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DETERMINANTS OF SUPPLIER-BUYER RELATIONSHIP COMPETITIVENESS IN TRANSNATIONAL COMPANIES

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ABSTRACT: *Effective supplier-buyer relationship management should not be seen only in terms of cost and financial measures, as outlined by Transaction cost economics, but also in terms of other (“softer”) relational benefits, like e.g. more comprehensive information sharing, higher levels of trust, better cooperation and increased relationship flexibility. This second view is grounded in both Relationship marketing and Resource-advantage theory. Surprisingly, only a few research papers on supplier-buyer relationships address both of these perspectives equally, as well as in terms of long-term competitiveness (vis-à-vis a traditional short-term performance). The purpose of this paper is to analyze business relationship determinants of supplier-buyer relationship competitiveness, where we study the impact of (1) relationship-based information exchange, (2) network spillover effects, (3) transaction-specific investments, (4) trust, (5) cooperation (joint actions) and (6) flexibility on perceived (7) supplier-buyer relationship competitiveness. In this regard the main research question of our study is: Which relational and transactional dimensions determine supplier-buyer relationship competitiveness, as well as how strongly? To provide the answer this research question we employ an exploratory-type Partial Least Squares (PLS) regression in conjunction with a novel perspective of network spillover effects, as a set of independent variables in our model. The data set consists of a sample of 130 international suppliers (approx. 30 % response rate) connected to a transnational company (TNC) headquartered in Slovenia, which operates in the steel construction solutions’ industry. Our results clearly identify a relational and a transactional set of determinants of supplier-buyer relationship competitiveness, with the former having a significantly higher impact on competitiveness than the latter. With regards to specific dimensions associated with this relational component network spillover effects, as well as trust turn out to be key determinants of supplier-buyer competitiveness.*

Key words: *Buyer-supplier relationships, transnational companies, competitiveness, determinants, NIPALS algorithm, PLS regression.*

JEL classification: F23

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1. INTRODUCTION

Supplier-buyer relationships have today become the “backbones of economic activities in the modern world” (Nagurney, 2010, p. 200) and a focal point of organizational competitiveness, performance and long-term business success (Veludo, Macbeth & Purchase, 2006). According to Gadde & Håkansson (2001, p. 4) for example, “the competitiveness and profit-generating capacity of the individual firm is highly dependent on its ability to handle the supply side”. Similarly, Griffith & Myers (2005, p. 254) position the management of supplier-buyer relationships “as a primary driver of both customer and shareholder value”. This is particularly true due to the increased adoption of “globalization and outsourcing strategies” (Tang & Musa, 2011, p. 25) leveraged by company specialization and focus “on their core competencies” in order to withstand today’s competitive market pressures (Blome & Schoenherr, 2011, p. 43). This has become particularly apparent in international contexts, dominated by transnational companies (TNCs), as key players in the organization of exchanges across markets worldwide (Hymer, 1960).

Moreover, the transitivity of company’s competitive advantage (Tang & Musa, 2011) has not only transformed simple linear supply chains into complex networks of supplier-buyer relationships (Nagurney, 2010), but has also made the management of supplier-buyer relationships “a key component of corporate strategy, competitive advantage and success” (Blome & Schoenherr, 2011, p. 43). This has in turn lead managers as well as researchers to address the issue of the relational determinants of competitiveness in supplier-buyer relationships.

However, as Autry & Golicic (2010) have shown, the link between supplier-buyer relationship management and company performance/competitive advantage is by no means a simple one, let alone a linear one, so they have in turn urged for more research related to this issue. In this regard, e.g. Nagurney (2006, 2010) has emphasized a need to move beyond the traditionally dyadic relationship perspective towards an upgraded network view where networks are not simply the sum of dyadic relationships. On the other hand, Autry & Golicic (2010) have also emphasized a need to study the dynamic nature of the link between supplier-buyer relationship management and company performance/competitive advantage by addressing the mechanism of so called relationship spirals, where the link between relationship strength/quality and performance is a feed-forward/feed-back process leading to long-term competitiveness of the relationship. Lastly, Jap (1999, 2001) has in particular addressed the question of pie-sharing relational mechanisms in competitive supplier-buyer relationships, and called for a deeper understanding of such mechanisms.

The purpose of this paper is to analyze business relationship determinants of supplier-buyer relationship competitiveness, specifically the impact of relationship-based information exchange, network spillover effects, transaction-specific investments, trust, cooperation (joint actions) and flexibility on perceived supplier-buyer relationship competitiveness. In this regard the main research question of our paper is: *Which relational dimensions and transactional dimensions - as well as how strongly - determine supplier-buyer relationship competitiveness?*

To provide the answer to this research question we employ an exploratory-type Partial Least Squares (PLS) regression in conjunction with a novel perspective of network spillover effects, as an additional set of determinants of supplier-buyer relationship competitiveness. Our research design follows both Nagurney's call for incorporating a network perspective in the study of supplier-buyer relationships, as well as Jap's stream of research on specific relational mechanisms driving competitive advantage in supplier-buyer relationships, particularly in the context of building long-term competitiveness of such relationships.

2. THEORY AND CONCEPTUAL FRAMEWORK

Given the exploratory nature of our research this section first provides a brief theoretical background for our research, followed by a description of the conceptual framework relevant to our research with corresponding research hypotheses.

2.1 Theoretical background

The impact of supplier-buyer relationships on organizations can be analyzed from both operational and strategic perspectives (Carr & Pearson, 1999; Lambert & Cooper, 2000). From an operational perspective, for example, Kannan & Tan (2006) mainly emphasize the impact of good supplier-buyer relationships on quality and service delivery, and/or costs. From a strategic perspective, they emphasize sustainable continuous improvements, innovation, enhanced competitiveness, and increased market presence (Kannan & Tan, 2006).

In terms of supplier-buyer performance and/or competitiveness, Lemke, Goffin & Szwedzowski (2003, p. 12) emphasize that suppliers have an important impact on the overall performance and/or competitiveness of the industrial organizations, not only through minimizing costs, but also through joint product, service and process development, as well as continuously improving quality across all business levels (also see Yang et al. 2009). Additionally, Lambert & Cooper (2000) define the value of good supplier-buyer relationships not only in terms of cost, but also in terms of product and service information which adds value. This is especially important in terms of the so-called knowledge-based perspective of supplier-buyer relationships (see Yang et al., 2009), and is further related also to the so called relationship marketing paradigm which we described more systematically in the next section.

2.2 Conceptual framework and hypotheses

Autry & Golicic (2010, p. 87) point to three key perspectives which link specific relationship dimensions to performance and/or competitiveness; and are particularly relevant for our conceptual framework and research approach. The first one is the *Relationship*

marketing theory which emphasizes the importance of long-term and value-adding relationships. These have a superior impact on performance and/or competitiveness outcomes (Morgan & Hunt, 1994). This should be compared to “weak-lined, short-term transactions” (Autry & Golicic, 2010, p. 89; cf. Berry & Parasuraman, 1991; Morgan & Hunt, 1994). Within such a perspective Morgan & Hunt’s (1994) *Trust-commitment theory* has become the cornerstone of the relationship marketing paradigm. While initially trust was mainly seen as a mediator to the antecedents and determinants of supplier-buyer relationship performance (Morgan & Hunt, 1994), Hutt & Speh (2004) later placed more emphasis on the long-term and value-adding nature of such relational exchanges. In such relationships “trust is central” (Morgan & Hunt, 1994, p. 24) and impacts relationship outcomes by reducing opportunistic behavior and increasing acquiescence (Morgan & Hunt, 1994), reducing negotiation and monitoring costs (Zaheer, McEvily & Perrone, 1998), as well as reducing conflict (Zaheer, McEvily & Perrone, 1998). According to Kingshott “trust signifies the transformation from an unpredictable and indeterminate relationship to one comprising relational stability as it reflects the ability to forecast the motives and behavior of others” (2006, p. 726). This aspect of trust has been described as trust based on identifying expectations and is believed to be central to cooperation (Ekar, 2007). This leads us to a link between trust and competitiveness via trust’s direct impact on cooperative behavior, especially in industrial supplier-buyer relationships (Anderson & Narus, 1990; Morgan & Hunt, 1994). Drawing on the multi-level nature of trust in organizational settings – where Zaheer, McEvily & Perrone (1998) point to theoretically and empirically different operational modes of interpersonal and interorganizational trust vis-à-vis relationship outcomes – the following hypothesis was formed:

Research hypothesis 1: *Trust, both at the interorganizational and interpersonal level, has a positive impact on supplier-buyer relationship competitiveness.*

Within the relationship marketing perspective the role of communication, especially information sharing, has also been specifically emphasized (Morgan & Hunt, 1994). On the one hand, withholding information can be actually understood as a dimension of passive opportunistic behavior (Jap & Anderson, 2003). We can thus say that there is a close link between the exchange of information and the lack of opportunistic behavior in business relationships, particularly supplier-buyer relationships, since “the overall purpose of monitoring is to reduce opportunism by virtue of reducing information asymmetry” (Wathne & Heide, 2000, p. 43). On the other hand, several prominent scholars in the marketing literature have emphasized the positive link between exchange of information (communication) and trust. Thus, past exchange of information leads to higher levels of trust between actors (Anderson & Narus, 1990), while a trusting relationship atmosphere further encourages better, more pristine and open exchanges of information (Mohr & Spekman, 1994). Anderson & Narus (1990) further pointed to a dynamic circular view between information exchange and trust, which Seppänen, Blomqvist & Sundqvist (2007) described as a reciprocal relationship. In terms of relationship outcomes, Selnes (1998) believes that open and timely communication had a positive influence on

the level of satisfaction of all actors involved in the relationship, as well as other relationship outcomes.

Research hypothesis 2: *Relationship-based information sharing has a positive impact on supplier-buyer relationship competitiveness.*

The second theoretical perspective discussed by Autry & Golicic (2010) is perhaps the most intuitively linked to competitiveness. This is the so-called *Resource-advantage theory* of competition (Hunt & Morgan, 1995, 1996, 1997; Hunt, 2000). More recently, this theoretical perspective has been directly integrated to the supply chain literature by Hunt & Davis (2008, 2012), merging the two disciplines together. Hunt and Morgan have in their rich stream of work addressed the shortcomings of a “static” understanding of market competition and provided their “dynamic” alternative. Within this perspective relationships and relationship strength were positioned as a key resource for organizational competitive advantage building (Hunt & Morgan, 1995). More recently, Hunt & Davis (2008) have explicitly called for the employment of the *Resource-advantage theory* in the supply chain management literature. In this regard, Hunt & Davis (2012, p. 16) have linked this organizational capability perspective specifically to supply chain management through Hunt & Morgan’s (1995) *Resource-advantage theory*. Building on Hunt & Davis’ (2008, 2012) work, relationships should not simply be viewed as a crucial organizational resource which contributes to sustainable competitive advantages by facilitating the flexibility of embeddedness and disembeddedness. This is because, according to Heidenreich (2012), the TNC’s capability to switch between different types of embeddedness/disembeddedness³ is crucial to its competitive advantage. They should actually be managed as complex social conduits of (1) activity links/patterns, (2) resource ties/constellations and (3) actor bonds/webs. Such a complex pattern of interaction – operationalized within the marketing literature by the ARA interaction model (Håkansson & Snehota, 1995) – requires collaborative behavior which creates long-term, trusting and value-adding relationships, which can be seen as key intangible organizational resources (Makovec Brenčič, 2000; Morgan & Hunt, 1994; Hunt & Morgan, 1995).

In supplier-buyer contexts collaborative behavior leads to “pie expansion” where mutually beneficial strategic competitive advantages are created between suppliers and buyers (Jap, 1999, p. 461). This can also be related to trust and is consistent to Anderson & Narus’ (1990, p. 45) description that “once trust is established, firms learn that coordinated, joint efforts will lead to outcomes that exceed what the firm would achieve if it acted solely in its own interest”.

Dwyer, Schurr & Oh (1987, p. 13) saw joint actions – in the form of “joint efforts related to both performance and planning over time” – as a core relational exchange mechanism,

³ In this context, the concept of embeddedness is employed as an economic sociology concept and relates to the structural and relational influence of “ongoing systems of social relations” on social and economic actions (Granovetter, 1985, p. 487; also see Zukin & DiMaggio, 1990, for a typology of different types of embeddedness).

linking suppliers and buyers in successful and long-term relationships. More specifically, collaborative behavior impacts relationship outcomes by increasing efficiency through better coordination and planning, and higher flexibility and adjustments which all lead to a sustainable long-term competitive advantage (Nyaga, Whipple & Lynch, 2010).

Research hypothesis 3: *Collaborative behavior in the form of joint planning and joint problem solving has a positive impact on supplier-buyer relationship competitiveness.*

Flexibility is a key performance indicator and outcome of an efficient and competitive operation system – like e.g. supplier-buyer relationships (Bertrand, 2003). In operational terms flexibility is not only crucial to deal with increasing market and demand uncertainty (Bertrand, 2003), but also to constantly adapt to transient market conditions (Swafford, Ghosh & Murthy, 2006). This can be related to both Hunt & Morgan's (1995) *Resource-advantage theory of competition* – which emphasizes this transient competition perspective – as well as Hunt & Davis' (2012) understanding of flexibility as a key organizational capability in a supply setting. Furthermore, in relational governance terms, Cannon, Achrol & Gundlach (2000) see flexibility as a particular type of social cooperative norm. Based on a sample of 396 buyer-seller relationships they were able to show that flexibility, as a particular type of social cooperative norm, positively affects relationship outcomes in cases of both high and low level of transaction uncertainty (Noordewier, John & Nevin, 1990). A similar perspective on flexibility, as a relational norm, was outlined by Heide & John (1992).

Research hypothesis 4: *Relationship flexibility has a positive impact on supplier-buyer relationship competitiveness.*

The last, third, perspective discussed by Autry & Golicic (2010) is the traditional *Transaction cost economics theory* which balanced internalization and externalization costs. In this regard, the most efficient supplier-buyer relationship was the one based on the lowest possible total cost – where internal operations costs were balanced-off with the costs of purchasing, planning, adapting and monitoring externally-transacted operations (Williamson, 1996). Addressing the question of interorganizational competitive advantage, Dyer & Singh (1998, p. 660) saw transaction-specific investments as one of “the four potential sources of interorganizational competitive advantage”. They linked the role of transaction-specific investment particularly to the creation of strategic relational rents as sources of sustainable long-term competitive advantage (Dyer & Singh, 1998). Yet, the transaction cost perspective needn't necessarily be an alternative to the relationship perspective in studying supplier-buyer relationships, since the ultimate goal of efficient supplier-buyer relationships is to achieve a socially desirable and economically acceptable performance outcome, which in turn contributes to a sustainable competitive advantage, Jap (2001) drew on the earlier work of Dyer (1996) and Dyer & Singh (1998) to show how suppliers and buyers “interrelate the use of idiosyncratic investments [transaction-specific investments], knowledge-sharing processes [relation-

ship-based information], complementary capabilities and effective governance to create competitive advantages” (Jap, 2001, p. 19). This perspective has also been taken up by Autry & Golobic’s relationship spirals perspective (2010, p. 90), who emphasize that “the iterative sequencing of the relationship strength and relationship-specific performance constructs as a spiral is supported via the integration of social capital and transaction cost economics theories”.

Research hypothesis 5: *Transaction-specific investments, both into physical assets and people, have a positive impact on supplier-buyer relationship competitiveness.*

Lastly, our conceptual framework also importantly addresses the issue of network spillover effects, because dyadic supplier-buyer relationships are not only embedded and constrained by their wider networks (Anderson, Håkansson & Johanson, 1994; cf. Granovetter, 1985), but the actors involved also “use their network consciously to support the business done in specific relationships” (Claro & Claro, 2011, p. 514). Within their respective networks individual actors also develop different network identities. They in turn relate “to the perceived attractiveness (or repulsiveness) of a firm as an exchange partner due to its unique set of connected relations with other firms, links to their activities, and ties with their resources” (Anderson, Håkansson & Johanson, 1994, p. 4). This sort of understanding formed the conceptual basis for our analysis of the impact of network spillover effects on supplier-buyer relationship competitiveness.

This can be connected to Burt’s (1995) research on network structures and actors’ structural positions, and further connects to the question of motivation of a particular supplier in a supply relationship. This helps to explain signaling effects, where “transaction with firms of known reputation and capabilities” may be a motivation behind a given supplier-buyer relationships and its TSIs (Claro & Claro, 2011, p. 515). In their discussion of the determinants of attraction in supplier-buyer relationships, Hald, Cordón & Vollmann (2009) focused on the issue of perceived expected value of supplier-buyer relationships. This perceived expected value can, among other things, also be association related. In this regard, a supplier may increase its legitimacy by being associated with a particular buyer (Hald, Cordón & Vollmann, 2009, p. 963).

Providing a more systematic typology of possible indirect value functions of supplier-buyer relationships, Walter, Ritter & Gemünden (2001, p. 368) outlined three different indirect functions, which directly correspond to our network spillover effects, namely: (1) the market function (creating new relationships based on references); (2) the scout function (obtaining information from other boundary spanning actors on potential new relationships); and (3) the access function (relationships enabling direct access to other relationships, resources and/or activities).

Research hypothesis 6: *Network spillover effects have a positive and substantial impact on supplier-buyer relationship competitiveness.*

3. DATA AND METHODOLOGY

3.1 Data

Data was collected from a sample of 130 international suppliers to a particular TNC between June and August 2011 (approx. 30 % response rate; convenience-based-type sample) using a web-based questionnaire in Slovenian, English, Serbian and Russian language. The surveyed suppliers were all connected to a particular TNC headquartered in Slovenia, with manufacturing operations in Slovenia, Serbia, Russia and United Arab Emirates. The TNC produces metal constructions and components, and is considered a leading developer of unique and complete solutions related to steel constructions, roof systems, façades, steel containers, as well as complete sound insulation solutions in Eastern Europe. It also has a strong presence in selected Western European markets and in Russia. In 2011 the TNC employed over 1,000 people world-wide and generated revenues in excess of 178 million EUR.

3.2 Methodology

The data set was analyzed using Partial Least Squares (PLS) univariate regression modeling,⁴ based upon the specific model of supplier-buyer relationship management developed for the Dutch potted plant industry. This model was first tested as a covariance-based structural equation model (SEM) by Claro in 2004, and subsequently by Claro & Claro (2010) as a simpler Ordinary Least Squares (OLS) regression model.

Claro's (2004) original model was chosen due to its unique incorporation of network-embedded downstream and upstream information exchange. Claro named this simply as "the business network" (ibid. p. 176), which is in accordance with Gulati's (2007) understanding of networks being important information repositories. The inclusion of this network-information-based perspective was an important contribution to the analysis of supplier-buyer relationships, which were (and still are) traditionally analyzed at a dyadic level. Such information exchange was first modeled as a key exogenous latent construct within Claro's (2004) PLS SEM testing, with the final dependent latent construct in the model being performance. In their extension of this analysis, Claro & Claro (2010) further analyzed this type of information exchange within their OLS regression testing. Here, supplier-buyer collaboration was chosen as the dependent (compounded) variable in their modeling.

Our PLS regression model includes seven constructs from the original 2004 Claro model. It further includes an adjustment of Claro's (2004) complex five-level⁵ business network

⁴ Using the *plsreg1* algorithm in R, ver. 2.15.2.

⁵ The five levels of upstream and downstream information exchange observed the information exchanged with (1) first tier suppliers, (2) other suppliers (e.g. second tier), (3) other buyers, (4) buyers' customers, and (5) agents of the cooperative network (brokers) (Claro, 2004, pp. 176-177).

construct to the specifics of the star-like, transnational supplier-buyer network research setting.⁶ Next, four variables related to network spillover effects, adapted from Anderson, Håkansson & Johanson's (1994, p. 12) concept of the anticipated constructive effects of network identity, were also added to our analysis. The inclusion of network spillover effects further extends Claro's (2004) business network context for possible sources of suppliers' motivation in the relationship with the focal TNC.

Lastly, Claro's (2004) original performance variables were replaced by variables related to supplier-buyer relationship competitiveness in order to incorporate a more long-term perspective of supplier-buyer relationships (as opposed to a more short-term perspective of performance), as well as to address a key managerial challenge faced by TNCs. Three variables related to various aspects of supplier-buyer relationship competitiveness (see Table 1) were transformed into a single compounded variable (using simple average), based on satisfactory convergent validity (AVE=0.718) and internal reliability statistics (Cronbach's alpha=0.804; composite reliability=0.884). This compounded variable was then used as the dependent variable in our PLS regression analysis.

In terms of the methodology employed, PLS regression was used as opposed to traditional OLS regression due to the exploratory nature of our analysis. Our analysis should be seen as an adjustment and considerable substantive expansion of Claro's (2004) original model testing. Furthermore, since Claro's (2004) model was originally conceptualized and tested as a SEM with latent reflective constructs, and given the relatively small sample compared to the number of analyzed variables (30 items), PLS regression was employed to tackle multicollinearity issues and correlation spuriousness (Geladi & Kowalski, 1986; Tenenhaus, 1998; Helland, 2001).

3.3 Operationalization (scales employed)

Table 1 provides an overview of the scales employed which are connected to 10 different constructs included in our analysis based on the adjustment and extension of Claro's (2004) covariance-based SEM. Please pay attention to the codes of individual independent variables (e.g. q2a, q6f) which refer to the item within a specific question. The original English version of the questionnaire can be found in Appendix 1 at the end of the paper.

As discussed earlier, the three variables related to supplier-buyer relationship competitiveness in Table 1 (q11a-q11c) were transformed into a single compounded variable (named *Comp*) and used subsequently as the dependent variable in our PLS regression analysis.

⁶ A star-like network refers to a network with a single central actor (in our case the TNC) and several other actors which are connected only to this central actor, but not among themselves (in our case to other TNC suppliers).

Table 1: Operationalization of the determinants of supplier-buyer relationship competitiveness in a TNC context

Construct	Abbreviation	Operationalization (variable codes)	Reference
Competitiveness	<i>Comp</i> (dependent)	3 items related to: (1) SCM as an important source of TNC competitive advantage (q11a); (2) increased competitiveness of supplier due to relationship with TNC (q11b); (3) efficient SCM leading to dyadic supplier-buyer higher competitiveness (vis-à-vis market competition) (q11c)	Scales developed from work by Veludo, Macbeth & Purchase, 2006; Dyer & Singh, 1998; Harland, 1996
Relationship-based information	<i>Info</i> (independent)	5 items of shared information between TNC and supplier related to: (1) prices (q2a); (2) quantities (q2b); (3) logistic operations (q2c); (4) production process (q2d); (5) future actions (q2e)	Adapted from Claro, 2004; based on Anderson, Hakansson & Johanson, 1994; Blakenburg, Eriksson & Johanson, 1999
Network spillover effects	<i>Spill</i> (independent)	4 items related to: (1) transferability of know-how and expertise to other relationships (q3a); (2) attractiveness to other partners (q3b); (3) increased productivity in other relationships due to developed competencies (q3c); (4) increased competitiveness in other relationships due to developed competencies (q3d)	Adapted from Anderson, Hakansson & Johanson, 1994
Transaction-specific investments (TSIs) in physical assets	<i>TSI_ass</i> (independent)	3 items: (1) significant supply relationship investments (q4a); (2) specific adjustments in organizational processes (q4b); (3) significant commitment to specific internal process and organization (q4c)	Adapted from Heide & John, 1992; Bensaou & Venkatraman, 1995
Transaction-specific investments (TSIs) in people	<i>TSI_per</i> (independent)	3 items: (1) learning about partner's business practices (q4d); (2) additional activities, training and education (q4e); (3) losing knowledge about partner's operation if relationship is terminated (q4f)	Adapted from Heide & John, 1992; Bensaou & Venkatraman, 1995
Interorganizational trust	<i>Trust_org</i> (independent)	3 items: (1) TNC unit openness/honesty in negotiations (q5a); (2) TNC unit trustworthiness (q5b); (3) TNC unit looking out for partner interests (q5c)	Zaheer, McEvily & Perrone, 1998
Interpersonal trust	<i>Trust_per</i> (independent)	3 items: (1) contact person's openness/honesty in negotiations (q5d); (2) contact person's trustworthiness (q5e); (3) contact person looking out for partner interests (q5f)	Zaheer, McEvily & Perrone, 1998
Joint planning	<i>Plan</i> (independent)	3 items of joint planning related to: (1) volume demands (q6a), (2) long-term plans for new products (q6b), (3) sales forecasts (q6c)	Heide & John, 1990 & 1992; Heide & Miner, 1992; Lush & Brown, 1996
Joint problem solving	<i>Solve</i> (independent)	3 items of joint problem solving related to: (1) dealing with problems jointly (q6d); (2) shared responsibility (q6e); (3) commitment to improvements (q6f)	Heide & John, 1990 & 1992; Heide & Miner, 1992; Lush & Brown, 1996
Flexibility	<i>Flex</i> (independent)	3 items: Efficient response in a supply relationship to: (1) day-to-day (operational) changes (q7a); (2) occasional (e.g. quarterly tactical) changes (q7b); (3) substantive, long-term, and rare (strategic) changes (q7c) (Efficient = with minimal impact/degradation on performance)	Adapted from Golden & Powel, 2000

Source: Adapted and extended from Claro, 2004, pp. 74-77; own review of the relevant literature presented in the last column of the table. Notes: SCM=supply chain management.

All the variables in Table 1 were measured on 7-point Likert-type scales – where 1 corresponded to the lowest possible value (completely disagree) and 7 to the highest possible answer value (completely agree).

The next section presents the results. First, the Non-Linear Iterative Partial Least Squares (NIPALS) algorithm was employed in R with the goal of indentifying an optimal set of principal components out of the 30 independent variables. Identified principal components are subsequently used in the PLS regression model.

4. RESULTS

4.1 Descriptive statistics and principal component analysis

Table 2 presents a summary of selected descriptive statistics. Due to the large amount of analyzed variables (3 dependent and 30 independent) descriptive statistics are presented at the conceptualized construct level for each of the 10 constructs outlined in Table 1.

Table 2: Descriptive statistics at conceptualized construct level (7-point Likert-type scale)

Construct	Items (see Table 1)	Mean (simple average)	SD	α	Skewness*	Kurtosis**
<i>Comp</i>	<i>q11a-q11c</i>	4.40	1.19	0.80	-0.52	-0.14
<i>Info</i>	<i>q2a-q2e</i>	5.08	1.32	0.87	-0.88	-0.04
<i>Spill</i>	<i>q3a-q3d</i>	4.50	1.46	0.93	-0.70	0.29
<i>TSL_ass</i>	<i>q4a-q4c</i>	4.81	1.41	0.77	-0.45	-1.04
<i>TSL_per</i>	<i>q4d-q4f</i>	4.17	1.37	0.75	-0.35	-0.76
<i>Trust_org</i>	<i>q5a-q5c</i>	5.32	1.44	0.90	-1.34	1.48
<i>Trust_per</i>	<i>q5d-q5f</i>	5.42	1.47	0.93	-1.58	2.16
<i>Plan</i>	<i>q6a-q6c</i>	3.91	1.60	0.86	-0.41	-0.91
<i>Solve</i>	<i>q6d-q6f</i>	5.28	1.27	0.83	-1.46	2.42
<i>Flex</i>	<i>q7a-a7c</i>	4.95	1.32	0.95	-0.79	0.72

Source: Suppliers' survey, 2011 (n=130). Notes: SD=standard deviation. α =Cronbach's alpha. *Skewness for normal distribution is 0. **Kurtosis for normal distribution is 3.

As we can see from the descriptive statistics presented in Table 2 interpersonal and interorganizational trust has the highest mean scores, indicating a relatively high degree of both types of trust among our supplier-buyer relationships. Similarly, joint problem solving and relationship-based information exchange also display mean scores above value five on a 7-point Likert-type scale. On the other hand, the mean value of 3.91 for joint planning indicates, at least relatively speaking, a moderate level of joint planning in the surveyed supplier-buyer relationships.

As expected, all constructs display appropriate internal reliability statistics (Cronbach's alpha over 0.7), given the employment of established and numerous cross-validated

scales. In terms of the distribution of the aggregate constructs we can see that all constructs are non-normally distributed.

Table 3 provides sample characteristics related to 130 suppliers and their corresponding TNC supplier-buyer relationships. As we can see the average length of the supplier-buyer relationships was 6.2 years. Among the surveyed suppliers almost 80 % are micro, small and medium-sized suppliers (in terms of the number of employees) with up to 50 employees. In general, these suppliers are quite independent of the TNC in terms of income generation, since they generate only up to 5 % of their income from business with the focal TNC. Almost half of them come from Slovenia; and a fifth from other EU countries and Switzerland. Two thirds of them supply to a key TNC unit in Slovenia.

Table 3: Sample characteristics

Characteristic	Data (sample structure)
<i>Supplier-buyer relationship length</i>	Mean=6.22 years (SD=4.83 years) Median=5 years
<i>Average number of employees (of supplier)</i>	22.2 % micro (0-9 employees); 34.9 % small (10-50 employees); 20.6 % medium (51-250 employees); 22.2 % large (251+ employees)
<i>% of supplier income generated from the TNC</i>	50.8 % (up to 1 % generated income from TNC); 29.2 % (between 1.1 % and 5 % generated income from TNC) 20.0 % (more than 5 % generated income from TNC)
<i>Country of supplier</i>	Slovenia (45.3 %); Other EU countries & Switzerland (22.6 %); Russia (18.9 %); Serbia (13.2 %)
<i>Key TNC location being supplied to</i>	Slovenia (66.2 %); Serbia (16.2 %); Russia (16.2 %)
<i>Type of supply</i>	Machinery & equipment (25.8 %); Components for bonding/gluing (19.5 %) Prepainted steel panels (13.2 %) Steel/black metallurgy (12.5 %) Other (29.0 %)

Source: Suppliers' survey, 2011 (n=130).

Next, Table 4 shows the results of the NIPALS algorithm-based Principal Component Analysis (PCA) on the original 30 independent variables corresponding to the nine constructs from Table 1.

Table 4: Results of PCA based on the NIPALS algorithm (30 independent variables, 9 constructs)

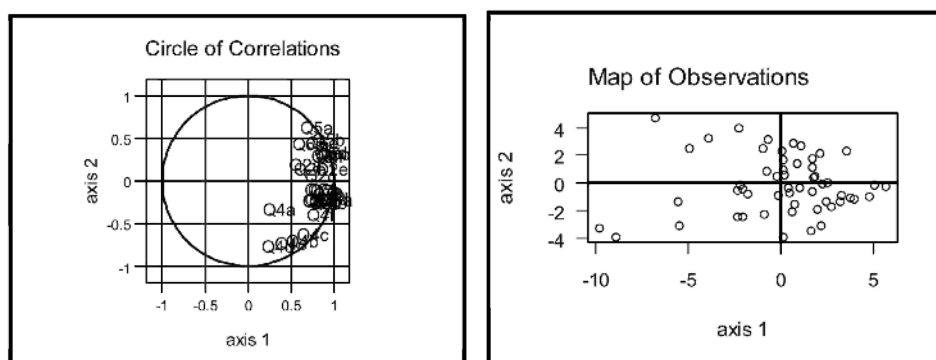
Components	Eigen values (> 1.00)	Explained variance	Cumulative explained variance
#1	12.2	40.7 %	40.7 %
#2	4.3	14.2 %	54.9 %
#3	2.4	8.1 %	63.0 %
#4	1.7	5.8 %	68.8 %
#5	1.5	5.0 %	73.8 %
#6	1.2	3.9 %	77.7 %

Source: Suppliers' survey, 2011 (n=130). Note: Analysis performed using the nipals algorithm in R, ver. 2.15.2.

As we can see from the results in Table 4, NIPALS PCA procedure identified six potential components with Eigen values over 1.0. However, only two components explain more than 10 % of the variance per component. Overwhelmingly, the first component explains 40.7 % of the variance of the original 30 independent variables, while the second component explains an additional 14.2 % (cumulative explained variance of 54.9 %). The remaining four components jointly explain only 23 % of additional variance.

Based on the results of PCA presented in Table 4 and additional analyses⁷ a two-component solution was chosen as the optimal one, as it explained 54.9 % of the total variance of the original 30 independent variables. Figure 1 shows the plot diagrams for the selected two-component solution, both for the 30 original independent variables (left hand side) and the 130 observation (right hand side).

Figure 1: Plot diagrams for the selected two-component solution



Source: Suppliers' survey, 2011 (n=130). Note: Analysis performed using the nipals algorithm in R, ver. 2.15.2. Due to resizing of the plot diagram related to observations (right hand side) the depicted number of observations (represented by blue dots) appear smaller than the actual number of observation (n=130).

⁷ Additionally, distance-to-the-origin analysis and cosine analysis were also performed in R. Results can be obtained from the authors upon request.

With regards to the left hand side plot diagram in Figure 1, which shows the plotting of the 30 independent variables, it must be pointed out that variables closer to the circle perimeter are better represented by the two-component solution. Furthermore, the closeness of selected variables indicates the level of correlation. By observing the left hand side plot diagram we can thus conclude that there appears to be a relatively high degree of multicollinearity among independent variables analyzed, which again strongly supports the selection of PLS over the OLS-type regression. Having established the optimal number of principal components with the NIPALS procedure the results of PLS regression are presented in the next section.

4.2 PLS regression results

Based on a two-component solution identified by the NIPALS PCA procedure in the previous section Table 5 presents the results of our univariate PLS regression model, with supplier-buyer relationship competitiveness as the dependent variable. Given the large amount of the analyzed independent variables (30), only the top five most important independent variables according to their loadings on each of the two components in our regression model are shown.

Table 5: Top five determinants of supplier-buyer relationship competitiveness based on top five loadings across the two components (univariate PLS regression)

Variable	Construct	Component #1		Component #2	
		Loadings (x)	Correlation coefficient	Loadings (x)	Correlation coefficient
What we learn from working with this TNC unit will be use full in our other (non-TNC) future business relationships (q3a)	Spill	0.242	0.854		
Competences developed in working with this TNC unit can be used to enhance the competitiveness in all our other (non-TNC) business relationships (q3d)	Spill	0.233	0.822		
My contact person at this TNC unit is a trustworthy person (q5e)	Trust_per	0.224	0.793		
This TNC unit is a trustworthy business partner (q5c)	Trust_org	0.224	0.793		
I have faith in my contact person at this TNC unit to look out for our company interests (q5f)	Trust_per	0.220	0.776		
We have made important investments to deliver products to this TNC unit (q4a)	Tsl_ass			0.442	0.619
Supplying to this TNC unit required additional tasks, training and skills for at least some of our employees (q4e)	Tsl_per			0.413	0.579
We have invested time and effort to learn about the business practices of this TNC unit (q4d)	Tsl_per			0.388	0.554
Our production processes have been tailored to meet the requirements of supplying to this TNC unit (q4b)	Tsl_ass			0.385	0.539
We have made important investments to handle internally the products and services that are ordered by the selected TNC unit (q4c)	Tsl_ass			0.357	0.500
R2		0.686		0.093	

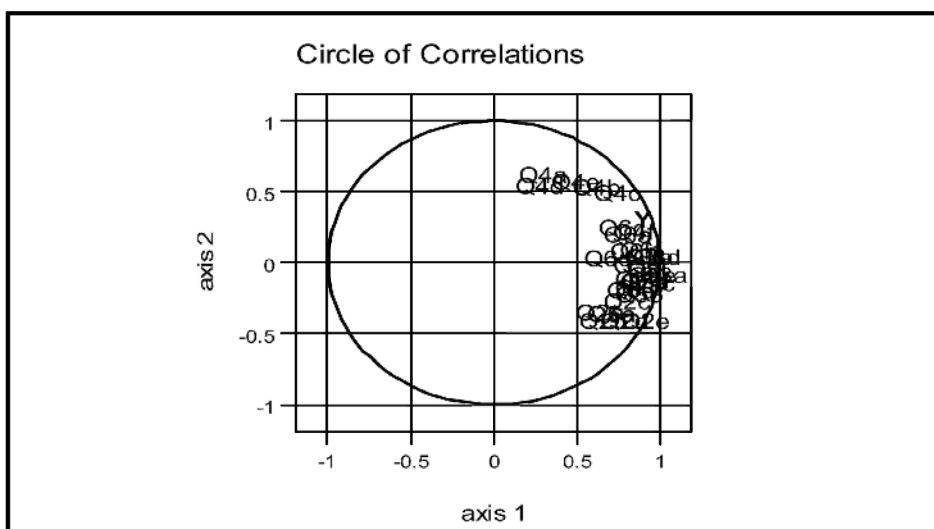
Source: Suppliers' survey, 2011 (n=109). Note: As the *plsreg1* algorithm does not support the analysis of the observations with missing data values the analyzed data set includes only 109 of the original 130 observations.

In addition to the loadings of independent variables across each of the two components Table 5 also provides information on the pair-wise correlation coefficients between each of the independent variables and the two obtained components. By observing both the loadings and correlation coefficients we can see that the component #1 is mostly closely connected to variables related to network spillover effects and trust, while component #2 is almost exclusively associated with both aspects of transaction-specific investments (both in physical assets and people).

Lastly, by observing the R^2 values related to each of the two components we can say that network spillover effects and trust (both interpersonal and interorganizational) are the strongest single determinants of supplier-buyer relationship competitiveness, as marked by a R^2 value of 0.686. Subsequently, a secondary determinant of supplier-buyer relationship competitiveness is connected almost exclusively with transaction-specific investments, as marked by a R^2 value of 0.093.

In conclusion Figure 2 shows the results of our regression analysis in the form of plotted correlation coefficients of the 30 independent variables and the dependent variable of competitiveness (indicated as y in the figure) across the two principal components in our regression model. As we can observe most of the independent variables display quite strong correlation coefficients with component #1, with the exception of the independent variables connected to transaction-specific investments (shown in Figure 2 in upper right corner as [q4a:q4f]), which have quite a strong positive correlation with component #2. Additionally, independent variables related to relationship-based information exchange display moderately positive correlation coefficients on component #1, but moderately negative correlation coefficients on component #2 (see correlation coefficient in Appendix 2 – Table 2 – for details).

Figure 2: Variable-component correlation plot diagram (two-component PLS regression)



Source: Suppliers' survey, 2011 (n=109).

As we can also observe from the position of the dependent compounded variable of supplier-buyer relationship competitiveness in the plot diagram it very strongly correlates ($\beta=0.828$) with component #1 (hence its high R^2 value of 0.686), but to a lesser, yet still significant extent with component #2 ($\beta=0.306$).

We have also cross-validated our two-component PLS regression model by applying the *plsreg1* algorithm in R. This procedure randomly splits the original data set in ten different sub-groups. Each time, one sub-group is left out of analysis as a reference set, while the remaining nine sub-groups are used to predict the observations in the excluded sub-group. This procedure is repeated ten times, each time taking one of the ten sub-groups (a reference sub-group) to be estimated by the remaining nine other sub-groups. Following this procedure an appropriate cross-validation statistic was obtained ($LimQ2=0.0975$) for both components, thus indicating that our PLS regression model is reasonably cross-validated.

5. RESULT IMPLICATIONS

5.1 Relational vs. transactional determinants of supplier-buyer relationship competitiveness

First and foremost, our results provide strong evidence in support of *Relationship marketing theory*, as well as *Social exchange theory*. This is particularly shown in the high explanatory power of component #1 ($R^2=0.686$), which displays high interorganizational and interpersonal trust variable loadings. However, by measuring the impact of relational and transactional determinants on long-term competitiveness (not short-term performance), our results go beyond Autry & Golicic's (2010, p. 96) reaffirmation of relationship-performance spirals to further support Hunt & Morgan's (1995) *Resource-advantage theory of competition* in which strong and high-quality (trusting) relationships drive competitiveness as key organizational resources. In this regard, we see that Autry & Golicic's (2010) relationship-performance spiral perspective fits well within Hunt & Morgan's (1995) *Resource advantage theory*, establishing it as a dynamic one.

This brings us to the second implication of our results, namely the difference between the impact of relational and transactional determinants on relationship competitiveness. We believe that the stronger explanatory power of the relational determinants (component #1) does not imply superiority over transactional determinants (component #2) per se. Rather, we believe our results are consistent with what Autry & Golicic (2010, p. 97) refer to as an accrual (additive) effect of relationship strength/quality on relationship outcomes. It is here that we believe *Spiral theory* is particularly valuable and has been also indirectly supported by our results, albeit based on inference from our cross-sectional data. Given that most of our surveyed suppliers have well-established and long-run relationships with the focal TNC, as is also indicated by the average length of the relationship and high levels of trust (again see descriptive statistics in Table 2), relational determinants play a more important role in driving relationship competitiveness, com-

pared to transactional determinants. This was expected and is consistent with extant *Relationship marketing theory*.

The accruing roles of relational determinants and the diminishing roles of transactional determinants are perhaps best illustrated by relatively high, yet negative factor loadings related to relationship-based information exchange within component #2 (see Appendix 2). In case of well-established supplier-buyer relationships strong transactional mechanisms related to transactional information sharing may be seen as a “redundant governance mechanism” (Rowley, Behrens & Krackhardt, 2000, p. 371), and can be interpreted as a negative signal to other existing and potential partners that the supplier is problematic and needs extra monitoring. Furthermore, this redundancy should also be linked to the punitive potential of network spillover effects, which we discuss separately in the next section.

5.2 Importance of network spillover effects

Ghoshal & Bartlett (1990, p. 603) have importantly described TNCs as interorganizational differentiated networks. Within these networks, however, there are often extremely powerful network “egos” (e.g. TNCs), with large bargaining power and influence over other their actors (e.g. suppliers). In this context, Dyer & Hatch (2004, p. 62) emphasize that a lot of transnational supplier networks have a star-like network structure, where the suppliers are connected to the TNC, but not among themselves. This asymmetric power/dependence perspective has important implications for the corresponding supplier-buyer relationships and their management, particularly within the so-called *Social exchange theory* perspective (Hald, Cordón & Vollmann, 2009, p. 961) in which trust and social capital are constructed and drawn upon differently within a network setting, compared to a dyadic business relationship. In such a setting, the wider network context may become more important for a given supplier than the focal dyadic supply relationship. Our results support this view, given both the explanatory power of our component #1 ($R^2=0.686$) with regards to supplier-buyer relationship competitiveness, as well as the high loadings (and correlations) of variables related to network spillover effects on this component.

Within such star-like, transnational supplier-buyer networks individual suppliers importantly craft different network identities, which are related to a “unique set of connected relations with other firms, links to their activities, and [especially] ties with their resources” (Anderson, Håkansson & Johanson, 1994, p. 4). These identities are very much association-related and lead to the attraction between a supplier and its buyer. Hald, Cordón & Vollmann (2009) saw this attraction as a function of the perceived expected relationship value, which among other things is also very much linked to the development of specific competencies and signaling effects to other potential partners (Hald, Cordón & Vollmann, 2009, p. 963).

Our results on the one hand support Dyer & Hatch’s (2004, p. 62) position that competence development can be a substantial network spillover effect in TNC supplier-buyer

networks. This can consequently lead to long-term competitive advantage, which is according to Møller, Johansen & Boer (2004, p. 369; *cf.* Hamel, 1991) based on both competence development, as well as learning. With regards to signaling effects on the other hand, the association of a supplier with a particular TNC may in fact have also many different types of different signaling effects.

According to Walter, Ritter & Gemünden (2001, p. 368), it can be seen as a quality seal of approval and lead to the formation of new business relationships (the so-called market function of signaling). It can also help to reach other partners of the TNC (the so-called scout function of signaling), and can provide access to a wealth of resources and capabilities pooled across the wider network (the so-called access function of signaling). In addition, Claro & Claro (2011, p. 515) also emphasize that “the transactions with firms of known reputation and capabilities imply that social bonds guards against trouble” (*cf.* Thorelli, 1986). In this regard, the affiliation of a supplier to a particular TNC provides valuable information to prospective partners on the potential costs and management issues they may expect if they engage with that supplier. While our results do not directly support this perspective, the strong impact of trust on supplier-buyer relationship competitiveness could indirectly provide some support for Claro & Claro’s (2011) position.

In terms of possible managerial implications from our results we would like to emphasize that TNC managers should understand the suppliers’ business network and its structure in order to assess the potential network spillover effects that might drive suppliers’ behavior. This is particularly relevant if there is a big asymmetry in size, dependence and/or power in the relationship between the supplier and the TNC. Having said this, TNCs have to be aware of all the potential non-monetary spillover effects that their relationship to a given supplier may offer, and which the suppliers can “capitalize” on within their business networks. Through understanding the suppliers’ business network, TNC managers should not only understand potential network spillover effects, but also measure them and communicate them in order to manage relationships with existing suppliers and attract new potential suppliers. This will contribute to both flexibility and learning, which are according to Bartlett & Ghoshal (1989) two from three of the most important strategic objectives of TNCs.

6. CONCLUSION

This paper has built on the *Relationship marketing and Resource-advantage theory* in analyzing transnational supplier-buyer relationships. By focusing on the specifics of the transnational inter-organizational supplier-buyer context, long-term relationship competitiveness was chosen as our dependent variable, as opposed to traditional short-term performance. By testing the impact of specific relational and transactional determinants of supplier-buyer relationship competitiveness we have found that both types of determinants drive such competitiveness. However, in-line with the well-established nature of our supplier-buyer relationships, and according to Autry & Golobic’s (2010) relationship-

performance spiral perspective, relational determinants have been found to be stronger drivers of supplier-buyer competitiveness, as opposed to transactional determinants. With regards to the former, network spillover effects have confirmed Nagurney's (2010) call for the incorporation of a wider network perspective in the study of dyadic supplier-buyer relationships. In addition to this, both interorganizational and interpersonal trust may be seen as a central relational determinant of supplier-buyer relationship competitiveness. This is consistent with *Relationship marketing theory* and Morgan & Hunt's (1994) trust-commitment perspective, but also complemented by network spillover effects.

We are fully aware that our research is also subject to some research limitations – ranging from a possible common methods bias from single respondents, to analyzing the perspective of only the suppliers' side of the supplier-buyer relationship, and to limitations related to the PLS methodology itself. However, we also believe that we have been able to test two comprehensive marketing theories (*Relationship marketing theory* and *Resource-advantage theory*) in a specific research context of transnational supplier-buyer relationships, by applying a non-traditional methodology for the marketing discipline. In this regard, the essence of a fairly complex SEM was tested with the help of PLS regression analysis to provide sound evidence and corresponding implications for both theory, as well as managerial practice.

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APPENDIX 1: Original questionnaire (English version)

All questionnaire items were measured as 7-point Likert-type scales, with the following answer values: 1-lowest possible value (completely disagree), 4-neutral (neither disagree, nor agree) and 7-highest possible value (completely agree).

1. **COMPETITIVENESS** (Adapted from Veludo, Macbeth & Purchase, 2006; Dyer & Singh, 1998; Harland, 1996):
 - a. *The supply chain management system at this TNC unit is an important source of the TNC's competitive advantage (code q11a).*
 - b. *Since becoming a supplier to this TNC, we have become a more competitive firm (q11b).*
 - c. *Because our supply relationship with this TNC unit is managed efficiently, both our organization and this TNC unit are more competitive on the market (q11c).*

2. **RELATIONSHIP-BASED INFORMATION (SHARING)** (Adapted from Claro, 2004; based on Anderson, Håkansson & Johanson, 1994; Blakenburg, Eriksson & Johanson, 1999):
 - a. *We get all the relevant information from this TNC unit and this supports us in defining product and service prices of supplies to this TNC unit (q2a).*
 - b. *We get all the relevant information from this TNC unit and this supports us in defining product and service quantities of supplies to this TNC unit (q2b).*
 - c. *We get all the relevant information from this TNC unit and this supports us in logistic operations of supplies to this TNC unit (q2c).*
 - d. *We get all the relevant information from this TNC unit and this supports us in production processes related to supplies to this TNC unit (q2d).*
 - e. *We get all the relevant information from this TNC unit and this supports us in foreseeing future actions of this TNC unit (q2e).*

3. **NETWORK SPILLOVER EFFECTS** (Adapted from Anderson, Håkansson & Johanson, 1994):
 - a. *What we learn from working with this TNC unit will be use full in our other future business relationships (q3a).*
 - b. *By working closely with this TNC unit our company can become more attractive to other business partners (q3b).*
 - c. *Competences developed in working with this TNC unit can be used to enhance the productivity in all our other business relationships (q3c).*
 - d. *Competences developed in working with this TNC unit can be used to enhance the competitiveness in all our other business relationships (q3d).*

4. **TRANSACTION-SPECIFIC INVESTMENTS (TSI) IN PHYSICAL ASSETS** (Adapted from Heide & John, 1992; Bensaou & Venkatraman, 1995):
 - a. *We have made important investments to deliver products to this TNC unit (q4a).*
 - b. *Our production processes have been tailored to meet the requirements of supplying to this TNC unit (q4b).*

10. RELATIONSHIP FLEXIBILITY (Adapted from Golden & Powel, 2000):

- a. How well does your supply relationship with this TNC unit respond to day-to-day operational changes (with minimal impact on performance) (q7a)?
- b. How well does your supply relationship with this TNC unit respond to occasional (i.e. monthly, quarterly) tactical changes (with minimal impact on performance) (q7b)?
- c. How well does your supply relationship to this TNC unit respond to one-way, long-term strategic changes (with minimal impact on performance) (q7c)?

APPENDIX 2: NIPALS and PLS regression results

Table 1: Loadings for each of the 30 independent variables on each of the two components from NIPALS procedure

	p1	p2
Q2a	0.13313638	-0.24911385
Q2b	0.14022950	-0.28820247
Q2c	0.18026661	-0.19148167
Q2d	0.17636931	-0.29249055
Q2e	0.21250434	-0.29174562
Q3a	0.24158717	-0.06122968
Q3b	0.21755603	0.03323476
Q3c	0.19820457	-0.01015446
Q3d	0.23270811	0.03292288
Q4a	0.03868468	0.44175622
Q4b	0.12818638	0.38470062
Q4c	0.16353677	0.35674650
Q4d	0.03081465	0.38846497
Q4e	0.09220849	0.41315566
Q4f	0.19780826	0.15882927
Q5a	0.15402946	-0.25766995
Q5b	0.20151680	-0.15685522
Q5c	0.22435051	-0.10273954
Q5d	0.21121918	-0.08657149
Q5e	0.22435688	-0.06116308
Q5f	0.21955304	-0.02008074
Q6a	0.18222459	0.14623608
Q6b	0.19192812	0.06108095
Q6c	0.17431126	0.17651407
Q6d	0.14903157	0.02454310
Q6e	0.18579001	-0.13855952
Q6f	0.20802829	0.07056687
Q7a	0.20908115	-0.09139806
Q7b	0.20115381	-0.12228321
Q7c	0.20108310	-0.08046043

Source: Suppliers' survey, 2011 (n=109). Note: Based on the plsreg1 algorithm in R, ver. 2.15.2.

Table 2: Correlation coefficients for each of the 30 independent variables and the dependent compounded variable across each of the two components from PLS regression

	t1	t2
Q2a	0.4705345	-0.34889399
Q2b	0.4956032	-0.40363917
Q2c	0.6371035	-0.26817780
Q2d	0.6233296	-0.40964480
Q2e	0.7510391	-0.40860150
Q3a	0.8538245	-0.08575463
Q3b	0.7688929	0.04654662
Q3c	0.7005004	-0.01422173
Q3d	0.8224438	0.04610982
Q4a	0.1367205	0.61869739
Q4b	0.4530401	0.53878873
Q4c	0.5779765	0.49963785
Q4d	0.1089061	0.54406084
Q4e	0.3258859	0.57864116
Q4f	0.6990997	0.22244679
Q5a	0.5443754	-0.36087716
Q5b	0.7122066	-0.21968206
Q5c	0.7929061	-0.14389086
Q5d	0.7464970	-0.12124687
Q5e	0.7929286	-0.08566136
Q5f	0.7759508	-0.02812389
Q6a	0.6440235	0.20480953
Q6b	0.6783180	0.08554633
Q6c	0.6160559	0.24721507
Q6d	0.5267117	0.03437360
Q6e	0.6566245	-0.19405819
Q6f	0.7352197	0.09883175
Q7a	0.7389407	-0.12800667
Q7b	0.7109237	-0.17126257
Q7c	0.7106738	-0.11268807
Y	0.8282748	0.30575147

Source: Suppliers' survey, 2011 (n=109). Note: Based on the plsreg1 algorithm in R, ver. 2.15.2.

ICT AS A NEW COMPETITIVE ADVANTAGE FACTOR – CASE OF SMALL TRANSITIONAL HOTEL SECTOR

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ABSTRACT: *This paper studies the information and communication technology (ICT) in a small hotel sector at a point in time when the transition towards a full market economy is coming to the end and competitiveness and ICT implementation is gaining on importance. Its main purpose is to study a business potential of this new competitive advantage resource and its productivity paradox. A competitive advantage factor model (CAF model) has been proposed and the structural modelling (SEM) has been performed on the case of a small transitional Slovenian hotel sector. The study contributes to knowledge on ICT competitiveness and ICT productivity paradox in hotel sector. Further, its results hold practical implications for the strategy for hotels operating in small-sized hotel industries in transitional or ICT developing environments. In more concrete terms, research findings indicate that such hotel sectors need to speed the ICT implementation. ICT as such doesn't directly increase the firm's profitability, yet there is an indirect positive impact of factor ICT on a firm's financial performance that emerges through other competitiveness factors, such as differentiation, quality or image, which helps firms to stay competitive on the tourism markets.*

Key words: *Information and communication technology (ICT), ICT implementation, competitiveness, strategy, small hotel industry, transition, Slovenia.*

JEL Classification: L8; M15; D24

1. INTRODUCTION

In a global market economy service companies must identify the key resources that can possibly generate a competitive advantage. They should also explore how they can access and capitalise on those resources in order to improve their business performance and stay competitive in the marketplace. The relevance of resources varies according to industry, time and space and may also depend on external industry conditions. Old resources such as personal contacts and low prices alone might be losing their competitiveness potential while intangible resources such as quality or brand (Tsai, Song, & Wong, 2009) are gaining in importance. New resources not previously known or explored might bring new

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potential for competitiveness. If for any reason companies have neglected the development of an important resource, new priorities must be set and a new policy defined in order to close the potential gap with their competitors.

Information technology (IT) such as Internet, central reservations systems (CRS) and other electronic distribution systems can be seen as a relatively new competitive resource not forming part of older competitive advantage theories and models. Interestingly, the conventional research doesn't identify information technology as a critical success factor for attaining exceptional performance (Praničević Garbin, Alfirević, & Štemberger Indihar, 2011). Further, more recent researchers argue whether the ICT can be a competitive resource or not and around its competitiveness direct and indirect potential (Breznik, 2012).

Today researchers claim that IT and the Internet in particular can create a competitive advantage and improve performance and competitiveness (Namasivayam, Enz, & Sigauw, 2000); Porter, 2001; Sirirak, Islam, Khang, 2011). In the hotel industry information technology investments are often made to improve performance (Tsai et al., 2009) which is the main reason for managers to install information and communication technology (ICT). Unfortunately, the empirical evidence does not always support the logic behind such expectations. There is evidence of a so-called ICT paradox that investing in computers and information systems may have a negative impact on a firm's productivity or performance (Roach, 1991; Brynjolfsson, 1993). This implies that ICT might not have a direct competitive advantage potential and thus researchers need to consider the benefits ICT offers apart from directly increased performance (Sigala, Airey, Jones, & Lockwood, 2004; Smith David, Grabski, & Kasavana, 1996). However, it has not been researched so far if the ICT productivity paradox in the early implementation stage might exist.

According to some authors, not many studies have researched the relationship of competitiveness factors, including ICT and performance, in hotel industry (Tsai et al., 2009) and there is a need for more studies investigating the impact of ICT on hotel performance in general, and in developing countries in particular (Sirirak et al, 2011). This is particularly the case in ex socialist and post-transitional Eastern European countries where at the beginning of the transition hotels have employed ICT at a much lower rate, compared to their more developed, traditionally market and customer oriented hotel sectors. In this context, studying the role of competitiveness factors in the transitional Slovenian hotel sector is becoming relevant. In the year of study Slovenian hotels were performing poorly compared to other companies in the Slovenian economy and other international hotel companies (Kavčič et al., 2005; Tajnikar & Pušnik, 2008; Knežević-Cvelbar & Mihalič, 2007). We believe this was not only due to poor management and a lack of know-how but also the slow transition in the hotel sector that resulted in an inefficient ownership structure and old ways of doing business as practiced in the old system before the transition. During the transition Slovenian hotels ended up in the hands of state and investment funds which are not market- and performance-oriented (Prašnikar & Gregorič, 2002; Hrovatin & Uršič, 2002). Some consortia, such as Sava, Istrabenz and NFD have invested capital into hotels in Slovenia, Croatia and Italy which

resulted in some small national and international hotel chains. At the same time, small privately owned hotel business represented 45 percent of the hotel companies. Although generally regarded as more efficient and active owners, foreign companies still had almost no presence in the Slovenian hospitality industry. Domestic private consortia investors chiefly saw hotel ownership as a real estate investment opportunity and did not play an active role as owner. When the research was conducted (2000-2010), Slovenia had already transformed from a transitional to a developed high-income country, yet there is enough evidence that the transition in the hotel sector had still to be completed (Knežević-Cvelbar & Mihalič, 2007).

The main purpose of this paper is to study a competitiveness potential of a new resource: ICT and its potential productivity paradox on negative impact of ICT on firm's productivity. It proposes a factor competitive advantage model based on both competitiveness theory and previous competitiveness research and uses a structural modelling to apply this model to the transitional tourism industry. The paper researches the issue of competitive-advantage sources which are grouped into competitive-advantage factors for the hospitality industry from the point of view of the management of ICT resources. It also attempts to contribute to the understanding of how ICT can support the competitiveness of hotel firms in the Slovenian and transitional economy and if the ICT paradox of the inability of ICT to improve performance really arises. In particular, it aims to contribute to knowledge on ICT competitiveness potential for hotels and address several questions, including:

- What is the competitiveness potential of so-called new ICT resources for the hotel sector?
- Do hotel managers recognize the new business opportunities emerging through ICT?
- Are there more traditional hotel business specific competitiveness resources that might make the use of ICT redundant or its penetration slow and which industry characteristics determine the implementation of ICT?
- Does ICT investment decrease a hotel firm's performance as claimed by a productivity paradox or does ICT increase the competitiveness in some other ways, such as by enhancing competitiveness of other factors?

This paper studies the information and communication technology (ICT) early stage implementation and competitiveness in a small hotel sector at a point in time when the transition towards a full market economy is coming to the end and ICT is gaining higher ranks on the competitiveness factors list of firms. At the same time, the chosen time point also date before the great economic and financial crisis which may influence the position of some competitiveness factors. More specifically, the price factor, which is seen as less important in the period of economic growth, might become more important in the circumstances of lower purchasing power and consumer confidence. For this reason data on tourism hotel competitiveness for Slovenia for the year 2005 have been chosen.

Paper has five sections. After the introduction, the second section considers the importance of ICT for the hotel industry's competitiveness and strategies and presents the literature research on the importance of ICT competitiveness factor. This is followed by a

presentation of Slovenian transitional hotel competitiveness issues and previous studies. Both sections form a theoretical and previous research framework for development of hypothesis, presented in section Methodology. The next part presents the results, while the last chapter delivers the discussion and conclusions, study limitations as well as suggestions for future research.

2. HOTEL COMPETITIVENESS AND ICTS

2.1 Sources of competitive advantage

A company is profitable if its ultimate value exceeds the collective costs of performing all the activities required to gain a sustainable competitive advantage over its rivals (Porter, 1979; 1989). Theoretically, we built on two different views on competitive advantage: generic strategy view and resource-based and (Bilgihan, Okumus, Nusair, & Kwun, 2011). A pure competitive advantage with respect to an individual company (offering tourist products) is linked to main generic strategies and can take the form of either low-cost or differentiated products that are sold at premium prices as well as the form of focus or niche market strategy. A competitive advantage resource-based view looks at the company resources and on their impact on competitiveness (Hunt 1995; Barney 1991). It suggests that a sustainable competitive advantage can only be created by intangible sources such as responsiveness to consumer needs and preferences, quality, image etc. Cost efficiency remains a necessary condition for the creation of profit; however, so-called non-price or intangible factors are those that add most of the value to a product.

2.2 ICT as a competitiveness advantage factor

Some authors believe the primary role of IT in the hotel industry is to improve productivity (Ham, Gon Kim, & Jeong, 2005). Many tourism and hospitality researchers claim that ICT is a competitive advantage factor (Buhalis, 2003; Polo Pena & Frias Jamilena, 2010; Camison, 2000; Sunil and Islam, 2005; Luque-Martinez, Castaneda-Garcia & Frias-Jamilena, 2007; Buhalis, 1998; Sheldon, 1997; Ma, Buhalis & Song, 2007). These authors understand ICT as the hardware and software, the groupware and netware as well as the intellectual capacity (humanware) to develop, programme and maintain the related equipment. Indeed, different kinds of the abovementioned “wares” such as super and mini computers, office applications, tele-conferencing, the Internet, intranet, central reservation systems (CRS), satellite and mobile communications, interactive television and self-service terminals etc. have been adopted by hotel companies to improve their operational efficiency and competitiveness (Buhalis, 2003).

The Internet has received significant attention from entrepreneurs, executives, investors and business observers and many have assumed that the Internet changes everything about companies and competition. Internet banking, for example, has changed the traditional banking culture and brought competitive advantages to ICT-advanced banking

firms (Yiu, Grant & Edgar, 2007). Another example in the airline and tourism industry is the use of CRSs (computer reservation systems) that have permanently changed the way of doing business in these service-based industries (Buhalis, 2004). Similar changes soon followed in the hotel industry and ICT became the key issue for the future of the hotel business (O'Connor & Frew, 2002). In 2000 US hotel managers saw IT as a mechanism to obtain competitive advantages, mainly through improved employee productivity and enhanced revenue generation (Siguaw, Enz, & Namasivayam, 2000).

The question is whether ICT should be seen as an independent intangible competitive resource or factor, and how is it linked to profitability. Some studies, mainly in OECD and some transitional economies, provided empirical evidence based on the production function of the link between ICT and rises in productivity, which proved to be stronger in service sectors (Stare, Jaklič & Kotnik, 2006). This can be linked to the new business opportunities offered by ICT and it seems that they are creating a new potential source of competitive advantage and profitability. Tsai, Song and Wong (Tsai et al., 2009, p. 537) studied competitiveness in the hotel industry and concluded that “information technology (IT), such as the Internet, intranets, and central reservation systems, is one of the crucial technology investments that are often made by hotels to improve performance”.

2.3 The ICT productivity paradox and ICT as supporter of other competitiveness resources

Despite the positive productivity expectations derived from ICT employment discussed above, there is also evidence of a negative relationship between ICT investment and productivity, called the IT productivity paradox (Brynjolfsson, 1993). Developed in non-tourism-related research, this paradox has been much discussed and criticised in the literature.

On the one hand, some hotel research has come close to the same negative impact of certain applications on productivity. For example, Smith-David, Grabski and Kawasana (1996) reported that hotel managers believe that some applications (vending, entertainment) reduced productivity. The same hotel researchers also did not establish a direct correlation between competitiveness and the implementation of ICT. Further, one Taiwanese study on hotel performance was unable to confirm a significant impact of ICT investment on Taiwanese hotel performance, although it acknowledged problems in isolating the contribution of ICT to other competitiveness factors (Sigala et al, 2004).

On the other hand, Sigala's research group argued that the IT productivity paradox is a methodological artefact and, in the case of three-star hotels in the United Kingdom, highlighted new methodology in order to prove ICT's productivity potential. The research group concluded that investing in ICT per se does not bring productivity gains, but benefits arise from exploiting ICT networking and informationalisation capabilities. The same is claimed by Buhalis and Zoge (2007). They interviewed 28 top tourism experts from all tourism sectors, including technology providers, who participated in the

Travel Distribution Conference in Brussels in 2005. They analysed the Internet's impacts on the tourism industry's structure by applying Porter's Five Forces Model of the competitiveness structure of an industry (Porter, 1979; 1980) and concluded that tourism firms should introduce constant innovations in terms of technological advancements in order to be able to offer differentiated and value-added products. Some empirical research in a hospitality industry in Turkey (Avcikurt, Altay & Ilban, 2010), has identified different management practices, performed over the internet, to be one of significant success factors.

Accordingly, there is more evidence that some authors do not see ICT as an independent competitive factor. Porter (2001) argued that the Internet cannot be a strategy in itself and that it is only by integrating it into an overall strategy that it will become a powerful source of competitiveness advantage. To unravel the productivity paradox, the hotel industry must consider the support and benefits technology offers apart from directly increased productivity (Smith-David, Grabski & Kasavana, 1996).

2.4 Determinants of ICT implementation

The available studies on ICT and competitiveness discuss a number of variables that determine the different attitudes of hotel firms to ICT and its implementation. These factors are firm size, category, ownership structure and governance type, type of hotel management model, contracts, culture, the kind of tourism destination and others. For example, Paraskevas and Buhalis (2002) argue that large hotel chains were faster to move to ICT alliances already in the 1980s, yet independent hoteliers have been more reluctant regarding ICT – partly due to technophobia. Similarly, Siguaw, Enz and Nmasivayam (2000) argue that US hotels belonging to a hotel chain are more innovative and can easily gain new technological know-how compared to lower tariff hotels that do not belong to any chain. Van der Borg, Minghetti and Riganti (1997) claim that the implementation of ICT in small- and medium-sized Italian firms depends on their location in a more urban or rural area, the sector's structure in terms of type, size and legal status, internal organisation and the management culture. They found that the strongest hindrances to implementing ICT were the significant fragmentation of the industry, the prevalence of family hotel management, the poor technology-oriented culture, the high attractiveness of the destination, costs and the prevalence of direct, informal and information flows inside the firm and between the firm and the market. Further, a Swiss case study also found that the implementation of ICT is significantly determined by category, size, geographical location and linguistic region (Murphy, Oлару, Schegg, & Frey, 2003). In the case of transitional economies, ownership and its characteristics are relevant determinants of firms' performances (Devi et al., 1998). The vast literature concerning the tourism sector suggests that different ownership forms (family, institutional, state) hold different potential for a firm's performance. Active ownership assumes that firms are owner-controlled and actively influence the firm's performance. Where owners are unable to effectively guide and control the decisions of managers, the firm becomes manager-controlled and management might have different goals. Further, the privatisation process that aims to

bring property rights and control in line with modern market-based economies might have the strongest impact on firms' performances in transitional countries. For example, in Eastern European countries outsider privatisation that would bring in active owners is only proceeding slowly (Blanchard & Aghion, 1996). The present insider owners might be reluctant to sell and block any outsider privatisation by an excessive resale price because, *inter alia*, they are protecting the jobs of the employees. The assumption that transitional owners that cannot achieve the restructuring most former state or former socialist firms require will have the right incentives to sell does not seem to hold water. Some of these factors might also be relevant to the Slovenian and other transitional hotel sectors.

3. SLOVENIAN HOTEL COMPETITIVENESS

3.1 The Slovenian hotel industry

Slovenia is a new post-transitional country that became independent in 1991 by proclaiming its independence from socialist Yugoslavia. The small population of 2 million people started on its way towards a market economy and became a European Union (EU) member in May 2004 and soon also a member of the European Monetary Union (EMU), with the European currency the euro being introduced in January 2007. At the beginning of the transition, restructuring from the socialist to a market economy was the main process enabling firms to survive. Accordingly, investment in general and investment in ICT in particular were delayed and lagged behind most transitional countries. The growth of ICT investment after 1995 was mainly driven by the service sector, although other sectors also invested in IT (Stare et al., 2006). The implementation of ICT in the tourism sector has been well below the European average.

The transition process in the Slovenian hotel industry was initially influenced by: the fall in foreign tourism demand; the lack of any service culture; the little brand awareness of this new state, an ex-socialist and small European country; the close proximity to the Balkan crisis; accession to the EU and, very likely, by the over-maturity and low quality of the Slovenian tourism product. In the year of our study, Slovenia hosted 2.4 million tourists who stayed 7.6 million nights, 58 percent of which were made by foreign visitors (SURS, 2009). Overnight stays in hotel accommodation represented about 60 percent of the overnight market volume. Slovenia had 130 hotels with a capacity of around 28,000 beds. About 80 percent of hotel companies could be classified as small and medium businesses in terms of their size. Since 1991 Slovenian tourism has started to be built on differentiated products with higher value for the customer. This has consequently brought higher prices for hotel services that were not a direct strategy in itself but a consequence of the orientation to differentiation, quality and image, as well as necessity due to the small size of the Slovenian tourism industry (Mihalič & Dmitrović, 2000).

The transition in Slovenia started with the privatisation process. 60 percent of social capital was privatised, with the remaining 40 percent being compulsorily transferred to state funds (Hrovatin & Uršič, 2002; Simoneti et al., 2005). Better performing companies

were privatised internally, while companies that had performed poorly ended up in the hands of the state and investment funds. In the year of our study, the state and investment funds held important ownership shares in Slovenian hotels, along with internal owners. The hotel sector was owned by different funds and banks (33 percent), other domestic companies which also had state funds in their ownership structure (40 percent), employees (9 percent), and managers (3 percent). In terms of competitiveness and performance, such an ownership structure has a negative potential and Slovenian hotel companies with higher direct state ownership perform worse than other companies. The reason is that the state (state funds) is a poor and passive owner (Prašnikar & Gregorič, 2002; Knežević-Cvelbar & Mihalič, 2006) and other ownership kinds offer better performance potential.

Foreign ownership was low, with just 2 percent of the hotel industry being held by foreign companies. The remaining 13 percent belonged to small owners and other owners (Knežević-Cvelbar & Mihalič, 2007). The hotel structure in Slovenia was quite homogeneous in terms of the management structure, mixed (state, private) ownership, medium in size, and the share of family owned and run hotel businesses was low. At the time of the research international foreign direct investment and management contracting in Slovenia was non-existent. Only a few international chains were present (two hotels belonged to Best Western and one to Relais & Châteaux).

The quality of more than 50 percent of all hotel capacities was at the four-star level, while approximately 40 percent of capacity was at the three-star level (Kavčič et al., 2005). Accommodation capacities were divided among different types of destinations: the majority was in mountain destinations (28%) and sea resorts (26%), followed by spa resorts (21%). The accommodation sector in the capital Ljubljana then accounted for around 10 percent of all hotel capacity in the country, other places 13 percent (SURS, 2011).

The majority of hotel companies were managed by hired managers, yet the appointment of those managers might have been influenced by the owners, including the state. The industry suffered from a skill shortage among middle and top managers (Sibila Lebe, Milfelner, Cviki, Šarotar Žižek, & Treven, 2009), probably due to the low wages and absence of training programmes. Some smaller hotels were managed by family owners, yet this was more the exception than the rule.

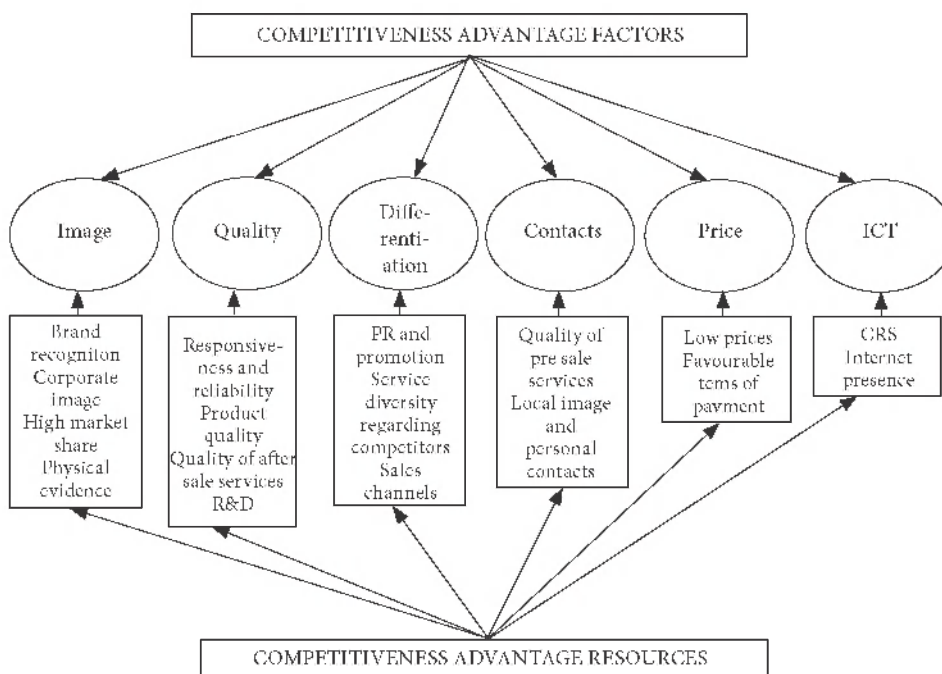
One study conducted in 2004 showed that Slovenian hotel firms were not competitive in IT technology (Omerzel-Gomezelj & Mihalič, 2008). Accordingly, investment in general and investment in ICT in particular were delayed and lagged behind most transitional countries (Stare et al., 2006). Less than 5 percent of tourism information was provided through the Internet, well below European average of around 30 percent. According to research (Polo-Pena & Frias-Jamilena, 2010; Balaz & Williams, 2004; Martin & Matlay, 2003; Stare et al., 2006), the deployment of ICT is especially important for emerging areas with less economic development, and smaller areas. The Slovenian hotel sector meets these conditions. While in the year of our study Slovenia had already moved from the

list of transitional countries into the category of high-income and developed countries, the transition in the hotel sector was slower than in the rest of the economy and still ongoing.

3.2 Previous studies on Slovenian competitiveness resources

In 2000 Slovenian researchers created a transitional competitiveness resource model for the Slovenian economy (Prašnikar, 2000; Mihalič & Dmitrovič, 2000). It is based on four economic sectors, namely: manufacturing, trade, hotels, and tour operating, which evaluated the importance of 15 possible sources of competitive advantage. The competitiveness resource list was based on previous research and Porter's (1979) and Hunt's (1995) work on competitive resources and resource-advantage theory. The explanatory factor study revealed five factors: image, quality, differentiation, contacts and price.

Figure 1: Proposed CAF^D model



CAF^D: Competitive advantage factor

Source: Adapted from Mihalič & Dmitrovič, 2000).

Among these five competitive advantage factors, first four can be classified as intangible (non-price) and the last one, e.g. price, as a tangible factor. Unfortunately the ICT was not part of the above Slovenian CAF model. In the questionnaire prepara-

tion phase, the group of tourism researchers in the project suggested extending the Porter/Hunt-based variable model and adding ICT-related competitiveness resources since at the time debate on ICT as a competitiveness factor had already started in the international general and tourism competitiveness literature and research (Buhalis, 1998). Unfortunately, in 2000 other researchers did not see ICT as a possible competitive factor for Slovenia's trade and manufacturing industry. Consequently, data on ICT were only collected for hotel and travel firms. Since in 2000 ICT tools, vocabulary and options were not well-developed in Slovenia, the absence of terminology for describing electronic distribution also became apparent (concerning this problem also see O'Connor & Frew, 2002) and only two resources were defined: Internet presence and the use of CRS. The latter referred to reservation systems that can take many different forms, varying from central reservation systems, as usually adopted by larger hotel chains, to other web intermediaries. For the sake of compatibility, the same vocabulary was also adopted in the 2005 hotel industry survey. The proposed six CAF model is presented in Figure 1 in circles. Figure also lists the corresponding competitive advantage resources in boxes.

4. METHODOLOGY

4.1 Data

The Institute for Tourism at the Faculty of Economics, University of Ljubljana conduct an ongoing research on tourism competitiveness and collects data every five years and have developed a data base for 2000, 2005 and 2010. In order to test our research hypothesis on the case of early stage ICT implementation in the hotel industry, data for the year 2005 have been chosen. The chosen year represent the point of time when Slovenia has already been a part of European Union, a transition towards a full market economy was coming to an end, ICT implementation started to gain position on the hotel competitive resource lists and before the great economic and social crises started.

Hotel managers were asked to assess the importance of specified sources of competitive advantage as regards their company on a five-point Likert scale (1 for not important, 5 for very important). In 2005, the same questionnaires as in the previously mentioned Slovenian competitiveness study in 2000 were sent to all Slovenian hotels (130). Sixty usable questionnaires from the respondents were obtained, constituting a response rate of 46 percent. The questionnaires were answered by hotel directors, marketing or reception managers.

Financial performance indicators were calculated directly from the financial statements of firms (GVIN, 2005). Different measures (ROA, ROE, value added) were tested, with only significant measures entering the final CAF model presented in this paper. Performance indicators for a certain hotel firm have been linked to the opinion on competitiveness resources of managers from the same firm.

Table 1: Size structure and sample characteristics of the Slovenian hotel industry, 2005

Enterprise size	Number of enterprises – sample (%)	Number of enterprises – hotel population (%)
1	2	3
Micro and small (10–49 employees)	48	45
Medium (49–250 employees)	37	38
Large (250 + employees)	15	17

Source: GVIN, 2005

According to size (EU, 2003), 45 percent of the interviewees were from small, 38 percent from medium-sized and 17 percent from large hotels. The hotel size sample structure was a fair reflection of the Slovenian hotel population (Table 1). Seven percent of the sample represented two-star hotels, 35 percent three-star hotels and 57 percent four- or five-star hotels. 13 percent of the hotels in the sample were family-owned, the rest had a mixed ownership structure, including state funds. All destinations are proportionally presented, with two hotels belonging to an international hotel chain (see Table A2 in the Appendix).

4.2 Method and hypotheses

For presented research, the proposed six CAF model (Figure 1), as developed by Mihalič and Dmitrović (2000) has been used. Descriptive statistics, methods for testing the hypotheses and correlation computations were conducted using the SPSS. A structural equation model (SEM) with a LISREL estimation was calculated in order to present the structured connections among the factors of a firm's competitiveness and firm's profitability. The CAF based SEM defines direct and indirect profitability connections and their dimensions, which is important when testing for the direct and supporting competitiveness potential of factors such as ICT.

In line with our literature research, presented in the previous chapters, four hypotheses have been created. First, since the implementation of ICT in Slovenian hotels was underdeveloped it is argued that Slovenian managers did not deploy ICTs in day-to-day business:

Hypothesis 1: Slovenian hotel managers perceive the ICT factor as being less important than other competitiveness factors.

Second, in order to understand the low ranking of ICT on the competitiveness factor list and the slow penetration of ICTs in the Slovenian hotel industry the industry's attitude to new ICT technologies have been studied:

Hypothesis 2: Slovenian hotel managers don't recognise the new business opportunities emerging through competitiveness factor ICT.

And third, following the discussion in previous chapters (Van der Borg et al, 1997) we examined if the use of ICT was made redundant as managers prioritized other old or hotel specific ways of doing business, such as personal contacts. Thus we claim:

Hypothesis 3: Slovenian tourism hotel managers prioritize competitive factor personal contacts.

In addition, the analysis also incorporated different determinants that influence the implementation of ICT such as firm size, category, ownership, the presence of international chains and destination type.

Forth, based on our previous discussion on ICT productivity paradox which showed a negative direct relationship between ICT investment and a firm's profitability, we claim that:

Hypothesis 4: There is an indirect positive impact of factor ICT on a firm's financial performance that emerges through other competitiveness factors.

5. ICT AS A COMPETITIVE ADVANTAGE FACTOR IN THE SLOVENIAN HOTEL SECTOR – RESEARCH RESULTS

5.1 Low importance of ICT competitiveness factor

In 2005, Slovenian hotel managers still perceived the ICT factor as less important than most other competitiveness factors. Compared to the situation in 2000, the result improved by just 7 percent (Table 2). Indeed, according to the managers ICT and low prices were the least important competitiveness factor, holding ranks 5 and 6. In their opinion, competition was based on contacts, differentiation and quality which occupied the first three ranks. In favour of our first hypothesis, the ICT factor was evaluated significantly lower than the three mentioned factors (Table 3). The importance of contacts for doing business remained the number one competitiveness factor in the opinion of hotel managers. Five years later, in 2010 contacts show much lower position. Table 2 also shows that the ICT position on the priority competitiveness list is steadily increasing and has improved its position for another rank in 2010.

Table 2: *The importance of CAFs^{d)} (1 - not important; 5 - very important), Slovenian hotel industry*

CAFs ^{d)}	2000		2005		2010	
	Mean	Rank	Mean	Rank	Mean	Rank
Contacts	4.26	1	4.47	1	3.98	5
Quality	4.15	2	4.17	2	4.29	2
Differentiation	3.98	3	3.94	3	4.31	1
Image	3.81	4	3.80	4	4.14	3
ITC	3.42	6	3.68	5	4.06	4
Price	3.57	5	3.09	6	3.23	6

CAF^{d)}: *Competitive advantage factor*

Table 3: Paired Samples Tests for CAFs^d, Slovenian hotel industry

		Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pair 1	Price - ICT	-.59167	1.04756	.13524	-4.375	59	.000
Pair 2	Image - ICT	.11250	.67244	.08681	1.296	59	.200
Pair 3	Contacts - ICT	.78333	.96272	.12429	6.303	59	.000
Pair 4	Differen - ICT	.25556	.80515	.10394	2.459	59	.017
Pair 5	Quality - ICT	.48750	.89540	.11560	4.217	59	.000

*: CAF - Competitive advantage factor

Since Slovenian firms entered the transitional period from a socialist to capitalist model in the 1990s, 15 years later in 2005 the industry characteristics were quite mixed. The majority of hotels had mixed state-private ownership, with a smaller share of the hotel business being family-owned. Yet, Pearson's coefficients (Table A1 in the Appendix) did not confirm that the implementation of ICT varied according to the type of ownership, even though family-run hotels have a lower propensity to adopt technological changes and a higher orientation to price policy. In our case, the importance of ICT was only affected by the category of the hotel and the destination type. The leaders in the category group are four-star hotels, while the leaders in the destination group are spa hotels. Contrary to our expectations, we were unable to confirm the impact of being a member of a chain or a firm's size on awareness of the importance of ICT.

5.2 Low hotel industry attitude to new technology and high importance of the competitiveness factor contacts

The industry's attitude to new technology was not very supportive; the mean value is 3.33 and lower than the value of any competitiveness factors, as demonstrated in Table 5 which supports our second hypothesis. Such a neutral environment (a mean value of around 3, Table 4) was not very friendly to the implementation of new technologies and might have slowed down the process of adapting in response to new technological challenges. Slovenian hotel firms that considered technological changes in the industry infrequently were less likely to implement new information technology. Given previous studies (Van der Borg et al., 1997), this result is no surprise. Many characteristics of the Slovenian hotel industry suggested ICT hindrances such as low technology-oriented management culture based on poor knowledge and a fear of the high cost of investing in access to digital worlds, as well as low connections with the international hotel world in terms of FDI, brands and consequently international hotel contracting. Yet, in line with previous research hotel managers hotels that belong to an international chain demonstrated greater awareness of the importance of technological change (Tables A1 and A2 in the Appendix). At the same time, we cannot confirm that large hotels are technologically more aware. On the contrary, the results confirm the statistically significant higher values for smaller firms' attitudes to technology.

Table 4: Evaluation of attitudes to new technology, Slovenian hotel sector (1 - don't agree; 5 - completely agree)

Attitude to new technology	Mean	St. dev
A new business opportunity	3.57	0.88
Infrequent changes	3.08	0.74

Table 5: Paired Samples Tests for Technology Attitude, Slovenian hotel industry

		Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pair 1	All Factors-Tech. Attitude	.45789	.67891	.08765	5.224	59	.000

Despite the low priority given to ICT by Slovenian hoteliers, the hotel business is in its nature an information and communication intensive business. The quality of the intangible service the industry offers depends on a firm's ability to rapidly communicate internally and externally with partners and customers. ICT manages internal and external contacts and thus information flows more efficiently than simply by way of personal contacts. Yet, Slovenian managers preferred to do business via personal contacts and evaluated the competitiveness potential of contacts significantly higher than ICT (Table 3). This confirms our third hypothesis on the prevalence of doing business according to old ways through personal contacts.

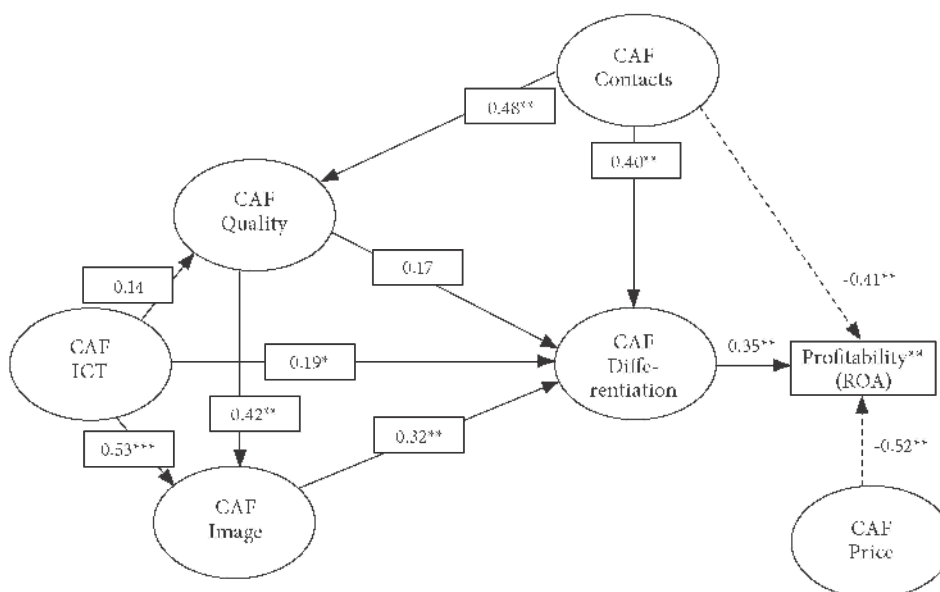
5.3 ICT's positive indirect impact on productivity

Further, the unfavourable deployment of ICT might have another explanation – the managers have not considered it as an important factor of their firm's profitability. Are Slovenian managers aware that ICT could represent a layer of info-structure which supports other factors of competitive advantage, e.g. that there may be an indirect impact on their firm's profitability? Can a firm successfully follow a differentiation strategy and neglect the supportive role of ICT? Can personal contacts efficiently support the chosen strategy and help improve the firm's performance in a more market-based environment?

The above questions were studied with the SEM LISREL CAF model on the direct and indirect impacts of competitiveness factors on productivity. The chi-square (10.78 with 7 degrees of freedom) for the test of difference between the observed and estimated covariance matrixes is not significant (a p value of 0.149) and the non-normed fit index (NNFI) is 0.93, above the threshold value of 0.9 suggested by Tze Hu and Bentler (1998). Only the root-mean square error of approximation (RMSEA) is slightly above the suggested cut-off value of 0.05 for a good fit model, although still below the 0.1 cut-off for a poor fit. All of the described indices were found by Tze Hu and Bentler (1998) to be robust to non-normality and sensitive to possible model misspecification. They all show that the model has a fairly good fit and is specified correctly.

The model confirms our fourth hypothesis that ICT has a positive impact on a firm's productivity, albeit its impact is only indirect via the factor of differentiation (Figure 2). ICT also supports differentiation through significant direct impacts of ICT on the factor image that, again, has an indirect impact on profitability through the factor differentiation. As Figure 2 shows, CRS helps improve the responsiveness and reliability of services. Both CRS and the Internet improve PR and promotion, open new sales channels, enable a bigger market share, and improve brand recognition and corporate image. Although there is no significant link between ICT and quality, quality orientation has a strong impact on image which, as already stated, positively supports the differentiation strategy and boosts productivity.

Figure 2: Proposed CAFs⁽¹⁾ model of ICT's impact on profitability, Slovenian hotel industry



CAF⁽¹⁾: Competitive advantage factor

*: Significant at the 0.05 level, **: Significant at the 0.01 level; ***: Significant at the 0.001 level

Chi-Square=10.78, df=7, P-value=0.14853, RMSEA=0.098, Normed Fit Index (NFI) = 0.93

Source: LISREL estimation

The model also showed that the personal contacts given such high priority by hotel managers have a direct negative impact on productivity, yet they are important for the perception of quality and also have the potential to support a successful differentiation strategy. Indeed, pre-sale personal services and other contacts do improve the quality of services, yet Slovenian hotel firms might overestimate the importance of contacts and employ them too extensively and at too great a cost, hence the negative impact on performance. It may be that other factors offer more productive potential for a firm's performance. Further, personal contacts might be too costly compared to CRS or the Internet, that

might partially replace the use of personal communication and via sales channels hold positive potential for a firm's productivity.

Further, our model also logically connects Porter's competitiveness strategy theory with the theory of competitive advantage resources/factors. The tangible factor low prices in Figure 2 can be easily linked to a low price strategy, which is obviously not an option for Slovenian hotel managers as it holds negative potential for a firm's profitability. Therefore, the alternative, e.g. a differentiation strategy, should have a positive impact on a hotel's performance. In our model the positive impact is a result of direct and indirect links with and among many intangible competitiveness factors which connect to differentiation which, in turn, have a positive impact on a firm's profitability. However, the ICT factor is an integral part of a differentiation strategy.

6. DISCUSSION AND CONCLUSIONS

6.1 Theoretical contributions

The main novelty of the present paper is the proposed six CAF model and its clear identification of six potential competitiveness advantage factors: image, quality, differentiation, contacts and price. Although the model has already been proposed in previous research (Mihalič & Dmitrović, 2000), the present study expanded its potential to study the direct and indirect competitiveness relations. Such a SEM based approach enables to test the ICT factor for its direct and indirect competitiveness potential and to study the ICT productivity paradox from the real and methodological point of view. The results on the presence of indirect ICT impact on productivity rather than direct, contribute to the wider knowledge and theoretical understanding of the productivity paradox in the tourism field. The SEM approach, first time used in order to study the mentioned paradox in a hotel industry, has some methodological advantages.

First, it helps to overcome a methodology based mentioned paradox and to understand the ICT competitiveness potential for hotel business. More specifically, it further confirms the previous research findings on the "lost productivity paradox" (Sigala et al., 2004, p. 180), based on different methodology. Our CAF model shows that also in traditional economies or in the early ICT implementation stage the ICT paradox does not exist and that ICT has indirect and strong positive potential for firm performance. The ICTs are a complement and enablers of other competitive resources and can no longer be ignored. Failure to employ ICTs can lead to competitive disadvantages as channels to the market will go unexplored, and PR and promotion, service diversity, branding etc. will not reach the potential competitiveness potential, if not properly supported by the ICT.

Second, SEM, using our six factors approach also helps to understand the indirect connections, their direction and positive or negative impacts. More specifically, transitional hotel sectors that, due to a social tradition, might not deliver a high quality products, need to recognise the importance of product quality, in comparison to lower importance

of price. Transition might also demand new ways of doing business, such as IT based communication, instead of more traditional personal contacts.

In the above sense our research expands a tourism field related knowledge on firm's ICT competitiveness, specifically for small transitional and ICT developing tourism sectors. In addition, the research also has some practical implications, as discussed in the next sub-chapter.

6.2 Practical implications

Our empirical research shows that the ICT has indirect and strong positive potential for firm performance. This is especially true in transitional countries where ICT is used much less than in more industrialised countries. Therefore, it is concluded that for hotel firms ICTs reengineer and rationalise processes and services and indirectly increase firms' performances – through other competitiveness factors. Although investments in ICT have been low, its productivity potential has been proven to be significant. Tourism policy in transitional countries should aim to speed up the process of implementing ICT.

The next practical implication refers to low-price strategies. Small hotels and hotels in small destinations cannot achieve the advantages of broader market scope and a mass scale economy. For such hotel firms, a low-price orientation in a small volume market erodes their economic efficiency and we found that ICT has no potential to improve this situation. As clearly seen in our model, there are no connections between low prices and the ICT factor and also no connections among price and other competitiveness factors that have positive potential for improving financial performance. In our case this also means that low quality tourism products, often associated with a low market and customer orientation and the poor managerial performance motivation in former socialist countries, with products marketed and sold at low prices, are incompatible with today's ICT-supported tourism business.

Further, we proved that in the year of study tourism managers did not see ICT as an important source or supporter of competitiveness. The perception of ICT's importance for business was relatively low, compared to other possible competitiveness sources. If we ignore the perceived competitiveness potential of low prices, Slovenian managers saw ICT as the least important factor. Their attitudes to technological changes were consistently neutral. Both factors might explain the low level of ICT deployment. In addition, other determinants are also important. In many cases equity owners in transitional countries still do not perform their usual governance function because the privatisation process has not yet been completely finished and thus the transformation towards market-oriented performance and competition has not been fully exploited. This means that the present owners are passive owners who do not strongly enforce the same business standards applied in more developed countries. In the year of the study, the transition in the Slovenian hotel sector had still not finished and a large share of hotels was still in the hands

of inside owners, the state and other funds which may explain why the managers hired by these owners have not been much forced to explore new ways of doing business. Less competitive and less innovative hotel managerial attitudes are well-known in many cases where managers are civil employees and hotels are state-owned. In general, hotel ownership has been attractive as a capital investment opportunity due to skyrocketing real estate values. Therefore, the main interest of shareholders has not been hotel performance since the value of their real estate (capital) has been rising, thus creating a low stimulus to control the managers to ensure they are more competitive. The willingness to sell to new, active owners has been hindered by excessive resale prices, also due to speculative expectations of higher property values. Mechanisms such as the standard hotel manager being contracted by an active (foreign) owner were non-existent in Slovenia at the time of survey. Yet it is true that managerial attitudes to technological changes were significantly higher in hotels that belonged to international hotel chains and it can hence be concluded that international hotel chains have a positive impact on ICT business integration. At the same time, chain partners have easy access to ICT-related knowledge, training and applications. Unfortunately, there has been few foreign capital or other partnerships in the Slovenian economy. The slow and case-by-case privatisation has kept foreign direct investment inflows at low levels, while the lack of effective competition and obstacles in the business environment have not been supportive of capital inflows and new competitive sources into the country. In 2005, the World Bank (2005) ranked Slovenia the second worst country in the EU for the "ease of doing business". The Slovenian hotel sector has remained practically the same in terms of foreign hotel investment and international hotel management connections and it could be argued that this also explains the slow penetration of new competitiveness sources, even though they have been extensively and successfully employed abroad.

The research findings also show that Slovenian hotel managers favour doing business through personal contacts, which they see as the most important competitiveness factor (rank number 1). Firstly, this is certainly the old way of doing business and can be seen as hotel business specific. Secondly, in the Slovenian context of a former socialist country, personal contacts in doing business also relate to contacts with other firms and organisations, including government ones, that are seen as a substitute and correction or non-market support for commercial business. Yet, unfortunately for Slovenian managers the SEM showed that such contacts have had a direct negative impact on firms' profitability. As the theory suggests that ICT is a tool for rapid and cost-effective communication with both business partners and final customers, this finding represents an additional argument for implementing ICT. The implementation of ICT will also change the nature of contacts which, in their present form, are obviously too costly and in the modern market economy inefficient, and thereby negatively connected to firms' performance. Certainly, this finding can be generalised, too.

Transitional hotel sectors might be implementing ICT in their day-to-day business too slowly. In order to close the gap with technologically-advanced hoteliers it is logical to expect that the neglected competitiveness factor will be prioritised and that it will hereby increase its rank on the list of possible competitive advantage factors. First, hotel

managers in transitional countries should be more aware of the competitiveness potential of new technologies, not simply of their costs. The situation has not been satisfactory given the time lag involved in Slovenian businesses implementing ICT technology compared to American or other West European hotels. It could be argued that, if the sector is relatively neutral as regards seeing technological change as a business opportunity and if the general awareness of frequent technological changes in the hotel business is also neutral, such a situation would slow the ICT implementation process down and widen the gap with technologically more advanced hotel sectors. Thus, there may be a need to boost the sector's awareness of technological business opportunities and changes. If the sector's attitude to new ICT is not strong enough, significant changes in favour of implementing ICT will have to be pushed from outside tourism companies and industries, for instance through tourism policy or through pressure in the supply chain. In the event of the poor employment of ICT, tourism demand might turn in the direction of (electronically) easily accessible accommodation. At the same time, supply chains might also turn to other more ICT-competitive destinations. For this reason, the awareness and employment of ICT in the commercial sector holds strong tourism policy relevance.

6.3 Limitations and future research

Some limitations of this study reduce the possibility to generalise its results. First, although the sample of the hotel industry covered 46 percent of the whole hotel population, this means a sample size of just 60 hotels. Consequently, the size of the sample sometimes imposed limits on the statistical analysis.

Second, data on competitiveness resources and conditions were gathered via a questionnaire and refer to a hotel unit. These data were combined with official data from balance sheets which refer to hotel firms that might also own other business units, not only the corresponding hotel. In addition, due to the unfinished transition and privatization process in Slovenia the financial statements might not always reflect the firms' true performance levels. Thus, some firms have negative equity and are still allowed to stay in business.

Nevertheless, we tried to overcome some of the above limitations with the selected statistical methods and confirmatory factor analysis using structural equation modelling (SEM). Thus, the Slovenian study makes an interesting case since its results also hold implications for strategy implementation for hotels operating in small-sized national or regional hotel industries in transitional or developing environments. Although it is dangerous to generalise empirical findings, the theoretical support of the empirical results might allow us some freedom to do so. We thus assume that the CAF model is useful for small-sized traditional hotel economies that are forced, or have decided, to concentrate on small volume business. Because of the size, the model could also be applied to hotel sectors not only in small national economies but also at regional destination levels.

In general, the above findings might be relevant to small and developing hotel sectors. The potential of ICT for the competitiveness of larger and more developed hotel sectors that might focus on a large-scale market and thus apply a low-price strategy has not been researched in the present paper and remains a challenge for future research.

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APPENDIX

Table A1: Pearson's correlations for CAFs⁽¹⁾ and hotel industry characteristic, Slovenian hotel industry

Statistics	Size	Category	Chain	Technology attitude	Destination	Ownership
Pearson's corr.	-.009	.310**	-.169	.024	-.216*	-.162
Sig. (1-tailed)	.474	.008	.099	.427	.049	.108
N	60	60	60	60	60	60

CAF⁽¹⁾: Competitive advantage factor

* Correlation is significant at the 0.05 level (1-tailed)

** Correlation is significant at the 0.01 level (1-tailed)

Table A2: Mean values for the importance of CAFs⁽¹⁾ broken down by industry characteristics, Slovenian hotel industry

	Structure in %	Contacts	Quality	Differen- tiation	Image	ICT	Contacts	Tech. Attitude
Total factor mean	100	4.46	4.17	3.93	3.79	3.68	3.09	3.33
Firm size								
- micro and small	48.33						3.37	3.51
- medium	36.67						2.81	3.18
- large	15.00						2.83	3.11
Category	0.00							
- *****	10.00	4.58	4.25	4.33	4.00	3.75		
- ****	46.67	4.62	4.41	4.14	4.03	3.98		
- ***	35.00	4.28	3.95	3.66	3.53	3.45		
- **	6.67	4.37	3.81	3.41	3.12	2.87		
Ownership	0.00							
Family	13.33						3.43	3.31
Other	86.67						3.03	3.32
International Chain	0.00							
- Yes	3.33							4.00
- No	96.67							3.30
Destination	0.00							
- Urban (cities)	28.33	4.23				3.91	3.35	
- Mountains	25.00	4.40				3.60	2.93	
- Sea	16.67	4.70				3.80	2.70	
- Spa	15.00	4.61				3.94	2.83	
- Other	15.00	4.61				3.00	3.55	

CAF⁽¹⁾: Competitive advantage factor

Note: only statistically significant mean values are presented (see Figure A1 for significance levels).

ESTIMATING BETA OF VIET NAM LISTED PUBLIC UTILITIES, NATURAL GAS AND OIL COMPANY GROUPS DURING AND AFTER THE FINANCIAL CRISIS 2007-2011

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ABSTRACT: *There comes a need for analyzing riskiness of many industries in Viet Nam stock market during the financial crisis period 2007-2011. Among these industries, the Viet Nam public utilities, natural gas and oil industries, specifically, also has to re-evaluate the risk level.*

First, we found out in the research sample that there are 84% of firms, of total 45 listed firms, with beta values lower than (\leq) 1, meaning with lower risk, and the systemic risk is acceptable.

Second, there are 13% among total 45 listed firms, whose beta values higher than ($>$) 1, meaning having stock returns fluctuating more than the market index.

Third, among three (3) groups, the systemic risk in the electric power industry is the smallest, and asset beta variance in the gas and oil industry is the smallest, shown by estimated values of equity and asset beta mean.

Finally, this paper generates some analytical outcomes that enable companies and government to have more evidence in establishing their policies in investments and in governance.

Key words: *equity beta, financial structure, financial crisis, risk, asset beta, computer and electrical industry*

JEL classification: G010, G100, G390

1. INTRODUCTION

The global crisis 2007-2009 affects the economy of many Asian countries and industries in Viet Nam. Increasing prices and cost of capital influence the business of many industries and Viet nam stock market. In this research, we perform a systemic risk analysis based on asset and equity beta of 45 listed companies in the three (3) groups of public utilities (water and electric power), natural gas and oil firms. The three (3) above industries faced many difficulties in previous years such as how to increase the number of customers, service quality and revenues; now, they have to deal with some problems

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from the global crisis. From 2009-2011, the local government and central bank have performed some effective macro policies to help the economy to recover. Then, this paper emphasizes on analyzing un-diversifiable risk in the 3 above industries in one of emerging markets: Vietnam stock market during and after the financial crisis 2007-2011. After the previous published article on estimated beta for listed construction company groups, here, we will estimate and compare asset and equity beta results of listed Viet Nam public utilities, gas and oil companies together to make an analysis on risk evaluation after financial crisis impacts. There is no research, so far, done on the same topic.

The structure of this paper is as follow. The research issues and literature review will be mentioned in next sessions 2 and 3, for a short summary. Then, methodology and conceptual theories are introduced in session 4 and 5. Session 6 describes the data in empirical analysis. Session 7 presents empirical results and findings. Next, session 8 gives analysis of risk. Lastly, session 9 will conclude with some policy suggestions. This paper also provides readers with references, exhibits and relevant web sources.

2. RESEARCH ISSUES

We mention a couple of issues on the estimating of beta for listed public utilities, natural gas and oil companies in Viet Nam stock exchange as following:

Hypothesis/Issue 1: Among the three (3) companies groups, under the financial crisis impact and high inflation, the beta or risk level of listed companies in natural gas and oil industries will relatively higher than those in the rest two (2) industries.

Hypothesis/Issue 2: Because Viet Nam is an emerging and immature financial/technological market and the stock market still in the recovering stage, there will be a large disperse distribution in beta values estimated in the public utilities, natural gas and oil industries.

Hypothesis/Issue 3: With the above reasons, the mean of equity and asset beta values of these listed public utilities, natural gas and oil companies tend to impose a high risk level, i.e., beta should higher than ($>$) 1.

3. LITERATURE REVIEW

William Sharpe., (1963) pointed in a simplified model of portfolio theory that each stock is correlated with each other stock because all are correlated with “the market”, and stock return depends on some factors such as a constant alpha and stock beta. Sheu, Wu and Ku (1998) observed that 3 variables: stock returns and market beta, the sale price and sales volume played a combined role in explaining returns of equity. Next, Copeland, Weston and Shastri (2005) argue that the enterprise entire risk can be reflected as the sum of systematic risk and unsystematic risk. Aswath, Damoradan., (2008) mentioned

several factors which affect beta estimation, including: different time periods generating different beta values, and therefore, different returns. And different return interval such as daily, weekly, monthly can also affect beta estimation. Beside, Pereiro, Luis E., (2010) said in merging markets, measuring betas is more difficult and a complicated job because developed markets have abundant historical data. Then, Mo Chaudhury (2011) investigated the effect of financial crisis 2007/08 on major US stocks and saw beta risk increased considerably for financial stocks. Pablo Fernandez (2013) also stated that industry betas are very unstable.

4. CONCEPTUAL THEORIES

Determinants of Equity and Asset Beta

Generally speaking, beta can be estimated for an individual firm by using regression analysis against a stock market index or a return of a portfolio. The slope of the regression line from linear least squares estimation is beta. Beta is also referred to the correlated volatility, or the sensitivity of return of a financial asset against that of market. The fluctuation of stock return is the component determining beta. Other factors affect beta values include, but not limit to, the impact from economic crisis, economic conditions, interest rates and inflation.

Beta is used in CAPM model, which says the expected return on equity is the function of equity beta of the firm. Besides, it is also used in a multiple beta model which says that two financial assets can have the same beta although one can be a better investment. Asset beta can be a function of equity beta and financial leverage. Moreover, beta can also be used in investment strategies that aim to generate returns over the standard market index.

Equity beta is sometimes considered as un-levered beta, which means the firm beta without using debt. Last but not least, beta is non-diversifiable risk which Billio, Getmansky, Lo, and Pelizon (2010) defined as any circumstance that threatens the stability of or public confidence in the financial system. Finally, beta can also be used in portfolio theory and it is a weighted average of the betas of many individual stocks with the weights similar to portfolio holdings.

5. METHODOLOGY

In order to estimate beta results, we use the input data from the live stock exchange market in Viet Nam during the four or five years of financial crisis 2007-2011. We select this period to do this research because Viet Nam stock market has shown the declining trend and this is the time highlighting financial crisis impacts.

Firstly, we use the market stock price of 45 listed companies in the public utilities (water and electric power), natural gas and oil industries in Viet Nam stock exchange market to

calculate the variability in monthly stock price in the same period; secondly, we estimate the equity beta for these 3 listed groups of companies and make a comparative analysis. Thirdly, from the equity beta values of these listed companies, we perform a comparative analysis between equity and asset beta values of these 3 companies groups in Viet Nam. Finally, we use the results to suggest policy for both these enterprises, financial institutions and relevant organizations.

The below table gives us the number of public utilities, natural gas and oil firms used in the research of estimating beta:

Market	Listed Water companies (1)	Listed Electric power companies (2)	Listed Natural Gas and Oil companies (4)	Note (4)
Viet Nam	0	13	9	Estimating by traditional method
	10	7	6	Estimating by comparative method
Total	10	20	15	Total firms in group: 45

(Note: The above data is at the December 12th, 2012, from Viet Nam stock exchange)

6. GENERAL DATA ANALYSIS

This research sample contains 45 companies in categories of industries: water, electric power (public utilities), natural gas and oil companies groups. After the analysis, the mean of equity beta is about 0,609 and that of asset beta is about 0,344 (lower). It shows us the effectiveness of using financial leverage to reduce the entire risk of the 3 industries. And these data, are acceptable values during the crisis and quite lower than those of construction industries in the same period.

Next, the difference of beta mean values (equity and asset) is just 0,2644, which is quite smaller than that of max beta values (about 0,6193).

Beside, the sample variance of asset beta is quite lower (0,0562), while that of equity beta varies higher (0,1524), with a difference of 0,0962. Both data means the high concentration level. This shows us, once again, that the effect of using financial leverage has decreased the systemic risk for the whole industry.

Additionally, max equity beta value is up to 1,617 that is a little bit high, compared to max asset beta value is just 0,998 with lower risk. The below table 2 shows us that a few companies still has larger risk exposure than most of the others.

Then, values of equity beta varies in a range from 1,617 (max) to -0,865 (min) and that of asset beta varies in a safer range from 0,998 (max) to -0,270 (min). There are only 1 listed company with beta lower than (<) 0 showing the stock return moving opposite to the market index (see table 2 below).

Moreover, there is a smaller difference between equity and asset beta variance values which is just 0,0962, compared to the relatively higher gap between max equity and max asset beta values, which is about 0,6193, and the gap b.t mean equity and asset beta values about 0,2644. So, there is not quite big effect from financial leverage on the gap between company's beta variance values.

In summary, there is 84% of listed firms in 3 above industries with acceptable beta values or risk lower than ($<$) 1 and higher than ($>$) 0 whereas there is just 13% of these listed firms having beta higher than ($>$) 1 and having more systemic risks. This number is acceptable. And 84% of firms with acceptable beta values uses little more financial leverage than the 13% (45% compared to 42%).

Table 1: *Estimating beta results for Three (3) Viet Nam Listed Public Utilities, Natural Gas and Oil Companies Groups (as of Dec 2012) (source: Viet Nam stock exchange data)*

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,617	0,998	0,6193
MIN	-0,865	-0,270	-0,5946
MEAN	0,609	0,344	0,2644
VAR	0,1524	0,0562	0,0962

Note: Sample size : 45

Table 2: *The number of companies in research sample with different beta values and financial leverage*

Beta	No. of firms	Financial leverage (average)	Ratio
<0	1	68,76%	2%
$0 < \text{beta} < 1$	38	45,07%	84%
Beta > 1	6	42,33%	13%
total	45	31,6%	100%

7. EMPIRICAL RESEARCH FINDINGS AND DISCUSSION

A-Water listed companies group

The market for these companies are still exists and obvious during the crisis period 2007-2011, but has certain difficulties. The market for these firms and other firms and the public has been affected because good prices increase.

There are 10 listed firms in this industry category whose values of equity and asset beta mean are around 0,602 and 0,471, accordingly. (see the below tables 3 and 4)

These data show a low and acceptable systemic risk. In addition to, the asset beta is lower than the beta mean of total 45 firms.

Beside, the variance of equity and asset beta of the sample group equals to **0,1230 (lower than the entire equity beta var) and 0,1015 accordingly (with a gap of 0,0215)** that are higher than the entire sample asset beta var, indicating that the beta values are more dispersed. And the impact from using financial leverage makes these beta values fluctuate a little more from the sample asset beta mean.

Furthermore, we might note that asset beta mean of these 10 listed firms in this water category are the highest among those of firms in the rest two (2) groups, whereas equity beta mean is the 2nd highest. This rejects our 1st hypothesis mentioned above that the beta or risk level of listed companies in natural gas and oil industries will relatively higher than those in the rest two (2) industries. And this is one feature of the water industry during the crisis period. Among three (3) industries, the market risk of water group companies is a bit higher than those of the rest two groups.

Ultimately, the table 3 and 4 give us equity and asset beta mean values lower than (<) 1 which are acceptable numbers and it rejects our 3rd research hypothesis or issue that the mean of equity and asset beta values of these listed companies tend to impose a high risk level or beta should higher than (>) 1.

Table 3: *Estimating beta results for Viet Nam Listed Water Companies (as of Dec 2012)*
(source: Viet Nam stock exchange data)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	BTW	1,042	0,895	PJS as comparable	14,1%
2	BWA	0,551	0,509	LKW as comparable	7,6%
3	CLW	0,430	0,279	NBW as comparable	35,0%
4	GDW	0,790	0,555	BTW as comparable	29,8%
5	LKW	0,585	0,501	NTW as comparable	14,3%
6	NBW	0,603	0,413	SFC as comparable	31,5%
7	NNT	0,131	0,021	PCG as comparable	84,0%
8	NTW	0,658	0,516	HFC as comparable	21,6%
9	PJS	1,170	0,998	VMG as comparable	14,7%
10	TDW	0,057	0,021	NNT as comparable	63,3%

Table 4: *Statistical results for Vietnam listed Water companies*

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,170	0,998	0,1726
MIN	0,057	0,021	0,0361
MEAN	0,602	0,471	0,1310
VAR	0,1230	0,1015	0,0215

Note: Sample size : 10

B- Electric power listed companies group

In a developing economy such as Viet Nam, one of emerging markets with the high growth rate of GDP and economy, the demand comes from all business sectors and from households definitely exists and potential because of the public need though it could be affected the financial crisis.

This is the category with the highest number of listed firms (20 firms). The Table 5 below shows us the equity and asset beta mean of 20 listed electric power companies, with values of 0,449 and 0,256, accordingly. This shows us the risk is low and acceptable in this category. Additionally, the max equity beta and asset beta values are 0,914 and 0,604 which are quite good numbers, indicating acceptable risk in the industry. Next, the difference b.t 2 beta mean values is smaller than (<) that of the entire 45 firms.

Compared to the equity/asset beta values in the water industry, those of the hotel industry are a little lower. Even though it does not reflect income or return, it reflects a lower level of systemic risk and maintains the investor confidence of business operation in this industry, and also indicates the good effect from using financial leverage.

Besides, the variance of beta values among these 20 firms is quite small, from 0,1353 to 0,0417, for equity and, especially, asset beta, accordingly.

Among 3 groups, this is the group whose values of asset beta mean are the smallest. Please refer to Exhibit 2 for more information.

Table 5: *Statistical results for Vietnam listed Electric power companies*

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	0,914	0,604	0,3094
MIN	-0,865	-0,270	-0,5946
MEAN	0,449	0,256	0,1927
VAR	0,1353	0,0417	0,0936

Note: Sample size : 20

C- Natural Gas and Oil listed companies group

Among 3 groups, this is the group with the 2nd smallest number of listed firms (sample size = 15) and with the highest equity beta mean of about 0,826 that is higher than the mean of the entire equity beta. We can see that the effect of leverage has influenced these listed firms' risk a bit more than the water industry when we compare the difference between equity/asset beta mean values in these 2 industries.

Different from firms in the other industries, the gap b.t equity and asset beta mean values in this category is the highest (0,4490) which shows more effect from leverage.

Moreover, 15 listed entertainment firms has the lowest asset beta var value, estimated at 0,0310, which implies there is a less dispersion in market risk among firms in this industry category, compared to the others.

While equity and asset beta mean values are acceptable, around 0,826 and 0,377 accordingly, the max value of equity beta is a little high, about 1,617. However, max asset beta is 0,662 is low.

The equity beta value are distributed in a longer range, from 1,617 to 0,183, but in a shorter range for asset beta, compared to those of 2 previous groups. Last but not least, the decrease in asset beta mean value (or the difference of 0,4490), together with the small gap of 0,0980 b.t equity/asset beta var indicate the effectiveness of using financial leverage.

Please refer to Exhibit 3 for more information.

Table 6: *Statistical results for Vietnam listed Natural Gas and Oil companies*

Statistic results	Equity beta	Asset beta (assume debt beta = 0)	Difference
MAX	1,617	0,662	0,9551
MIN	0,183	0,107	0,0765
MEAN	0,826	0,377	0,4490
VAR	0,1290	0,0310	0,0980

Note: Sample size : 15

Comparison among 3 groups of water, electric power, natural gas and oil companies

We can find out among the 3 groups, equity and asset beta mean values of the electric power group is the lowest (0,45 and 0,26) while equity beta value of the gas and oil group is the highest (0,83) and asset beta of the water group is the highest (0,47). Assuming debt beta is 0, financial leverage has helped many listed firms in these industries lower the un-diversifiable risk, esp., the firms within the electric power, gas and oil industries. (see below chart)

Furthermore, we see the asset beta mean values of all 3 groups have not big difference and lower than ($<$) 0,5. As a result, it also rejects our 3rd hypothesis that the mean values of equity/asset beta of all 3 groups impose higher risks.

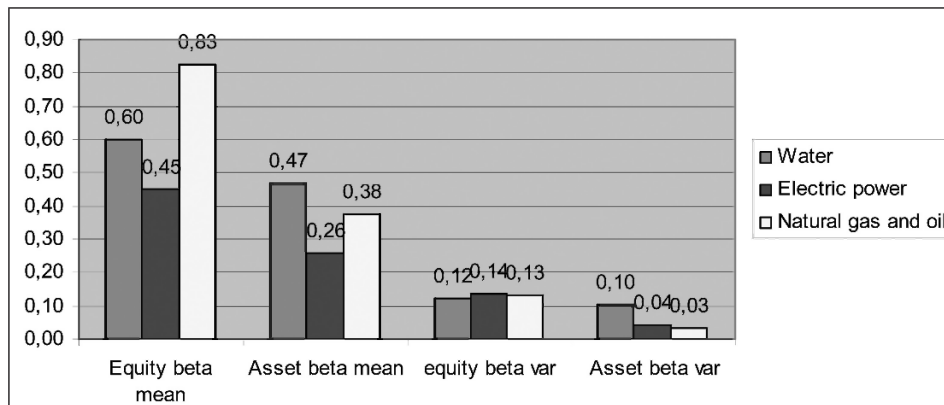
Then, we can recognize from the chart that, the risk in the water industry is higher than that in the two others. So, it rejects our 1st hypothesis.

Last but not least, in number, equity beta var varies from 0,12 (water) to 0,14 (electric) and asset beta var varies from 0,03 (gas and oil) to 0,1 (water) which are not so high under the effectiveness of leverage. This also rejects our 2nd hypothesis.

Then, if we compare beta values of three (3) above industries to those of construction, material and real estate group companies, we see the equity beta mean values in the water and electric power industries are lower, and the asset beta mean value in the gas and oil industry is also quite lower than those in the construction category (see exhibit 5). It indicates the business in the gas and oil industries could be more effective in using financial leverage to control market risk.

Finally, we could compare beta values of the above 3 industries to those of computer and electrical industries (see exhibit 4) and realize that equity beta mean values in the electric power and gas & oil industries are still lower than those in hardware/software/telecom industries, as well as asset beta mean values. The reason might come from the market and the demand under the crisis which might have more impacts on the computer and electrical industries than the electric power, gas and oil industries in this research.

Chart 1: *Statistical results of three (3) groups of 45 listed VN public utilities, natural gas and oil firms during/after the crisis period 2007-2011*



8. RISK ANALYSIS

The general macro economic factors are shown with high rates during the year 2008 (see in exhibit 1). The market for public utilities such as water and electric power is obvious and the economy and crisis has influenced on increasing price pressure during this period because of increasing material price and some losses. Moreover, the ratio of wastes in using fresh water in Viet Nam is still high and a few supporting or sponsoring programs from international organizations such as ADB needed. More electric power companies have been established to join in the electric market.

In addition to, the inflation increasing has certain impacts on selling prices of gasoline and oil. Electric power is an alternative source of energy for gas and oil; so, it affects the business and growth of gas and oil companies. In reality, some foreign companies left this market (Up Gas, BP Gas) because of some difficulties in competition to other firms.

Even though there are many difficulties, these 3 industries can expect the economy recovery from effective macro policies of the local government.

9. CONCLUSION AND POLICY SUGGESTION

Water industry

Whereas beta mean values are fine, this is the industry which has the highest asset beta mean and the 2nd highest equity beta mean values and the highest asset beta var (see chart 1). During the crisis period, this industry has higher market risk and the leverage might have less effect on dispersion of asset beta value of firms in the group, compared to those in the 2 other industries. Fluctuation in the real estate and construction groups also affects companies in this group.

After the crisis period, financial services firms, the government and central banks have some certain efforts to support businesses, corporate tax and investment environment, and stabilize inflation.

Electric power industry

In general, this is the industry which has the lowest values of equity and asset beta mean values, and the highest equity beta var, among 3 groups. The stability of market and the using of financial leverage can be reason to reduce market risk.

Natural gas and oil industry

In our research sample on beta values, this is the industry which has the highest equity beta mean and the lowest asset beta var, compared to those of the other two (2) above industries. Therefore, it shows smaller dispersion of market risk, with leverage, than, esp., water and electric power firms.

In general, our empirical findings state that they are not in favor of our 1st, 2nd and 3rd hypotheses or research issues.

In summary, though Viet Nam is an emerging market with imperfect financial system, the beta values estimated are at acceptable level with 84% companies in the research sample while just some companies' beta values are riskier (about 13% firms only).

Once again, the research indicates the effect of financial leverage, and the higher risk level in the water industry, compared to the 2 other. Moreover, if we compare these data and values to those of construction and real estate firms, and to those of computer and electrical companies in our previous research (see exhibit 4 and 5), we might see that in

this research, the asset or equity beta mean of electric power and gas and oil groups can be much lower while the financial crisis impacts on the entire market. The financial crisis might have less influence on the firms in the above groups.

Finally, this paper suggests implications for further research and policy suggestion for the Viet Nam government and relevant organizations, economists and investors from local and overseas.

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EXHIBIT

Exhibit 1: Interest rates, Inflation, GDP growth and macroeconomics factors
(source: Viet Nam commercial banks and economic statistical bureau)

Year	Basic rates	Lending rates	Deposit rates	Inflation	GDP	USD/VND rate
2012	n/a	12% - 15%	9%	6,81%	5,03%	20.828
2011	9%	18%-22%	13%-14%	18%	5,89%	20.670
2010	8%-9%	19%-20%	13%-14%	11,75% (Estimated at Dec 2010)	6,5% (expected)	19.495
2009	7%	9%-12%	9%-10%	6,88%	5,2%	17.000
2008	8,75%-14%	19%-21%	15%-16,5%	22%	6,23%	17.700
2007	8,25%	12%-15%	9%-11%	12,63%	8,44%	16.132
2006	8,25%			6,6%	8,17%	
2005	7,8%			8,4%		
Note	Approximately (2007: required reserves ratio at SBV is changed from 5% to 10%) (2009: special supporting interest rate is 4%)					

Exhibit 2: Estimating beta results for Viet Nam Listed Electric Power Companies
(as of Dec 2012) (source: Viet Nam stock exchange data)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	BTP	0,840	0,357		57,5%
2	CHP	0,407	0,168	BTP as comparable	58,7%
3	DNC	-0,865	-0,270		68,8%
4	DRL	0,473	0,388	NLC as comparable	17,9%
5	DTV	0,527	0,499	NLC as comparable	5,4%
6	GHC	0,359	0,117	NBP as comparable	67,3%
7	HJS	0,699	0,200		71,3%
8	KHP	0,615	0,308		50,0%
9	NBP	0,914	0,604		33,9%
10	ND2	0,180	0,043	TBC as comparable	76,2%
11	NLC	0,550	0,510		7,2%
12	NT2	0,639	0,137		78,6%
13	PPC	0,811	0,232		71,3%
14	RHC	0,361	0,200		44,7%
15	SBA	0,177	0,062	SJD as comparable	64,8%
16	SEB	0,427	0,194		54,5%
17	SHP	0,485	0,245	BTP as comparable	49,4%
18	SJD	0,420	0,221		47,4%
19	TBC	0,612	0,568		7,3%
20	TIC	0,351	0,343		2,2%

Exhibit 3: Estimating beta results for Viet Nam Listed Natural Gas and Oil Companies (as of Dec 2012) (source: Viet Nam stock exchange data)

Order No.	Company stock code	Equity beta	Asset beta (assume debt beta = 0)	Note	Financial leverage
1	ASP	0,619	0,149	PGC as comparable	76,0%
2	CNG	0,183	0,107	ASP as comparable	41,7%
3	GAS	0,416	0,228	NT2 as comparable	45,2%
4	HFC	0,794	0,511		35,7%
5	HTC	0,794	0,328	MTG as comparable	58,7%
6	MTG	1,125	0,564		49,9%
7	PCG	0,644	0,405	MTG as comparable	37,1%
8	PGC	1,084	0,521		51,9%
9	PGD	0,691	0,408		41,0%
10	PTH	0,522	0,213	HFC as comparable	59,3%
11	SFC	0,812	0,618		23,8%
12	TMC	0,856	0,327		61,8%
13	VMG	1,322	0,662		49,9%
14	PGS	0,910	0,186		79,5%
15	PVG	1,617	0,431		73,3%

Exhibit 4: Statistical results of four (4) groups of 64 listed VN computer and electrical firms during/after the crisis period 2007-2011

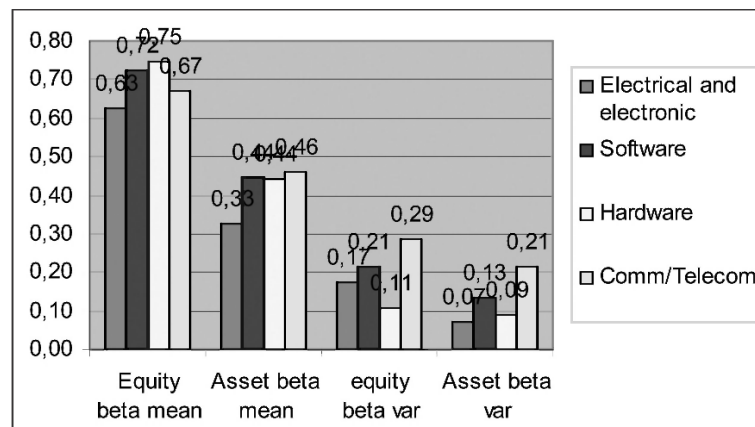


Exhibit 5: Statistical results of three (3) groups of 103 listed construction firms during crisis period

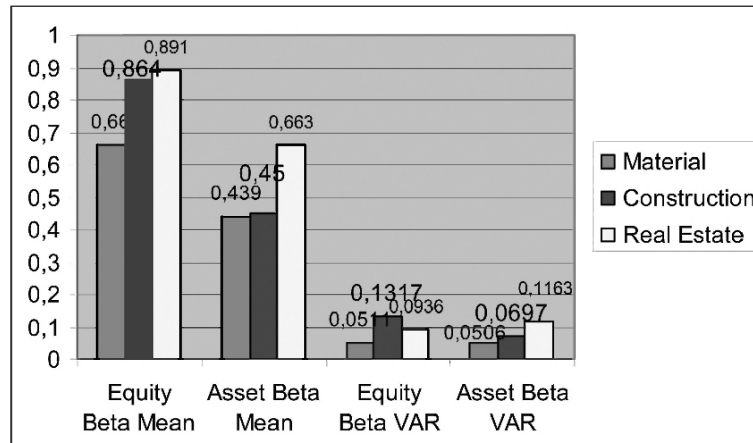


Exhibit 6: Statistical results of three (3) groups of 229 listed VN consumer good, wholesale and retail firms during/after the crisis period 2007-2011

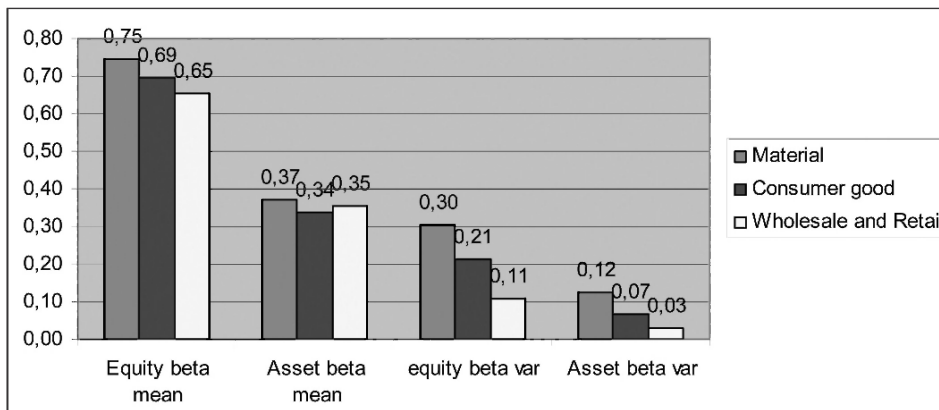
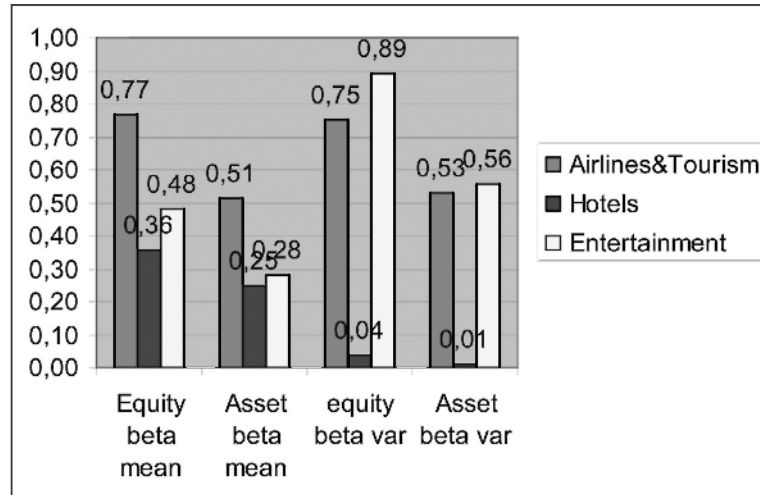


Exhibit 7: Statistical results of three (3) groups of 22 listed VN tourism, hotel and entertainment firms during/after the crisis period 2007-2011





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