

Horizontal cooperation among logistics service providers (LSP) and the influence of environmental uncertainty

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Abstract

Cooperation among LSPs is very common in emerging economies due to inefficient infrastructure and unreliable institutions. We develop a framework that incorporates transaction and relational mechanisms and their impact on cooperation's performance. Utilizing 113 cases from Africa/ Middle East we found empirical evidence for a strong moderating effect of environmental uncertainty.

Keywords: Cooperation, logistics service provider, environmental uncertainty

Introduction

As the gross domestic product of emerging economies are set to surpass that of advanced markets; they continue to gain traction in academic research (Sheth 2011). However, the growth of firms operating in emerging economies is limited by the institutional impediments such as lack of a clearly defined legislation or efficient infrastructure. Thus, many companies like LSPs operating in emerging economies have in recent past decided to engage in horizontal cooperations in order to circumvent the impediments of their home economies and increase their competitiveness (Cruijssen et al. 2007). In particular are cooperations with other firms be seen as a viable way for LSPs to provide a safeguard in higher levels of market turbulence, weak infrastructure and poor institutional settings as found in emerging economies (Kogut 1988).

Owed to lower levels of interdependencies between partnering firms in horizontal cooperations they usually display greater opportunism than in vertical cooperations (Rindfleisch 2000). As a result, governance mechanisms for restraining opportunism and improving the cooperation performance are central in horizontal cooperations (Liu et al. 2009). While the governance of vertical cooperation of supply chains and lateral cooperation in supply networks in emerging economies is well established in academic research, academic research is scarce in regards to the governance of horizontal cooperations between LSPs (Cruijssen et al. 2007). However, in particular in emerging economies is the identification and understanding of effective governance mechanisms for cooperations crucial, as it can differ significantly from the mechanisms in developed countries (J. Li et al. 2010). Studies reveal that poor performance of cooperations is more likely to arise in emerging economies as contract law is not enforced and

information cannot be verified easily (Luo 2002). This confirms the governance challenges and inefficiencies that accompany cooperations in emerging economies (Zhou and Poppo 2010). Therefore the contribution of this paper is twofold. Firstly we extend the body of knowledge on horizontal LSPs cooperations by gaining an understanding on the effects that different governance mechanisms have on the cooperation performance. Secondly, we investigate the impact that institutional impediments in emerging markets have on these different governance mechanisms. By doing so, we explicitly address a research gap in horizontal LSP cooperation outlined by Smoltzi and Wallenburg (2011, p. 570) who indicate the need to “extend the scope of research to other regions” beyond developed markets like Germany. For this, we employ a partial least squares (PLS) analysis to test our hypotheses in a model, encompassing relational and transactional forms of governance as well as their interrelation. Our model is based on a sample of 181 LSPs that are engaged in horizontal cooperations. Our sample is drawn from LSPs operating in multiple countries across Africa and the Middle East. The results are then discussed based on the extant literature and further validated via expert interviews. Finally we provide implications for practice and guidance for future research.

Conceptual model

The three underlying logics: transactions costs, social relations, and institutional constraints describe according to Zhou et al. (2003), the behavior of firms in economic exchanges. This is supported by further empirical studies on governance in economic exchanges, which showed that they entail relational and transactional mechanisms (J. Li et al. 2010) and are moderated by their institutional environment (Wang et al. 2011). Thus, we employ transaction cost theory, social exchange theory and institutional theory in this paper as it may provide helpful insights on the adoption of governance mechanisms (Y. Li et al. 2010).

Transaction Mechanisms

Transactional mechanisms are according to transaction cost economics (TCE) derived from economic rationality and emphasize governing economic exchanges through monitoring and incentive-based structures in order to subdue opportunistic expropriation. Transaction specific investments increase the cost for all cooperation partners to terminate cooperations (Murray and Kotabe 2005), as specific investment support a given transaction, with little value outside the exchange relationship (Grover and Malhotra 2003). Transaction-specific investments create interdependences between partners and serve as incentives to act non-opportunistically. In a logistics and supply chain context, transaction specific investments can encompass factors such as sharing complementary information and communication technologies (ICT) as well as logistics investments for process coordination to reduce transactional uncertainties (Yeung et al. 2009, Aggarwal et al. 2010). Besides technically enabling cooperation, investments into ICT also reduce transaction costs and transactions risks (Esper and Williams 2003). Joint investments of LSPs in assets or joint purchases of fuel also substantially reduce the individual purchasing costs, which was suggested by Dyer and Singh (1998) as an important reason for companies to engage in a horizontal partnership (Crujssen et al. 2007). Such investments may be tangible e.g., a warehouse facility, trucks, warehouse handling equipment, EDI systems, fuel) or intangible (e.g., alignment of process flows, tacit knowledge, driver trainings) (Chen et al. 2009). Based on former research and the above discussion, we derive the following hypothesis on transactional mechanisms in horizontal cooperations:

H₁ – Transactional governance mechanisms based on logistics- and ICT specific investments have a positive impact on the performance of horizontal LSP cooperations.

Social Relations and cooperation performance

According to social exchange theory, relational mechanisms deal with the roles of social interactions and socially embedded relationships in economic exchanges like horizontal cooperations (Uzzi 1996, Granovetter 1985). Governance emerges from the values and processes found in these social interactions and socially embedded relationships in economic exchanges (Heide and John 1992), as they subdue opportunism and thus reduce transaction costs (Dyer and Singh 1998). By forging relational governance mechanisms based on informal rules and unwritten codes of conduct, companies like LSPs can circumvent institutional failures and avoid exchange hazards in economic exchanges (Baker et al. 2002). In prior academic literature, most researchers mention the relational mechanisms, trust (Morgan and Hunt 1994), embeddedness (Granovetter 1985, Zhou et al. 2003) and commitment (Morgan and Hunt 1994). We therefore follow the distinction of Lavie (2011), who suggest that most relational mechanisms can be associated either with trust, embeddedness or commitment.

Interorganizational trust implies that the exchange parties rely on trust in uncertain economic conditions and behavioral risks (Zhou and Poppo 2010). The more the exchange partners trust each other, the more they feel assured that their cooperation partners will cooperate in good faith, rather than behave opportunistically (Dyer and Chu 2003). Trust is therefore considered an essential characteristic of relational governance mechanisms in cooperative relationships (Zhou and Poppo 2010).

In social exchange theory the notion of relational embeddedness is strongly shared by scholars in the areas of strategic management, organizational theory and organizational economics (Uzzi 1996). It defines the degree to which economic relationships are driven by social attachment and interpersonal ties (Granovetter 1985). Through the repeated face-to-face interactions among exchange partners, relational embeddedness can develop and exploitation of exchange partners is less like to occur in the cooperation (Uzzi 1996, Heide and Miner 1992). Embeddedness therefore acts as relational governance mechanism in horizontal cooperations.

Relational commitments like information sharing and mutually interests push LSP to resolve conflicts and evolve to collective strategies (Heide and Miner 1992). Mutual commitment assists cooperation partners in dealing with the problem of institutional failures and deters opportunism (Srinivasan and Brush 2006).

Horizontal cooperations usually display a lower level of trust than vertical cooperations (Rindfleisch 2000). This suggests that individual norms such as trust alone might not overcome the fear of opportunism. (Williamson 1993) Consequently, individual aspects of relational mechanisms in horizontal LSP cooperation must be supported by further governance mechanisms. In fact, studies by McEvily and Marcus, (2005) have shown that the individual aspects of relational mechanisms are often mutually reinforcing rather than independent. For instance, frequent interaction between exchange partners is necessary to nurture trust, which in turn encourages partners to increase their commitment to the cooperation and to rely on informal governance (Dyer and Singh, 1998). Therefore, we refer to the unified construct of relational mechanisms and hypothesize:

H₂ – Relational mechanisms made up by trust, embeddedness and commitment impact the performance of horizontal LSP cooperation positively.

Interaction effects

Some scholars like Wuyts and Geyskens (2005) argue that transactional and relational mechanisms may be less effective when used together than when used separately to govern cooperations. However, other researchers contend that transactional and relational aspects of governance may be complements, as individually they do not suffice to hinder opportunism. (Zhou et al. 2003, Luo 2002) As such, transactional mechanisms generally provide a tangible framework by transaction specific investments within which intangible relational mechanisms can perform and compensate the deficiency of legal and institutional hazards in economic exchange structures (Liu, et al. 2009). Also in practice it appears that many effective cooperations use multiple governance mechanisms simultaneously (Dyer and Singh 1998). As such, our third hypothesis suggests that there will be some mitigating effect on opportunism and an improving effect on cooperation performance when both transactional and relational mechanisms are used jointly:

H₃ – The interaction of transactional mechanisms and relational mechanisms is positively related to the performance of horizontal LSP cooperation.

Environmental Uncertainty

Institutional theory indicates that the choice of alternative governance mechanisms depends on a broad set of interrelated factors, including the institutional environment that defines the rules and beliefs of socially acceptable economic behavior (North 1990, Williamson 1996). Environmental uncertainty requires exchange partners to constantly monitor their external situation and adapt their operations and strategies accordingly (Noordewier et al. 1990). This is even more apparent in emerging economies which tend to have higher levels of market turbulence (Tseng and Lee 2010), weak infrastructure and poor institutional settings (Hoskisson et al. 2000, Meyer et al. 2009). This environmental uncertainty in emerging economies moderates the effectiveness of relational and transactional control mechanisms (Poppo and Zenger 2002, Cavusgil et al. 2004). Consistent with institutional logic, a weak legal protection significantly reduces a firm's reliance on transaction specific investments to mitigate the risks of opportunism in horizontal exchange relationships (Zhou et al. 2003). Because a weak legal system provides little legal recourse for victims of opportunistic conduct, LSPs are less likely to invest in dedicated IT and communication technology or specific assets like warehouses to safeguard behavioral uncertainty in horizontal cooperations. The high uncertainty characteristic of emerging economies is likely to reinforce the cultivation of social relationships and mechanism. People in emerging economies traditionally rely on personal contacts and networks rather than on formal contract to coordinate horizontal exchange relationships (Luo 2009). Consequently we suspect that in transitional economies relational mechanisms are more effective than transactional mechanisms to hinder opportunism. Therefore we hypothesize that:

H₄ – Environmental uncertainty negatively moderates the relationship between transaction mechanisms and cooperation performance of horizontal LSP cooperation.

H₅ – Environmental uncertainty positively moderates the relationship between relational mechanisms and cooperation performance of horizontal LSP cooperation.

Research methodology and data analysis

We developed a questionnaire by conducting an extensive literature review for validate and reliable measures. Prior to data collection, we tested the questionnaire for content and face validity. Therefore we applied Q-sorting processes and checks regarding structure, completeness, clarity, and appropriateness in both, academic and managerial settings. In addition, we pre-tested our survey instrument in a random sample of 50 LSPs from the original database.

We focus on data from LSPs operating in multiple African and Middle East countries as little empirical research has been carried out in these regions (Khavul et al. 2010), and countries from these two regions qualify as emerging economies (Hoskisson et al. 2000). Our sample frame consisted of 2,454 LSPs covered under the International Standard of Industrial Classification of All Economic Activities (ISIC) codes 60 to 64. After excluding 336 entries for missing addresses, the survey was sent to a total of 2,118 firms. We received complete and usable responses on 181 firms. Regarding a non-response bias, we examined the difference between the expected and the realized respondents' firm size, conducting a chi-square test. The results of these tests suggested that our sample is representative, as a non-response bias is not evident in the sample (Tang and Rai 2011). Since only one respondent from each of the contacted companies provided the data for our study, concerns of common method variance may be raised. Therefore, we applied Harman's single-factor test to examine the possibility of common method bias (Podsakoff and Organ 1986). As less than 39% variance was extracted by a single factor with half of the items reveal factor loadings well below 0.5, we could not identify a general factor that accounted for the majority of the variance in the tested variables.

All constructs introduced in Section 2 constitute latent variables that require indirect measurement (Churchill 1979). Table 1 show the valid and reliable multi-item measures we adopted for our research. The constructs were all measured using a seven-point Likert scale.

Table 1 – Measurement models

Multi-item scale		Source
Relational embeddedness		Heide and Miner 1992, Lawson et al. 2008, Liu et al. 2009
Trust		Nyaga et al. 2010, Morgan and Hunt 1994
Information sharing		Li et al. 2005
ICT		Prajogo and Olhager 2011, Tallon 2011
Relationship performance		Saxton 1997, Benton and Maloni 2005, Kale et al. 2002
Cooperation performance	Logistic efficiency	Fugate and Mentzer 2010
	cost performance	Lai et al. 2002
	financial performance	Cao and Dowlashani 2005

Cooperation performance is measured as a 2nd order formative construct, represented by the lead items of four different performance dimensions (relationship-, logistics efficiency-, cost- and financial performance) to cover different facets of the performance construct (Diamantopoulos and Winklhofer, 2001). To assess reliability and validity, we examine the multicollinearity between items and the nomological validity of the formative construct. All Variance Inflation Factor values are less than 3.3, indicating that multicollinearity does not seem to pose a problem (Diamantopoulos and Siguaw 2006). We tested for nomological validity by correlating the formative items with variables with which the formative construct should theoretically be correlated (Diamantopoulos and Winklhofer 2001). Our results indicate positive and highly sig-

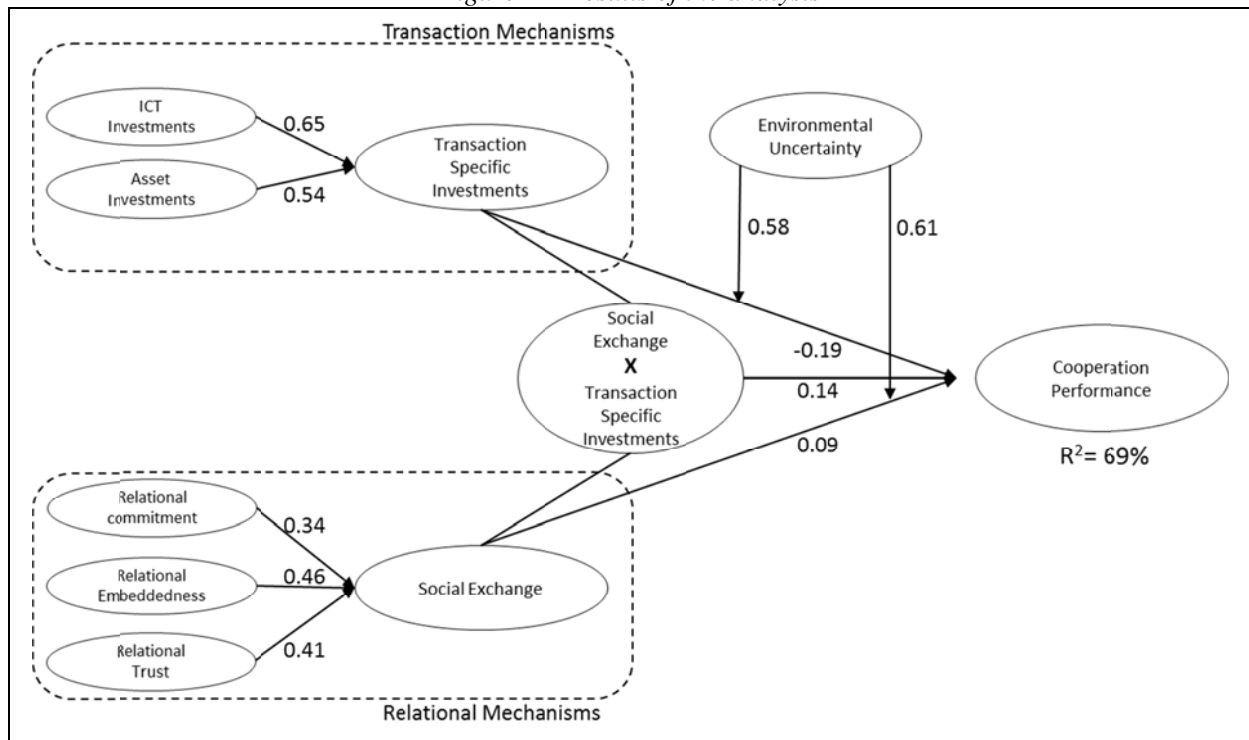
nificant relationships between cooperation performance and its two antecedents, ICT and information sharing, indicating the nomological validity of the cooperation performance construct.

We tested indicator reliability for the reflective constructs of our research model using a bootstrapping procedure with 500 randomized samples taken from the original sample. All estimates of the outer loadings exceed the recommended minimum value of .7 and exhibit sufficient t-values. Regarding construct reliability, Cronbach's alpha value (α) for all constructs was well above the suggested cut-off value of .7 (Cronbach 1951) and similar, the observed composite reliability values were all greater than .8 and as such above the suggested cut-off value of .6 (Bagozzi and Yi 1988). In addition, we used a multitrait-multimethod (MTMM) matrix to test our measurement model in a sum regarding convergence validity and discriminant validity (Bagozzi 1981). The MTMM matrix indicates that the individual measurements per constructs are higher correlated among each other than they are correlated with other constructs. As such, we can conclude that our measurement models are valid and reliable.

We utilized PLS for testing our research model, as it is a more appropriate algorithm for our dataset and (partly) formative model specification (Jarvis, Mackenzie, and Podsakoff 2003). The effect sizes f^2 of the transaction based governance construct is close to medium (.12). The f^2 of relational based governance signifies large effects (.93); while the f^2 of environmental uncertainty exhibits only small effects (.06) (Cohen 1988).

Figure 1 shows the results of the analysis. The explanatory power value of the endogenous latent variable Performance ($R^2 = .69$) must be considered substantial (Chin, 1998), as the performance of horizontal exchange relationships is impacted by many other aspects besides transactional and relational governance. Overall, our model was deemed to demonstrate acceptable explanatory power.

Figure 1 – Results of the analysis



Discussion of results

In our sample of companies, relationship specific investments actually have a detrimental effect on the cooperation performance ($b = -.19$). Thus we must reject Hypothesis H₁. This might be for the fact, that the majority of the LSPs in our sample size employed less than 100 people, thus making investments into relationship specific assets and ICT cumbersome. In addition, if the environment is stable, the need for constant information exchange via ICT and constant process alignment by means of asset sharing may be lower than in highly volatile market conditions.

Relational based governance mechanisms exhibit little to no effect on the competitive success. ($b = .03$), which does not support our Hypothesis H₂. If the environment is stable, relational mechanisms such as trust, embeddedness and commitment seem to be obsolete, as other means of governance seem to be more effective. For the joint usage of transactional and relational governance one can only observe a slight effect on performance ($b = .14$) which partly contradicts previous findings in vertical settings by (Liu et al. 2009). However, the joint effects are stronger than the individual effectiveness, thus supporting our Hypothesis H₃. If relational and transactional governance is applied simultaneously, they offer a broader coverage against opportunisms. However since both have individually little effect on the performance, their joint effectiveness is also not significant.

However, if the economic environment is volatile, and institutional settings uncertain, transactional mechanisms have a significant effect on the performance of cooperations ($b = .58$), and therefore we must also reject the hypothesis H₄. Investments into joint asset infrastructure and ICT by the exchange parties act as stabilizing factor in fast changing environments. Transaction based governance acts as a substitute for institutions who in emerging economies often time lack dependability and consistency. While transaction based investments impede the flexibility required in swift changing economies, they signal stability and reliability to partnering LSP in cooperation.

This is even more apparent for relationally governed exchanges, which shows a significant impact on the cooperation performance if specifications are vague ($b = .62$). If the institutional specifications are vague, governance between exchange partners is achieved by mutual relationships based on trust, embeddedness and commitment. If partners develop a mutual understanding and an affiliation, they are much less likely to act opportunistically on cooperation partners in instable market conditions. This relational form of governance might act as a substitute for more formal based governance forms such as contracts, as they lose their value in uncertain institutional settings. Hypothesis H₅ is therefore supported by our empirical data.

Conclusion and further research

Our study contributes and extends the emerging research stream on horizontal LSPs cooperations, documenting the individual and joint effects of social and transactional governance systems on cooperation performance under environmental uncertainty. Generally, the results of this research provide empirical evidence that environmental uncertainty has a strong moderating effect on governance mechanisms in a horizontal cooperation setting. In particular, our findings suggest that neither social aspects nor transactional governance mechanisms by their selves bring value to cooperations performance, but only if they are aligned to the institutional constraints surrounding a company do they provide benefits to cooperation performance.

Executives of LSPs in emerging economies must therefore align the governance mechanism to their individual market conditions. In particular as the perceived external risks are manifold; trust, commitment and embeddedness should be emphatically used by executives to open

up communication and ensure the joint development of inter-personal and inter-firm ties among participants. Another lesson learned from this study is that the differentiation between the two examined governance mechanisms does not significantly impact the success of these relationships. As LSP aim to decrease opportunism and improve cooperation performance, the executives should consider using relational mechanisms alongside transactional mechanisms. However, as most LSP operating in emerging economies are small in size and cash restricted, executives might not have the financial means or manpower for far-reaching alignment of their ICT systems or assets. Consequently, relational governance aspects seem more viable in such circumstances. However, as the economies and institution progress, the transactional other means of governance might become more applicable.

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