

Determinants of Vertical Coordination in Buyer-Seller Relations: Exploratory Findings from a Developing Economy

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Abstract

This study aims at understanding determinants of vertical coordination for firms in developing economies by conducting exploratory study in Tanzania. The study is centred on business - to business buyer -seller relations. Primary data were collected from buying side of the relationship. The main supplier of each firm was identified and used for answering the questionnaire. Findings suggest contractual flexibility to have higher significant positive effect in determining vertical coordination. The interaction effect between buyer asset specificity and contractual flexibility was also significant, while asset specificity by itself was not found to be significant. These preliminary findings suggest the strength of vertical coordination relies to extent on whether parties in relationship agree to be flexible in their contracts.

Keywords: Vertical coordination, Asset specificity contractual flexibility, Environmental uncertainty

1. Introduction

A focus behind Transaction Cost Theory (TCA) is the assignment of specific governance mode on the basis of low (economical) transaction costs (Williamson, 1985). TCA perspective argues that the “inter-firm exchanges vulnerable with unforeseen contingencies can not be governed with complete contract” (Buvik & Grønhaug, 2000, p.447). Vertical coordination is among the intermediate/relational forms of governance (Stern & Reve, 1980; Buvik & Andersen, 2002). Core dimension of Transaction cost theory (TCA) are asset specificity and uncertainty surrounding the exchange (Andersen & Buvik, 2002). According to Williamson (1985, 1991) the escalation of specific assets will call for vertical coordination as a mechanism for controlling the ex post transaction costs. There are mixed results on effect of environmental uncertainty on vertical coordination. Some studies have found negative relationship (Levy, 1985; John & Weitz, 1988; Masten, 1984) while others found no relationship (Anderson & Schmittlein, 1984; Maltz, 1994). TCA has been criticized before for lack of generalizability and having ethnocentric bias (Dore, 1983). A need for flexibility arises because of bounded rationality limits of a human mind to focus on given information (Macneil, 1980). Rindfleisch and Heide (1997) argued that bilateral hybrid governance structures appear to provide a firm with a way to safeguard its specific assets by developing closer ties with its exchange partners. This study has assumed the vertical coordination to be contingent upon partners’ readiness to exercise contractual flexibility. Willingness to show contractual flexibility is a sign of trust and it will improve the vertical coordination upon low to medium asset specificity deployment in the relationship between buyer and seller. This study is one of few attempts that examine the way asset specificity interacts with contractual flexibility in determining vertical coordination.

2. Statement of the problem

There are very few studies in developing countries that relate most of business theories emerged from developed economies. There is a general assumption that existing findings do directly apply for firms in developing economies. Transaction cost theory has been developed around firms in developed economies and mostly in large manufacturing (supplier-manufacturer relations). Typical characteristics of firms in developing economies include small size and small manufacturing. Culture and institutions surrounding firms in developing economies are different from developed economies. This difference shapes the way firms respond and organize their activities. The effect of context on TCA theory is assumed to be minimal in developing economies. This study provides a different platform through bringing in a developing economy context to understand determinants of vertical coordination from TCA perspective. Current literature suggests vertical coordination to be driven by asset specificity. In attempt to safeguard these specific investments, firms cannot totally rely on the use of formal contracts and so they use vertical coordination instead. This might not always be a condition for firms in developing economies. Presence of vertical coordination could be derived by other contingencies surrounding of partners. This study is important in a sense that it enhance our understanding on how vertical coordination decisions play in developing economies.

3. Literature Review and Hypothesis

3.1 Vertical Coordination

Vertical coordination is one of the intermediate (hybrid/relational) modes of governance. It can be viewed as a purposive organization of activities and information flows between firms (Stern & Reve, 1980; John & Reve, 1982; Buvik & John, 2002). Vertical coordination has been associated with reduction of ex post transaction costs such as product design and production (Dowst, 1988; Spekman, 1988). The strength of vertical coordination is attributed by first; having interaction pattern that is beyond contracts and second; having interaction patterns that are private rather than legal mandate (Buvik & John 2000). For a “vertical coordination to be beneficial, the ex post transaction costs has to decline with greater vertical coordination, and vice versa” (Buvik & John 2000). Vertical coordination is seen to be important in “handling ex post issues” that arises when firms make transactions (Buvik & Andersen, 2002). Studies has supported the idea of better adaptation as a result of relational interactions among firms (Heide & John, 1990; Lusch & Brown’s, 1996)

3.2 Effects on Vertical Coordination

3.2.1 Conceptual Model

The model in Figure 1 gives a summary of the hypotheses that are raised. It consists of three hypotheses. Hypothesis 1 predicts of direct positive relationship between contractual flexibility and vertical coordination. Hypothesis 2 predicts the direct positive effect of asset specificity on vertical coordination and hypothesis 3 predicts the positive interaction effect of asset specificity and contractual flexibility on vertical coordination.

INSERT FIGURE 1

3.2.2 Direct effect of contractual flexibility

From supplier’s perspective, contractual flexibility represents assurance that the relationship will be subject to good-faith modification if a particular practice proves detrimental in the light of changed circumstances (Heide & John, 1992). Contracts are “incomplete” and we can hardly rely on them to solve our problems (Anderlini & Felli, 1999). A need for flexibility arises because of “bounded rationality i.e. the limits of a human mind to focus on available information” (Macneil, 1980). Flexibility defines a “bilateral expectation of willingness to make adaptations as circumstances change” (Heide & John 1992:35). “It is not the degree to which agreements have been tightly worded *ex ante* that is of concern, rather it is the reaction toward change requests that matters” (Noordewier et al 1990: 83). Flexibility is a sign of trust and confidence among trading partners. The assumption is that flexibility might be an opening door towards vertical coordination. The other side of argument is that flexibility is important ingredient for cooperation. When it exists for sometimes it will transform the relationship between supplier and buyer in a very positive level. This assumption leads to the hypothesis that contractual flexibility will have a significant positive impact on vertical coordination.

H1: Contractual flexibility has a positive impact on vertical coordination

3.2.3 Buyer Asset specificity

Asset specificity has been seen as a key motive for vertical coordination (Bucklin & Sengupta, 1993; Rindfleisch & Heide, 1997, Geyskens et al, 2006). Empirical works have previously linked asset specificity with vertical coordination (Buvik & Reve, 2002; Heide & John, 1990). Asset specificity is defined as the “durable investments that are undertaken in support of a particular transaction” (Williamson, 1985). They include “physical and immaterial assets tailored to a specific relationship that cannot be redeployed for other purposes without the sacrifice of productive value” (Buvik & Andersen, 2002). The prediction of transaction cost theory is that low asset specificity is associated with market form of governance. Market as a form of governance provides self control against opportunistic behaviour. Increased power of the buyer in the market mode, positions the seller in threat of losing customers and reputation if he behaves opportunistically. TCA predicts the escalation of asset specificity to lead to vertical coordination as a mechanism to handle hazards that are brought by small number conditions (Williamson, 1991, Williamson, 1985). The study assumes this relation will be maintained independent of the context and formally we hypothesize that:

H2: Buyer asset specificity has a positive effect on vertical coordination

3.2.4 Interaction effect of contractual flexibility and asset specificity

Rindfleisch and Heide (1997) argued that bilateral hybrid governance structures appear to provide a firm with a way to safeguard its specific assets by developing closer ties with its exchange partners. Bucklin and Sengupta (1993), found that under conditions of high levels of specific “investments, co-marketing alliance partners reduce power imbalances through formal contracts that build exit barriers, exclusive dealing, and financial incentives into the relationship”. The problem that arises with strict contractual agreements is the inflexibility. For closer ties to grow, partner has to assume a reasonable level of flexibility. The exercise of vertical coordination is therefore contingent upon partners’ willingness to exercise contractual flexibility. In consistent with Rindfleisch (1997), we expect under the presence of both asset specificity and contractual flexibility the effect of vertical coordination will be positive.

H3: The asset specificity will have positive impact on vertical coordination in the presence of contractual flexibility.

3.3 Control Variables

3.3.1 Environmental uncertainty

Environmental uncertainty is reflected by instability in volume or technical (Geyskens et al, 2006). Environmental uncertainty (volume and technical) increases the likelihood of choosing market governance over relational governance (Geyskens et al, 2006). In search to reduce uncertainty, not only will hierarchies create a low discretion, high-compliance environment inside the organization, they will also choose external environment that will represent relatively low levels of volatility in technologies and market characteristics (Eisenhardt, 1985). Williamson (1991) argued hybrid to be vulnerable with presence of external uncertainty. Some studies reported positive relationship between environmental uncertainty and vertical coordination (Levy, 1985; John & Weitz, 1988; Masten, 1984), while others have reported negative association (Anderson & Schmittlein, 1984; Maltz, 1994). We predict environmental uncertainty to lower the chances for both contractual flexibility and asset specificity in predicting vertical coordination.

3.3.2 Reciprocal investment by supplier

Anderson and Weitz (1992) have pointed out that one party in a relation can make specific investment that will serve as hostage to safeguard the other party's investment. We also expect the reciprocal investment by the supplier to increase the likelihood of both contractual flexibility and asset specificity in predicting vertical coordination.

3.3.3 Performance ambiguity

Performance ambiguity is related to ex post information asymmetry which could be a potential source for opportunism (Rindfleisch & Heide, 1997; Williamson, 1979). Handling ex post problems are associated with the idea behind vertical coordination (Buvik & Andersen, 2002). Difficulties associated with measuring performance will encourage cooperation among partners. When neither behaviour nor outcome of behaviours can be measured effectively, the social control become performable (Ouchi, 1980). Hence we expect performance ambiguity to have a positive impact on both contractual flexibility and asset specificity in predicting vertical coordination.

4. Methodology

4.1 Research Background

The empirical context for the study is Tanzanian producer and distributor firms, representing suppliers and buyers respectively. Data were collected from distributor (buyer) firms. A random sample of n=150 buyers were contacted by phone call, of which n=130 were interested to participate. The questionnaires were distributed personally. This allowed for explanations or clarification to respondents. Buying firm was told to identify a major supplier who was being used to respond to the questionnaire. Questionnaires were later collected and the response rate was about 65%.

4.2 Sample characteristics

25.8% of firms involved in this study were established between years 1990-2000, 73.2% were those which had been established after year 2000. The rest were established before year 1990. Business turnover indicated that 30.9% of firms had an annual turnover of up to 5 million Tanzanian shillings, 55.7% with annual turnover of between 5 to 200 million Tanzanian shillings (exclusive), 12.4 had annual turnover of between 200 to 800 million Tanzania shillings (exclusive), and the rest had above 800 million Tanzania shillings. 25.8% of firms purchased from their supplier an amount of less than 10% of their total purchases, 33% with between 10-40% exclusively, 23.7% with between 40-70% exclusively and the rest were above 70%.

4.3 Measurements

4.3.1 Vertical coordination

Multi item scales have mainly been used to measure vertical coordination (Heide & John, 1990). These studies have indicated high reliability of these scales. This study used three items (in table1) in measuring this concept. After factor analysis the three items loaded into a single factor. The reliability analysis indicated $\alpha = 81.59\%$ which was quite significant. The results were also confirmed by Kaiser-Meyer-Olkin (KMO) and Bartlett's test which measured 0.717 and $\lambda^2 = 97.153$ (significant at $p < .001$), respectively signifying a very strong correlation of items measuring this concept.

4.3.2 Contractual flexibility (CFLEX)

A 7-points likert scale consisting of multi items indicating the degree of acceptance has been widely used in measuring this concept (Heide & John, 1992; Heide 1994). The focus on measuring this construct has been on parties' expected flexibility in response to changing circumstances (Heide, 1994). This study adopted the same scale (7-points likert scale) with multi items scale indicating the extent to which respondents rank the accuracy of description (completely inaccurate/completely accurate description). Three items (table1) were used and all of them loaded in a single component after performing a factor analysis. The reliability analysis measured a level of

$\alpha = 78.92\%$ which was significant. KMO and Bartlett's test indicated a measure of 0.623 and $\lambda^2 = 98.234$ (significant at $p < .001$) respectively. In the analysis this factor was abbreviated by CFLEX

4.3.3 Buyer asset specificity (BUASP)

This concept has been measured using five item, seven-point scale, anchored by "strongly disagree" and "strongly agree" statements (Rokklan et al, 2003; Stump & Heide, 1996). While Anderson (1985) used 7 items, this study used four items (table1) on 7-points likert scale with completely inaccurate/accurate description. After performing factor analysis all loaded into one component using principal component factor analysis method. The reliability of this component measured $\alpha = 93.35\%$ which is very significant. KMO was 0.796 also indicated a satisfactory correlation level of the items which justified for factor analysis. Bartlett's test indicated $\lambda^2 = 501.17$, significant at ($p < .001$), rejecting the null hypothesis that the correlation matrix was identity matrix. The buyer asset specificity was abbreviated by term BUASP in the analysis.

4.3.4 Performance ambiguity (PA)

Some studies have tried to capture concept of performance ambiguity separately without being integrated inside behavioural uncertainty measures. For example four to six items in seven-point scale have previously been used before in measuring this construct (Stump & Heide, 1996; Ghosh & John, 2005). Some studies have integrated this concept in the behavioral as well as environmental uncertainty (Anderson, 1985). This study adopted these measures using four items, 7- point likert scale (table1). All items loaded into one component with reliability coefficient $\alpha = 70\%$. KMO and Bartlett's test measured at 0.771 and $\lambda^2 = 65.647$ (significant at $p < .001$) respectively implying a very significant correlation of these items in measuring the concept. This concept was abbreviated by PA in the analysis.

4.3.5 Environmental uncertainty (ENVU)

Multi items scales have mostly been used in many studies for this variable (Noordwier et al, 1990; Anderson, 1985). The items used in these studies reflect instability (complex, volatile, difficult to monitor, uncertain markets, high forecast error) and other items reflect venturing into the unknown as the firm's emphasis on new activities (Anderson, 1985), or volume and technological uncertainties (Noordwier et al, 1990). The study used three items (all shown in table1) in measuring this concept. After factor analysis all items loaded into a single factor. Further the reliability analysis indicated $\alpha = 82.78\%$ which is quite significant. KMO and Bartlett's test measured 0.859 and $\lambda^2 = 417.069$ (significant at $p < .001$) respectively, implying a significant correlation of the terms in measuring the concept. This concept in the analysis was then be abbreviated as ENVU.

4.3.6 Supplier asset specificity (SUASP)

Multi item scale has been used to measure this concept (Heide & John, 1992; Buvik, 2000). The 7-points likert scale of 4 items (table1) was used in measuring this concept. Minor adjustments were implemented so as to suit with the new study setting. After factor analysis method the results from varimax rotation indicated that two items loaded in single component. The reliability coefficient for the variables in the component measured $\alpha = 95.91\%$, which was quite significant. Other measures were used for factor analysis justification like KMO, which measured at 0.813, indicating correlation among items were significant. Bartlett's test as well measured at $\lambda^2 = 573.517$ which was significant at $p < .001$, rejecting the null hypothesis that the correlation matrix was identity matrix. Supplier asset specificity was abbreviated by term SUASP in the analysis.

INSERT TABLE1

5. Results

H1 suggested a positive impact of contractual flexibility on vertical coordination. This hypothesis was supported from table2 results in Model 1 ($t = .813$, $p < .01$). The strength of this effect remained consistent after introducing different control. Model 4 in table 2 used all controls and the robustness was maintained ($t = .783$, $p < .01$). Correlation matrix from table3 does not indicate any serious effect of multicollinearity. This improved validity of variable's prediction.

H2 suggested buyer asset specificity to have a positive impact on vertical coordination. This hypothesis was not supported. All Models from table 2 have not indicated any significant effect in spite of adding different controls.

H3 suggests buyer asset specificity to have higher positive effect in presence of contractual flexibility. This hypothesis was supported and the effect remained consistent after introducing controls. The Interaction effect between buyer asset specificity and contractual flexibility on vertical coordination with absence of controls in table 2, Model 1 ($t = .582$, $p < .01$) was significant. This effect remained significant after introducing all controls in Model 4 ($t = 2.4$, $P < .01$) in table2. The correlation matrix in table3 indicated vertical coordination to significantly and positively correlate with contractual flexibility and performance ambiguity. These correlations do not indicate any serious problem of multicollinearity. On the other hand asset specificity did not indicate to have significant correlation with vertical coordination.

General remarks imply little effect from controls on the suggested relations. Model 1 in table2 ($R^2 \text{Adj} = .23$; $F(3, 94) = 10.41$; $p < .001$) do not differ with Model 4 in table 2 ($R^2 \text{Adj} = .235$; $F(7, 90) = 5.17$; $p < .001$). The increments in $R^2 = .005$, which is very small and thus suggest the three variables hypothesized were strong predictor of

vertical coordination.

INSERT TABLE2

INSERT TABLE3

6. Discussion

The result from table 2 has supported the H1 and H3 while H2 was not supported. These findings indicate vertical coordination to be highly determined by willingness of partners to exercise contractual flexibility. Previous findings have suggested low to moderate asset specificity will have positive impact on vertical coordination (Buvik & John, 2000; Rendefleisch & Heide, 1997), while others have found negative effect (Frank & Henderson, 1992). Ghoshal and Moran's (1996) found asset specificity to have positive effect in markets but negative in hierarchies/hybrids, while Buvik and John (2000) has found asset specificity to have positive effect on vertical coordination. This study has found contractual flexibility to be key determinant of vertical coordination. This partly suggests contractual flexibility to be a lubricant through which better relations between seller and buyer can develop. Buyer asset specificity alone does not cause any significant impact. The sign of the effect is negative [consistent with previous findings from Ghoshal and Moran's, (1996)] though not significant. The interaction between asset specificity and contractual flexibility was found to be significant as predicted. This suggests asset specificity to be contingent upon contractual flexibility among partners. Flexibility could be viewed as a sign of "willingness to make adaptations as circumstances change" (Heide & John 1992). From these findings we argue flexibility to be one of key determinants in defining the boundary between hierarchy and vertical coordination in presence of asset specificity.

7. Limitations

This study acts as exploratory and the scope is limited to firms in developing economies. The study had only included relations between local firms and did not extend to analyse relations between local and international firms. The sample size of the firms used was small which limits the explanatory power. The analysis of the results has not included variables like culture and institutional related factors. These variables could provide extensive explanation of these relationships. Differences in industries was not analysed and the findings might not apply to all industries.

8. Conclusion and Implications

The study suggests contractual flexibility to be a major determinant toward vertical coordination. Asset specificity itself was not found to be significant determinant though its interaction with contractual flexibility had a significant positive impact on vertical coordination. Our understanding on the influence of low to moderate asset specificity in determining vertical coordination has ignored other surrounding dimensions like partners' willingness to show flexibility. This study has updated our understanding on the role of partners' willingness to exercise contractual flexibility in determining vertical coordination.

We do suggest other studies to examine how firms in developing economies interplay asset specificity and contractual flexibility and how does this differ between industries, firm size, culture and even experience. This study was limited by being conducted to firms in Tanzania and the generalizability should be considered primarily but not minor.

9. Recommendations

We do recommend other studies on this area to involve more countries and more industries. More variables like culture and other institutional related factors could be added and their role should be explained. Future studies should involve alternative theoretical approaches. For example network theories could be integrated in this subject to expand the explanation. Results should also take into account both industry and country specific factors. Extensive studies could try to explain why there are expected to be fundamental differences or similarities in terms of theoretical implications between firms in developed and developing economies.

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Table 1. Summary of Measurements

CONSTRUCT	ITEMS
Vertical Coordination (VertCoord) (3 Items) $\lambda^2=97.153$ $p < .01$ $\alpha = 81.59\%$ KMO = .717	1.We regularly exchange information on this product with this supplier 2. We regularly exchange information about price development and market conditions with this supplier 3. We cooperate closely with this supplier on quality control of product delivered to our firm.
Contractual Flexibility (CFLEX) (3 Items) $\lambda^2 = 98.234$ $p < .01$ $\alpha = 78.92\%$ KMO = .623	1 Flexibility in response to request for changes is a characteristic of this relationship 2. The parties expect to be able to make adjustments in the ongoing relationship to cope with changing circumstances 3. When some unexpected situation arises, the parties would rather work out a new deal than hold each other to
Buyer Asset specificity (BUASP) (5 Items) $\lambda^2=501.174$ $p < .01$ $\alpha = 93.35\%$ KMO = .796,	1.We have made significant investment in equipment dedicated to our relationship with this supplier 2. We have made extensive internal adjustments in order to deal effectively with this supplier 3. Training our people to deal with this supplier has involved substantial commitments of time and money 4. Our logistics system have been tailored to meet the requirements of dealing with this supplier
Supplier Asset Specificity (SUASP) (4 Items) $\lambda^2=573.517$ $p < .01$ $\alpha = 95.91$ KMO = 0.813	1.Supplier has trained their employees to deal with our firm 2.Supplier has made substantial commitment of time and money 3.Supplier production systems have been tailored to produce for our firm. 4. Supplier logistics system has been tailored to meet the requirements of dealing with our supplies.
Performance ambiguity (PA) (4 Items) $\lambda^2=65.647$ $p < .01$ $\alpha = 70\%$ KMO = .711	1 It is inadequate to evaluate this supplier base on item(s) price. 2. Evaluating the supplier's performance is highly complex process 3. There would be significant costs associated with one-site monitoring of this supplier. 4. Precise standards to assess this supplier's performance are not readily available.

Environmental Uncertainty (EU) (3 Items) $\lambda^2 = 417.069$ $p < .01$ $\alpha = 82.78\%$ KMO = 0.859	1 Demand for this product varies continually. 2. Our most important competitors are regularly carrying out product adjustment 3. Product we are purchasing from this supplier have high innovation rate and varies continually.
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This table shows a list of all the variables used in the analysis. First column gives the details of each variable (reliability, KMO Bartlett’s test and significance level). Second column show a list of specific items used to indicate a given variable.

Table 2. Regression Results

Dependent Variable: Vertical Coordination

Independent variables	MODEL 1		MODEL 2		MODEL 3		MODEL 4	
	b	t	b	t	b	t	b	t
CONST	5.467	.000	5.477	.000	5.472	47.8**	4.45	5.7**
H1 BUASP	-.207	-1.14	-.177	-.956	-.179	-.966	-.181	-.98
H2 CFLEX	.813	.582**	.842	5.44**	.845	5.43**	.783	4.7**
H3 BUASPCFLEX	.568	.582**	.559	2.57**	.553	2.53**	.532	2.4**
Control Variables								
SUASP			-.091	-.967	-.088	-.909	-.104	-1.07
ENVU					-.111	-.808	-.138	-1.008
PA							.194	1.318
	R² Adj = .23 F (3, 94) = 10.41 P < .001		R² Adj = .23 F (4, 93) = 8.04 P < .001		R² Adj = .22 F (6, 91) = 5.5 P < .001		R² Adj = .235 F (7, 90) = 5.17 P < .001	

*Indicates p<.05 (One-tailed)

**Indicates p<.01 (two-tailed)

This table gives regression results for the three models use. Model1 consist a list of three variables used in hypotheses excluding controls. Model 2 used reciprocal investment from supplier as a control. Model 3 used supplier reciprocal investment and environmental uncertainty as controls. Model4 use all controls. The results on each model’s fitness are presented under the table.

Table 3. Correlation Matrix

	1	2	3	4	5	6	7
1. VERTCOORD	1	-.139	.435**	-.057	-.041	-.080	.25*
2. BUASP		1	-.131	.143	.065	-.019	-.042
3. CFLEX			1	-.56**	.189	.055	.381**
4. BUASPCFLEX				1	-.095	-.056	-.171
5. SUASP					1	.062	.220*
6. ENVU						1	.311**
8.PA							1
Means	5.56	-.389	.0605	-.0707	5.43	-.0220	5.210
Standard deviation	1.00	.503	.722	.506	.47	.9047	.7112

* Indicates significance at p<.05

** Indicates significance at p<.01

This table presents a correlation matrix for all variables used in the analysis. Information about means and standard deviation for each variable is also presented under the table.

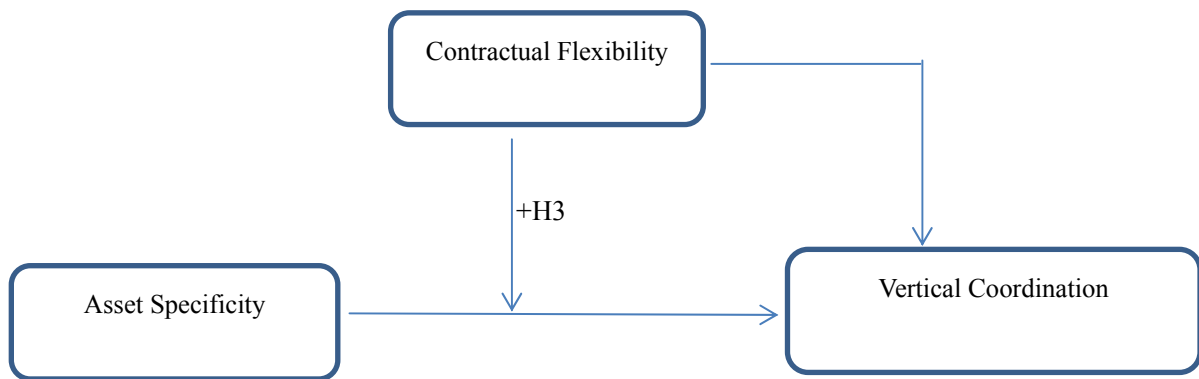


Figure 1. Conceptual model

The model describes three conceptual framework of this study. The three hypotheses are denoted as H1, H2 and H3. H1 suggests a direct positive impact of contractual flexibility on vertical coordination. H2 suggests a direct effect of of asset specificity on vertical coordination. H3 suggests positive interaction effect of asset specificity and contractual flexibility on vertical coordination.