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Effect of Network Structure on Transaction Cost of Small Enterprises in Sri Lanka: An Empirical Study

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Abstract

Prime objective of this study is to explore how different dimensions of network affect the Transaction Cost (TC) of Small Enterprises (SEs) in Sri Lanka. The data were collected from 376 SEs in Sri Lanka, conducting face to face personal interviews with respondents. The data were analysed using Partial Least Squares-Structural Equation Modelling. The results revealed that network density and size have significant negative effect on TC of SEs. Both have a negative significant impact on opportunism of exchange partners, positive significant effect on rational ability of the Owners of Small Enterprises (OSEs), significant negative impact on transaction uncertainty and positive significant impact on transaction frequency. Thus, the study provided sufficient evidences to conclude that network structure has a significant impact on mitigating TC of SEs in Sri Lanka. The study provides important insights for SEs and policy makers to forces their strategies to develop SEs strengthening network relationship between SEs and different stakeholders.

Keywords: Network Density, Network Size, Opportunism, Rational Ability, Small Enterprises, Transaction Costs, Uncertainty.

1. Introduction

SEs have relatively higher TC compared to the large firms and TC leads to discriminate against SEs damaging their survival and success (Nooteboom, 1993). SEs have higher TC compared to large firms because they suffer hazards from opportunism of exchange partners (Carmel and Nicholson, 2005; Nooteboom, 1993). Transaction Cost Economics (TCE) underline that opportunism of exchange partners is one of the major reason for generating TC (Williamson, 1981). SEs have a high possibility to suffer hazards from opportunistic behavior of the exchange partners due to the lack of knowledge to access and assess information, the lack of time and capacity to gather and handle information, the lack of resources to access and evaluate information, the lack of experience to avoid opportunism (Carmel and Nicholson, 2005; Nooteboom, 1993; Pitelis and Pseiridis, 1999). If SEs spend money and time to search information, negotiation, monitoring transaction activities to avoid opportunism, their TC will increase (Coff, 2001; Joskow, 1995).

As an alternative, SEs use their informal and personal connections in order to obtain necessary information and resources (Bhagavatula, 2009; Lu, 2007; Priyanath et al., 2016). These informal and personal connections do not have formal and written agreement but these connections are based on network relationships with family members, relatives, friends, exchange partners, supportive institutions and the others (Bhagavatula, 2009; Lu, 2007; Priyanath and Premaratne, 2017). Literature describes that the network structure facilitates access to information (Adler and Kwon, 2002; Burt, 1992; Granovetter, 1983) and has an ability to access information reducing information asymmetric (Bwalya et al., 2013; Priyanto et al., 2014). Network structure helps SEs to mitigate information asymmetric facilitating to access information which enable to improve rational ability and mitigate the opportunism of exchange partners (Henningsen and Henning, 2013; Richman, 2006). Thus, network structure has an influence on mitigating TC.

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Therefore, the study attempts to understand how network structure affect the mitigation of TC particularly SEs in Sri Lanka. The study developed a combined framework synthesizing TCE and Social Network Theory (SNT) and tests the model empirically to understand the effect of network structure on TC. In this way, application of theories into a different economic and social context is the broad contribution of this study. The theoretical and empirical findings of this study will definitely contribute the policy makers to develop alternative policies to achieve fast growth of SEs on the one hand and will facilitate SEs to achieve their business success on the other hand.

2. Theoretical Background

Transaction Cost Economics: A business firm needs to incur costs for searching new buyers and suppliers, negotiating with exchange partners, long-term contracting and monitoring the transaction agreements due to the asymmetrical information generated by imperfect market mechanism (Dyer, 1997; Hobbs, 1996; Williamson, 1985). Those costs are termed as TC (Coff, 2001; Dyer, 1997; Williamson, 1979, 1985; Zhang, 2009).Classical economists assumed that transactions can be made without spending any costs if they have perfect knowledge about the market (Hobbs, 1996; Priyanto et al., 2014). They build this argument assuming that all exchange parties have equal information (Priyanto et al., 2014). In reality, information are unequal among transaction parties. Asymmetrical information blocks business firm to make rational decisions which is called as bounded rationality on the one hand and encourage exchange partners to behave opportunistically (opportunism) against the focal firm on the other hand (Williamson, 1981). These reasons appeared due to the asymmetrical information and therefore transactions tend to become costly (Williamson 1979, 1981). TC differ in the degree to which transaction specific assets (assets specificity) are involved, the amount of uncertainty about the future (environmental uncertainty), the amount of uncertainty about other parties' actions (behavior uncertainty), and the frequency with which a given transaction occurs (Everaert, Sarens and Rommel, 2010). These characteristics of TC are governed by market or hierarchy. Business firms attempt to govern TC in economize manner employing these two alternative strategies i.e. 'market' or 'hierarchy' (Zhang, 2009). If a transaction is performed outside the firm through market coordination, the governance structure being utilized is a market where the price mechanism governs the transactions. If a firm governs transaction within its boundaries through bureaucratic control and coordination, the governance structure being utilized is a hierarchy (Williamson, 1991). A selection of TC governance is based on the comparison of TC between 'market' and 'hierarchy' (Priyanto et al., 2014; Zaheer, 2009).

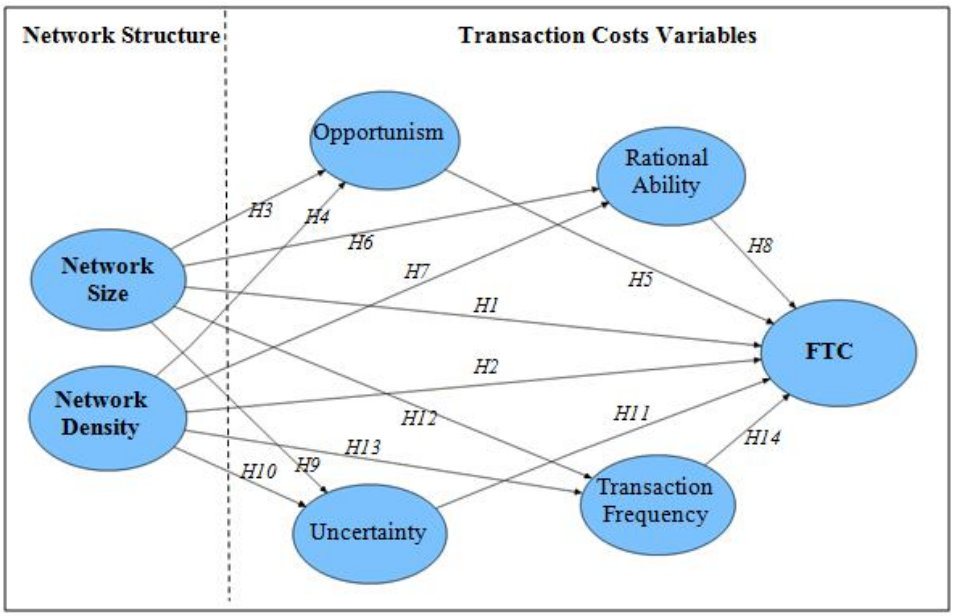
Social Network Theory: Networks are generally define as a specific set of relationships amongst various groups or actors (Abban et al., 2013; Burt, 2000; Donnell, 2004; Granovetter, 1983; Uzzi, 1997). Individuals in any society involve in a number of social relationships with others expecting information and resources (Abban et al., 2013; Burt, 1992; Granovetter, 1983; Donnell, 2004; Uzzi, 1997). They have connection with their social network (family members, relations, and friends), business network (buyers, suppliers and other firms), acquaintances (religion leaders, teachers, and professionals) and supportive network (banks, government institutes, societies etc.) in order to obtain necessary supports (Ahmad, 2009; Premaratne, 2002).

The network structure discusses the pattern of connections between the members of the network (Nahapiet and Ghoshal, 1998). Important aspects of the network structure are the pattern of ties between the members of a social network. Scholars (Babaei et al., 2012; Bhagavatula, 2009; Bolino et al., 2002) highlighted that network size (total number of actors that the focal firm is connected to) and network density (existing connections out of potential ties) is as the two reflective dimensions of network structure. Bhagavatula (2009) defined network size as the number of relationships that person is directly connected to. Premaratne (2002) explained that network size is the number of people with whom they dealt with in business activities and supports such as discussions their plans for running business, information, cash, moral support and any other resources. Network density is the average strength of connection between actors. Density is one of the forms of network closure (Bouzdine and Lorgnier, 2004). Dense of network structure defines as focal member knows and has contact with many members in the network (Bhagavatula, 2009). The networks with dense structures are called 'closed networks'. If many members of a network know each other, the structure of the network is believed to be dense, otherwise, it is considered as sparse (Bhagavatula, 2009; Burt, 1992). Sparse networks (few members know each other) contain more structural holes (Bhagavatula, 2009). Thus, network density implies that the percentage of close relationships within the total number of possible relationships among alters (Batjargal, 2004).

3. Research Model and Hypotheses

The study developed an integrated model synthesizing betweens and TCE to analyze how network affect the TC (see figure 1).Two dimensions of network structure (network size and density) represent the independent variable while Firm's TC (FTC), the reasons for the TC (opportunism and rational ability) and the characteristics of TC (Uncertainty and Transaction Frequency) represent the dependent variable.

Figure 1: Research Model



Network Structure and TC: Information access through network structure helps to reduce searching costs (Yenidogan, 2013). Network members introduce and recommend reliable customers and suppliers to the other members that affect the increase of market share without making advertising costs (Priyanath and Premaratne, 2015). This prevents the searching costs. Gulati (1995b) explained that network structure enables SEs to gather superior information, helps exchange information among network members and facilitates to acquire information in correct time with minimum costs (Henningsen and Henning, 2013). Thus, network structure facilitates to reduce the information costs providing low cost information about exchange partners and their reliabilities that lead to decrease searching costs (Henningsen and Henning, 2013; Yenidogan, 2013).Network structure promotes negotiation efficiency by enabling each exchange partner to be more flexible in granting concessions because of the expectation that the other exchange partner will reciprocate in the future (Zaheer et al., 1998). Network structure encourages exchange partners to support each other and discourages to make costs for legal agreement because members of the network encourage verbal agreement (relational contact) which does not need to incur any costs. Network structure leads to minimize negotiation costs which include the costs of deciding the details of transaction (Gulati and Singh, 1999; Jones et al., 1997).

Exchange partners with dense connection do not behave breaking the previous agreement and such partners do not make any mistake in transaction because friendship is powerful than the transaction (Priyanath and Premaratne, 2015). If one partner behaves opportunistically, informal punishment systems, such as the loss of a good reputation or exclusion from future trade possibilities, can be enforced. The better these informal mechanisms work, the lower the incentive to defect in a transaction and, hence, the lower the monitoring and enforcement costs (Richman, 2006). Therefore, SEs do not spend more time and money to monitoring transaction. Thus, network structure leads to minimize control costs of SEs. Therefore, the study hypothesizes that;

H1 Network size of the SEs relates negatively to the FTC of SEs.
H2 Network density of the SEs relates negatively to the FTC of SEs.

Network Structure and the Opportunism: SEs can reduce TC if information is more easily accessible with low costs (Gulati, 1995). Network structure is important source of identifying the prospective exchange partners and learns about each other's reliabilities (Henningsen and Henning, 2013). The closure argument (Granovetter, 1983) states that dense networks increase social control, develop common norms, and provide the possibility of punishment in the case of misbehavior such as the loss of a good reputation or removing from future exchange possibilities.

SEs can search and contact reliable exchange partners through network structure. Thus, the network structure leads to decrease the potential risk of opportunistic behavior of exchange partners (Careyand Lawson, 2011; Granovetter, 1983). Frequent and close interactions between the SE and exchange partners permit them to know one another and to develop good faith relationship between them. Hence, a SE occupying a central location in a network is likely to be perceived as trustworthy by exchange partners in the network (Tsai and Ghoshal, 1998). Therefore, risk of opportunism may be averted, if a SE has more network dense. When SEs and its exchange partners are satisfied with each other, they will have more confidence and a sensitive expectation that their future dealings with each other will be positive which will minimize the temptation to take advantage of each other. Thus, opportunistic behavior of exchange partners becomes decrease if the SE has a greater network relationship. Therefore, the study hypothesizes that;

H3 Network size of the SEs relates negatively to the opportunism of exchange partners.
H4 Network density of the SEs relates negatively to the opportunism of exchange partners.

The Opportunism and the FTC: TCE explained that opportunism generates due to asymmetrical information. Exchange party who has more information may tend to behave opportunistically against the partner who has less information (Williamson, 1981). In order to avoid the opportunism, business firms need to incur costs to search prices, negotiate transaction details with exchange partners, and get legal advices for agreements etc. Therefore, the existence of opportunism increases the. This theoretical relationship related to the SEs in Sri Lanka is empirically tested by the study forming the following hypothesis:

H5 Opportunism of exchange partners positively relate to the FTC of SEs.

Network Structure and the Rational Ability: SEs are unable to achieve their goals by themselves alone (Premaratne, 2002). They expect information, supports, resources and ideas from networks. They usually get support from network members to gather information, evaluate information, and get ideas and advice before making crucial transaction decision (Priyanath and Premaratne, 2015). Close members of the network provide opportunities for interpersonal contact and leads to more positive feelings about providing supports, sharing information and resources with those with whom they develop a close relationship (Chow and Chan, 2008). Members of the network who have strong network relationship would perceive greater social pressure for supporting and sharing their knowledge and information, because a good relationship results in high expectations of colleagues, including favorable actions (Chow and Chan, 2008).

Thus, network structure has the ability to access information and get the support to evaluate information. As a result, rational ability of the owner of SEs becomes improve due to the information access through network structure and support obtained from members of the network to evaluate such information. Nooteboom (1993) explained that increasing the ability to spread of personal networks (size), rationality could be improved. SEs can obtain specialist' ideas, opinions and experiences from supportive networks with low costs and they can improve their rational ability extending their network. Thus, the network structure helps SEs to mitigate information asymmetric facilitating to access and evaluate information which leads to improve rational ability.

Therefore, the study hypothesizes that;

H6 Network size of the SEs relates positively to the rational ability of SEs.
H7 Network density of the SEs relates positively to the rational ability of the SEs.

The Rational Ability and the FTC: TCE highlights that transaction parties do not have perfect knowledge about the market since they possess only limited information. Information is unequal among transaction parties i.e. one party has more information than the other (Bwalya, 2013; Priyanto et al., 2014). The partner who has less information fails to make rational decision due to lack of knowledge about the circumstances (bounded rationality). Due to bounded rationality, transaction between partners could not be efficiently organized (Williamson, 1985).

TC generates due to the fear of principal partner to make decisions because the risk of opportunistic behavior of exchange partner may possible (Hobbs, 1996; Williamson, 1985). Business firms are careful to make decisions if

they don't have sufficient information. Firms incur costs to search adequate information, assess information, and get legal advices etc. before making important transaction decisions (Priyanath and Premaratne, 2015). It means that bounded rationality increases the TC showing a positive relationship between them (Hobbs, 1996). In order to test this theoretical relationship in the context of SEs, the study proposes the following hypothesis.

H8 Relational ability of the SEs negatively relate to the FTC of SEs.

Network Structure and Transaction Uncertainty: SEs suffer higher uncertainty (both environmental and behavioral) due to lack of knowledge about the business environment, a lack of business experience, and lack of information (Ahmad and Seet, 2009). Networks play a vital role in facilitating processes of information sharing and learning among firms. Especially for SEs, network structure is essential for the exchange of information. Information gain from network helps SEs to predict more accurately the market share, purchase and sales volume and prices which are the attributors of environmental uncertainty (Ahmad and Seet, 2009). In contrast, behavioral uncertainty is the uncertainty that is present in a transaction due to the opportunistic preferences of the transacting partners (John and Weitz, 1988). Network relationships have ability to reduce TC associated with behavioral uncertainty (potential risk of opportunism) communicating and passing information about dishonest and cheated partners (Lu, 2007). Information and assistance gained from the members of network function as a mechanism for reducing threats of uncertainty. For example; according to Lu (2007), SEs can consult members of the network to know in advance whether the potential business partners are honest before making contract. Network structure help SEs to select better exchange partners assessing his previous performances through the members of network and thereby SEs are able to minimize the potential behavioral uncertainty (Rindfleisch and Heide, 1997; Shin, 2003). Thus, network structure helps SEs to minimize both environmental and behavioral uncertainties. Therefore, the study predicts that;

H9 Network size of the SEs relates negatively to the transaction uncertaintyof SEs.
H10 Network density of the SEs relates negatively to the transaction uncertaintyof SEs.

The Transaction Uncertainty and the FTC: TCE explained that when uncertainty increases, transaction should be better organized to avoid opportunism (Murray and Kotabe, 1999; Noordewier et al.,1990). Thus, TCE predicts that TC increases with the increase of uncertainty because more safeguard devices are needed to be used to avoid the risk of opportunistic behavior of the exchange partner. In order to test this theoretical relationship, the study develops the following hypothesis;

H11 Transaction uncertainty of the SEs relates positively to the FTC of SEs.

Network Structure and Transaction Frequency: Transaction frequency reflects that transaction appears repeatedly and regularly between the same exchange partners. Network structure helps SEs to assess the performances of their exchange partners and open avenues to observe the trustworthy of exchange partners (Tsai and Ghoshal, 1998).

Frequent transactions between SEs and exchange partners help to develop good faith between them which encourage them continue transaction. SEs and exchange partners interact over time, their trusting relationship become strong which permits them to continue the transaction long time. Furthermore, when SEs and their exchange partners are satisfied with each other they will have more confidence that their future dealings with each other. Therefore, the study proposes that;

H12 Network size of the SEs relates positively to the transaction frequency of SEs.
H13 Network density of the SEs relate positively to the transaction frequency of SE.

The Transaction Frequency and the FTC: Frequent transaction between SEs and exchange partners help to generate relational contract (Boyle et al., 1992).Relational contacts are defined as recurrent transactions that are completed based on long term relationships between two parties (Dyer and Sing, 1998; Noordwier et al., 1990; Uzzi, 1997). Cooperation and mutual benefits are the major concerns in relational contact (Lu, 2007). Such relational contact increases the level of satisfaction between current exchange partners, prevents the need to find a new partner and reduces TC incurred on looking for a new reliable partner. Thus, transaction frequency decreases FTC. Therefore, the study assumes that;

H14 Transaction frequency between SEs and the exchange partners relates negatively to the FTC of SEs.

4. Methodology

Quantitative approach is employed to study the research problem and the survey method was selected to gather data. Only manufacturing SEs, which are classified according to 2 digit levels of ISIC-Revision, 4 (UNDP) were selected to gather data. Department of Census and Statistics (DCS) in Sri Lanka defines SEs as 'establishment with 5 - 24 persons engaged' and the same definition was used to select SEs for the survey. According to the DCS, there were 71,126 SEs dispersed in Sri Lanka and the study employed those SEs as the study population. Multi-stage sampling method was adopted to determine the sample. First, the study selected only the enterprises classified under manufacturing category as the sample frame. According to the Economic Census in 2013/2014, there were 14,185 industries belonging to the category of manufacturing establishments. Second, using the sample frame (14,185 of SEs), 376 of SEs were selected employing the sample size determination formula developed by Krejcie and Morgan (1970) with 95 percent confidence level and 5 percent margin of error. Third, the sample is distributed according to the percentage share of the SEs located in each district and determines the number of firms to represent all the district in Sri Lanka. Then, SEs of each districts were listed out according to ISIC category and the sample were selected using stratified sampling method to represent all the manufacturing industrial divisions.

The study used two step procedures to develop questionnaire. The study initially generated a pool of items of each dimensions reviewing empirical literature and carefully selected items, which are more relevant to measure the particular dimension of the constructs. Thus, the questionnaire items were designed systematically based on literature published in cited journals. Then, a pilot survey was conducted prior to the main questionnaire survey in order to verify whether the questions are understood; whether instructions are clear; whether the order of the questions is appropriate and the questions are uninspiring etc. This helped to increase the validity and the reliability of the study. Data were collected for the questionnaire conducting face to face interviews. The unit of analysis is each owner of SEs because the owner is the 'entrepreneur' in many SEs who starts and manages the business. Partial Least Square - Structural Equation Modeling (PLS-SEM) was used to test the hypothetical relationships because it helps to examine the interrelationship between multiple independent and dependent variables and facilitates the evaluation of relationships between more than one construct simultaneously. Measurement model is evaluated employing reliability and validity tests and the efficiency of the structural model was evaluated by multi-co linearity issues, R^2, effect size (f^2) and predictive relevance (Q^2). The smart PLS (version2) software was used to analyze data.

Measures

All the constructs were measured using structural questions. Each items were measured at an ordinal level with 7-point Likert scales (1 – Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neither agree nor disagree; 5 – Somewhat agree; 6 – Agree; 7 – Strongly agree). Each respondent was asked to state their agreement to the statements using these rankings.

Transaction cost: The study measured TC at unit level (in SEs), adopting Williamson's (1985) classification i.e. searching costs, negotiation costs, monitoring costs and enforcement costs. Six items (adopted by Dyer and Chu, 2003; Nguyen and Crase, 2011) were used to measure searching cost. Five items adopted by Dyer and Chu (2003); Nguyen and Crase (2011) were employed to measure negotiation cost. Four items (adopted by Dyer and Chu, 2003; Nguyen and Crase, 2011) were used to measure monitoring cost. Four items (adopted by Dyer and Chu, 2003; Nguyen and Crase, 2011) were used to measure enforcement cost(see appendix 1).

Opportunism: Opportunism of exchange partners against SEs is defined as exchange partners' seek self-interests with guile. Opportunism was measured using eight items: exaggeration of needs, sincerity in dealings, truthfulness in dealings, good faith bargaining, dishonesty in dealings, unfair in dealing, cheat in dealing and breach of agreement engaged in by the exchange partner. Those items were adopted Dahlstrom and Nygaard (1999); Gundlach (1999); Rokkan et al., (2003) (see appendix 1).

Rational Ability: Bounded rationality has not been empirically measured by scholars. Instead, the study attempts to measure the rational ability of the owner of SEs using three dimensions; a) ability to access information (lower the information asymmetry), b) ability to assess information because the study observed that not only information asymmetry but also inability to evaluating information averts the decision making ability of human beings and the ability to make good decisions. The study used 8 items to measure ability to access information, 4 items to measure ability to assess information and 4 items to measure decision making ability(see appendix 1).

Uncertainty: The environmental uncertainty is measured using demand and supply uncertainty. The demand uncertainty is measured using four items employed for empirical studies by scholars John and Weitz (1988);

Noordeweir et al. (1990). Supply uncertainty is measured using four items adopted by Chen and Chen (2003), Li and Lin (2006). On the other hand, behavioral uncertainty has been operationalized by the degree of the difficulty in assessing the performance of exchange partners (Rindfleisch and Heide, 1997; Shin, 2003). Two items (developed by Chen, 2003; Kamyabi and Devi, 2011): the degree of difficulty in assessing the performance of exchange partners and the risk of opportunistic behavior of exchange partners can be employed in order to measure behavioral uncertainty of SEs.

Frequency: Transaction frequency of SEs in this study is measured using a simple item i.e. transactions between SEs and exchange partners are repeated adopted by Everaert et al. (2010), John and Weitz (1988) (see appendix 1).

Network Size: The network size of OSE is simply defined as the number of persons that SEs is directly connected to. This measurement was adopted by Batjargal (2005); Bhagavatula (2009); Premaratne (2002).

Network Density: The total number of persons that the SE deals business activities with and obtains support such as information, resources and moral support. The network density is measured as the percentage of close relationships within the total number of possible relationships of the owner of SE. This is adopted by Bhagavatula (2009); Burt (2000); Premaratne (2002).

5. Results and Discussions

Based on PLS-SEM measurement of outer model, first, the study evaluated 14 of first order endogenous latent variables. The appendix1 shows standardised factor loadings which were above than the minimum threshold criterion 0.7 confirming the indicator reliability of first order reflective constructs.

In addition, the appendix 1 further shows that all the factor loadings were statistically significant at 0.05 significance level. The appendix1 further exhibits that the Cronbach's α was higher than the required value of 0.7 and composite reliability was higher than the recommended 0.7 value. Higher value of the Cronbach's α and the composite reliability confirm the convergent validity of the first order constructs. Regarding the discriminant validity, the table appendix II demonstrates that none of the inter-construct correlation value was above the square-root of the AVE and satisfied the criterion of the discriminant validity of first order constructs.

The second-order constructs were developed using latent variable scores of the first-order constructs. Indicator reliability of three endogenous latent variables [i.e. opportunism (OPPO), rational ability (RA) and transaction uncertainty (UNCERT)] at the second order level in the hierarchical model were evaluated. All path coefficients (standardised factor loadings) were well above the threshold value 0.7 (see appendix II). The bootstrapping procedure was conducted to estimate the significance of each path coefficient by examining the t-statistics. All the t-statistics were significant at 0.05 significance level (see appendix III). Appendix III further displays that the Cronbach's α was higher than the required value of 0.7 and composite reliability was higher than the recommended 0.7 value. With a higher level of the Cronbach's α and composite reliability, the second order constructs were developed in reliable manner. The results confirm the convergent validity of the second order construct. Discriminate validity of the second order constructs are presented in appendix IV which shows that none of the inter-construct correlation value was above the square-root of the AVE and satisfied the criterion of the discriminant validity of the second order constructs.

Table 1: Path Coefficients and Significant among Constructs

	Hypothesis	Relationship	β	t-statistics	Result
1.	H1	NSIZE -> TC	-0.140	4.22***	Supported
2.	H2	DENSE -> TC	-0.203	4.51***	Supported
3.	H3	NSIZE -> OPPO	-0.252	4.96***	Supported
4.	H4	DENSE -> OPPO	-0.533	12.19***	Supported
5.	H5	OPPO -> TC	0.267	6.63***	Supported
6.	H6	NSIZE -> RA	0.201	4.87***	Supported
7.	H7	DENSE -> RA	0.629	14.53***	Supported
8.	H8	RA -> TC	-0.163	3.30***	Supported
9.	H9	NSIZE -> UNCERT	-0.250	4.04***	Supported
10.	H10	DENSE -> UNCERT	-0.658	19.33***	Supported
11.	H11	UNCERT -> TC	0.209	4.45***	Supported
12.	H12	NSIZE -> TFQ	0.249	7.03***	Supported
13.	H13	DENSE -> TFQ	0.629	16.54***	Supported
14.	H14	TFQ -> TC	-0.054	1.24	Not Supported

****p>0.01. (n=376).*
R^2 = 0.807, f^2 = 0.88 (Network Size), f^2 = 0.83 (Network Density), Q^2 = 0.594.
Source: Survey data, 2016.

The results of the structural model were assessed using steps and guidance recommended by Hair et al. (2014). The study initially assesses structural model for collinearity issues.VIF values for all path show minimal collinearity, ranging from 1.220 to 3.121. These values are significantly less than the recommended threshold value of 5.00. The tolerance levels range from 0.334 to 0.820 exceeding 0.20.This indicates an absence of multi-collinearity between the independent constructs and the dependent constructs in the structural model. Then, the significant of the path coefficients in the measurement model is estimated to decide the effect of network structure on the TC. Each path relationship presents the regression coefficient (β). T-statistics, which was obtained using PLS bootstrap process, is used to evaluate the significance of the path coefficient (β). Considering both the paths coefficients and t-statistics, 13 hypothetical relationships (88.2 percent) were significant out of 14 and remaining. Given that, the results of the paths towards the TC revealed that the both NSIZE and DENSE were significant at 1 percent (p>0.01).

As expected, the study found that the network structure has a negative impact on TCs of SEs. Table 1 shows that the network size of the owner of SEs has a significant impact on mitigating TC (*β = -0.140 or 14 percent and t-value = 4.22*) while the network density of the owner of SEs has also a negative effect on TC (*β = -0.203 or 20 percent and t-value = 4.51*) supporting hypothesis H1 and H2.

Although there is no similar previous study in the literature, some studies have provided similar findings. Scholars (Gulati, 1995; Henningsen and Henning, 2013; Yenidogan, 2013) highlighted that the network structure facilitates to access reliable information with low costs and to identify reliable exchange partners. In this way, network relationships help to reduce the TC of business firms. Scholars (i.e. Jones et al., 1997; Uzzi, 1997; Zaheer et al., 1998) have explained that the network relationships minimize the searching costs and the negotiation costs discouraging legal contacts. Richman (2006) explained that the network encourages relational governance which lead to decrease the monitoring and the enforcement costs. Uzzi (1997) explained that the network ties create values for firms by enhancing their ability to reduce the costs of negotiations and to reduce the costs of writing contracts. Doucette (1996) found that network relationship increases information sharing between current exchange partners and prevents the need to find a new partner and reduces the searching costs incurred on looking for a new reliable partner. However, the empirical results of this study further prove that the network size and the dense of the owner of SEs have a direct impact on mitigating TC of SEs in Sri Lanka. Considering the reasons for the existing TC which reflects the opportunism and the rational ability, the results display in the table 1, illustrate that network size of the owner of SEs has a significant negative effect on the opportunistic behavior of the exchange partners (*β = -0.252 or 25 percent and t-value = 4.96*) and also network density of the owner of SEs negatively affect the opportunistic behavior of the exchange partners (*β = -0.496 or 53 percent and t-value = 12.19*) supporting both hypotheses H3 and H4. Though a few scholars (Henningsen and Henning, 2013; Kandori, 1992; Richman, 2006) studied the relationship between the network structure and the opportunism, the effect of network size and density on opportunism represents a significant gap. Similar results are provided by the studies of Careyand Lawson (2011), Lu (2007) and Mysen et al. (2011) confirming that the network structure mitigates the opportunistic behavior of exchange partners.

The closure argument of Granovetter (1983) highlighted that the dense networks increase social control and provide the possibility of punishment in the case of misbehavior of network members. Similarly, Henningsenand Henning (2013) explained that the informal punishment systems, such as the loss of a reputation or remove from

future transaction can be enforcement through network relationships. Bergen et al. (1992) showed that network ties help to minimize information asymmetric and to lower down the problem of hidden information and the opportunistic behavior of exchange partners. The better these informal mechanisms work, the lower the incentive to opportunism (Henningsen and Henning, 2013; Richman, 2006).

In the table 1, path coefficients indicate that the opportunism of exchange partners is positively associated with the TC of SEs ($\beta = 0.267$ *or 26.7 percent and t-value = 6.63*). Thus, the result has been answered the hypothesis H5 showing that the opportunism of the exchange partners has a positive influenced on the TC of SEs as well. A similar finding has been made by the study of Dahlstrom and Nygaard (1999). They underscore that opportunism is an originator of TC, and their results indicate that the opportunism will influence on the bargaining costs, the monitoring costs, and the mal-adaptation costs of franchised distribution channels. The study of Ting, et al. (2007) indicates that the entrepreneurs' opportunism in a partnership is associated with TC and has a significant positive influence on TC ($\beta = 0.664$ *or 66.4percent and t-value = 10.86*). Thus, the empirical results of many studies (Gulati, 1995; Zaheer et al., 1998) provide similar findings.

Regarding the influence of network size on the rational ability of the owner of SEs, the results of this study show that network size of the owner of SEs has an impact on the rational ability of the owner of SEs by 20.1 percent ($\beta = 0.201$), the regression coefficient is positive significant (*t-value = 4.87*). Thus, hypothesis H6 is strongly proved by the survey data. The regression results shown in table 1 indicate that network density of the OSEs has an influence on the improvement of their rational ability. The results strongly supported the hypothesis, H7 on the basis of the significant positive regression coefficient ($\beta = 0.629$ *or 62.9 percent and t-value = 14.53*). A large number of studies (Baker, 1990; Bouzdine and Lorgnier, 2004; Burt, 2000; Donnell, 2004; Granovetter, 1983; Jones et al., 1997; Ting et al., 2007) empirically confirmed that network structure plays an important role in sharing information which leads to improve rational ability (mitigate bounded rationality). The results of this study further strengthen the idea of Coleman (1988) who explained that dense network exchanges information among members.

Network structure has an ability to access information and get the support to evaluate information. Okten and Osili (2004) and Ting et al. (2007) explained that network size helps to tap information in external environment successfully and reduce information asymmetry. Nooteboom (1993) explained that increasing the ability to spread of personal networks (size), rationality could be improved. These ideas are further verified by the empirical results of the study.

Confirming this theoretical relationship between bounded rationality and TC, empirical results of this study show that the rational ability of the owner of SEs has a negative impact on TC (see the table 1). Therefore, hypothesis, H8 is supported by the results ($\beta = -0.163$ *or 16.3 percent*) and the path coefficient is significant (*t-value = 3.30*). Bounded rationality has not been empirically measured by scholars. Instead, information asymmetric has been measured by a few scholars (Aslam, 2013; Ting et al., 2007). The study measured rational the ability of the owner of SEs (not bounded rational), using ability to access to information and ability to assess information. Both studies i.e., Aslam (2013) and Ting et al (2007) have provided similar relationship between asymmetric information and TC. Network literature shows that individual can gain access to information through interaction with people (Bouzdine and Lorgnier, 2004). Chau (2002) explained that 'who you know' affects 'what you know' and highlighted that network ties allow to access more information. Tsai and Ghoshal (1998) found a significant relationship between interaction and information sharing and explained that network established for other purposes permit members to reduce time and money required to gather information. Network structure facilitates to access quick information with low costs (Bolino, et al., 2002). Chua (2002) argued that interactions among network members enhance the quality of information. Information sharing process is likely to be higher when members of a network interact frequently and know each other very well (Bolino, et al., 2002). Their empirical findings showed that interaction among network members positively relates to the improvement of rational ability which leads to decrease TC.

With regard to the influence of network size on the transaction uncertainty, table 1 shows that network size of the owner of SEs has an impact on the mitigation of transaction uncertainty by 25 percent ($\beta = -0.250$), the regression coefficient is positive significant (*t-value = 4.04*). Thus, hypothesis, H9 is strongly proved by empirical data.

The regression results have shown that the relationship between network density of the owner of SEs and uncertainty indicates the significant negative regression coefficient ($\beta = -0.658$ *or 65.8percent and t-value = 19.33*) supporting the hypothesis, H10. The results further specify that hypothesis, H11, having a positive influence of

uncertainty on TC, is supported by the path coefficient ($\beta = 0.209$ *or 20.9percent and t-value = 4.45*). Thus, the results confirmed that the network structure of the owner of SEs has an influence to mitigate TC. Lohtia and Krapfel (1994) provide similar finding that strong network relationship reduces uncertainty. Table 1 shows that network size of the owner of SEs has positive effect on transaction frequency ($\beta = 0.249$ and t-value =7.03) supporting the hypothesis H12.

The regression results have shown that the relationship between network density and transaction frequency indicates the significant positive regression coefficient ($\beta = 0.629$ *or 62.9 percent and t-value = 16.54*) supporting the hypothesis H13. Many scholars (Dyer and Singh, 1998; Heide and John, 1992; Noordewier et al., 1990) highlighted that network relationship causes the increase of transaction frequency, and thereby decreases TC. Cooperative behavior between partners increases with the increase of the transaction frequency (Tsai and Ghoshal, 1998). However, the results indicate that transaction frequency is not associated with TC and has not shown a significant influence on TC ($\beta = -0.054$ *and t-value = 1.24*). The results do not support the hypothesis H14.

6. Conclusion

The study argued that TC minimization based on network is the best alternative solution for SEs to govern TC in economise manner. Based on this argument, conceptual model has been developed synthesising the SNT with the TCE and working hypotheses have been developed to test how each dimension of network affects the TC of SE in Sri Lanka. The results revealed that both the network size and the network density of the owner of SEs has a significant negative impact on TC of SEs implying that the network structure affects the mitigation of TC of SEs in Sri Lanka. The network density has a higher impact on mitigating TC of SEs than the network size. Theoretically, the existence of exchange partners' opportunism is the most powerful reason for the increase of TC. However, the opportunism of exchange partners decreases with the existence of strong the network structure. Both the network size and the network density have a significant negative influence on opportunism of exchange partners. The effect of network density on mitigating opportunistic behaviour of the exchange partner is more powerful than the network size. The study recognizes that the rational ability of the owner of SEs is improved by the strong the network structure. The network size and the density have a significant positive impact on the improvement of rational ability of the owner of SEs. Furthermore, the network structure leads to decrease TC of SEs by improving a rational ability of the owner of SEs. Both the network size and the density of the owner of SEs have a significant negative correlation for transaction uncertainty and have a significant positive influence on transaction frequency of SEs.

Policy Implications: The study recommends policymakers to develop approaches to provide necessary supports to access information and resources through their social relationship that helps to improve performance mitigating TC. Government agencies, private sector and NGOs can maintain information services (through web page, providing broad brand connections for SEs) to access information and develop more connections among network members both in local and international markets. The study observes that the most of the SEs have developed close relationship with a few reliable buyers and suppliers (most of them are in surrounding areas or in the same region) for regular transactions expecting to minimize transaction uncertainty, opportunism and finally TC. Therefore, most SEs limit themselves only the survival stage in their business. They do not have enough capacity to establish direct relationship with large scale and foreign exchange partners (producers/suppliers/buyers). Therefore, the study recommends that policy makers should develop mechanism to create better relationship between SEs and new exchange partners (organizing network formation activities such as seminars, trade fairs etc., providing information about reliable or guaranteed exchange partners through a webpage of responsible agency) in order to increase the owners' ability to establish more reliable connections with different exchange partners in quick and easy ways.

Research Direction: Measuring network dimensions and transaction costs variables are not easy because both variables are broad and multi-dimensional concepts. For most concepts, there is no standard methodology to measure empirically (i.e. transaction costs, bounded rationality). Developing systematic methodology to measure TC and network variables in the context of developing counties need to be addressed in future researchers. Scholars have argued that building network is an investment, but it takes time, money and effort. The costs of maintenance of network vary according to various factors such as the nature of relationships, network size and density.

Therefore, it is interesting to measure the opportunity costs of building and maintenance of network and to evaluate its benefits. Since it is beyond the scope of this thesis, the study leaves this question for future research.

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Appendix 1: Analysis of the First Order Constructs

Construct		Loading	t-statistics	CR	AVE	α*
1.	**Searching Costs (SECHTC)**			**0.939**	**0.839**	**0.903**
	Brokers'/commission fees to search new buyers and suppliers.	0.829	39.93			
	Labour cost to handle advertising activities	0.964	176.25			
	Travelling cost to handle advertising activities	0.949	133.13			
2.	**Negotiation Costs (NEGOTC)**			**0.915**	**0.785**	**0.861**
	Labour cost to handle legal matters and negotiate with exchange partners to decide details relating to transaction.	0.933	86.05			
	Travelling cost to handle legal matters and negotiate with exchange partners to decide details relating to transaction.	0.948	145.58			
	Communicationcost to handle legal matters and negotiate with exchange partners to decide details relating to transaction.	0.767	28.24			
3.	**Monitoring Costs (MONITC)**			**0.892**	**0.678**	**0.843**
	Cost for monitoring the transaction activities whether they are undertaken according to the agreements.	0.709	18.11			
	Labour cost for monitoring the transaction activities whether they are undertaken according to the agreements.	0.914	77.41			
	Travelling cost for monitoring the transaction activities whether they are undertaken according to the agreements.	0.911	84.69			
	Communication cost for monitoring the transaction activities whether they are undertaken according to the agreements.	0.744	25.25			
4.	**Enforcement Costs (ENFOTC)**			**0.908**	**0.713**	**0.865**
	Cost to resolve transaction disputes, to pay commissions for sales ref/intermediates after the transaction made and to pay license fees and sales taxes.	0.723	21.73			
	Labour cost to resolve transaction disputes, to pay commissions for sales ref/intermediates after the transaction made and to pay	0.909	66.86			

	license fees and sales taxes.					
	Travelling cost to resolve transaction disputes, to pay commissions for sales ref/intermediates after the transaction made and to pay license fees and sales taxes.	0.915	104.42			
	Communication cost to resolve transaction disputes, to pay commissions for sales ref/intermediates after the transaction made and to pay license fees and sales taxes.	0.816	37.80			
5.	**Buyers' Opportunism (OPPOB)**			**0.970**	**0.784**	**0.965**
	Buyers do not provide a truthful clear picture from the deal when negotiating.	0.822	41.52			
	Complete honesty will not be expected from our buyers when negotiating.	0.908	80.49			
	Generally most of the buyers exaggerate needs to get what they wants	0.823	40.66			
	Buyers always change the pre-agreed facts in order to get their own benefits	0.898	69.98			
	A complete good faith deals will not be expected from our buyers	0.917	94.61			
	We need to check carefully each and every steps of the transaction that are made with buyers to avoid the their cheating	0.811	39.82			
	Generally most of the buyers are dishonest in transaction activates	0.918	93.44			
	Generally most of the buyers are not sincere in transaction activities.	0.926	109.32			
	Generally most of the buyers do not fair in transaction activities	0.932	103.83			
6.	**Suppliers' Opportunism (OPPOS)**			**0.965**	**0.753**	**0.958**
	Suppliers do not provide a truthful clear picture from the deal when negotiating.	0.841	43.38			
	Complete honesty will not be expected from our suppliers when negotiating.	0.863	48.86			
	Generally most of the suppliers exaggerate needs to get what they wants	0.819	34.57			
	Suppliers always change the pre-agreed facts in order to get their own benefits	0.874	50.86			
	A complete good faith deals will not be expected from our suppliers	0.888	64.16			
	We need to check carefully each and every steps of the transaction that are made with suppliers to avoid the their cheating	0.783	34.97			
	Generally most of the suppliers are dishonest in transaction activates	0.914	93.88			
	Generally most of the suppliers are not sincere in transaction activities.	0.933	108.61			
	Generally most of the suppliers do not fair in transaction activities	0.889	46.69			
7.	**Ability to access information (ASSESS)**			**0.969**	**0.797**	**0.963**
	Ability to find accurate information about market prices for our product.	0.859	41.38			
	Ability to find sufficient information about new markets and buyers	0.928	80.40			
	Ability to find sufficient information about reliable buyers	0.944	133.79			
	Ability to find sufficient information about threats coming from competitors	0.929	99.94			
	Ability to find accurate information about input prices.	0.867	80.40			
	Ability to find sufficient information about new input suppliers	0.873	72.49			
	Ability to find sufficient information about reliable suppliers	0.926	88.87			
	Ability to find sufficient information about product techniques	0.810	46.12			
8.	**Ability to assess information (ACCESS)**			**0.917**	**0.735**	**0.879**
	I have a high ability to evaluate information about the behavior of market prices of our products before making important sale decision	0.808	40.61			

	Ability to evaluate the input prices and quality related to our products before purchase decision	0.851	55.65			
	Ability to evaluate the potential threat coming from competitors	0.910	110.14			
	Ability to evaluate the change of business environment, political situations and external socks	0.858	69.36			
9.	**Ability to Make Decision (DMA)**			**0.928**	**0.721**	**0.903**
	Ability to make a satisfactory sale decision evaluating information	0.838	50.07			
	Ability to face the threats coming from competitors	0.791	83.35			
	Ability to face the changes coming from external business environment.	0.887	79.01			
	Ability to make good transaction decisions avoiding various issues	0.851	59.56			
10.	**Environmental Uncertainty (ENUN)**			**0.986**	**0.761**	**0.984**
	Future market shares for the product can easily be forecasted	0.961	48.66			
	Future sales volume forthe product can easily be forecasted	0.969	71.21			
	Future prices for the product can easily be forecasted	0.960	66.39			
	Customers' demand for the product in future is stable	0.971	59.23			
	Future market for input supply can easily be forecasted	0.913	38.65			
	Future input supply can easily be forecasted	0.935	57.52			
	Future input prices can easily be forecasted	0.916	57.60			
	Input supply for the product in future is stable	0.959	38.72			
11.	**Behavioural Uncertainty (BEUN)**			**0.984**	**0.879**	**0.978**
	It is very easy to understand the performance of buyers	0.971	131.06			
	Risk of opportunistic behavior of buyers is very low	0.970	128.30			
	It is very easy to understand the performance of buyers	0.968	90.29			
	Risk of opportunistic behavior of buyers is very low	0.969	101.60			
12.	**Transaction Frequency (TFQ)**			**0.768**	**0.768**	**0.698**
	Sale substantial higher amount of products for regular buyers (wholesalers, distributors, retailers, producers).	0.951	66.29			
	Purchase substantial higher amount of inputs from regular suppliers (wholesalers, distributors, retailers, producers).	0.950	57.82			
13.	**Network Density(DENSE)**			**0.892**	**0.735**	**0.820**
	Density of social network	0.872	77.26			
	Density of business network	0.847	48.79			
	Density of supportive network	0,855	53.19			
14.	**Network Size (NSIZE)**			**0.881**	**0.849**	**0.798**
	Size of social network	0.853	59.44			
	Size of business network	0.871	70.26			
	Size of supportive network	0.855	60.13			

*Cronbach's α.

(n=376).

Source: Survey data, 2016.

Appendix II: Discriminant Validity of the First Order Constructs

		AVE	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	**OPPOB**	**0.784**	**0.885**													
2.	**OPPOS**	**0.753**	.772**	**0.867**												
3.	**ACCESS**	**0.797**	-.585**	-.598**	**0.893**											
4.	**ASSESS**	**0.736**	-.577**	-.533**	.775**	**0.858**										
5.	**DMA**	**0.721**	-.582**	-.512**	.739**	.810**	**0.849**									
6.	**ENFOTC**	**0.713**	.577**	.515**	-.370**	-.337**	-.308**	**0.844**								
7.	**MONITC**	**0.679**	.646**	.576**	-.471**	-.465**	-.427**	.772**	**0.823**							
8.	**NEGOTC**	**0.785**	.714**	.582**	-.509**	-.491**	-.462**	.612**	.749**	**0.885**						
9.	**SECHTC**	**0.839**	.792**	.646**	-.563**	-.541**	-.551**	.481**	.581**	.755**	**0.916**					
10.	**BEUN**	**0.879**	.748**	.734**	-.638**	-.602**	-.616**	.540**	.621**	.676**	.735**	**0.937**				
11.	**ENUN**	**0.761**	.613**	.632**	-.582**	-.588**	-.600**	.431**	.533**	.549**	.641**	.798**	**0.872**			
12.	**TFQ**	**0.768**	-.374**	-.350**	.194**	.184**	.205**	-.344**	-.418**	-.413**	-.389**	-.349**	-.288**	**0.876**		
13.	**NDENSE**	**0.735**	-.615**	-.555**	.415**	.417**	.394**	-.486**	-.521**	-.554**	-.577**	-.589**	-.495**	.444**	**0.833**	
14.	**NSIZE**	**0.849**	-.438**	-.386**	.356**	.231**	.213**	-.430**	-.460**	-.450**	-.441**	-.475**	-.361**	.235**	.378**	**0.921**

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

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

(n=376).

Source: Survey data, 2016.

Appendix III: Analysis of the Second Order Constructs

	Construct	Loading	t-statistics	CR	AVE	Cronbach's α
1.	**Opportunism (OPPO)**			**0.939**	**0.885**	**0.871**
	OPPO-Buyers	0.949	147.92			
	OPPOS- Suppliers	0.932	108.88			
2.	**Rational Ability (RA)**			**0.944**	**0.850**	**0.912**
	Ability to access	0.911	7.89			
	Ability to assess	0.934	7.92			
	Decision Making Ability	0.919	7.91			
3.	**Transaction Uncertainty (UNCERT)**			**0.946**	**0.898**	**0.887**
	Environmental Uncertainty	0.940	142.50			
	Behavioural Uncertainty	0.955	182.35			

(n=376).

Source: Survey data, 2016.

Appendix IV: Discriminant Validity of the Second Order Constructs

		AVE	1	2	5
1	OPPO	**0.885**	**0.941**		
2	RA	**0.850**	-.651**	**0.922**	
5	UNCERT	**0.898**	.767**	-.692**	**0.948**

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

(n=376).

Source: Survey data