



The influence of economic crises on network behavior

Journal:	<i>Journal of Business and Industrial Marketing</i>
Manuscript ID	JBIM-07-2015-0126.R4
Manuscript Type:	Original Article
Keywords:	business relationships, network behavior, economic crisis, Perception, relationship strategy, relational outcomes

SCHOLARONE™
Manuscripts

The influence of economic crises on network behavior

Abstract

Purpose

Following Industrial Network Theory, this paper addresses network behavior from a focal company's perspective. Special attention is paid to examining the effect of perceptions of the economic crisis on network behavior.

Design/Methodology/Approach

The study is built on a quantitative analysis of an empirical database of 300 companies based on a survey completed in 2013 in Hungary. A focal company network behavior model was developed and applied to investigate the link between variables (valuable customer relationships, valuable supplier relationships, relationship strategy, and relational outcomes) and the effect of managers' perceptions about the intensity of the crisis. To obtain a deeper understanding of the effect of the crisis, structural modeling methodology was applied during data analysis.

Findings

How crises are perceived has a moderating influence on companies' network behavior. In a context in which a crisis is strongly perceived, valuable customer relationships are considered more important than valuable supplier relationships; relationship strategy becomes more intensive, and performance is increasingly focused on operations and less on innovation. The main difference in network behavior is found with the management of the supply side. A different level of attention is paid to supplier relationships in a high-crisis-perception context than when a crisis is perceived as being less critical.

Research implications

Results emphasize the importance of perceptions as a key factor in managerial attitudes, behavior, and ultimately, decision-making. This finding merits more attention from both researchers of business relationships and networks.

Practical implications

From a managerial point of view, the results emphasize the existence of potentially new opportunities in network management. The reinforcement of attention to the customer during a period of crisis implies the importance of the customer orientation, but also suggests that firms may have unexploited opportunities and more potential resources on the supplier side.

Originality/value

The paper combines an analysis of network behavior and perceptions of crisis, helping to explain managerial decisions and attitudes. Analysis was undertaken from a focal firms'

1
2
3 perspective and investigated differences in attitudes concerning both supplier- and customer-
4 side relations. How crises are perceived is a moderating variable of network behavior.
5
6
7

8 **Keywords:**
9

10 business relationships, network behavior, economic crisis, perception, relationship strategy,
11 relational outcomes, network management
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Introduction

A crisis is an abnormal event that modifies behavioral patterns (Grewal and Tansuhaj 2001) and requires sustained attention from those involved. Crises are neither inherently good nor bad (Penrose 2000), as they provide companies with an opportunity to rethink their strategies, resources, and relations. The precise impact of crises on firm performance is influenced by the attitudes of managers. The important issue here is that a crisis situation is always perceived in different ways. Despite the interest in the strategic and organizational consequences of crises in the management literature, there has been no theoretical discussion of the influence of crises on business relationships (Grewal et al. 2007) and relationship management. Although the importance of managerial perceptions is commonly accepted in the business network literature, interestingly there is still relatively little research about the possible role of perceptions of crisis.

The main objective of this article is to describe how economic crises influence buyer-seller relationships and company network behavior. More exactly, we provide an overview of the influence of the perception of a crisis from a focal company's point of view. In order to address this issue, it is important to understand 'how companies behave in business networks'. In the current analysis, the effect of the crisis is used as a moderating variable of a firm's relational behavior, as described by the Focal Company's Network Behavior Model which has been constructed by the authors. To obtain a deeper understanding of the effect of the crisis, structural modeling was employed during data analysis. The results confirm how the perceived intensity of the crisis has different effects on companies' relational network behavior.

The empirical research was built on the results of a survey carried out in 2013 in Hungary with a sample of 300 companies by the Competitiveness Research Centre of Corvinus University of Budapest. The first results from this survey (Chikán et al. 2014) indicate that the crisis is still a burning issue for Hungarian firms: less than one third of executives feel that the crisis is over, but 40% of them presume that more than one year will be needed for trends to become broadly positive. Most of them felt the impact of the crisis mainly on the customer side (in terms of a loss of customers and customer solvency problems) and in the uncertainty of the business environment.

The paper is structured as follows: It begins with a theoretical summary of network behavior and provides a short overview of the main research directions concerning the managerial implications of crisis perceptions, emphasizing the research gap relating to the impacts of crises on business network behavior and business relationships. After a presentation of the Focal Company's Network Behavior Model the next section describes the methodology applied in the research. Results are presented in the third part of the paper and discussed in the fourth. The paper finishes by suggesting some of the theoretical and managerial implications of the research, describing the limits of the paper and offering ideas for further research.

Theoretical foundations

1
2
3 In this section, based on Industrial Network Theory (Håkansson et al. 2009, Axelsson and
4 Easton 1992), network behavior is first discussed. Second, from the perspective of this study
5 we outline the nature of the crisis and the role of crisis perception. The third part of this
6 section brings together these concepts in a Focal Company's Network Behavior Model
7 (FCNBM). This FCNBM serves as the theoretical framework of the article, which seeks to
8 combine an analysis of crisis perception and firm network behavior.
9

10
11 *Background theory: companies' network behavior*
12

13 Todeva (2006) provides an interdisciplinary overview of structuralist, relational and cultural
14 theories that explain business networks and network actors' behavior. From the complex
15 network structure perspective, Todeva (2006) emphasizes that these structures are interesting
16 because they represent interlinked actors and entangled relationships. Network actors,
17 relationships and structure simultaneously impact each other and affect the processes that take
18 place as part of overall network interaction and exchange. "At the heart of this dynamic is the
19 notion of individual actions and interactions. Different actions and choices are the engine that
20 drives the formation and evaluation of networks" (Todeva 2006:46).
21

22
23
24 Network positions are a consequence of the cumulative nature of the use of resources to
25 establish, maintain and develop business relationships. Each actor is engaged in relationships
26 with other actors. These relationships define the position of the actor in the network. In turn,
27 the network position is a highly strategic issue because it involves the role and the relative
28 importance of the actors in the business network (Johanson and Mattsson 1992). It also
29 influences the firm's opportunities to find clients and suppliers (Håkansson 2006), to acquire
30 information about potential partners and competitors (Gulati and Gargiulo 1999, Thornton et
31 al. 2015) and decisions about whether to attempt to create new business relationships
32 (Mandják et al. 2015). On the other hand, companies are able to proactively search for
33 necessary resources by trying to manage their business relationships (Ford et al. 2013). These
34 relationships create the network structure (Todeva 2006, Håkansson et al. 2009, Axelsson and
35 Easton 1992). This network structure is thus the result of actors' network behavior, while at
36 the same time it shapes actors' activities and decisions in the network. In fact, network
37 behavior is the result of the different activities and choices of actors in an interactive business
38 network (Håkansson et al. 2009). This way of conceptualizing actors' network behavior
39 allows us to understand the actors who interact with their embedding networks (Thornton et
40 al. 2015).
41

42
43
44
45
46
47 Ford et al. (2011) conceptualize actors' network behavior through a complex model based on
48 network pictures, networking, and network outcomes. Networking (Ford and Mouzas 2013)
49 relates to the activities of the organizations embedded in business networks through which
50 they seek to reach their goals. Their *network or relational strategy* (Ford and Mouzas 2008) is
51 based on and influenced by their network picture (Ford and Redwood 2005). *Network pictures*
52 describe the pictures of the surrounding network, as perceived by managers and upon which
53 they make their relational decisions (Ford and Ramos 2006). These decisions are supported
54 and constrained by other network actors' decisions and networking activities. These network
55 pictures influence the networking (Ford et al. 2011) activities which happen in relationships
56
57
58
59
60

(Todeva 2006), and the results are the network outcomes (Ford et al. 2011). *Network outcomes* are the multiple and sequential outcomes of these relationships (Ford et al. 2011) which together create the network structure (Todeva 2006). Ford et al. (2011) draw the conclusion that changes in network pictures, networking and network outcomes simultaneously interact, thereby creating the essential elements of business relationship management.

Thornton et al. (2013) conceptualize network behavior at an organizational level. The authors define network behavior as the actors' activities in their direct and indirect business and non-business relationships that affect their strategic network positions. In their conceptual network behavior model, Thornton et al. (2015) propose **two moderating variables which they postulate influence the activities of actors: closeness to the end-user, and technological turbulence**. The first is related to the actor's role in the technological process (Johanson and Mattsson 1992) and the latter to rapid technological changes (Håkansson 2006).

A focal company always has business relationships with its (typically numerous) clients and suppliers. Consequently, the company is obliged to simultaneously manage their customer and supplier business relationship portfolios (Turnbull et al. 1996). A successful firm needs to focus on relationship management to create a portfolio consisting of different types of relationships with other firms (Bengtsson and Kock 1999). From a focal company's viewpoint, portfolio management relates to a process of aggregation (Axelsson and Easton 1992) of the management of each unique business relationship, as described by Ford et al. (2011). In this context, *networking* (Ford et al. 2011) refers to all the different attitudes and activities in a company's different portfolios. By networking, the company tries to influence the content and direction of their interactions, mainly in the relationships which they consider to be important or valuable. These valuable relationships are generally those that Thornton et al. (2013, 2015) define as strong tie relationships.

However, each business relationship always has a certain value for both parties. This *relationship value* always has economic and non-economic elements (Mandják and Durrieu 2000). Relationships can be perceived as valuable because the developments or processes realized in such relationships can be used in other relations (Håkansson et al. 2009), or because of the reliable (Lapierre 2000) and promise-keeping behavior (Mandjak and Durrieu 2000) of a partner. In this context, value creation can be described as the set of shared resources in linked activities as perceived by bonded actors. However, these connected and combined resources simultaneously create different types of value for companies (e.g. customer value, and exchange value) for the buyer-seller dyad (business relationship) and for the other actors in the network. Business relationships are not only valuable but they are also important value drivers, so relationship management has become a strategic issue for every company (Ford et al. 2011).

At an aggregated level, network pictures may correspond to the totality of the pictures which create the basis of the *relationship strategy*. This strategy contains the goals and interactions in all types of relationships (even including joint ventures or outsourcing contracts) which are

1
2
3 established, maintained or developed with economic and non-economic partners (Baraldi et
4 al. 2007), as well as with local or state institutions.

5
6 *Network outcomes* may correspond to a focal company's relational outcomes, which are based
7 on the results of its multiple and sequential interactions (Ford et al. 2011). Relational
8 outcomes are founded on the ensemble of the company's existing relations (both business and
9 non-exchange) and are the result of its networking and relationship strategy. At the activity
10 level (Todeva 2006), they may relate to delivery outcomes related to punctuality and the lead
11 time of delivery. At the resource level (Todeva 2006), innovation outcomes may be one
12 interesting result (Aaboena et al. 2013).
13
14

15
16 Although business relationships are interactive economic exchanges, organizations always
17 have other types of relationship as well. These include non-economic relations (Easton and
18 Araujo, 1992) with different economic and non-economic actors (Cova et al. 2002). Non-
19 economic relationships are diverse and do not have an economic component (Easton and
20 Araujo, 1992). They may include relations with, among other actors, state organizations,
21 administrations, authorities, universities, professional groups, lobby groups, and so on (Cova
22 et al. 2002).
23
24

25
26 All business or non-economic relationships with economic or non-economic actors must be
27 managed by the organization. This means that organizations have more than two relationship
28 portfolios (customer and supplier) to manage, as they also have relationships with innovation
29 partners, institutions and local and central government actors. Furthermore, these portfolios
30 also demand unique, strategic relationship management (Ford et al. 2011).
31
32

33 **To conclude, network behavior from a focal company's perspective concerns its relational**
34 **strategy, which includes its relationship portfolios and relational outcomes.**
35

36 *The role of the economic crisis*

37
38 The world economy witnessed a decline of 6.5% in industrial output and a 12.8% decrease in
39 international trade since 2008, while in the European Union these decreases were even larger
40 (13.7% and 15%) in 2008 and 2009 (Békés et al. 2011:1.) Since the crisis shattered the world
41 economy, there has been increasing interest in understanding and analysing not just the causes
42 but the consequences and impacts of the crisis in management literature. From the point of
43 view of business network management, the literature that deals with the managerial
44 implications of the crisis provides us with our research background.
45
46
47

48 Penrose (2000) emphasizes that *attitudes* and *perceptions* about the crisis may ultimately
49 affect outcomes. Whether a crisis is perceived as an opportunity or a threat can have
50 significant implications. Crises are not inherently good or bad. Perceiving a crisis as an
51 opportunity should lead to an increase in the ability of those involved to consider various
52 alternatives and thus engage in more proactive planning. Perceptions have the potential to
53 influence the extent to which an organization is willing to engage in crisis management
54 activities (Penrose 2000).
55
56
57
58
59
60

Several pieces of research have sought to investigate the *different types of response to the crisis* (e.g. Gulati et al. 2010, Andersson and Mattsson 2010, Brenčić et al. 2012, Archibugi et al. 2013, Afthonidis and Tsiotras 2014, Aghion et al. 2014, Ghemawat 2014, Bakonyi 2016), mainly focusing on strategic shifts, organizational changes or implications for the use of company resources. Lin (2002) argues that an economic crisis is an event that requires extra resources, and organizations often rely on their relational networks. Gulati et al. (2010) classify companies and their approaches to managing during recessions. Bakonyi (2016) points out that an economic crisis stimulates companies to rethink their strategies (e.g. by restructuring decision-making authority within companies in the form of centralisation or decentralization). These strategies may extend beyond the boundaries of the company and influence relationship strategy. As a consequence of the potential reallocation of resources, changes in the management of relationship portfolios may also occur. Several authors also state that a *crisis also represents an opportunity* to develop a new way of operating and mobilizing resources, so companies need to rethink their strategies (Ghemawat, 2014), as well as functional elements such as markets and products, operations and innovation (e.g., by simplifying supply chains).

Afthonidis and Tsiotras (2014) examine the relationship between the strategic thinking of firms and their management with business excellence in times of economic crisis. One of their conclusions is that the main element of a well-structured strategy is the absolute focus on satisfying the needs of customers and stakeholders. Their findings emphasize the growing importance of management (business and non-business) relationships during the crisis. Furthermore, Merigo et al. (2016) emphasize the fact that companies must be well prepared for critical crisis situations.

Effects of the crisis on the Focal Company's Network Behavior Model

Following the aforementioned model proposed by Ford et al. (2011) based on network pictures, networking, and network outcomes, an aggregated model was developed to investigate this issue from a focal company's point of view. The proposed Focal Company's Network Behavior Model is also built along three dimensions: important or valuable relationships, relationship strategy and relational outcome. As a company is always obliged to manage several different relationships in a complex network, the model synthesizes the structural approach of Todeva (2006) and the relationship management approach of Ford et al. (2011). The Focal Company's Network Behavior Model attempts to deal with the complexity of relational management in a business network at an aggregated level. The model portrays a company's relational behavior in business networks.

While the Focal Company's Network Behavior Model (FCNBM) is in line with the model proposed by Thornton et al. (2013), there are also some differences between them. The relationship strategy concept of FCNBM focuses on the goals and activities in every type of relationship of the focal company, and is naturally linked to opportunities (Thornton et al. 2013) and information acquisition (Thornton et al. 2013). The FCNBM differs from Thornton et al.'s (2013) model by synthesizing the network position, its strategic role and its

consequences from a relational perspective. This means that a network position is considered to be the result of all the relationships that a company has (Johanson and Mattsson 1992). Strategic activities (Johanson and Mattsson 1992) may affect network position, but this is only possible by and through relationships (Ford et al. 2011). Moreover, these strategic activities have consequences in terms of their impact on relationships with partners. These consequences influence the network outcome in the form of relational outcomes.

The importance of business relationships and networks may be strengthened in periods of crisis. Earlier research has shown that business relationship characteristics, as well as attitudes to and activities in business relationships can affect firm performance (Grewal et al. 2007, Grewal and Tanushaj 2001, Afthonidis and Tsiotras 2014). As the crisis has made the business environment more turbulent, changes in suppliers' and customers' activities and in supplier and customer networks may have become more critical. This raises questions about the influence of the crisis on attitudes to relationships, as well as its impact on relational outcomes. This paper combines an analysis of crisis perception and firm network behavior. The novelty of this approach is that it helps analyze network behavior in relation to crisis perceptions, thereby explaining some of the decisions or attitudes of managers. The primary contribution is the validation of the Focal Company's Network Behavior Model. A secondary contribution is the analysis of the effect of the perceptions of the crisis on network behavior.

Research design, data collection and measures

The analysis is based on a survey carried out within the framework of the "In Global Competition" research program conducted in 2013 by the Competitiveness Research Centre (CRC) at the Corvinus University of Budapest (CUB). CRC was founded in 1999 by the Institute of Business Economics, the Institute of Marketing and Media, and the Institute of Management at CUB to coordinate research projects that commenced in 1996, and strives to be an internationally recognized centre for research into competitiveness at the Hungarian micro-sphere and enterprise level. The Centre cooperates with national and international academics and professionals from academic, governmental, and non-governmental organizations. A similarly structured survey has been undertaken five times, whereby four managers (chief executives, financial, manufacturing and commercial/marketing managers) from 300 (or more) firms responded to a comprehensive questionnaire that covered every phase of the competitiveness research program. The questionnaires were designed by multidisciplinary teams of researchers (more than 100 researchers participated at every phase of the research), and the response scales were validated by academics, managers and through several iterations of competitiveness research. The results of the previous surveys justify the validity of the research methodology. However, it is important to emphasize that the survey and its results reflect the opinions of executives, not objective truth (Chikán et al., 2002).

This study is part of the fifth phase of the competitiveness research program and builds on the measuring instruments and findings from this huge database. Questions about business relationships were answered by managers from marketing and sales ('customer-side' questions), and manufacturing/operations ('supplier-side' questions). The survey of 2013 was

carried out with a special focus on the impacts of and perceptions about the economic crisis in Hungary, and changes in companies' attitudes and performance from 2008-2012. The crisis perception items were included following the opinions of chief executives. The sample of 300 companies primarily consists of medium-sized manufacturing companies under mostly Hungarian domestic ownership. As with the previous surveys of the research program, the target group comprised companies registered and operating in Hungary as independent legal entities that use double-entry bookkeeping. The companies surveyed in the first 4 rounds were re-targeted. 50 companies from one of the first four surveys responded, thus it was necessary to expand the sample using a list obtained from a Hungarian Central Statistical Office (KSH) database, accounting for headcount and industry. However, following the original research design of the "In Global Competition" research program, which was not dedicated to representative data collection, the sample from 2013 is also not representative of the whole Hungarian economy. Employees of the TARKI Social Research Inc. assisted respondents with filling in the questionnaire during a series of interviews which were conducted between May and November 2013 (Tátrai, 2012, 2014). Sample characteristics are presented in Table 1.

Table 1 Sample characteristics by size (number of employees, asset value and sales revenue) and by industry

<i>Size</i>	<i>Number of employees</i>	<i>Frequency</i>	<i>Percentage</i>
Small	< 50 employees	32	10.7%
Medium	51 – 249 employees	221	73.7%
Large	≥ 250 employees	47	15.7%
Total		300	100.0 %
<i>Size</i>	<i>Asset value</i>	<i>Frequency</i>	<i>Percentage</i>
Small	< 10 million EUR	225	75.0%
Medium	11 - 43 million EUR	61	20.3%
Large	≥ 44 million EUR	14	4.7%
Total		300	100.0%
<i>Size</i>	<i>Sales revenue</i>	<i>Frequency</i>	<i>Percentage</i>
Small	< 10 million EUR	212	70.7%
Medium	11 - 50 million EUR	72	24.0%
Large	≥ 51 million EUR	16	5.3%
Total		300	100,0%
<i>Industry</i>		<i>Frequency</i>	<i>%</i>
Agricultural production		24	8.0%
Manufacturing		136	45.3%
Utility services		13	4.3%

Construction		23	7.7%
Wholesale and retail		60	20.0%
Services		44	14.7%
Total		300	100.0%
Dominant owner/s		Frequency	%
State		17	5.7%
Domestic private		214	71.3%
Foreign		69	23.0%
Total		300	100.0%

Source: Csesznák and Wimmer, 2014

The current analysis is based on the survey completed in 2013. One of the aims of this survey was to investigate the impact of the perception of the crisis on companies' network behavior¹ Managers' perceptions concerning the economic crises ("Crisis perception" in our Focal Company's Network Behavior Model) and value-creating factors of business relationships ("Valuable supplier relationship" and "Valuable customer relationship"), attitudes to the different types of relationships ("Relationship strategy") and elements of company's relational outcomes (including elements connected to business relationships such as "Relational outcomes") were investigated. Most of the responses were provided using a five-point Likert-scale (5: totally agree, 1: totally disagree, or 5: very important, 1: not at all important). The list of variables examined is provided in the Appendix.

Results

Model validation

In order to define the one-dimensional character of the different constructs used in this article, we performed Exploratory Factor Analysis (principal component analysis) with promax rotation. Exploratory Factor Analysis was chosen to analyze the huge "In Global Competition" research database because the originally measured manifest variables had to be revisited from the perspective of the present analytical goals. We tested for convergent, discriminate validity, and reliability of the constructs. The convergent validity of each parameter was considered to be verified if the average of all the λ^2 (ρ_{vc}) was greater than 0.5 (Fornell and Larcker 1981). Convergent validity was also confirmed if each item shared more variance with its construct than with the error. Reliability was assumed when all indicators relatively equally measured the same construct (i.e. loadings had to be at a comparative level). The ρ indicator was used to measure the internal coherence of constructs. To measure the reliability of the constructs, we then used ρ rather than Cronbach's α , the former being a more powerful test with smaller samples (Chen 2007), scales with limited items (less than four items) and composite reliability for the same constructs (Peterson 1994). The factorial structure and reliability of all variables that define the Focal Company's Network Behavior Model (Figure 1) are presented in Table 2.

¹ Results of earlier surveys concerning business relationship issues are presented in Wimmer and Mandjak 2002, Wimmer et al. 2004, 2010; Szántó and Wimmer, 2007.

Table 2 Factorial structure and reliability of variables

Variable	Dimension	Item	Loadings	Rho VC	Rho of Joreskog
Valuable customer relationship		Developments can be used in other relationships	0.91	0.60	0.80
		Customer shares best industry practices	0.86		
		Processes can be used in other relations	0.85		
Valuable supplier relationship		Developments can be used in other relationships	0.85	0.70	0.90
		Supplier contributes to the good reputation of our firm	0.85		
		It is easier to manage these contacts than with other potential suppliers	0.84		
		Supplier shares best industry practices	0.81		
Relationship strategy		Outsource contracts	0.82	0.57	0.87
		Engage in joint ventures	0.79		
		License contracts	0.71		
		Relationships with local institutions	0.72		
		Relationships with state institutions	0.74		
Relational outcomes	Delivery	Delivery lead time	0.93	0.86	0.93
		Punctuality of delivery	0.93		
	Innovation	R & D expenditure	0.92	0.84	0.92
		Number of innovations (both product and process innovation)	0.92		
Crisis perception		Loss of some former customers (cessation, exit from market).	0.79	0.61	0.82
		Reduction in solvency of customers.	0.78		
		Decline in demand.	0.77		

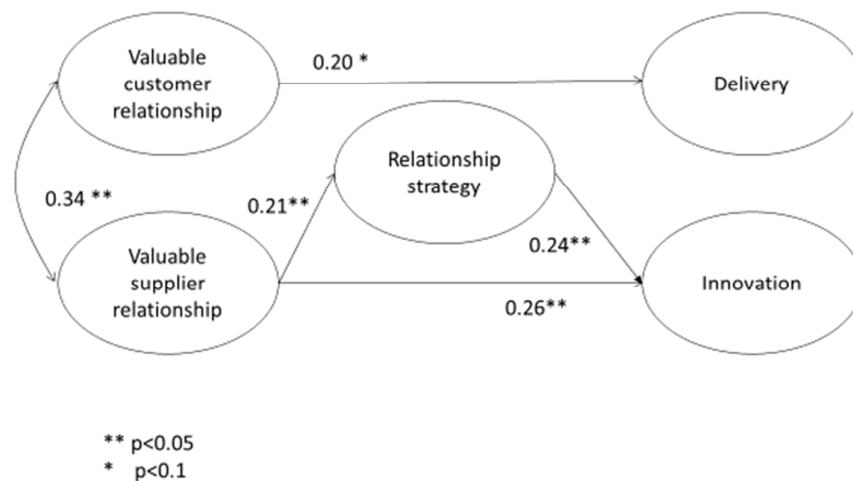
With the factorial score, we constructed clusters by following a hierarchical classification process (the main results are included in Table 3). This clustering process allowed us to split our latent variable, Crisis perception, into two (statistically validated) groups: Low crisis perception, and High crisis perception.

Table 3 Results of hierarchical classification

	Group	
	Low crisis perception	High crisis perception
Crisis perception	-0.71	0.89
Size	54%	46%

The scale and the impact of valuable relationships on relationship strategy and relational outcomes were tested using the EQS model (Bentler and Wu, 2002). With the aim of avoiding problems with multivariate normality, we applied the robust corrected method (Bentler and Wu, 2002) that corrects for the fit index and the coefficients of the model. We partly confirm the impact of Valuable relationships on Relationship strategy and Relational outcomes, as the focal company's relational strategies have no mediating role between the Valuable customer relationships and Relational outcomes. Goodness of fit was validated². The model is well adjusted according to the empirical data (Chi² 83.35 df 60, p=0.03, GFI 0.91, AGFI 0.86, NFI 0.89, CFI 0.97, SRMR 0.06 RMSEA 0.05). Figure 1. illustrates the structural parameters of the model.

Figure 1 Structural parameters of the Focal Company's Network Behavior Model



Valuable customer relationship is directly linked with Delivery (0.20), while Valuable supplier relationship is both directly (0.26) and indirectly related (0.21*0.24) to Innovation via Relationship strategy. Delivery and Innovation are the dimensions of Relational outcomes (see Table 2).

Effect of crisis perception

In order to test the moderating effect of the crisis on the model presented in Figure 1, we carried out a multi-group analysis. First, we adapted the measurement invariance methodology (Steenkamp and Baumgartner, 1998) to structural equation modelling, then tested the difference between the models with unequal parameters in each group and those with all equal parameters for each group (Configural invariance model) to verify the global effect. The Chi-square difference was used to test the significance of the effect. To understand the source of this effect, the model with unequal parameters in each group was compared with the model with equal metric invariance to determine whether the source of the global effect arose from the loading parameters of the model. The same was done with the structural

² Some are founded on the adjustment function (Chi², GFI, AGFI and RMSEA). Others are calculated by comparison to a null model (NFI and CFI). With reference to the adjustment indices (GFI, AGFI, NFI and CFI) their value should be near to 0.9 and, if possible, greater than 0.95. An RMSEA and SRMR of less than 0.05 is considered acceptable. The model fit conforms to the level recommended by Hu and Bentler (1999)

invariance that determines whether the source of the global effect is derived from the structural parameters of the model. Table 4 shows the results of the test for measurement invariance.

Table 4: Measurement invariance

	chi2	df	Δchi^2	Δdf	sign	CAIC	RMSEA	CFI
Model with unequal parameters	184.15	120				-548.57	0.06	0.94
Configural invariance	229.23	150	45.09	30	0.04	-686.66	0.06	0.92
Measurement invariance	220.80	140	36.65	20	0.01	-634.03	0.06	0.92
Structural invariance	187.71	130	3.57	10	0.96	-606.06	0.05	0.94

Configural invariance being verified, we analyzed other kinds of invariance to better understand their sources. Metric invariance was found to be significant, thus validating the moderating effect at $p=0.05$. All other indicators (Chi^2 184.15 df 120, $p=0.00$, CFI 0.94, RMSEA 0.06) conform to the criteria for validity. For each level of crisis, each measurement coefficient for Valuable relationship, Relationship strategy and the Relational outcomes measures is now presented. Table 5 displays the effects of the perceptions of the crisis on the measurement model.

Table 5: Effect of crisis perception on measurement model

	Global model	T	Low crisis perception	T	High crisis perception	T	Differences
Valuable supplier relationship							
Developments can be used in other relations	0.84	8.16	0.83	7.77	0.89	3.66	↗
Supplier contributes to the good reputation of firm	0.81	8.46	0.77	7.31	0.84	3.92	↗
It is easier to manage contacts with them than with other potential suppliers	0.75	9.42	0.75	8.12	0.74	5.15	=
Supplier shares best industry practices	0.70		0.75		0.59		↘
Valuable customer relationship							
Developments can be used in other relations	0.91	10.60	0.88	8.18	0.94	7.30	↗
Customer shares best industry practices	0.76		0.77		0.76		=
Processes can be used in other relations	0.77	9.33	0.69	6.49	0.89	7.50	↗
Relationship strategy							
Outsourcing contracts	0.89	4.84	0.94	3.48	0.92	4.73	=
Engaging in joint venture	0.85		0.75		0.92		↗
Delivery							
Delivery lead time	0.76				0.86		↗
Punctuality of delivery	0.99	2.36			0.92	2.57	↗
Innovation							

R & D expenditure	0.73	3.37	0.68	2.38	0.84	3.50	↗
Number of innovations (both product and process innovation)	0.91		0.94		0.80		↘

This analysis gives rise to the following observations. First, the measurements for Valuable customer relationship differ in the two cases. Valuable supplier relationship appears different according to High crisis perception than Low crisis perception. The fact that developments realized with one supplier may be used in other relationships (0,89 vs. 0,83) and the supplier's contribution to the good reputation of the firm (0,84 vs. 0.77) rose in importance. However, the importance of sharing industry best practice (0,59 vs. 0.75) becomes less important when the perception of the crisis is high. Furthermore, with Low crisis perception firms are more inclined to use customer relationships when compared to High crisis perception ('Developments can be used in other relations'; 0.88 vs. 0.94, 'Processes can be used in other relations'; 0.69 vs. 0.89). Similarly, the Relationship strategy and Relational outcomes (Delivery and Innovation) measurements warrant some comments. When the perception of crisis is low, Relationship strategy is less important than when it is high ('Engaging in joint venture'; 0.75 vs. 0.92) and this finding is similar for Relational outcomes (delivery lead time – not significant with Low crisis perception and R & D expenditure; 0.73 vs. 0.84). The same does not hold true for number of innovations (0.94 vs. 0.80).

Discussion

In this section the empirical evidence from the sample of the 300 Hungarian companies is discussed from the perspective of network behavior and the effects of the crisis. Based on the structural model presented in Figure 1, we first discuss the companies' network behavior; second, we highlight the effects of the perception of the crisis, showing how the perceptions about the intensity of the crisis influence the behavior of companies in the network. The discussion of results highlights their continuity with the concepts and statements from the literature earlier presented as theoretical background.

Taking into consideration the manifest variables (see Table 2, and the Appendix), the network behavior of the Hungarian companies investigated in this research is built on *valuable relationships*. A relationship is considered valuable if it makes possible the exchange of products or services and the establishment of processes which can be used in other relationships. It is also important that in such a relationship a partner would be ready to share best industry practice. This means that, on the one hand, actors consider their situation as interrelated (corresponding to the findings of Todeva (2006)). On the other hand, and perhaps indirectly, companies consider the importance of their individual roles in the network structure, as Johanson and Mattsson (1992) state. This form of networking (Ford et al. 2011) also helps them to acquire rich information, as industry best practice contains technological, economic and competition-related information. Results are in agreement with those of Gulati and Gargiulo (1999) and Thornton et al. (2015). On the other hand, this finding also seems to be in line with Thornton et al. (2015)'s 'opportunity enabling behavior', which relates less to

1
2
3 specialization and more to standardization; i.e. the fact that resources and activities can also
4 be used in other relationships (Thornton et al. 2013).

5
6 In their *relationship strategy*, the studied companies take a more collaborative approach as
7 they consider important not only the outsourcing of contracts and joint ventures, but also
8 some of their relationships with non-business actors (Cova et al. 2002), such as local or state
9 institutions. This could be partially being due to their place in the network structure. 70.7% of
10 the companies are small and 24% are medium-size according to their sales revenue, and most
11 of them are involved in the manufacturing industry (see Table 1). These roles of these
12 companies in the technological process (Johanson and Mattsson 1992) is relatively distant
13 from the end-user. Thus, as Thornton et al. (2015) emphasize, closeness to end-user may be
14 moderating variable of company network behavior.

15
16
17
18 The companies' *relational outcomes* are clearly separated into two dimensions: Delivery at
19 the activity level (in line with Todeva 2006), and Innovation at the resource level (Todeva
20 2006). Punctuality and lead time are considered important outcomes in customer relationships
21 by Hungarian companies who want to receive innovation support from their suppliers. This
22 interesting separation of the relational outcomes in delivery and innovation is shown by the
23 structural model (see Figure 1), as is the separation of the customer (delivery) and the supplier
24 (innovation) sides of the network. One possible explanation for this is the high proportion of
25 small and medium-size companies in the sample. These companies may be networking (Ford
26 and Mouzas 2010) based on their network picture (Ford and Redwood 2005) which mirrors
27 their network position (Johanson and Mattsson 1992). Their probably weaker network
28 position may lead them to concentrate on improving delivery quality (increasing punctuality
29 and shortening lead time compared to competitors) and mobilizing supplementary resources
30 in their supply portfolio, demanding innovation from their suppliers.

31
32
33
34
35
36 The effects of *crisis perception* on companies' network behavior is confirmed by the
37 empirical evidence based on the Hungarian sample. The perception of crisis has a moderating
38 influence on companies' network behavior. This moderating influence is visible in the
39 changes in all the dimensions of the companies' network behavior (supplier side and customer
40 side). Perceiving a crisis invokes changes in managers' attitudes via adjustment of the
41 elements of valuable relationships and leads to a reconfiguration of companies' incoming and
42 outgoing business relationships. This reconfiguration is encouraged by relationship strategy
43 and affects two elements of the relational outcome; namely, delivery lead time and R&D
44 expenditure. These results, on the one hand, are in accordance with the findings of earlier
45 research. Crisis perception influences companies' network behavior, and consequently
46 network outcomes (Penrose 2000). Through changes in customer and supplier relationship
47 management, perceptions of crisis engender resource mobilization (Lundgren 1992) and a
48 strategic shift (Lin 2002). Our findings are also aligned with those of Hale (2012) who
49 analyzed the consequences of different financial crises during the period 1980 – 2009 using
50 an enormous database of 7938 banks. The author concluded that: "recessions and banking
51 crises tend to have negative effects on the formation of new connections and that these effects
52 are not the same for all countries or all banks" (Hale 2012:312).

1
2
3 However, the moderating effect is dependent on the *intensity of the perception of crisis*. The
4 intensity of the crisis could be perceived as high or low. The hierarchical classification results
5 (Table 3) highlight the difference that having low or high perceptions of a crisis makes, and
6 enables the classification of companies' different network behavior.
7

8
9 With *high crisis perception*, focal companies are more interested in those supplier and
10 customer relationships that increase the opportunities of standardized behaviors or processes.
11 (those relationships in which the applied behavior or process could be used in other
12 relationships). Focal companies focus on valuable relationships to reduce delays and are ready
13 to increase their R&D budgets. **They are also ready to participate in joint ventures to increase
14 the security of their network position.** The supplier side can develop non-risky relationships in
15 terms of innovation, and the customer side can develop more operational capacity. Thus, in
16 situations of high crisis perception, companies' relationship management strongly focuses on
17 preexisting customer relationships (Aftonidis and Tsiotras 2014) but on the supplier side it
18 demands more standardized, specific relations. Furthermore, there is a decline in demand;
19 firms can fulfill orders with a shorter lead time and the punctuality of deliveries is also
20 improved. Product and process innovation declines, but some firms try to increase R&D
21 expenditure in order to create new business during the crisis.
22
23
24
25

26 In the case of *low crisis perception*, the studied companies' network behavior becomes
27 increasingly about information-seeking and sharing with valuable customers and suppliers.
28 This is because such companies consider their interrelated situation (Todeva 2006) to be less
29 coercive in nature than is the case with companies with a strong perception of crisis. They
30 consider this factor to be less important **than** the resources and activities which could be also
31 used in other relationships. Consequently, they are more open to incidental specialization on
32 the customer side, and to outsourcing contracts on the supply side. They are also able
33 (Thornton et al. 2015) to ask for and require more product and process innovation from their
34 important suppliers.
35
36
37

38 These research findings are in accord with Industrial Network Theory literature which
39 emphasizes the importance of focal companies' interrelated relationships (Håkansson 2006,
40 Todeva 2006). The empirical results also highlight the crucial role of the focal company's
41 network position (Johanson and Mattsson 1992). The results are also in line with the emerging
42 network behavior literature that provides evidence that focal companies' network behavior is
43 the result of their networking and relational strategy (Ford et al. 2011, Thornton et al. 2015).
44 One important statement from the crisis-related literature concerns the fact that perceptions of
45 crisis influence company network outcomes (Penrose 2000); this proposition is similarly
46 supported by our empirically derived results. However, this examination of Hungarian
47 empirical evidence raises questions about the moderating effect of the crisis, and the
48 important role of the intensity of the perception of the crisis. These are issues that have not yet
49 been discussed in network behavior literature.
50
51
52
53
54
55

56 57 58 59 60 Conclusions

1
2
3 The paper presents the results of an analysis of some empirical data about the intersection
4 between perceptions of crisis and company network behavior; an area that is still relatively
5 poorly researched (Thornton et al. 2015). How does the perception of crisis influence the
6 network behavior of companies? This question was investigated from the company
7 perspective using a huge sample from a survey administered in Hungary in 2013.
8
9

10 Based on a literature review, the Focal Company's Network Behavior Model was constructed
11 to identify the behavior of companies in their business networks. The influence of crisis
12 perception was studied as an exogenous parameter (Grewal et al. 2007) of the company
13 network behavior model (the Focal Company's Network Behavior Model) which was applied
14 to Hungarian data and operationalized and validated through structural equation modeling.
15 Results from data analysis prove that the strength of perception of a crisis has an effect on the
16 network behavior of companies. The stronger the perception of crisis, the more companies
17 focus on their customer relationships. The main difference in network behavior relating to the
18 strength of perception of crisis concerns the management of the supply side.
19
20
21

22 The study contributes to emerging network behavior research in several ways. Network
23 behavior was analyzed from a relational perspective by concentrating on investigating
24 valuable business relationships (both on the customer and supplier side), relationship strategy
25 and relational outcomes. Accordingly, the research approach is in line with work by Ford et
26 al. (2011). However, by addressing the portfolios of different relationships it makes a modest
27 contribution to the development of Industrial Network Theory.
28
29
30

31 This investigation is also connected to research by Thornton et al. (2013, 2015) which
32 proposes that the research focus be broadened. Based on the findings, it may be said that,
33 besides closeness to end-users and technological turbulence (Thornton et al. 2015), crisis may
34 also be a moderating variable of company network behavior. Crises affect at different levels
35 of intensity the crisis perceptions of actors and modify their network behavior in terms of their
36 strategic activity. This strategic activity targets their network positions and is realized in their
37 different relationship portfolios.
38
39
40

41 Concerning managerial implications, the results emphasize the opportunities for network
42 management: the focus on the customer side during a period of crisis implies not only the
43 importance awarded to customer orientation but also suggests that there are probably
44 unexploited opportunities and potential resources on the supplier side. Another finding of
45 relevance to managers is that networking capabilities (contributions to good reputation, and
46 through this, to finding potentially new business opportunities) are important on the supplier
47 side as well. Conversely, supplier potential as a source of innovation (through the sharing of
48 industry best practice) is perceived as less valuable during a crisis. This approach indicates a
49 short-term orientation and a focus on making immediate gains.
50
51
52

53 The research described in this paper naturally has some limitations. Although the empirical
54 data come from a relatively large, multiple-respondent survey, the sample is not
55 representative. This obviously means that there are limitations to how much findings can be
56 generalized. However, the findings are a potential starting point for further research.
57
58
59
60

1
2
3 The results also suggest some avenues for future research. The findings emphasize the fact
4 that perceptions are a key factor in managerial attitudes and behaviors, and one which may
5 determine decision-making. This field of investigation merits more attention in research into
6 both business relationships and networks. Network behavior literature also entertains weak
7 and strong relationships (Thornton et al. 2013, 2015). The impact on the network behavior of
8 perceptions of the strength of relationships in times of crisis would be an interesting topic for
9 further research. Other future research may address the nature and characteristics of the
10 networks which help companies to withstand crisis. Study of the longitudinal effects of the
11 crisis could also be interesting for discovering and distinguishing crisis effects from structural
12 changes. Further research could also focus on examining such differences by industry, and the
13 differences in attitudes of more and less successful companies (for example, by incorporating
14 into the Focal Company's Network Behavior Model a link to business performance).
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

References

- Afthonidis, E. P. and Tsiotras, G. D. (2014), "Strategies for business excellence under an economic crisis", *The TQM Journal*, Vol. 26 No. 6, pp. 610-624.
- Aghion P., Bloom, N., Sadun, R. and Van Reenen, J. (2014), "*Never Waste a Good Crisis? Growth and Decentralisation in the Great Recession. (Preliminary)*" Working Paper, Harvard Business School, 31 December, 2014. Downloaded: http://www.people.hbs.edu/rsadun/GoodCrisis_December2014.pdf
- Andersson, P. and Mattsson, L-G. (2010), "Temporality of resource adjustments in business networks during severe economic recession", *Industrial Marketing Management*, Vol. 39 No. 6, pp. 917-924.
- Archibugi, D., Filippetti, A. and Frenz, M. (2013), "The impact of the economic crisis on innovation: evidence from Europe", *Technological Forecasting and Social Change*, Vol. 80 No. 7, pp. 1247-1260.
- Axelsson, B. and Easton, G. (1992) (eds.), *Industrial networks, A new view of reality*. Routledge, London and New York.
- Bakonyi, Z. (2016), "Centralizáció és gazdasági ciklusok: miért központositunk akkor is, ha már nem kéne? – Egy kvalitatív megközelítés" (Centralisation and economic cycles: A qualitative study, In Hungarian), *Vezetéstudomány* (Budapest Management Review), Vol. 47 No. 1, pp.44-57.
- Baraldi, E., Brennan, R, Harrison, D. Tunisini, A. and Zolkiewski, J (2007), "Strategic thinking and the IMP approach: A comparative analysis", *Industrial Marketing Management*, Vol. 36 No. 7, pp. 879-894.
- Békés G., Halpern L., Koren M. and Muraközy B. (2011), "Still standing: how European firms weathered the crisis" *The third EFIGE policy report*. Bruegel Blueprint Series. Downloaded: <http://www.bruegel.org/publications/publication-detail/publication/661-still-standing-how-european-firms-weathered-the-crisis-the-third-efige-policy-report/>
- Bentler, P. M. and Wu, E. J. C. (2002), *EQS6 for windows User's guide*, Multivariate Software Inc., Encino, CA.
- Brenčić, M. M., Pfajfar, G. and Rašković, M (2012), "Managing in a time of crisis: marketing, HRM and innovation", *Journal of Business & Industrial Marketing*, Vol. 27 No. 6, pp. 436-446.
- Bengtsson, M. and Kock, S. (1999), "Cooperation and competition in relationships between competitors in business networks". *Journal of Business & Industrial Marketing*, Vol. 14 No. 3, pp.178-194.
- Chen, F. F. (2007), "Sensitivity of goodness of fit indexes to lack of measurement

- 1
2
3 invariance". *Structural Equation Modeling*, Vol.14 No.3, pp.464–504.
- 4
5 Chikán, A., Czakó, E. and Wimmer, Á. (2014) (eds), *Kilábalás göröngyös talajon –*
6 *Gyorsjelentés a 2013. évi kérdőíves felmérés eredményéről*, (Rough breaking through:
7 First results of 2013 survey of In Global Competition, in Hungarian), Budapesti
8 Corvinus Egyetem, Versenyképesség Kutató Központ, Budapest.
- 9
10
11 Chikán, A., Czakó, E. and Zoltay-Paprika, Z. (2002) (eds), *National Competitiveness in*
12 *Global Economy – The Case of Hungary*, Akadémiai Kiadó, Budapest.
- 13
14 Cova, B., Ghauri, P. and Salle, R. (2002), *Marketing project, Beyond competitive bidding*,
15 John Wiley & Sons, Chichester.
- 16
17
18 Csesznák, A. and Wimmer, Á. (2014), *Vállalati jellemzők és összefüggéseik (Corporate*
19 *characteristics and their relationship, in Hungarian)*, Versenyképesség Kutató
20 Központ (Competitiveness Research Center), Budapest.
- 21
22
23 Easton, G. and Araujo, L. (1992), "Non-economic exchange in industrial networks",
24 Axelsson, B. and Easton, G. (1992) (eds.), in *Industrial networks, A new view of*
25 *reality*. Routledge, London and New York, pp. 62-87.
- 26
27
28 Ford, D., Gadde, L-E., Håkansson, H. and Snehota, I. (2011), *Managing business*
29 *relationships*, Third ed., John Wiley & Sons, Chichester.
- 30
31
32 Ford, D. and Mouzas, S. (2013), "The theory and practice of business networking", *Industrial*
33 *Marketing Management*, Vol. 42 No. 3, pp. 433-442.
- 34
35
36 Ford, D. and Mouzas, S. (2008), "Is there any hope? The idea of strategy in business
37 networks", *Australasian Marketing Journal*, Vol. 16 No. 1, pp. 64-78.
- 38
39
40 Ford, D. and Ramos, C. (2006), "Network pictures: Conceptual development and preliminary
41 findings", *22nd IMP Conference*, Milan, Italy.
- 42
43
44 Ford, D. and Redwood, M. (2005), "Making sense of network dynamics through network
45 pictures: A longitudinal case study", *Industrial Marketing Management*, Vol. 34 No.
46 7., pp. 648–657.
- 47
48
49 Ford, D. and Mouzas, S. (2010), "Networking under uncertainty: Concepts and research
50 agenda", *Industrial Marketing Management*, Vol. 39 No. 6, pp. 956-962.
- 51
52
53 Fornell, C. and Larcker, D. F. (1981), "Evaluating structural equation models with
54 unobservable variables and measurement error", *Journal of Marketing Research*, Vol.
55 18 No. 1, pp. 39-50.
- 56
57
58 Ghemawat, P. (2010), "Finding your strategy in the new landscape", *Harvard Business*
59 *Review*, Vol. 88 No. 3, pp. 54-60.
- 60
61
62 Grewal, R., Johnson, J. L. and Sarker, S. (2007), "Crisis in business markets: implications for
63 interfirm linkages", *Journal of the Academy of Marketing Science*, Vol. 35 No. 3. pp.

- 398-416.
- Grewal, R. and Tansuhaj, P. (2001), "Building organizational capabilities for managing crises: The role of market orientation and strategic flexibility", *Journal of Marketing*, Vol. 65 No. 2, pp. 67-80.
- Gulati, R., Nohria, N., and Wohlgezogen, F. (2010), "Roaring out of recession", *Harvard Business Review*, Vol. 88 No. 3, pp. 62-69.
- Gulati, R. and Gargiulo, M. (1999), "Where do inter-organizational networks come from?", *American Journal of Sociology*, Vol. 105 No. 5, pp. 1439-1493.
- Håkansson, H. (2006), "Business Relationships and Networks: Consequences for Economic Policy", *The Antitrust Bulletin*, Vol. 51 No. 1, pp. 143-163.
- Håkansson, H. (ed.) (1982), *International Marketing and Purchasing of Industrial Goods: An Interaction Approach*, John Wiley & Sons, Chichester.
- Håkansson, H. and Ford, D. (2002), "How should companies interact in business networks?", *Journal of Business Research*, Vol. 55 No. 2, pp. 133-139.
- Håkansson, H. and Johanson, J. (1992), "A model of industrial networks", In Axelsson, B. and Easton, G. (1992) (eds.), *Industrial networks, A new view of reality*. London and New York, Routledge, pp. 28-36
- Håkansson, H. and Snehota, I. (1995) (eds.), *Developing relationships in business networks*, Routledge, London.
- Håkansson, H., Ford, D., Gadde, L-E., Snehota, I. and Waluszewski, A. (2009), *Business in networks*, John Wiley & Sons, Chichester.
- Hale, G. (2012), "Bank relationships, business cycles, and financial crises", *Journal of International Economics*, Vol. 88 No 2, pp. 312-325.
- Harrison, D. and Håkansson, H. (2006), "Activation in resource networks: a comparative study of ports", *Journal of Business & Industrial Marketing*, Vol. 21 No 4, pp. 231-238.
- Hu, L. and Bentler, P. M. (1999), "Cutoff criteria in fit indexes in covariance structure analysis: Conventional criteria versus new alternatives", *Structural Equation Modelling*, Vol 6 No 1, pp. 1-55.
- Johanson, J. and Mattsson, L-G (1992), "Network positions and strategic action – an analytical framework", in Axelsson, B. and Easton, G. (1992) (eds.): *Industrial networks, A new view of reality*, Routledge, London and New York, pp. 205-217.

- 1
2
3
4 Lin, Z. (2002), "The dynamics of inter-organizational ties during crises – empirical evidence
5 and computational analysis", *Simulation Modeling Practice and Theory*, Vol. 10, No.
6 5. pp. 387-415.
- 7
8 Lundgren, A. (1992), "Coordination and mobilisation processes in industrial networks", in
9 Axelsson, B. and Easton, G. (1992) (eds.), *Industrial networks, A new view of reality*,
10 Routledge, London and New York, pp. 144-165.
- 11
12 Mandják, T. and Durrieu, F. (2000), "Understanding the non-economic value of business
13 relationships", in Proceedings of the 16th IMP-conference in Bath, U.K, pp.1-11.
- 14
15 Mandják, T., Szalkai, Zs., Neumann-Bódi, E., Magyar, M. and Simon, J. (2015). "Emerging
16 relationships: How are they born?", *Industrial Marketing Management* Vol. 49, pp.
17 32-41.
- 18
19
20 Merigó, J. M., Gil-Lafuente, A. M., & Gil-Lafuente, J. (2016). Business, industrial marketing
21 and uncertainty. *Journal of Business & Industrial Marketing*, Vol. 31 No. 3, pp. 325-
22 327
- 23
24
25 Penrose, J. M. (2000), "The role of perception in crisis planning", *Public Relations Review*,
26 Vol. 26, No. 2, pp. 155-171.
- 27
28 Peterson, R. A. (1994), "A meta-analysis of Cronbach's coefficient Alpha", *Journal of*
29 *Consumer Research*, Vol. 21 No 2, pp. 381-391.
- 30
31 Steenkamp, J. B. E. M., and Baumgartner, H. (1998), „Assessing Measurement Invariance in
32 cross-National Consumer Research”, *Journal of Consumer Research*, Vol. 25 No. 2,
33 pp. 78-98.
- 34
35 Szántó, R. and Wimmer, Á. (2007), "Performance Management and Value Creation – A
36 Stakeholder approach", in 4th Conference on Performance Management Control. Nice,
37 France, 2007.09.26-2007.09.28. pp. 1-27.
- 38
39 Tátrai, A. (2012), "In Global Competition 1996, 1999, 2004 and 2009 – The documentation of
40 the first four surveys", TÁRKI Social Research Inc. Budapest.
- 41
42 Tátrai, A. (2014), "Versenyben a világgal, 1996, 1999, 2004, 2009, 2013 – A kutatás első öt
43 hullámának dokumentációja (In Global Competition 1996, 1999, 2004, 2009 and 2013
44 – The documentation of the first five surveys, in Hungarian)" TÁRKI Zrt. (TÁRKI
45 Social Research Inc.), Budapest.
- 46
47
48 Thornton, S. C.; - Henneberg, S. C and Naudé, P. (2015), "An empirical investigation of
49 network-oriented behaviors in business-to-business markets", *Industrial Marketing*
50 *Management*, Vol. 49, August 2015, pp.167-180
- 51
52
53 Thornton, S. C.; Henneberg, S. C. and Naudé, P. (2013), "Understanding types of
54 organizational networking behaviors in the UK manufacturing sector", *Industrial*
55
56
57
58
59
60

1
2
3 *Marketing Management*, Vol. 42 Issue 7, pp.1154-1166.

4
5 Todeva, E. (2006), *Business networks, Strategy and structure*. London, Routledge

6
7 Turnbull, P., Ford, D. and Cunningham, M. (1996), "Interaction, relationships and networks
8 in business markets: an evolving perspective", *Journal of Business & Industrial*
9 *Marketing*, Vol. 11 No. 3/4, pp. 44-62.

10
11 Wimmer, Á. and Mandják, T. (2002), "Business relationships as value drivers?", in Spencer,
12 R. (2002) (ed.): *Proceedings of the 18th IMP Annual Conference*, Dijon, CD-ROM: pp.
13 1-13.

14
15
16 Wimmer, Á., Mandják, T., Durrieu, F. and Lesi, M (2004), "Performance and Business
17 Relationships – Some Empirical Findings", in *Proceedings of the 20th Annual IMP*
18 *Conference*, Copenhagen, September 2004. Copenhagen: IMP Group. pp. 1-18

19
20
21 Wimmer, Á., Mandják, T. and Esse, B. (2010), "Perception and practice of the supplier
22 relationship management", in *Proceedings of the 26th Annual IMP Conference*, 2010.
23 September, Budapest. pp. 1-12.

Appendix

List of variables analyzed in the Focal Company's Network Behavior Model

Variable	Survey question	Items
Valuable customer relationship	Evaluate these statements concerning the characteristics of valuable customer relationships (1 – totally disagree, 5 – totally agree) A customer business relationship is valuable if customer shares best industry practices ... developments can be used in other relationships ... processes can be used in other relationships
Valuable supplier relationship	Evaluate these statements concerning characteristics of valuable supplier relationships (1 – totally disagree, 5 – totally agree). A supplier business relationship is valuable if supplier shares best industry practice ... developments can be used in other relationships ... supplier contribute to the good reputation of our firm ... it is easier to manage this contact than with other potential suppliers
Relationship strategy	Evaluate the importance of different relationships in companies' networks from the point of view of strategy implementation. (1 – not at all important, 3 – moderate importance, 5 – very important)	License contracts Engage in a joint venture Outsourcing contracts Relationships with local institutions Relationships with state institutions
Relational outcomes	Evaluate the level of your company's performance during the period 2008-2012, compared to your most important competitor on a five-point scale (1 – much weaker, 3 – similar, 5 – much better).	Delivery lead time Punctuality of delivery Number of innovations (both product and process innovation) R & D expenditure
Crisis perception	What was the most typical form of the manifestation of the economic crisis for the company? (1 – not at all typical 3 – typical 5 – most / very typical).	Decline in demand. Deterioration in solvency of customers. Loss of former customers (cessation, exit from market).

Source: authors' construction