Management and Business Administration Doctoral Program

THESIS BOOKLET

Márta Aranyossy

**Business Value of Information Systems:
A Resource-Based Study of Value Creation –
The Case of Hungarian ICT E-Tailers**
Ph.D. thesis

Supervisor:

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Budapest, 2012

Department of Enterprise Finances

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1. About the Research

1.1 Motivation

Gartner puts worldwide IT (information technology) spending at over USD 2500 billion in 2012, signaling a 1.6% growth on the previous year despite corporate budget cuts [Gartner, 2012]. Domestic companies continue to upgrade their technologies as well: at the turn of the millennium, Hungarian firms spent 62% of their IT budgets (44% in the case of budgets exceeding HUF 100 million) on investments and upgrades [Drótos – Szabó, 2001, p. 19]. These few statistical data selected with the purpose of illustration certainly arouse professionals' curiosity as to whether there is any value creation behind the figures. At the latest ICIS conference, one of the most important international scientific forums in the field of IT, a separate session was dedicated to the value and economics of information systems [ICIS, 2011]. Eric Brynjolfsson, one of the first researchers of IT value creation and Director of MIT Center for Digital Business, has dealt with the subject for nearly 20 years and still considers it exciting – he published two related articles in the first months of 2012.

That said, it was not until recent years that the business sector had started to apply the traditional ROI approach to IT investments. Hungarian studies have revealed that a mere 44% of corporate strategies cover the business aspects of IT, including e.g. the issue of applications providing a competitive edge or cost-benefit analysis of proposed applications [Drótos – Szabó, 2001, p. 18]. While, according to an American survey conducted in 2001, only 22% of companies used some kind of financial analysis to value corporate portal projects, five years later over 60% of businesses applied financial indicators to value IT investments and 47% used net-present value based analysis. [Alter, 2007]. Although in the highly IT-intensive banking sector five out six banks already made net present value calculations for a preliminary assessment of IT investment options, ex post financial valuation did not happen in half the cases [Hitt – Frei – Harker, 1999].

Meanwhile, found by the Standish Group's researchers, among the success criteria of IT projects the setting of clear business targets ranks third right after stakeholder involvement and support from top executives [quoted by Bőgel, 2003, p. 3]. In other words, according to one of the mottos of my paper, "if you can't measure it you can't manage it", or at least you will find it harder to manage. It is my personal opinion that the most important benefit of detailed ROI calculations to the company lies not necessarily in the actual calculated value but in the fact that the key value creation factors to which return responds the most

sensitively are revealed and become clear to decision-makers, thus enabling project management to focus on them.

1.2 The Focus of the Empirical Research

My proposed research is going to focus on exploring the existence and process of IT value creation on the Hungarian market. From the wide variety of corporate IT projects I focus on e-commerce investments because of some distinctive characteristics of them:

- Based on the historical reviews of IT business value literature, the current period is the era of outward focusing IT [Bőgel, 2009] or the era of the internet [Applegate et al., 1996].

- The tendencies of IT research literature show [Baskerville – Myers, 2009] that e-commerce research was one of the latest hype around the millennium. Even when we are well over the peak of this wave, at least now we have the opportunity to observe more market players, and have experience and data to examine the depths of the e-commerce value creation.

- It still is an open question whether e-commerce is a source of competitive advantage or a strategic necessity – or none of them. There are also controversial opinions about the beneficiaries of e-commerce: do the SME-s benefit from long tail effects or the larger companies from network effects and intangible asset accumulation [Corbitt – Al-Quirim, 2004].

- Finally, e-commerce applications are ideal for large sample data collection, because the most of the e-commerce capabilities of the firms can be observed openly through their websites (in B2C – business-to-customer context at least), and related public databases are also available for analysis.

The resource-based view (RBV) has been chosen to act as theoretic framework for my research on e-commerce value creation in Hungary. While the main critics of RBV [see Barney, 1991] focus on the elusive concepts and criteria, the limits of its theoretical and managerial usefulness [see more: Kraaijenbrink et al., 2010; Foss – Knudsen, 2003], its empirical benefits outweigh the disadvantages:

- RBV sets out a clear – but sometimes indirect – link between resources and sustainable competitive advantage and a well defined, financially measurable dependent variable: above industry average profitability;

- with its internal focus RBV facilitates the identification, specification and classification of information systems resources, and also handles tangible and intangible resources the same way;

- using its competitive advantage criteria IS resources can be compared with one another and with non-IS resources [Wade – Hulland, 2004, p. 109-110.];

- while RBV accepts the commodity-like features of technology, it also allows the hypotheses that complementary firm (human, management or business) resources could produce competitive advantage [Zhu – Kraemer, 2002];

- empirical evidence suggests, that RBV's explanatory power is higher than contingency theory's in the case of strategic or revenue-focused IT investments [Wonseok - Pinsonneault, 2007];

- as RBV is one of the mainstream theories in IT business value research, it serves as a common language and facilitates comparison of results.

1.3 Literature Review

A synthesized definition of IT business value research could be "any conceptual, theoretical, analytic, or empirical study that examines the organizational performance impacts of IT" [Melwille, 2004, p. 287.]. This includes subjects from the IT productivity paradox till the IT based competitive advantage, approaches from the financial theories to the strategic literature.

A organized my broad scale literature review (See Table 1) of IT business value research in my thesis based on the first two core question of Mellwille et al. [2004]: *(1)Is the IT resource associated with improved operational efficiencies or competitive advantage? (2) How does the IT resource generate operational efficiencies and competitive advantage?* We can organize e-commerce business value literature based on these two questions as well, focusing on the existence and process of value creation.

Let us start with the first. Are the e-commerce (-related) resources associated with improved operational efficiencies or with competitive advantage? On the market level Bakos [1998] found that corporate e-commerce value creation can be achieved via (1) increased personalization of products, (2) aggregation and disaggregation of information-based products and (3) lower search costs. On the other hand economic theory says that one of the most compelling advantage (also in financial terms) of e-commerce would be to decrease the transaction and agency costs for both retailers and customers [Malone – Laubacher, 1998]. A game theory modeling of the retail market [Bernstein et al., 2006] concluded that click-and-mortar could become the dominant business model, even a strategic necessity which creates value mostly for the customers. At the same time a McKinsey study [Krishnamurthy, 2007] drew a different conclusion: that the effective sales model would be of the bricks-and-clicks'.

Table 1. Structure of the literature review – Core questions and theories of IT business value literature

Question Nr.	Explorative-descriptive	Normative
1	**1./a question:** Does IT create business value? **Sub-questions**: - Does IT affect productivity? - Does IT create sustainable competitive advantage? **Related theories:** Economics - production functions - stock market event study methodology Strategy	**1./b question:** How can we measure the value created by IT investments? **Sub-questions:** - What effects have to be considered in the valuation? - Which valuation methodology should we use? **Related theories:** Economics - agency and transaction costs Finance - discounted cash-flow - real options Accounting
2	**2./a question:** How does IT create business value? **Sub-questions:** - What are the key sources of value creation? - What are the necessary and criteria of value creation? **Related theories:** Resource-based view Technology acceptance	**2./b question**: What can we to support IT value creation? *(This question is far beyond the focus of this paper, so I am not going to discuss it in the literature review.)* **Related theories**: Management / Project management Risk management IT project escalation and de-escalation

Event studies (focusing on the share price affects of e-commerce initiative announcements) indicate that the market sets a higher value on B2C initiatives in comparison to B2B projects, and that e-commerce investments related to tangible products are more valuable than the ones concerning digital products [Subramani – Walden, 2001]. Dehning et al. [2004] repeated these event studies and showed that while the positive price effect of e-commerce announcements diminished after 2000, B2C initiatives and the e-commerce investments of traditional companies were still recognized by the stock market as value creation.

The second research question about how the e-commerce resources are going to create business value is dominated by the resource based-view. Amit [2000] found four sources of e-commerce success: novelty, lock-in, complementarities, and efficiency. Zhu and Kraemer [2002] conceptualized the e-commerce resource in the information-transaction-interaction-integration dimensions and found a significant positive effect on operative performance measurers like inventory turnover. Later Zhu [2004] used the same model in the retail industry and revealed the complementarities between e-commerce capabilities and IT infrastructure, their joint effect on cost reduction and productivity.

Table 2. E-commerce Business Value – Results Previous Studies

(*0,05 < p < 0,1; **0,01< p <0,05; *** p<0,01)

Authors	Profitability (ROA or gross margin or value added)	Inventory turnover	Sales revenue per employee
Zhu [2002]	model R²: 0,361*** e-com. R²: 0,104		model R²: 0,379*** e-com. R²: 0,251**
Zhu – Kraemer [2004]	model R²: 0,140 e-com. R²: -	model R²: 0,412** e-com. R²: 0,458*	
Merono-Cerdan – Soto-Acosta [2007]	model R²: 0,891*** e-com. R²: 0,252***		

In Europe, Marono-Cerdan and Soto-Acosta [2007] found similar complementarities between the corporate e-commerce capabilities: the information and interaction functions strongly support the positive financial effect of the transaction function of the website. Zhuang and Lederer [2006] use similar resource categories like information-transaction-interaction but integrated with some technical and usability capabilities, human and business resources, where all but the human resources have significant positive effect on firms' financial performance. While Hulland – Wade – Antia [2007] use fairly different concepts of e-commerce resources in the retail industry, they found that technological and marketing resources do not have a direct positive effect on the firm performance, only through their model's intermediary variable, which is online channel commitment. As my research is going to use the information-transaction-interaction-customization dimensions of e-commerce capabilities, the most similar research models' results are summarized in Table 2.

While the technology acceptance (TAM) literature is rarely connected to the IT business value research directly, I strongly believe that IT usage and the factors affecting usage and user behavioral intentions in e-commerce [see e.g. Gefen et al., 2003] are keys to create real return on investment. This is also the reason why I plan to include usage into my research model as an intermediary variable between e-commerce capabilities and firm performance.

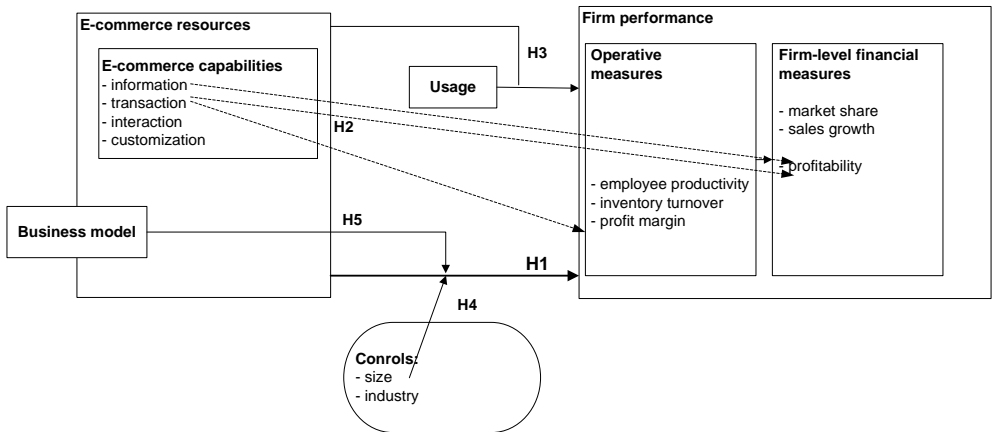## 2. Research Questions and Methodology

2.1 Conceptual Framework

Some researchers have already explored the specific field of e-commerce value creation on RBV foundations, the models of Zhu – Kraemer [2002]; Zhu [2004] and Marono-Cerdan – Soto-Acosta [2007] are the most similar to mine. My model (see Figure 1) fits into the general framework of IT business value research [see Dehning – Richardson, 2002] but uses e-commerce specific concepts and I have also included indicators related to usage and to business model:

▪ Davern and Wilkin [2010] suggest improving the demonstrability of value creation by employing perceived output variables (such as usage) in studies in order to show direct effects together with separately observable output variables (such as financial performance) to measure indirect subsequent effects. DeLone and McLean's [1992] famous model dealing with the success of IT projects already apply usage as an intermediate variable between IT capabilities and technology and their individual and corporate effects. When the authors revised their model [DeLone – McLean, 2003] ten years later, they dedicated a separate chapter to e-commerce still assigning a main role to usage. Koufaris [2002] integrated usage into the research model of e-commerce value creation as part of the technology acceptance theory, while Zhu and Kraemer [2005] did so within a technology-organization-environment framework. So including usage as an intermediate or complementary variable is not unique in the IT business value literature, but e-commerce RBV literature has not adopted this concept yet.

▪ The inclusion of information related to business model or sales channel in the analysis of e-commerce value creation is not completely unique either. Strategic choice in respect of the sales model has been taken into account by literature before – a central question is whether traditional shop trade or online trade is more competitive, or perhaps a combination of the two [e.g. Subramani – Walden, 2001; Dehning et al., 2004]. I personally believe that a study on value creation by IT should seek to take into consideration as many

contextual factors and strategic decisions in the analysis as possible; in this current case business/sales model was included into the research model.

Figure 1. Research Model and Hypotheses

The core constructs, definitions and measures – taken from previous research literature mentioned earlier:

- **E-commerce capabilities:** E-commerce capabilities are measured by the widely used four-grade scale of (1) information, (2) transaction, (3) interaction and (4) customization. Similar concepts are used by other researchers, like: information-transaction-communication [Miranda – Banegil, 2004; Marono-Cerdan – Soto-Acosta, 2007]; information-transaction-interaction-integration [Mojzes – Talyigás 2000; Zhu, 2002; Zhu – Kraemer, 2004]. Also similar e-commerce capabilities are measured by European and national ICT surveys [information-transaction-customization, see KSH, 2008]. The four core capabilities are measured by the occurrence of a set of e-commerce-related key-words, where the list of keywords is based on previous research, expert interviews and tested on a small sample.

- **Usage**: As there's no direct usage database for my sample, I have to use some proxy metrics estimating popularity of these websites. I use public ranking databases for this purpose, where ranking criteria can be activity-based, reference-based or opinion-based [Lo – Sedhain, 2006]. These could be the best accessible information sources concerning to website usage, even knowing that some of them are biased by the user community (Alexa rank) or

based on references and links instead of real usage metrics (Google PageRank) or is very indirectly related to usage (SEO Score).

- **Competitiveness and financial performance measures**: The RBV theory usually operationalizes the competitive advantage construct in terms of above industry average profitability [see Clemons – Row, 1991 or Piccoli-Ives, 2005]. The IT RBV literature uses many different metrics of competitiveness, what could also be the cause of inconclusive empirical results of the field. [Dao et al., 2007] Based on the system of traditional financial multiples [see Virág - Fiáth, 2010], the most common RBV performance categories [Aral – Weill, 2007] and the most popular metrics in the e-tailing industry [Zhuang – Lederer, 2003] I chose 3 types of financial metrics to represent the competitiveness and financial performance of the companies: (1) market metrics like revenue growth and market share changes, (2) profitability metrics like EBIT per sales, (3) efficiency metrics like inventory turnover, indirect cost of administration and sales or human resource productivity.

2.2 Hypotheses

Based on the research focus, the theoretical background and the above outlined research model, I wish to test the following hypotheses:

H1: There is a positive relationship between Hungarian ICT retailers' firm level e-commerce capabilities and the companies' competitiveness.

This first hypothesis is the basic translation of the main research question of the resource-based view into the field of e-commerce value creation. Based on the different operationalization of the concept of competitiveness, we can test the following sub-hypotheses:

H1/A: There is a positive relationship between firm level e-commerce capabilities and market performance of Hungarian ICT retailers.

H1/B: There is a positive relationship between firm level e-commerce capabilities and profitability of Hungarian ICT retailers.

H1/C: There is a positive relationship between firm level e-commerce capabilities and operational efficiency of Hungarian ICT retailers.

According to a survey taken in 2002, European SMEs tend to expect increased sales revenues from their e-business applications, particularly from their e-commerce applications [Johnston – Wade – McClean, 2007, p. 357-8]. A somewhat similar but dominantly qualitative study conducted by Demeter and Matyusz [2006] found that among the successes of different corporate functions,

the success of the firm measured by financial ratios show the strongest correlation with the success of the IT area. The lack of such relationship would mean that either there is no value creation taking place or it is rather intangible or unsustainable in market competition.

Although profitability and market performance may seem less affected by direct e-commerce effects, the impact on operational efficiency ratios is worth examining as well. Earlier similar studies [Zhu – Kraemer, 2002 and Zhu, 2004] managed to relate e-commerce capabilities under study primarily to efficiency (per capita sales revenue and inventory turnover) ratios. This is reflected in the third sub-hypothesis formulated in connection with Hypothesis 1.

Although my hypotheses concerning the value creation effects of e-commerce capabilities have been quite general so far, it is worth examining the effects of information, transaction and interaction e-capabilities on a one-by-one basis [see e.g. Zhu – Kraemer, 2002]. I will conduct my examination not only in relation to H1 but also to test a hypothesis formulated from a gradual development aspect:

H2: Different levels of e-commerce development have different performance effect in the Hungarian ICT retail industry.

This hypothesis will be examined by testing the following two sub-hypotheses:

H2/A: Moving from the state of a total lack of e-commerce capabilities to the online informational level is related to sales growth.

H2/B: Moving from information e-commerce capabilities to an online transaction level is related to both sales growth and retail efficiency.

If outstanding e-commerce capabilities are not coupled with website traffic, the website can hardly contribute to firm value creation. Hence website usage is a key addition to e-commerce capabilities and the inclusion of this variable in the study facilitates the exploration of the logic behind the value creation process.

H3: Greater e-commerce capability in conjunction with higher levels of website usage, is associated with better competitiveness in the Hungarian ICT retail industry.

In addition to the above, the effects of certain external factors in relation to the first hypothesis are also worth examining, and I intend to include company size and business model in the study. Size as a modifying factor is part of the general model developed by Dehning and Richardson [2002] as well as the e-

commerce-specific model of Zhu and Kraemer [2002]. In a similar research conducted by Merono-Cerdan and Soto-Acosta [2007], company size expressed by the number of employees has a significantly positive effect in the model. Taking firm size and sales model into account allows creating more homogenous sub-samples to analyze e-commerce value creation further.

H4: Relationship between Hungarian ICT retailers' firm level e-commerce capabilities and company's competitiveness changes with firm size.

Similar research [Zhu – Kraemer, 2002; Merono-Cerdan – Soto-Acosta, 2007] found significant positive relationship between transaction e-capabilities and corporate performance ratios. Obviously, the level of this effect may differ according to whether businesses use their online platform as a complementary or exclusive sales channel.

H5: Relationship between Hungarian ICT retailers' firm level e-commerce capabilities and company's competitiveness changes with sales channel choice.

2.3 Data collection

With 34% of the retail company websites enable online shopping [KSH, 2008], retail is a traditionally e-commerce intensive sector, from which I chose an IT intensive subsector: ICT retail industry, selling hardware, software and telecommunication equipment. According to Hungarian market studies [Kis, 2009] ICT retail is one of the most popular e-commerce industry, along with book retail, travel or insurance services, but it is one of the less researched areas.

- Primary data collection: One of the innovations of the research methodology is the use of automated crawler-based data collection Web crawlers [see Chakrabarti, 2003] were created to explore the sampled websites and their e-commerce capabilities, using given key word sets and automated search mechanisms.

- Secondary data sources: For usage measurement I use some public website rankings as proxies, like Google PageRank and Alexa rank, using SEOQuake application as a data collection tool. The financial data comes from public national sources (Ministry of Justice and Law Enforcement) and from business databases like 'Complex Céginfó'.

The main characteristics of my research design is summarized in Table 3.

Table 3. Main Characteristics of the Research Plan, Using the System of Kauffman - Weill [1989]

Motivation	Focus	Caveats
> Purpose *Are the e-commerce resources associated with improved operational efficiencies or competitive advantage?* > Approach *Justificatory* > Theory base *Resource-based view*	> Unit of analysis *Firm (Hungarian ICT retail industry)* > Locus of value *Firm level financial performance* > Data collection *E-commerce data: web crawlers* *Usage: ranking databases* *Financial data: secondary analysis of national databases*	> Measures *Multiple measures for E-commerce resources, Usage and Financial Performance* > Data analysis *Correlation and regression analysis, paired sample statistical test, cluster analysis* > Organizational context *Firm size, industry and retail model*

2.4 Analytic Methods Used

To decrease the number of independent variables the use of factor and principal component analyses can be an obvious solution as it happened in the case of similar research [Zhu, 2004; Merono-Cerdan – Soto-Acosta, 2007]. This method is objective and retains much of the variance of original variables, and in my case it resulted in the identification of nine e-commerce factors.

As for the indicators transformed into e-commerce factors, they make it possible to calculate the correlation co-efficient expressing also the strength and direction of the relationship of the two variables besides demonstrating its existence. The common Pearson correlation, however, is excessively sensitive to outliers and to deviation from the linear relationship or from normal distribution. As these can also cause problems in the present case, it is methodologically justified to choose Spearman's rho coefficient and to apply the related non-parametric test [Nagpaul, 2012].

In related literature, the most common tool for examining similar relationships is regression analysis [e.g. Zhu – Kraemer, 2002; Zhu, 2004 and Merono-Cerdan – Soto-Acosta, 2007], which should therefore be part of the analytical toolkit of the present paper. I did best to construct a model as similar as possible to those of regression analyses used in related pieces of research so that the results are comparable in space and time.

However, in order to be able to understand deeper connections of so many variables of different types, it is worth resorting to the complex methods of multivariate analysis. With the help of cluster analysis, I assigned the companies to distinct groups based on certain financial, usage-related and e-commerce variables [Füstös et al., 2004], and I examined in what e-commerce features the identified clusters differed most. To test that, I used the chi-square test for dichotomous variables (e.g. individual e-commerce capabilities) and the ANOVA table for any other variable measurable on the ratio scale.

3. Results

3.1 New Research Approaches

In the literature review of my dissertation I classified diverse interdisciplinary scientific literature in the fields of economics, information technology, strategy and corporate finance, and even sociology and psychology along the main research questions. Beyond systemization, the most important novel aspect and added value of the literature review presented lies in the coverage of literature on normative finance/evaluation related to the theme and the inclusion of the question of usage in the mainstream of literature on IT value creation. In other words, this literature review has a much broader focus than most international reviews of the subject.

The first part of the research seeks to reproduce the results of a few previous US and Spanish studies [Zhu – Kraemer, 2002; Zhu, 2004; Merono-Cerdan – Soto-Acosta, 2007] on a special market. It is an interesting to analyze e-commerce value creation in the Central and Eastern European environment, especially during the years of recession following the financial crisis. The population under review was represented by domestic ICT retailers as this industry is particularly e-commerce-intensive but under-researched in our country.

Furthermore, the aim of my research model and hypotheses is to get a deeper insight into e-commerce value creation factors by including a few new variables. On the one hand, adding the usage variable to the model is based on the assumption that e-commerce capability in itself cannot be good enough since if a website is not visited by potential consumers the anticipated performance growth cannot be realized. On the other hand, theoretical and practical experience has clearly shown that the strategic environment of IT value creation cannot be overlooked, and therefore the decision on selecting sales channels adds further colour to the picture in my research.

One of the innovations of the research methodology is the use of automated crawler-based data collection. Web crawlers – or spider-based search engines – are computer programs that crawl on the worldwide web automatically and systematically collecting data. Thus, I tried to make use of the possibilities offered by internet technologies, which not only enabled me to conduct an efficient and objective survey but also to enrich the crawler-based methodological approach initiated by the Budapest Corvinus University's E-Business Research Centre by adding yet another area of application [Nemeslaki – Pocsarovszky, 2011 and 2012].

3.2 Result of Hypotheses Testing

My overall expectation from the proposed research was to dispel or confirm some myths about the existence and characteristics of e-commerce value creation. And by resource-based modeling and including usage and business model variables, I was hoping to gain a deeper understanding of the value creation process supported by e-commerce technology.

The key findings of the hypotheses testing are summarized in Table 4, and are going to be discussed further here.

Table 4. Summary of the Results of Hypothesis Testing

No	Hypotheses	Results	
H1/A	There is a positive relationship between firm level e-commerce capabilities and market performance of Hungarian ICT retailers.	No relationship was found in 2009, but in 2010 only the clusters with good interactional capabilities were able to grow.	X
H1/B	There is a positive relationship between firm level e-commerce capabilities and profitability of Hungarian ICT retailers.	The interactional e-capabilities and the ROIC and ROA ratios show a positive relationship, but the impact of special informational capabilities – typical to offline sellers primarily – are definitely negative.	√ X
H1/C	There is a positive relationship between firm level e-commerce capabilities and operational efficiency of Hungarian ICT retailers.	There is a definitive positive relationship between the transactional e-commerce capability and retail labour efficiency.	√
H2/A	Moving from the state of a total lack of e-commerce capabilities to the online informational level	Both pure play offline retailers and advanced e-tailers are the best concerning market performance.	X

No	Hypotheses	Results	
	is related to sales growth.		
H2/B	Moving from information e-commerce capabilities to an online transaction level is related to both sales growth and retail efficiency.	The market performance and labour efficiency of advanced e-tailers are better than those maintaining only an information site – but their inventory indicators are the worst.	√ X
H3	Greater e-commerce capability in conjunction with higher levels of website usage, is associated with better competitiveness in the Hungarian ICT retail industry.	The introduction of the usage variable to the model explains certain previous results (the negative effect of the special functions, the impact of e-capabilities on inventory or growth) but its importance falls short of expectations.	√
H4	Relationship between Hungarian ICT retailers' firm level e-commerce capabilities and company's competitiveness changes with firm size.	In the case of micro-businesses, the informational functions have a significant negative while transactional capabilities a significantly positive impact, whereas in the case of small businesses sales information comes becomes much more important.	√
H5	Relationship between Hungarian ICT retailers' firm level e-commerce capabilities and company's competitiveness changes with sales channel choice.	Certain informational and interactional capabilities are important to traditional offline retailers for achieving better financial performance. The mixed sales model is more favourable from the aspect of growth, but here more diverse and sophisticated e-commerce capabilities are needed to achieve a profitability advantage.	√

In carrying out a thorough analysis of the Hungarian ICT retail market I was able to confirm a few basic "urban legends". From both international and domestic comparisons it can be clearly concluded that Hungarian ICT retailers have their own homepages significantly more frequently than the average; and the proportion of those providing customers an opportunity to buy online is over twice the domestic mean. In other words, selecting the industry for the purpose of this research was appropriate; it is indeed a highly e-commerce-intensive market.

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Furthermore, it can be concluded that informational e-functions represent the overwhelming majority of the most frequent capabilities. This comes as no surprise since the first step towards entry into the internet business world – and a necessary condition for building further e-capabilities – is to establish some basic informational functions.

That in my sample geographical location and company size normally do not affect the level of e-commerce capabilities does not contradict e-commerce professional literature either. This is consistent with the theoretical statement that e-commerce is able to bridge geographical distance from the target markets and provides actors of all sizes the same opportunities to enter the market.

Let us now review my central hypothesis that corresponds to the fundamental question of the resource-based view: Is there then a positive relationship between the e-commerce resources and corporate performance of Hungarian ICT retailers? The strongest positive relationship in my sample can be demonstrated between per capita sales revenue and transactional e-capability. This co-movement suggests that online sales indeed have a beneficial effect on retail labour efficiency even if at the level of profitability or market performance this effect can only be demonstrated to a lesser extent. Similar foreign studies [Kraemer – Zhu, 2002; Merono-Cerdan – Soto-Acosta, 2007] also measured the strongest positive effect on corporate performance indicators in the case of transaction e-commerce capabilities. In other words, as regards online sales the classical productivity paradox [Solow, 1987] was disconfirmed: Even if the internet is full of webshops it has a demonstrable positive effect on productivity.

It is a surprising result, however, that most positive profitability relationships are revealed in the case of interactional e-commerce factor. This means that in 2009 those Hungarian ICT retailers were more successful who were more open to a dialogue with potential customers and were not afraid to hear their opinions. It seems therefore that it is this interaction capability rather than more widespread informational or transactional functions that sets retailers apart from their competitors.

Interestingly, other similar research identified no e-capability with a significantly negative effect; therefore, in this respect my research has also produced a surprising result. The e-factor combining special functions (map, "add to favourites", privacy) shows a negative relationship with nearly each performance indicator, i.e. these e-commerce functions are primarily characteristic of low-performing companies. Since it is traditional retailers with physical outlets

that are mainly characterized by all three functions, they also tend to be the ones that are impacted by this negative performance effect.

Although related research showed a clearly positive relationship between inventory efficiency and (primarily transactional) e-commerce capabilities [Zhu, 2004 and Zhu – Kraemer, 2002], in my case the reproduced regression model did not demonstrate this effect. On the contrary, the comparative tests show that it is mainly the most successful e-tailers with wide-ranging capabilities that have proportionately high inventory levels. It seems to be evident that the business model of these online enterprises entails higher inventory levels. A reason for this can be that these successful e-tailers promise fast and flexible delivery, which may however require larger inventories.

The relationship between e-commerce and inventory efficiency were further shaded by analyses performed in the light of website popularity and usage. These analyses help demonstrate the relationship between inventories and e-commerce capabilities identified by previous research and contradictory effects concealed by the originally received neutral results also become visible. Weighted by usage, the relationship becomes strongly positive, i.e. the achievable profit rate can be increased considerably if these capabilities are developed on a more frequented website. Moreover, only those corporate clusters were able to increase their revenues in 2010 which had above-average usage characteristic in 2009, i.e. focused on their internet presence and thereby managed to acquire the appropriate number of links and visitors. The fact that this positive effect on growth only occurred in 2010 can be explained by the delayed value creation effect frequently mentioned in connection with IT value creation [eg. Lee – Kim, 2006].

The introduction of the usage variable did not, however, change earlier results radically. This could primarily mean that Hungarian ICT retailers do not necessarily need high website attendance as they can succeed even without strong e-commerce capabilities and convert even a small number of visits into purchases. Furthermore, this can of course also suggest that ranking indicators frequently used in the web ecosystem do not have the right approach to the usage dimension after all. This means that e.g. search engine optimization is not necessarily a guaranteed way to succeed and measuring marketing effectiveness by the click-through rate may also need revisiting. These days this issue has also raised the attention of business analysts and decision-makers as according to a recent survey there is practically no relationship between the click-through rate of internet display advertisements and actual purchases [Lipsman, 2012].

The analyses performed in view of the selected business/sales model have rendered the conclusions reached so far more unambiguous and crystallized. Therefore, it seems that it is primarily offline retailers with physical outlets in whose case certain informational and interactional capabilities are important for improving performance. However, the mixed sales model being more beneficial in terms of growth, increased profitability requires wide-ranging and sophisticated e-commerce capabilities. Another interesting finding is that loss-making e-tailers mainly lag behind their leading peers in terms of security-related e-capabilities (guarantee, disclaimer, privacy). Quite possibly, in absence of these capabilities they also under-perform also in building customer confidence, which it is one of the important factors of success in e-commerce as shown by both international professional literature and domestic practice.

It is also interesting to observe that during the years of economic recession two business models were operating successfully, namely: the model focusing on traditional sales through physical outlets almost completely foregoing the benefits of the internet; and that of e-tailers with sophisticated e-capabilities who also maintain physical outlets as a supplementary sales channel. Although the best traditional retailers were characterized by somewhat higher and more stable profit rates also during the recession years, e-tailers were clearly more successful in retaining and increasing their markets. Therefore, building outstanding e-commerce capabilities amidst adverse market conditions proved to be an effective survival strategy for Hungarian ICT retailers.

3.3 Conclusions and Implications for Further Research

If I was to formulate a few pieces of practical advice for ICT retailers considering online developments these would be the following:

- Traditional shop retailers are also recommended to build up some kind of online presence since it is in this group that advanced e-capabilities represent a real differentiating factor! The right decision in my opinion is not to be present on an info page but to construct their own websites filled with high-quality information also offering the opportunity to interact with potential buyers. Profitable operation is of course possible even without all this but then continuously falling profit rates and market losses are to be reckoned with.

- Those who decide (or have decided) in favour of creating a webshop should consider supplementing transactional e-capabilities by sophisticated informational functions to build customer confidence. There is no business without buyers, of course, which means that they should be mindful of the

importance of attracting visitors but in doing so it might be advisable for them not to focus on traditional web-based measuring methods only (e.g. various Google measures) in this regard. E-commerce may enable their companies to increase market share or improve labour efficiency but if they try to attract buyers by offering fast availability, some of the extra profit might be eroded by the need for a higher inventory level.

On the whole, it can be stated that if outstanding online presence is incorporated into corporate strategy then by relying increasingly on transactional capabilities combined with high-quality informational functions in every respect and achieving high website usage the company may increase sales revenues as well as becoming more profitable. This can however be reached by only a limited number of companies and in such a turbulent technological and market environment the concrete individual success factors may change rapidly. During the recent period, in respect of interactional functions the use of social networks (e.g. Facebook) has come to the fore; with regard to the customer value creation factor, coupon or community purchases should be mentioned; or in regard to security, increasingly sophisticated electronic and mobile payment opportunities should be talked about. The contents and tools of various e-capabilities, but not necessarily the basic conclusions, are changing rapidly.

As an illustration of the fact that the relationship between transactional e-commerce functions and market performance has not disappeared to date let us take a glance at the fate of some major players in the Hungarian ICT retail market. Market leader Extreme Digital Zrt (not neglecting sales via their supplementary physical outlets either) has reached a nearly 25 % turnover growth in 2011. At the same time, eBolt Kft having a slightly wider product range but being a nearly 100% e-tailer has increased its sales revenue by 30%. Electro World operating an offline retail chain was liquidated in 2011 and one of its previous owners has since created Digidog.hu Zrt with the intention to supplement online commerce by a smaller retail chain at a later stage.

I am of course aware that a study on an IT subject is considered obsolete as soon as it leaves the print shop. It is true of statistical figures and results related to individual e-commerce capabilities but may however be less true of my basic question and the relevant answers. My most important goal by doing this research was to analyse whether the IT value creation effect can also be demonstrated on a large sample in Hungarian market environment. Despite the differing conclusions I have drawn in respect of the various hypotheses, I believe that the answer to my main question is unambiguous: Although the relationship between the analyzed technological capabilities and corporate performance is weak, it is far from being

insignificant in my sample. I did not, and could not, expect that e-commerce capabilities (only representing a small segment of the business strategy of retailers under review) would have an order-of-magnitude greater effect on financial performance.

Considering the narrow theme of this research, some further research opportunities are logically offered. It would be worth having a closer look at strikingly large market actors, e.g. by conducting case study-based research on Extreme Digital's success. Furthermore, the analysis based on 2009-2010 data could later be repeated, thus enabling the capturing of long-term value creation based on e-commerce in the case of companies included in the sample. It would also be interesting to collect more accurate measurement data for the usage variable in my model, or identify and build in motivations behind usage.

Interpreting the theme in broader terms again, there are still numerous interesting areas to be explored in IT value creation literature. As a person working in the field of finance, I naturally consider it important to develop more accurate models and methodological frameworks for IT project valuation that could also be effectively used in practice. In addition, it would be particularly exciting to carry out an exploratory piece of research on the actual background and – organizational and psychological – motivations of corporate IT investment decisions and pose as a main question to what extent these decisions reflect value creation considerations [from a somewhat different aspect: Brynjolfsson – Hitt – Kim, 2011]. After all, my dissertation ultimately addresses the question of whether the fortunes spent on information technology will ever be recovered. Is this issue also a concern to corporate decision-makers or do they make their decisions about the fate of millions of Euros driven by entirely different considerations?

4. References

(1)   Alter, A. E. [2006]: July 2006 survey: What's the value of IT? At many companies, it's just guesswork. CIOInsight. July 25, 2006. http://www.cioinsight.com/article2/0,1540,1987873,00.asp (2006.09.10.)

(2)   Amit, R. – Zott, C. [2000]: Value Drivers of e-Commerce Business Models. Paper presented at the 20th Annual International Conference of the Strategic Management Society, Vancouver, Canada

(3)   Applegate, L. M. – McFarlan, F. W. – McKenney, J. L. [1996]: Corporate Information System Management: The Issues facing snior executives. Irwin, Chicago

(4)   Aral, S. – Weill, P. [2007]: IT Assets, Organizational Capabilities, and Firm Performance. Organization Science. Vol. 18. No.5. pp. 763–780.

(5)   Bakos, Y. [1998]: The emerging role of electronic marketplaces ont he Internet. Communication of the ACM. Vol. 41. No. 8. pp. 35-42.

(6)   Barney, J. [1991]: Firm Resources and Sustained Competitive Advantage. Journal of Management. Vol. 17. No. 1. pp. 99-120.

(7)   Baskerville, R. L. – Myers, M. D. [2009]: Fashion waves in information systems research and practice. MIS Quarterly. Vol. 33. No. 4. pp. 647-662.

(8)   Bernstein, F. – Song, J. – Zheng, X. [2006]: „Bricks-and-Mortar" vs. „Clicks-and mortar": An equilibrium Analysis. European Journal of Operational Research. Vol. 187. No. 3. pp. 671-690.

(9)   Bőgel, Gy. [2003]: Informatikai beruházások üzleti értékelése. CEO. Vol. 4. No. 3. Melléklet pp. 1-12.

(10)   Bőgel, Gy. [2009]: Üzleti elvárások – Informatikai megoldások. HVG Kiadó. Budapest

(11)   Brynjolfsson, E. – Hitt, L. M. – Kim, H. [2011]: Strength in Numbers: How does data-driven decision-making affect firm performance? Proceedings of the Thirty Second International Conference on Information Systems, Shanghai 2011. Economics and Value of IS.

(12)   Chakrabarti, S. [2003]: Mining the web: Analysis of hypertext and semi structured data. Morgan Kaufmann. New York

(13)   Clemons, E. K. – Row, M. C. [1991]: Sustaining IT Advantage: The Role of Structural Differences. MIS Quarterly. Vol. 15. No. 3. pp. 275-292.

(14)   Dao, V. – Shaft, T. – Zmud, R. [2007]: An examination of lag effects in relationships between information technology investment and firm-level performance. Twenty Eighth International Conference on Information Systems, Montreal 2007

(15)   Davern, M. J. – Wilkin, C. L. [2010]: Towards an integrated view of IT value measurement. International Journal of Accounting Information Systems. Vol. 11. No. 1. pp. 42–60.

(16)   Dehning, B. – Richardson, V. J. [2002]: Return on investment in Information Technology a Research Sysnthesis. Journal of Information SystemsVol.. 16. No. 1. pp. 7-30.

(17)   Dehning, B. – Richardson, V. J. – Urbaczewski, A. – Wells, J. D. [2004]: Reexamining the Value Relevance of E-Commerce Initiatives. Journal of Management Information Systems. Vol. 21. No. 1. pp. 55–82.

(18)   DeLone, W. H. – E. R. McLean [1992]: Information Systems Success: The Quest For The Dependent Variable. Information Systems Research Vol. 3. No. 1. pp. 60-95.

(19)   DeLone, W. H. – E. R. McLean [2003]: The Delone And Mclean Model Of Information Systems Success: A Ten Years Update. Journal of Management Information Systems. Vol. 19. No. 4. pp. 9-30.

(20)   Demeter, K. – Matyusz, Zs. [2006]: Értékteremtés funkcionális alapokon – az értékteremtés projekt zárótanulmánya. Versenyképesség kutatás című műhelytanulmány sorozat. 43. számú kötet. 2006. április

(21)   Drótos, Gy. – Szabó, Z. [2001]: Vállalati informatika Magyarországon az ezredfordulón. Mítosz és valóság. Vezetéstudomány. Vol. 32. No. 2. pp. 17-23.

(22)   Foss, N. J. – Knudsen [2003]: The resource-based tangle: towards a sustainable explanation of competitive advantage. Managerial and Decision Economics. Vol. 24. No. 4. pp. 291.

(23)   Füstös, L. – Kovács, E. – Meszéna, Gy. – Simonné Mosolygó, N. [2004]: Alakfelismerés – Többváltozós statisztikai módszerek. Új Mandátum Könyvkiadó. Budapest

(24)   Gartner [2012]: Forecast Alert: Enterprise IT Spending by Vertical Industry Market, Worldwide, 2010-2016, 1Q12 Update. http://www.gartner.com/id=1993415 (letöltve: 2012.05.23.)

(25)   Gefen, D. – Karahann, E.– Straub, D. [2003]: Trust and TAM in Online Shopping: An Integrated Model. MIS Quarterl. Vol. 27. No. 1. pp. 51-90.

(26)   Hitt, L. M. – Frei, F. X. – Harker, P. T. [1999]: How Financial Firms Decide on Technology. Working Paper. The Warton School. University of Pennsylvania

(27)   Hulland, J. – Wade, M. R. – Antia, K. D. [2007]: The Impact of Capabilities and Prior Investments on Online Channel Commitment and Performance. Journal of Management Information Systems. Vol. 23. No. 4. pp. 109–142.

(28)   ICIS [2011]: Track 5: Economics and Value of Information Systems. ICIS 2011 Shanghai. http://icis2011.aisnet.org/track5.htm (letöltve: 2012.05.18)

(29)   Johnston, D.A. – Wade, M. – McClean, R. [2007]: Does e-Business Matter to SMEs? A Comparison of the Financial Impacts of Internet Business Solutions on European and North American SMEs. Journal of Small Business Management. Vol. 45. No. 3. pp. 354–361.

(30)   Kauffman, R. J. – Weill, P. [1989]: An Evaluative Framework for Research on the Performance Effects of Information Technology Investment.

Information Systems Working Papers Series. NYU Working Paper No. IS-89-083

(31) Kis Gergely [2009]: Ki-mit vesz az interneten és hogyan fizet? SZEK Konferencia. Budapest, 2009. május 07.

(32) Koufaris, M. [2002]: Applying the Technology Acceptance Model and Flow Theory to Online Consumer Behavior. Information Systems Research. Vol. 13. No.2. pp. 205-223.

(33) Központi Statisztikai Hivatal [2008]: A magyarországi üzleti szektor infokommunikációs [IKT-]eszközökkel való ellátottsága és azok használatának jellemzői 2006/2007. Budapest. http://www.ksh.hu (2009.11.04.)

(34) Kraaijenbrink, J. – Spender, J.-C. – Groen, A. [2010]: The Resource-Based View: A Review and Assessment of Its Critiques. Journal of Management. Vol. 36. No. 1. pp. 349-372.

(35) Krishnamurthy, S. [2007]: E-Commerce Management.Text and Cases. Thomson South-Western, Mason, Ohio

(36) Lee, S. – Kim, S. H. [2006]: A Lag Effect of IT Investment on Firm Performance. Information Resources Management Journal. Vol. 19. No. 1. pp. 43-69.

(37) Lipsman, A, [2012]: For Display Ads, Being Seen Matters More than Being Clicked. comScore, Inc. http://www.comscore.com/Press_Events/Press_Releases/2012/4/For_Display_Ads_Being_Seen_Matters_More_than_Being_Clicked (2012.05.10.)

(38) Lo, B.W.N. – Sedhain, R.S. [2006]: How reliable are Website rankings? Implications for E-business advertising and Internet search. Issues in Information Systems, Vol. 7. No. 2. pp. 233-238.

(39) Malone, T. – Laubacher, R. [1998]: The dawn of the e.lance economy. Harvard Business Review. Vol. 76. No. 5. pp. 145-152.

(40) Melville, N. – Kraemer, K. – Gurbaxani, V. [2004]: Review: Information technology and organizational performance: An integratice model of IT business value. MIS Quarterly. Vol. 28. No. 2. pp. 283-322.

(41) Merono-Cerdan, A. L. – Soto-Acosta, P. [2007]: External Web content and its influence on organizational performance. European Journal of Information Systems. Vol. 16. No. 1. pp. 66–80.

(42) Miranda, F.J. – Banegil, T.M. [2004]: Quantitative evaluation of commercial Web sites: an empirical study of Spanish firms. International Journal of Information Management Vol. 24. No. 4. pp. 313–328.

(43) Mojzes, I. – Talyigás, J. [2000]: Elektronikus kereskedelem. MTA Információtechnológiai Alapítvány, Budapest

(44) Nagpaul, P. S. [2012]: Guide to Advanced Data Analysis using IDAMS Software. UNESCO http://www.unesco.org/webworld/idams/advguide/TOC.htm (2012.03.19.)

(45) Nemeslaki András – Pocsarovszky Károly [2011]: Web Crawler Research Methodology. 22nd European Regional ITS Conference. 2011. September 18-21, Budapest

(46) Nemeslaki, A. – Pocsarovszky, K. [2012]: Supporting e-business research with web crawler methodology. Society and Economy. Vol. 34. No. 1. pp. 13-28.

(47) Piccoli, G. – Ives, B. [2005]: Review: IT-Dependent Strategic Initiatives and Sustainable Competitive Advantage: A Review and Synthesis of the Literature. MIS Quarterly. Vol. 29. No. 4. pp. 747-775.

(48) Solow, R. M. [1987]: We'd better watch out. New York Times Book Review. 1987.07.12.

(49) Subramani, M. – Walden, E. [2001]: The Impact of E-Commerce Announcements on the Market Value of Firms. Information System Research. Vol. 12. No. 2. pp. 135-154.

(50) Virág, M. – Fiáth, A. [2010]: Financial Ratio Analysis. AULA Kiadó. Budapest.

(51) Wade, M. – Hulland, J. [2004]: Review: The resource-based view and information system research: Review, extention, and suggestions for future research. MIS Quarterly. Vol. 28. No. 1. pp. 107-142.

(52) Wonseok, O. – Pinsonneault, A. [2007]: On the Assessment of the Strategic Value of Information Technologies: Conceptual and Analytical Approaches. MIS Quarterly. Vol. 31. No. 2. pp. 239-265.

(53) Zhu, K. [2004]: The Complementarity of Information Technology Infrastructure and E-Commerce Capability: A Resource-Based Assessment of Their Business Value. Journal of Management Information Systems. Vol. 21. No. 1. pp. 167-202.

(54) Zhu, K. – Kraemer, K. L. [2002]: e-Commerce Metrics for net-enhanced organisations: Assessing the value of e-commerce to firm performance in the manufacturing sector. Information System Research. Vol. 13. No. 3. pp. 275-295.

(55) Zhu, K. – Kraemer, K. L. [2005]: Post-Adoption Variations in Usage and Value of E-Business by Organizations: Cross-Country Evidence from the Retail Industry. Information Systems Research. Vol. 16. No. 1. pp. 61–84.

(56) Zhuang, Y. – Lederer, A.L. [2003]: An Instrument for Measuring the Business Benefits of E-Commerce Retailing. International Journal of Electronic Commerce. Vol. 7. No. 3. pp. 65-99.

(57) Zhuang, Y. – Lederer, A.L. [2006]: A resource-based view of electronic commerce. Information & Management. Vol. 43. No. 2. pp. 251–261.

5. Selected Publications of the Author

Hungarian Publications

Peer Reviewed Journals:

Aranyossy, M. [2010]: Szorzószámos értékelés információtechnológiai iparágakban. *(Valuation by Multiples in ICT Industries)* Vezetéstudomány. No. 11. pp. 44-56.

Aranyossy, M. [2011]: Az információtechnológia üzleti értékének nyomában. *(About Business Value of Information Technology*) Hitelintézeti Szemle. Vol. 10. No. 6. pp. 554-574.

Aranyossy, M. – Nemeslaki, A. [2005]: Információtechnológiai beruházások megtérülésének modellezése: Problémák és megoldások egy vállalati portál példáján. *(Modelling IT Investment ROI: Problems and Solutions for the Case of Enterprise Portals)* Vezetéstudomány. Vol. 36. No. 9. pp. 24-36.

Nemeslaki, A. – Aranyossy, M. [2005]: Az információtechnológia vállalati értékteremtésének elméletei, szemléletmódjai és módszerei. *(Theories, Appoaches and Methodologies about IT Business Value)* Vezetéstudomány. Vol. 36. No. 7-8. pp. 27-38.

Other:
Conferences

Aranyossy, M. [2007a]: Információtechnológiai befektetési döntések: A reálopciós megközelítés helye az értékelésben. *(IT Investment Decisions: The role of the Real Option Approach)* XXVIII. OTDK Doktorandusz Konferencia. 2007. április 25-27., Miskolc. A tanulmány megjelent a konferencia kötetben.

Aranyossy M. [2010b]: Mi az, ami megtérül és hogyan számoljuk ki? Üzleti tervezés és értékelés az e-kereskedelem kapcsán. *(What Makes the Profit and How Do We Calculate It? Valuation and Business Planning for E-commerce)* E-kereskedjünk-e? Szövetség az Elektronikus Kereskedelemért Egyesület őszi konferenciája. 2010. november 17. Budapest

Working Papers

Aranyossy, M. – Juhász, P. [2012]: Értékteremtés e-kereskedelemmel: kitörési lehetőség a recesszió sújtotta magyar kiskereskedelemben? *(Value Creation With E-commerce: Opportunities During Recession in the Hungarian Retail Industry)* Kiadás előtt álló kézirat

English Language Publications

Other:

Conferences

Aranyossy, M. – Csiszár, D. [2004]: ROI Rationale: Measuring ROI for Your Deployment. Plumtree Odyssey 2004. Hollywood. Florida. USA. 11-14. October 2004

Aranyossy Márta [2006]: Towards Dynamic IS Strategic Map. IT Business Value from Financial, Process and Network Perspectives. CEMS Doctoral Consortium „Innovation through Enterprise Networks and ICT", Piliscsaba, November 2nd-4th 2006.

Aranyossy, M. [2007b]: Business Value of IT Investment: The Case of a Low Cost Airline's Website. 20th Bled eConference, eMergence: Merging and Emerging Technologies. 2007. június 4-6., Bled, Szlovénia. A tanulmány megjelent a konferencia kötetben: http://domino.fov.uni-mb.si/proceedings

Aranyossy, M. [2010a]: Mapping the business value of information technology investments. Spring Wind 2010. 2010. március 25-27., Pécs

Aranyossy, M. [2011]: Resource-based Analysis of E-commerce Business Value. NITIM Doctoral Consortium „Networked Innovation – necessity, challenges and research questions ", Konstanz. Germany. April 12-15. 2011

Working Papers

Aranyossy, M. – Szutorisz, G. [2005]: E-payment, E-invoicing, E-contracting – Central and Eastern European Regional Overview. Research Report. BCE, E-business Research Center, Budapest

Aranyossy, M. – Szutorisz, G. – Gólya, Z. [2006]: Business Value of wizzair.com – Website Valuation and Benchmarking. Research Report. BCE, E-business Research Center, Budapest