commercial Bank 2, 3 and 4 , 3) not delisting from Indonesia Stock Exchange during 2016-2018 periods and obtained 60 data from 20 samples of banks in 3 years of observations. Questionnaire were delivered to Manager/Director of 20 banks in Purwokerto Branch in consideration that bank is a standarized organization so the values is quite same among branches in Indonesia. Manager and director are choosen because they are represents best information source, had strategic information access, and know their organization.

Operational definition and measurement

1. Intellectual Capital

Items used to measure Intellectual capital such as human capital: concern in human resource development, structural capital: concern in structural and company development, and relational capital: concern in tighten stakeholders' relationship. Each dimension was operationalized with a number of items that measured employees' perception of that variable were adopted from Chen (2008) and previously used by Kamukama (2013).

2. Financial Performance and Operational Performance

Items used to measure company performance was consisted into financial performance and operational performance, were adopted from Wang (2014). The financial performance showed how good a company's ability to make a profit. It shown by profitability ratio which is Return on Assets (ROA) ratio, Return on Investment (ROI), average profit, and profit growth. ROA is measured by comparing profit after tax with total assets of the company and ROI is measured by profit after tax with total investment of the company. While the operational

performance showed how good a company's ability in customer satisfaction, quality, cost management, responsiveness, productivity, and assets management

3. Knowledge Sharing

Items used to measure two knowledge sharing dimensions which are explicit knowledge sharing and tacit knowledge sharing. Explicit knowledge sharing measured by six items in collecting and delivering formal reports and tacit knowledge sharing measured by seven items in employee experience, know who and where, professionalism, and lessons from failure, all were adopted from Wang, et al (2012)

Result

To test the hypothesis, the proposed measurement and structural model analyzed with Smart PLS version 3.00. PLS approach was chosen because it is considered more effective to analyze measurement and structural model at the same time. In addition, PLS was considered suitable because it can handle small sample sizes and multicollinearity among independent variables.

1. Instrument testing

The measurement analysis of this study reveals that all measures are significant and above 0.60 loading level. That is indicating that the measures share more variance with their respective constructs than with the error variance (see Table 1).

Table 1. Reliability and convergent validity

Construct	Mean	S.D.	Items	Loading	AVE	CR	C- α
Intellectual Capital (IC)	3,95	0,84	HC 1	0,9537	0,78	0,96	0,95
			HC 2	0,6409			
			HC 3	0,9067			
			HC 4	0,8078			
			HC 5	0,8969			
			HC 6	0,8205			
			HC 7	0,9302			
			HC 8	0,8812			
			HC 9	0,9249			
			HC 10	0,9027			
			HC 11	0,7623			
			HC 12	0,8343			
			HC 13	0,8838			
			HC 14	0,8791			
			HC 15	0,8262			
			SC 1	0,8457			
			SC 2	0,8091			
			SC 3	0,9126			
			SC 4	0,8432			
			SC 5	0,8402			

			SC 6	0,9015			
			SC 7	0,8346			
			SC 8	0,8631			
			SC 9	0,9039			
			SC 10	0,9251			
			SC 11	0,9127			
			SC 12	0,8977			
			RC 1	0,6247			
			RC 2	0,7356			
			RC 3	0,8012			
			RC 4	0,7369			
			RC 5	0,8162			
			RC 6	0,8302			
			RC 7	0,7712			
			RC 8	0,8335			
			RC 9	0,8116			
			RC 10	0,7811			
Financial Performance (FP)	4,17	0,58	FP 1	0,8069	0,74	0,93	0,93
			FP 2	0,7423			
			FP 3	0,7746			
			FP 4	0,8663			
			FP 5	0,8408			
			FP 6	0,8231			
Operational Performance (OP)	4,44	0,74	OP 1	0,8967	0,74	0,95	0,95
			OP 2	0,8825			
			OP 3	0,8673			
			OP 4	0,8295			
			OP 5	0,8811			
			OP 6	0,8987			
Tacit Knowledge Sharing (TKS)	3,95	0,84	TKS 1	0,8846	0,78	0,96	0,95
			TKS 2	0,9041			
			TKS 3	0,7898			
			TKS 4	0,8822			
			TKS 5	0,8365			
			TKS 6	0,9138			
Explicit Knowledge Sharing (EKS)	4,06	0,98	EKS 1	0,9128	0,81	0,97	0,97
			EKS 2	0,9311			
			EKS 3	0,9039			
			EKS 4	0,9375			
			EKS 5	0,8538			
			EKS 6	0,8873			
			EKS 7	0,9102			

Construct validity is assessed in terms of convergent validity using the average variance extracted (AVE). To be considered as having adequate convergent validity, a construct should have an AVE measure of 0,50 or more (Hulland, 1999). For this study, as seen in Table 2, the AVEs for all the constructs are above 0,65. Providing evidence of adequate convergent validity.

2. Hypothesis testing

Model analysis was developed to support the purposes hypotheses. Table 2 showed the results of hypothesis calculating value from PLS application and and Figure 1 showed the structural relationship among the latent variables which intellectual capital, knowledge sharing, financial performance, and operational performance.

The results, as show in Table 2 and Figure 1, indicate that intellectual capital has positively affect financial performance (coefficient = 0,413; $p < 0,01$, $R^2 = 0,194$). Therefore hypothesis H1 which states that Intellectual capital has positive effect toward financial performance is supported. Also shown in Table 2 and Figure 1 that intellectual capital is positively affect operational performance (coefficient = 0,425; $p < 0,01$, $R^2 = 0,189$). Therefore hypothesis H2 which states that Intellectual capital has positive effect toward operational performance is supported.

Table 2. PLS results (path coefficient, t-statistics, and R^2)

Panel A. Direct Effect				
Variable	Path to			
	Financial Performance		Operational Performance	
Intellectual Capital R ²	0,413 (4,546)***		0,425 (4.174)***	
	0,194		0,189	
Panel B. Full model				
Variable	Path to			
	Tacit Knowledge Sharing	Explicit Knowledge Sharing	Financial Performance	Operational Performance
Intellectual Capital	0,449 (4,611)***	0,334 (2,281)**	0,076 (0,596)	0,359 (2,528)**
Tacit Knowledge Sharing			0,082 (0,492)	0,346 (3,121)***
Explicit Knowledge Sharing			0,178 (1,463)*	0,424 (3,002)**
R ²	0,317	0,202	0,276	0,331

***p < 0,01 (one-tailed)

**p < 0,05

*p < 0.10

Conducting further analysis, tacit knowledge sharing and explicit knowledge sharing introduce as mediating variables. Results show that the relationship between intellectual capital and tacit knowledge sharing is significant (path

coefficient = 0,449; $p < 0,01$). After there is tacit knowledge sharing, the relationship between intellectual capital and financial performance became not significant (path coefficient = 0,076). This means that tacit knowledge sharing fully mediate the causal relationship between intellectual capital and financial performance. Therefore hypothesis H3a which states tacit knowledge sharing mediate the effect of intellectual capital toward financial performance is supported

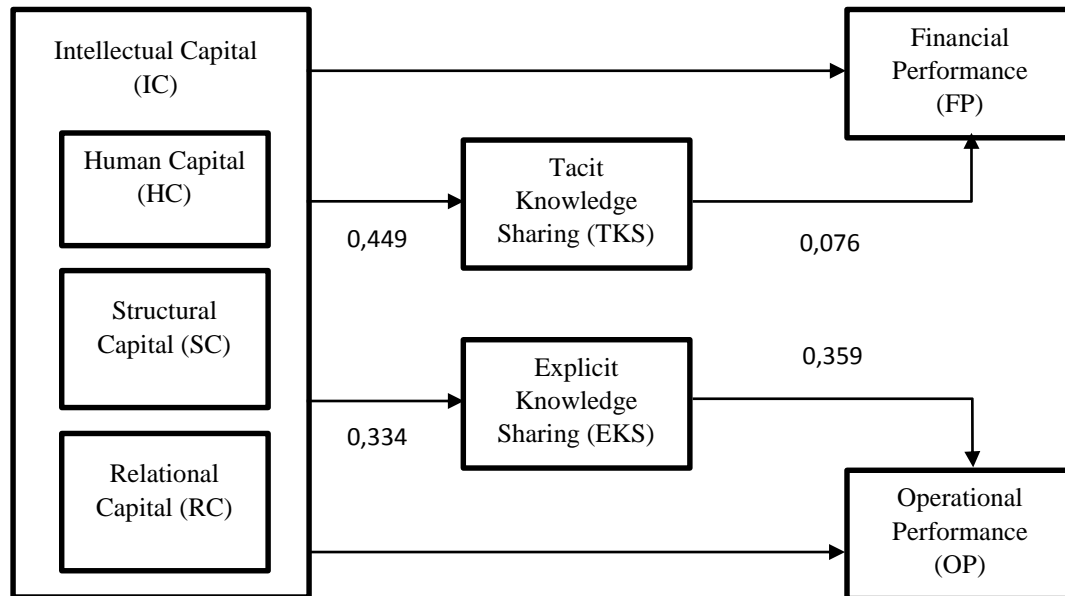
Meanwhile, the association between intellectual capital and operational performance still significant (path coefficient = 0,359; $p < 0,05$). This means that tacit knowledge sharing just partially mediate the causal relationship between intellectual capital and operational performance. Therefore Hypothesis H4a which states tacit knowledge sharing mediate the effect of intellectual capital toward operational performance also supported

Baron and Kenny (1986) argue that full mediator exists if a significant direct effect of the independent and dependent variables become insignificant after controlling for the effects of mediator variables. Another results shown that the relationship between intellectual capital and explicit knowledge sharing is significant (path coefficient = 0,334; $p < 0,05$). After there is explicit knowledge sharing, the association between intellectual capital and financial performance became not significant (path coefficient = 0,082). This means that explicit knowledge sharing fully mediate the causal relationship between intellectual capital and financial performance. Therefore hypothesis H3b which states explicit knowledge sharing mediate the effect of intellectual capital toward financial performance is supported

Meanwhile, the association between intellectual capital and operational performance still significant (path coefficient = 0,346; $p < 0,01$). This means that explicit knowledge sharing just partially mediate the causal relationship between intellectual capital and operational performance. Hypothesis H4b which states explicit knowledge sharing mediate the effect of intellectual capital toward operational performance also supported.

The causal relationship analysis result among indicators can be seen on figure below:

Figure 1. PLS Result



Discussion (finding interpretation)

Based on the result that tacit knowledge sharing is fully mediated the relationship of intellectual capital and both performances, it means that without tacit knowledge, intellectual can not has significantly effect toward financial performance and operational performance. It can be happened because tacit knowledge is a capability or understanding or invidual knowledge which sometimes this form of knowledge is quite difficult to shared or needs time to be transferred. Banks is a standarized industry where everyone need to have one understanding and vision, if in one company has different level of knowledge may affect the performance. But this tacit knowledge can be codificated to explicit knowledge, in banks it did by regularly held refreshment quiz, trainings and certifications for its employees. By did this, hopely the financial performance and operational performance can be optimally gained.

Based on the result that explicit knowledge sharing partially mediated the relationship of intellectual capital and both performances, it means that without explisit knowledge, intellectual still can has significantly effect toward financial performance and operational performance. It can be happened because explisit knowledge is a form of articulated knowledge, more structurized, standarized, can be saved and easily transferred among the member of the company , such as document, standar operational

procedures, log book and any formed information. This explicit knowledge in bank is easily accessed by employees because they already have integrated communication and information system. Even if , the explicit knowledge not maximumly shared among member, banks already have digital standart procedures, and double checker by supervisor, so the value of intellectual capital still can have significant effect toward financial performance and operational performance.

Conclusion, Limitation, and Future Research

This study investigates whether intellectual capital affects firm financial and operational performance and if so, whether the effect is mediate by knowledge sharing which proxied by tacit and explicit knowledge sharing. Using sample from 20 managers and directors within a banking company in Purwokerto, the study finds that intellectual capital is positively associated with financial and operational performance. Further analysis showed that both tacit and explicit knowledge sharing mediates the effect of intellectual capital on financial and operational performance. This suggests that in banking company, knowledge sharing play important role to increase company performance.

The result of this research brings some implications for several interest parties. To be ready in facing revolution industry 4.0 eras, top management of banks must be aware that the existence of intellectual capital in the industry is unavoidable, given the competitive weapon to survive in industry 4.0. It is important to underline that top management and manager must be realized how contemporary company changes so rapidly following the world's movement. The survival key is depending on its intellectual capital consisting of human capital, structural capital, and relational capital. The transfer knowledge system among the member of the companies is also very important to assured the companies' sustainability and security.

The government also needs to take alert following this industry 4.0 eras. Policies and rules determined by the government however must be in line with companies and society interest. Intangible government competencies can elevate the performance of nation in the current dynamic 4.0 environment. The last but not least this findings also useful for student and additional literatures for further researcher.

This research has some limitations. At first, the investigation of this research was only conducted in one sector, which bank, somehow it would its result only to be finite with bank sector only. Therefore in future research can apply investigating in vary other business sectors especially the main industry which directly connected with technology development in 4.0 era such as high tech companies or other financial institution in order to enhance the incredibility level, giving wider acknowledged and

be generalized. Second, this research only examined the effect of intellectual capital toward both financial and operational performance; the further research may address the effect of intellectual capital toward other kind of company performance, such as innovation. Then other variable such as company commitment, employee commitment, and satisfaction can be used in mediating variables in future researches to gain wider literatures in intellectual capital, knowledge sharing and performance.

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