

Mediating Effects of Collaboration Among Business Supply Chain Firms on Inter - Organizational Trust And Knowledge Sharing Intention

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Abstract

Knowledge sharing studies in the fourth industry revolution is still new. Therefore, an empirical study had been conducted in this research, and the result might be useful for the multinational supply chain firms in the economy of digital era. This research aims to examine how collaboration among business supply chain firms mediates the relationship between inter-organizational trust and knowledge sharing intention; explicit knowledge and tacit knowledge. The data was collected through simple random sampling technique of 50 multinational organizations, both in Thailand and some in USA. By using partial least square regression analysis, the result showed that there was positive relationship between inter-organizational trust and knowledge sharing intention as well as inter-organizational trust and collaboration. In addition, the indirect relationship between inter-organizational trust and explicit knowledge sharing intention was also found through the mediating effect of collaboration. The analysis also found that collaboration was the real mediator between inter-organizational trust and explicit knowledge sharing intention. Overall, the evidences suggested that both explicit knowledge sharing and tacit knowledge sharing intention could be acquired by increasing both inter-organizational trust between business firms and collaboration.

Keywords: inter-organizational trust, collaboration, explicit knowledge sharing, tacit knowledge sharing.

Introduction

Industry 4.0 or the fourth industrial revolution is the current trend of automation and data exchange in manufacturing technologies nowadays. Consequently, everything is defined itself as 4.0; manufacturing 4.0, factory 4.0, logistics 4.0, supply chain 4.0, for instances. The drive toward globalization of industry 4.0 since 2011 by German organizations are increasingly expanding to overseas markets where organizational viability can work collaboratively across and within cultures differences (Salas & Gelfand, 2013). Most multi-organizational firms have been planning and targeting their future basing on industry 4.0 methodologies: cyber-physical systems (CSP), internet of things (IoT) and cloud computing. To achieve goal, knowledge management strategy especially knowledge sharing among inter-organizational firms is highly needed and strongly required to support what their future will be. Collaboration is an important strategy that affects organization development.

Tachizawa, E. M., Gimenez, C., & Sierra, V. (2015) studied collaboration in the green supply chain management approaches, they found that whereas collaboration has a direct effect on performance, monitoring has only an indirect relationship through collaboration. Liao, S.H.; Hu, D. C.; & Ding, L.W. (2017) also assessed the influence of supply chain collaboration value innovation, supply chain capability and competitive advantage. The results showed that the relationships among supply chain collaboration value innovation, supply chain capacity and competitive advantage could have a positive impact, and that supply chain capability was a full mediator. Supply chain echelons (upper, middle and downstream) have some moderating effects in these relationships. As we are going to supply chain 4.0, data exchanging or knowledge sharing will play important role in support firm's performance and firm's growth in digital economy era.

Because of the importance of knowledge in today's competitive world, the understanding of employee knowledge sharing has become critical (Hau et al., 2013). Antecedents studied found that encouraging employees to share knowledge across an organization could increase and sustain the firm's competitive advantages (Liu & Phillips, 2011). In addition, several studies in knowledge management (KM) have proven that employee knowledge sharing enhances firm performance such as absorptive capacity and innovation capability (Liao, Fei & Chen, 2007; Liu & Phillips, 2011). Moreover, knowledge sharing among team members is essential in maintaining high levels of group and organizational productivity.

However, to be able to survive in high competitive world, particularly in Blue Ocean Market Strategy, inter-organizational trust is very important (Yan et al., 2016). Previous researchers had argued that lacking trust and collaboration between inter-organization, willingness to share valuable knowledge both explicit knowledge and tacit knowledge might not be effective, especially in term of innovation, financial performance and operational performance (Wang & Wang, 2012). This is the reason that our present research will find out what factors affect knowledge-sharing intention in supply chain field. Manufacturing is the process of converting raw materials, components, or parts into finished goods that meet a customer's expectations or specifications.

Manufacturing commonly employs a man-machine setup with division of labor in a large scale of production (Businessdictionary.com, 2017b) Roosevelt Institute. (2017) indicates that manufacturing is so important with 6 supported reasons. 1) Manufacturing has been the path to development and the key to prosperity, e.g. in Korea, Taiwan, and China. 2) Manufacturing is the foundation of global great power; the most powerful nations of the world are those who control global production of manufacturing technology. 3) Manufacturing is the most important cause of economic growth; the manufacturing machinery and technological improvements are main drivers of economic growth. 4) Global trade is based on goods, not services; according to WTO, 80% of world trade among regions is merchandise trade. 5) Services trade are dependent on manufactured goods. 6) manufacturing creates jobs. Therefore, manufacturing is the most interesting industry to study rather than other industries. However, the model proposed in this study may not be the best one, it links the variables and can be applied to all industries. To make the word manufacturing clear, Balakrishnan, R., Sivaramakrishnan, K. & Sprinkle, G. (2012: 98) explained the word "manufacturing firm" that it is a firm that uses labor and equipment to transform inputs such as materials and components into outputs

The purposes of this paper are two folds. First, to examine the relationship between inter-organizational trust and two types of knowledge sharing; explicit knowledge sharing (ES) and tacit knowledge sharing (TS), in supply chain firms. Another purpose is to see whether collaboration among inter-organizational supply chain firms mediates relationship between inter-organizational trust and knowledge sharing. The benefit of this research is to know the

factors that impacts knowledge sharing intention, both ES and TS, through inter-organizational collaboration, to improve firm's performance and gain more competitive advantage in global supply chain field. We, therefore, applied three theories; theory of reasoned action (TRA) (Ajzen, 1985) theory of planned behaviors (TPB) (Ajzen, 1988) and social exchange theory (SET) (Blau, 1964) as theoretical foundation to develop the research. The presentation in this paper is as follows: chapter 2 reviews the theoretical background, previous literatures and hypotheses creation. Chapter 3 presents research methodology. The result analysis, discussion and conclusion will be shown in chapter 4 and chapter 5 respectively. The implications and limitations of this research are discussed at the end of this paper.

Background and Hypothesis

Theories applied on knowledge sharing intention

Theory of reasoned action (TRA)

Theory of Reasoned Action (TRA) is a social psychology model, which explained the intention behavior reasons (Ajzen, 1985). It is widely used by many scholars to determine the individual behavior intention. Individual intention behavior always be influenced by a positive attitude and social norms. Attitude defines as a tendency to respond favorably or unfavorably to the self, others and the environment (Ajzen, 1985) whereas social norm defines as the way individuals think and expect from others towards different actions.

Theory of planned behavior (TPB)

A psychologist, Icek Ajzen (1985), introduced theory of planned behavior (TPB) that links beliefs and behaviors together. This TPB was developed from the theory of reasoned action (TRA), which was proposed by Martin Fishbein together with Icek Ajzen in 1980 by including perceived behavioral control (PBC). PBC refers to the perceived ease or difficulty of performing the behavior and the amount of control. It deals with situations in which people may lack of complete control over the behavior in question (Ajzen, 1991). In another word, TPB is a theory explaining human behavior stated that attitude toward behavior, subjective norms, and perceived behavioral control, shapes an individual's behavioral intention. As TPB defines the individual's intention to perform a given behavior, the intention need to be clear and precise on what individual wants to get and response to the individual behavior's decision to perform. TPB applied to study the relations among beliefs, attitudes, behavioral intentions and behaviors in various fields, including knowledge sharing. Jafarkarimi et al. (2016) stated that using TPB concluded attitude and subjective norm that influence behavioral intention in social networking sites.

Social exchange theory (SET)

Social exchange theory (SET) is defined as an exchanging of a valuable resource which benefits between two parties. This theory practices to maximize the benefit and reduce the cost that will affect the individual actions (Blau, 1964). According to the antecedent of SET, this theory describes the rational behavior of the individual to perceive the possibility of rewards that they would gain from the social exchange. Reward can be money, social approval, self-esteem or respected by others and compliances (Blau, 1964). According to Razak & White (2015) SET concept has been defined by some scholars in similar ways, for instances; SET has regarded to the maximize benefits and minimize costs that incurred when an individual exchange with others (Cry & Choo, 2010). Another scholar also supported that individual seek

to maximize their benefits and minimize their costs when exchanging resources with others (Molm, 2001). According to SET, knowledge sharing is a kind of exchange behavior (Bock et al., 2005). Users who share knowledge may want to get some return of either intrinsic or extrinsic benefits (Kankanhalli, Tan & Wei, 2005). Intrinsic benefits are the feelings of pleasure and satisfaction that people experience when participating in an activity. It is intangible and cannot be measured directly. Intrinsic benefits motivate individuals to perform certain activities only for personal fulfillment and gratification. Extrinsic benefits come from outside in the form of rewards, promotion, coercion, or punishment. The main extrinsic benefits of exchange behavior are economic reward, reciprocal benefits, and reputation feedback (Yan et al., 2016). According to TRA, this research focuses on the intention of knowledge sharing behavior between inter-organizational firms. Some previous studies found that attitude toward subjective norms have a positive effect on knowledge sharing behavior (Bock & Kim, 2002; Jarvenpaa & Staples, 2000). Therefore, this research uses knowledge sharing behavior as it is affected by attitude, subjective norms, and knowledge sharing behavior.

Roos, D. & Hahn, R. (2016) indicated that while collaborative consumption is a promising solution for unsustainable consumption practices, attitude, personal norm, and self-identity had significant positive relationships with intention to consume collaboratively, explaining a large amount of its variance. Intention and perceived behavioral control had significant positive relationships with self-reported collaborative consumption and explained a medium amount of its variance. To summarize, these three theories suggested that attitude, subjective norms, perceived behavioral control, and exchanging of maximizing benefits and minimizing cost in turn leads to drive individual towards knowledge sharing behavior (Razak & White, 2015).

Explicit and tacit knowledge sharing

Explicit and tacit knowledge has opposite meaning. Explicit knowledge is articulated knowledge, expressed and recorded as words, numbers, code mathematical and scientific formulae, and music notations. Explicit knowledge is easy to communicate, store, and distribute. It is found in books, web, and other visual and oral means (Businessdictionary.com. 2017a). Tacit knowledge is the unwritten, unspoken vast storehouse of knowledge held by practically every normal human being, based on his/ her emotions, experiences, insights, intuition, observations, and internalized information. It also called informal knowledge. Businessdictionary.com. (2017c). Example of both knowledge is an iceberg; explicit knowledge is the tip of the iceberg that can be seen above the marine, while tacit knowledge is the bottom part of the iceberg underneath the marine which is a lot bigger that cannot be seen.

Knowledge management (KM) is one of the most important components in business to maintain firm's competitive advantage (Cummings & Teng, 2003; Razak & White, 2015). Consequently, KM has increased improving firm's performance and business growth along with high technology and innovation influences (Wang & Wang, 2012). One of the most necessary components of KM is knowledge sharing, which is the fundamental means that employees can exchange their knowledge and contribute knowledge application, innovation, and ultimately the competitive advantage of the organization (Wang & Noe, 2010). The way to share knowledge between business partners is different, depending on types of knowledge sharing—explicit or tacit knowledge.

Explicit knowledge sharing (ES) is the process of sharing codified knowledge that can easily captured and transmitted. Most of explicit knowledge can be documented such as reports, procedure, policies, handbooks and information technology system (Hislop, 2013). Nield, T (2017) suggested that a good organization values metrics and performance based on value contribution. If someone is decent at his job, you are contributing value. But if you can

consistently and successfully train others on what you do, you are increasing your value exponentially, and this put you in the position of leadership. A primary aspect of effective leadership is being able to spread your knowledge to others, increasing yours and others positive impact on the organization, and this will not go unnoticed. It's a subtle way to take your role at the organization to a much higher profile. However, accessing the tacit knowledge is more difficult, the employees are willing to share their explicit knowledge (Coakes, 2006; Huang, Davison, & Gu, 2010).

The tacit knowledge is more difficult to illustrate or express in personal interaction than explicit knowledge. Keys to tacit knowledge sharing are the willingness and capacity of individuals to share what they know (Holste & Fields, 2010; Lin, 2007; Lee et al., 2007). Human experience is the foundation of tacit knowledge sharing (TS) because individual cannot take advantage of new knowledge unless that person has social software connected to it. Tacit knowledge is subjective, context specific, and difficult to capture and formalize so it is not easy to express or communicated visually or verbally (Nonaka, Toyama & Nagata, 2000).

Inter-organizational trust to knowledge sharing; ES and TS

Trust is one of an important aspect of business relationships success. It is necessary to gain trust in business relationships. Many antecedents defined trust as the reliability between parties (Zaheer, McEvily, & Perrone, 1998). According to Mayer, Davis, & Schoorman (1995), trust posited as the belief in, and willingness to depend on, another party. Trust is also the intention or willingness to accept vulnerability based on positive expectations of the intentions or behavior of others. One of component of inter-organizational trust, to build on objective of expected benefits and proven capacity (Jiang, Henneberg & Naudé, 2011). Therefore, inter-organizational trust is defined as the extent that the business firm holds positive expectations which relies on their business partners, to do what has been expected to fulfill their specific needs, given its proven capability (Jiang, Henneberg & Naudé, 2011; Mouzas et al., 2007).

Once trust between inter-organization is good, knowledge sharing between business partners will be easy to transfer and exchange. Consequently, knowledge between businesses partners will be potentially started sharing. Explicit knowledge, for example; all tangible things, report, policy, procedure, is easier to share. In contrast, tacit knowledge, for example: experience, technical skills, customer behavior, is more difficulty to interpret and predict. It may take time to learn unless two business partners share each other. Sharing knowledge to each business partners improved firm's performance and productivity, including sustaining the firm's competitive advantages (Liao, Fei & Chen, 2007; Liu & Phillips, 2011). According to literature review above, the first two hypotheses would be as follows:

Hypothesis1: inter-organizational trust is positively associated with explicit knowledge sharing intention

Hypothesis2: inter-organizational trust is positively associated with tacit knowledge sharing intention

Inter-organizational trust to collaboration

Previous research has argued that inter-organizational trust and learning are critical factors associated with successful supply chain innovation and long-term competitiveness (Ojha, Shockley & Acharya, 2016). In addition, trust can lead to more effective and efficient cooperative behavior among individuals, groups, and organizations (Becerra & Gupta, 2003; Gulati & Sytch, 2008; Hansen, Hoskisson & Barney, 2008)

When people trust someone, their attitude, belief and social norm are ready to understand what other does or thinks. According to SET (Blau, 1964) they tend to collaborate with another to meet individual goal. Similarity, in inter-organizational level, if one organization trust each other, they potentially collaborate and support each other to meet their goal together (Ojha, Shockley & Acharya, 2016). The expectation reward from collaboration is either intrinsic or extrinsic depending on the situation at that time. Therefore, the third hypothesis would be as follows:

Hypothesis3: inter-organizational trust is positively associated with collaboration

Collaboration to knowledge sharing; ES and TS

According to Osland & Yaprak (1995), the ability to acquire, absorb, and transfer knowledge from inter-firm collaboration has become more crucial, which leads to the suggestion that a strategic alliance is like a learning battlefield. Moreover, even collaboration supports certain important work activities, such as the planning of new products and the pursuit of interface usability (Alby & Zuccheromaglio, 2008) but there are rare studies that examine collaboration as a mediator between inter-organizational trust and knowledge sharing intention.

Prior research conducted by Wang, Wang & Liang (2014), focusing on innovation and intellectual capital (IC) as simultaneously two mediators in knowledge sharing instead of collaboration. The results indicated that these two factors mediated the relationship between knowledge sharing (KS) and firm performance (FP). Therefore, in this research we will deeply examine whether collaboration mediate the relationship between inter-organizational trusts and two kinds of knowledge sharing intention; ES and TS in supply chain field.

The regular collaboration among firms in supply chain filed is that the two business partners share explicit knowledge to each other in term of reports, for in stances, sales forecast, annual demand, customer's requirement, and customer specification. This kind of knowledge sharing could be done easily. Tacit knowledge such as customer's behaviors, seasonal demand, and technical shooting in the past can help them understand the situation to predict future with explicit knowledge.

This kind of knowledge sharing is intangibles and it needs time to understand. Therefore, observation, personal communication, on the job interaction, are practical ways to cope with those problems. However, without trust, sharing knowledge between firms may not be efficiently and effectively benefits. Consequently, collaboration plays important role in mediating the relationship between inter-organizational trust and knowledge sharing intention as two following hypotheses:

Hypothesis4: collaboration is mediating the relationship between inter-organizational trust and explicit knowledge sharing

Hypothesis5: collaboration is mediating the relationship between inter-organizational trust and tacit knowledge sharing

According to five hypotheses above, we therefore propose conceptual model as follows:

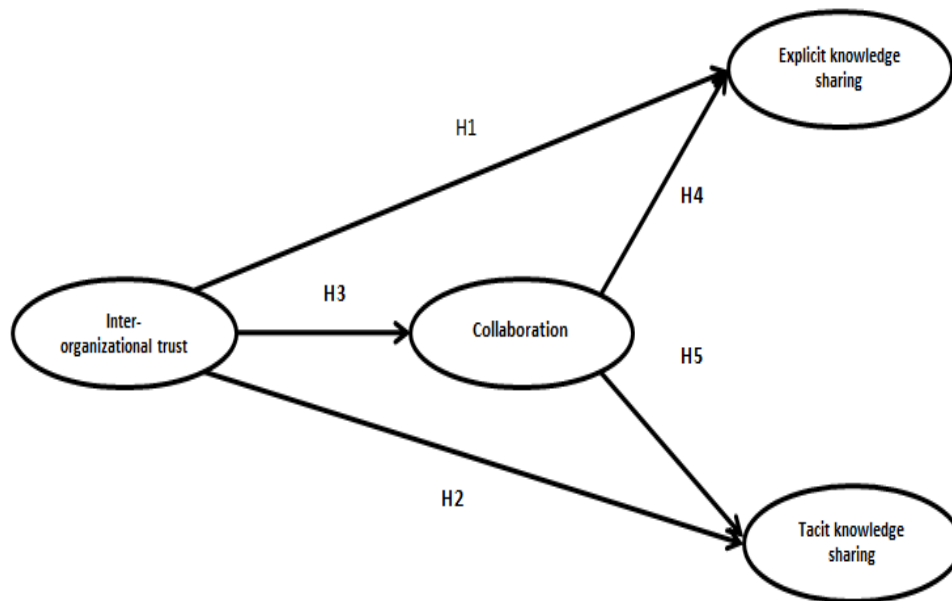


Figure 1. Conceptual model

Methodology

Sample and Data Collection

The manufacturing industry plays a major role in terms of the supply chain context, transforming raw materials and other components into products. The targeted group of the study are the specific multinational firms, both in Thailand and in the US. The multi-national firms used have employees from diversity nations and races doing business both in Thailand and other countries, and basing in Thailand for merchandize production and distribution, using English language for communication. The list of firms were from the Stock Exchange of Thailand. This is as an ideal target of intensive communication and interaction that occurs among suppliers, wholesalers, and retailers (Chen et al, 2014). That is why our all samples frames for this study are focusing on supply chain field in specific multinational organizations. 90 questionnaires were randomly distributed to head of supply chain department in multinational manufacturing firms, which are firms both in Thailand and in foreign countries. There were 52 respondents' feedbacks, 57.77% of response rate. However, only 50 respondents' answer (N=50) can be used, the rest need to be rejected.

Measures

The survey instrument is composed of four scales: inter-organizational trust (4 items), collaboration (5 items), explicit knowledge sharing (6 items) and tacit knowledge sharing (7 items). Every single item is used a five-point Likert Scales to measure a respondent's answer. Inter-organizational trust scale belonging to Ashnai et al. (2016) used adopted from Jiang, Henneberg & Naudé (2011). Collaboration scale developed by Chen et al. (2014). Explicit knowledge sharing scale and tacit knowledge sharing scale used developed from Wang, Wang & Liang (2014) and Wang & Wang (2012). All questionnaires are in appendix 1.

Data Analysis

Data analysis was determined by using SPSS (version 23) regression analysis to test the hypothesis of the study. Hypothesis 1, 2, 3, 4 and 5 will be directly tested the relationship between independent available and dependent available as normal. To test mediating effect, Beta value (β) and standard error of hypothesis 3 versus hypothesis 4 also hypothesis 3 versus hypothesis 5 will use Sobel test as the final step. The reliability test done by distributing 30 questionnaires via email to people working in multinational firms in the field of supply chain in Thailand. Reliability tests result are in Table2. According to reliability test result, all of Cronbach's Alpha value (α) is more than 0.6, which is acceptable for conducting a research (Nunnally, 1978): inter-organizational trust (.661), collaboration (.814), explicit knowledge sharing (.704), and tacit knowledge sharing (.867).

Results

Respondent's demographic characteristics, firm's size and annual sale revenue are in table1. Most of respondents are male (56%), average aging is 38.3 years old, single (50%), and mostly graduated master degree (54%). Most of them are supervisor (42%) and managers up (44%). Average in year work experience of respondents in multi-organization firms is about 11 years.

Table1. Demographic characteristics, work experience, firm's size and annual revenue

Gender	Male: 28 (56%) Female: 22 (44%)
Age (years)	Mean: 38.30 Standard deviation: 8.586
Marital Status	Single: 25 (50%) Married: 23 (46%) Divorced: 2 (4%)
Education	Under Bachelor's: 2 (4%) Bachelor's: 17 (34%) Master's: 27 (54%) Doctorate: 4 (8%)
Position	Supervisor: 21 (42%) Manager: 17 (34%) Senior Manager: 5 (10%) Director, CEO, Vice President: 7 (14%)
Work Experience (years)	Mean: 11.30 Standard deviation: 8.142
Firm size (number of employees)	< 100 employees: 13 (26%) 101-500 employees: 15 (30%) 501-1,000 employees: 4 (8%) >1,000 employees: 18 (38%)
Firm annual sales (Million USD)	< 100 Million USD: 22 (44%) 101-500 Million USD: 8 (16%) 501-1,000 Million USD: 7 (14%) >1,000 Million USD: 18 (36%)

Table 2. Reliability Statistics Test: Cronbach's Alpha value (α) in special variables

Variables	Cronbach's Alpha (α)	No. of items
Inter-organizational trust	.661	4
Collaboration	.814	5
Explicit knowledge sharing	.704	6
Tacit knowledge sharing	.867	7

To reveal correlations between variables, Pearson correlation analysis was determined. Correlation among variables are in table 3. Bivariate correlations between the variables are analyzed using Pearson correlation coefficients. The relationship between variables are explored.

Table 3. Correlation matrix between variables

Variables	2	3	4	5	6	7	8	9	10	11	12
1. Gender (male=1, female=0)	.292*	-.079	.267	.276	.153	.128	.220	.009	-.104	-.016	-.017
2. Age (years)	1	-.197	.025	.489**	.803**	.131	.106	-.120	-.130	-.064	-.033
3. Marital Status (married=1, Single=0, divorced=2)		1	-.144	-.031	-.252	.098	.057	.067	.092	-.081	-.090
4. Educational level			1	.292*	-.116	-.020	-.029	-.053	.036	.057	.086
5. Position				1	.489**	.159	.099	-.025	-.083	.220	.233
6. Work experience (years)					1	.040	.017	-.169	-.234	-.016	.041
7. Number of employees						1	.602**	-.182	-.149	-.196	-.170
8. Firm annual sales (Million USD)							1	.012	.027	.003	.049
9. INTER								1	.424**	.393**	.156
10. COLLA									1	.516**	.415**
11. ES										1	.762**
12. TS											1

Note: * Correlation is significant at the 0.05 level (2- tailed)

** Correlation is significant at the 0.01 level (2-tailed)

Hypotheses testing result

All hypotheses are tested, and their results are shown in table 4a and 4b. To conduct a mediating effect test, the researcher tested the relationship between independent variables

At the first step, the researcher tested Inter-organizational trust and collaboration mediator in hypothesis3 (H3), followed by step2, tested the relationship between collaboration mediator, and dependent variables (ES), hypothesis4 (H4). The third step is testing the relationship between independent variable (Inter-organizational trust) and dependent variables (ES), hypothesis1 (H1).

To confirm whether the mediator in model 1 and model 2 was the real mediator, used Sobel test as recommended by Preacher & Hayes (2004), the result is in table 4c

Table 4 a. Dependent variable: Hypotheses (Model 1); H3, H4 and H1

Hypotheses Variables	Dependent variable : ES (N=50)		
	H3 (mediator) Step 1	H4 Step 2	H1 Step3
Gender (Male=1, Female=0)	-.155	.013	-.088
Age (years)	.013	-.021	-.014
Marital Status (married=1, Single=0, divorced=2)	.036	-.157	-.137
Educational level	.046	-.075	-.026
Position	.004	.234	.222
Work experience (years)	-.019	.008	-.001
Number of employees	-.071	-.101	-.120
Firm annual sales (Million USD)	.057	.050	.073
INTER	.460*		.502*
COLLA		.613***	
ES			
TS			
R square	.247	.417	.284
Adjusted R square	.078	.286	.123
Std. Error	.181	.152	.208

Note: *p<0.05, **p<0.01, ***p<0.001

H3 shows positive relationship ($\beta = 0.460^*$) between inter-organizational trust and collaboration as expected. It means that once two business partners trust each other, the collaboration between them will increase. This hypothesis is statistically supported (p-value = 0.015) at 95% confidence level. However, there is only 24.7% confidence level ($R^2 = 0.247$) between these variables that can explain the relationship between these variables in this model. H4 shows positive relationship ($\beta = 0.613^{***}$) between collaboration and explicit knowledge sharing as predicted. It means that once 2 business partners collaborated, explicit knowledge sharing between them tend to be strongly increased. This hypothesis is strong statistically supported (p-value = 0.000) at 99.9% confidence level. Moreover, up to 41.7% confidence level ($R^2 = 0.417$) can explain the relationship between these variables in this model. H1 shows positive relationship ($\beta = 0.502^*$) between inter-organizational trust and explicit knowledge sharing as predicted. It means that once two business partners trust each other's, explicit knowledge sharing between them tend to be increased.

This hypothesis is statistically supported (p-value =0.021) at 95% confidence level. However, there is only 28.4% ($R^2=0.284$) can be explained relationship between these variables in this model.

According to regression result of H3, H4 and H1, all of them are positive related significantly, with statistically supported at 95, 99.9 and 95% confidence level; this is called partial mediating effect. To test whether mediator (collaboration) is the real mediator, we did the Sobel test from website and the result has been given in table 4c. Regarding to p-value (0.03*) of Sobel test, we can have concluded that collaboration is the real mediator in model 1 (figure2).

Table 4 b. Dependent variable: Hypotheses (Model 2); H3, H5 and H2

Hypotheses Variables	Dependent variables: TS (N=50)		
	H3 (mediator) Step 1	H5 Step 2	H2 Step3
Gender (Male=1, Female=0)	-.155	-.025	-.085
Age (years)	.013	-.018	-.013
Marital Status (married=1, Single=0, divorced=2)	.036	-.015	-.091
Educational level	.046	-.007	.005
Position	.004	.166	.172
Work experience (years)	-.019	.012	.004
Number of employees	-.071	-.090	-.126
Firm annual sales (Million USD)	.057	.071	.098
INTER	.460*		.114
COLLA		.396**	
ES			
TS			
R square	.247	.332	.185
Adjusted R square	.078	.181	.002
Std. Error	.181	.130	.177

Note: *p<0.05, **p<0.01, ***p<0.001

H3, the regression analysis result is as same as model 1 as above. H5 shows positive relationship ($\beta = 0.396^{***}$) between collaboration and tacit knowledge sharing as predicted. It means that once 2 business partners collaborate, tacit knowledge sharing between them tend to be strongly increased. This hypothesis is strong statistically supported (p-value =0.004) at 99% confidence level. Moreover, up to 33.2% ($R^2=0.332$) can be explained relationship between these variables in this model. H2 shows positive relationship ($\beta = 0.114$) between inter-organizational trust and tacit knowledge sharing as predicted. It means that once 2 business partners trust each other's, tacit knowledge sharing between them tend to be increased. However, this hypothesis is not statistically supported (p-value =0.525) at 95% confidence level. In addition, there is only 18.5% ($R^2=0.185$) can be explained relationship between these variables in this model. According to regression result above, there are only H3 and H5 that are significant with statistically supported at 95% and 99 % confidence level; this is called fully mediating effect. To test the last step, seeing whether mediator (collaboration) is the real mediator as hypothesized, we did the Sobel test from website and the result is in table 4c. Regarding to p-value (0.051) of Sobel test, we can't conclude that collaboration is the real mediator in model 2 (figure3) due to p-value is greater than 0.05.

Table 4c. Sobel test for model 1 and model 2

Figure 2. Model 1

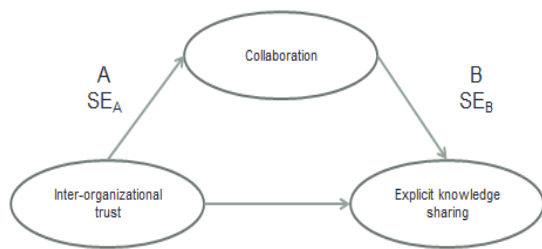
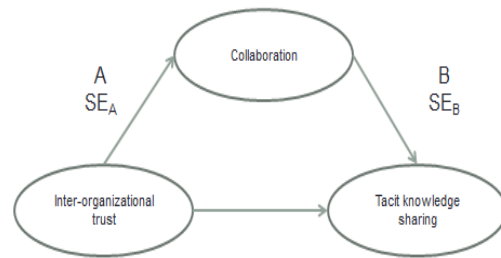


Figure 3. Model 2



		Model G3 2
	Model 1	
	A	0.460
	B	0.613
	SE _A	0.181
	SE _B	0.130
Sobel test statistic	2.15011643	1.95144796
One-tailed probability	0.01577300	0.02550189
Two-tailed probability	0.03154601	0.05100378

Where A is the regression coefficient for the relationship between the independent variables and the mediator, B is the regression coefficient for the relationship between the mediator and the dependent variables, SE_A is the standard error of the relationship between the independent variables and the mediator, and SE_B is the standard error of the relationship between the mediator variable and the dependent variable.

Ordinary Least Square (OLS) Regression; OLS model

Testing result indicated that all hypotheses are related to what we hypothesized, based on TRA, TPB and SET as well as some literatures reviewed. Every single hypothesis was supported with statistically significantly, excepting only H2 did not. Moreover, we found that collaboration is the real mediator only in model 1 but not in model. In model 1, collaboration plays an important role to partial mediate relationship between inter-organizational trust and explicit knowledge sharing intention, whereas in model 2 it did not play as the real fully mediator in relationship between inter-organizational trust and tacit knowledge sharing intention. Regarding to all hypotheses above, we can draw ordinary least square (OLS) model as figure 4.

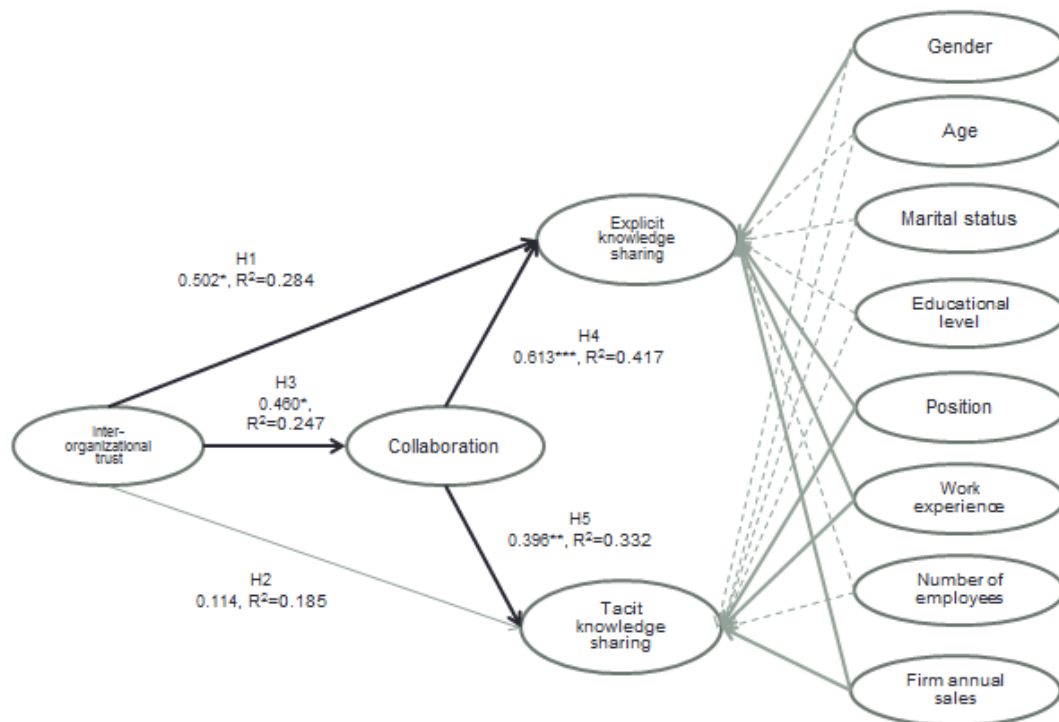


Figure 4. OLS Model

Discussion and Conclusion

General Discussion

To gain more competitive advantage, business partners in supply chain filed need inter-organizational trust and collaboration to support knowledge sharing intention, both explicit knowledge and tacit knowledge. This is in line with the previous research which suggested that lack of trust and collaboration between business firms and willingness to share valuable knowledge, both explicit knowledge and tacit knowledge might not be effectiveness especially in term of innovation, financial performance and operational performance (Wang & Wang, 2012). According to hypotheses result, increasing inter-organizational trust between firms will affect not only in making explicit knowledge sharing increased, but also in collaboration between firms that will increase as well. Consequently, explicit knowledge sharing between firms will be significantly increased. In another word, explicit knowledge sharing can be acquired by increasing inter-organizational trust itself and collaboration between business partners. On the other hand, tacit knowledge sharing needs only collaboration between firms to share their knowledge, whereas collaboration tends to be increase if inter-organizational trust between firms increases. However, increasing inter-organizational trust between firms does not mean that tacit knowledge sharing intention will increase; there might be other factors that affect this model.

Limitation and Future Research Directions

There are some limitations in conducting this research. Firstly, time limitation, all data was collected under cross-sectional designed, so the researcher conducted at one point of time. This may cause high variance in the result. Since this study did not employ a longitudinal

design, it is impossible to judge how much time would affected the relationships between the variables in this study (Vodosek, 2007). Secondly, the number of respondents is quite low (N=50). Therefore, variances may happen and may link to wrong result interpretation. A final limitation is that our sample may not represent all global supply chain behaviors. Information collected was mostly multinational firms in Thailand and some in USA. At the result, there may cause some error by different cultures and geographic location. Therefore, next research should use longitudinal design for data collection in instead of cross-sectional design. Moreover, sample size should represent to entire supply chain population along the globe (Yamane, 1967) and candidate respondents need to be well rearranged and designed to prevent further bias, both from researcher and respondents.

Implications

Although this research gets some valuable findings, but it does not cover all important dependent variables which impact to knowledge sharing intention nowadays. To gain competitive advantage in global supply chain, two business partners should consider sharing knowledge both explicit knowledge and tacit knowledge. The way to share these two kinds of knowledge starting from creating more trust and more collaboration together. Consequently, organizational performance will be improved sustainably in the period of supply chain 4.0 nowadays.

Conclusion

In conclusion, the main finding in this paper is that collaboration mediated the relationship between inter-organizational trust and explicit knowledge sharing intention. Despite research limitations, the study provided some evidence that increasing inter-organizational trust and collaboration can make explicit knowledge sharing intention increase. Moreover, increasing collaboration between firms can make tacit knowledge sharing intention increase. However, increasing inter-organizational trust between firms may not be able to make tacit knowledge sharing intention increase. This is because tacit knowledge sharing between firms need more trust than explicit knowledge sharing. The more trust between businesses partners, the more believe in each other. Consequently, tacit knowledge will be transferred and exchanged. Overall, these findings suggested that global supply chain firms need more collaboration, inter-organizational trust to share resources; explicit and tacit knowledge, to continuously improve their performance among high competitive strategy in nowadays in economy digital era.

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