

MATURITY LEVEL OF IT AND ITS IMPACT ON COMPANY'S COMPETITIVE ADVANTAGE

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Abstract: Nowadays companies are daily challenged with turbulent and highly competitive global environment. Tourism is one of industries where presence of internet and therefore information technology in last decade dramatically changed business models. Companies struggle to gain competitive advantage and they employ various resources. Informatics is among areas where almost every manager has great expectations. But blindly investing into informatics by itself does not gain competitive advantage. Without support of top management and without alignment to business strategy IT can't be much more than commodity, accessible to every competitor. The purpose of this paper is to show top management's perspective on IT investment and point out relationship between investment in informatics and ability of informatics to gain firm's sustainable competitive advantage.

Keywords: competitive differentiation, competitive advantage, information technology, investments, management, maturity model, strategy, sustainable competitive advantage

Introduction

In last decades informatics became not only important but mandatory for every company. Together with business demands, bigger integration into processes and security issues informatics rises to higher levels of complexity. On top of this legacy information systems presents another degree of complexity. They were developed or acquired in the past which also have to be maintained and integrated. These legacy systems usually use outdated programming languages with archaic architecture and all incremental modifications made over the years are poorly documented. Despite obsolete technology, legacy systems typically still play the key role and crucial operations rely on them. Mature organizations have a large number of legacy systems on one side and huge expectations of IT to create strategic value on the other side. This dual role of informatics is challenging for both, the top management and also for IT management because companies are facing vigorous worldwide competition which demands flexibility and scalability. These are the properties of modern information systems but rigid outdated and still crucial systems make this goal harder to achieve. Mellville's (2004) research showed that legacy IT systems have strong

negative correlation with strategic flexibility and business process performance.

Informatics is a pervasive sector of contemporary organizations. Today it is hard to imagine and even harder to find a department without support of informatics. In this paper I am using broad term “informatics” instead of “information technology”. Traditionally information technology implies hardware, software, communications, security, databases, data storage etc., while the term “technology” does not cover human resources as the most important asset. I also add business processes management under the term of “informatics”, because it is impossible to imagine implementing, reengineering or managing processes without an intensive support of informatics over the last decade, especially without informatics’ human resources and software.

Most recently in research on information technology and business value using the resource based view of the company, IT has been separated into at least two components, technology resources and IT related human resources (Melville, Kraemer, & Gurbaxani, 2004). Technology resources mainly involve software and hardware, whereas the term human resources addresses programmers, users’ support, maintenance, security and others supporting technology based resources.

Background

Latest trend among software vendors is to sell solutions that comprise industry’s best practices and business processes, which can reduce competitive advantage in the long run. Peppard and Ward (2004) pointed out that the use of standard application packages can limit organization’s ability to innovate. In a provocative article “IT Doesn’t Matter” Nicolas Carr (2003) argues that IT is no longer a competitive advantage for a company, but more like a commodity and he makes a comparison stating that IT is like electricity – everyone can have it and therefore it cannot represent a competitive advantage. He was heavily targeted by the IT industry, but at the end he has a point or at least loudly stated that informatics by default is not strategic function, or endless pool of innovative approaches.

Urwiller & Frolick (2008) adopted Maslow’s hierarchy of needs and showed analogy with maturity level of information technology used within competitive organizations. They came to conclusion that lower levels of informatics maturity are commodity and upper levels help innovate and help organization to compete. Figure 1 shows Maslows’s hierarchy combined with needs and expectations for organization regarding informatics.

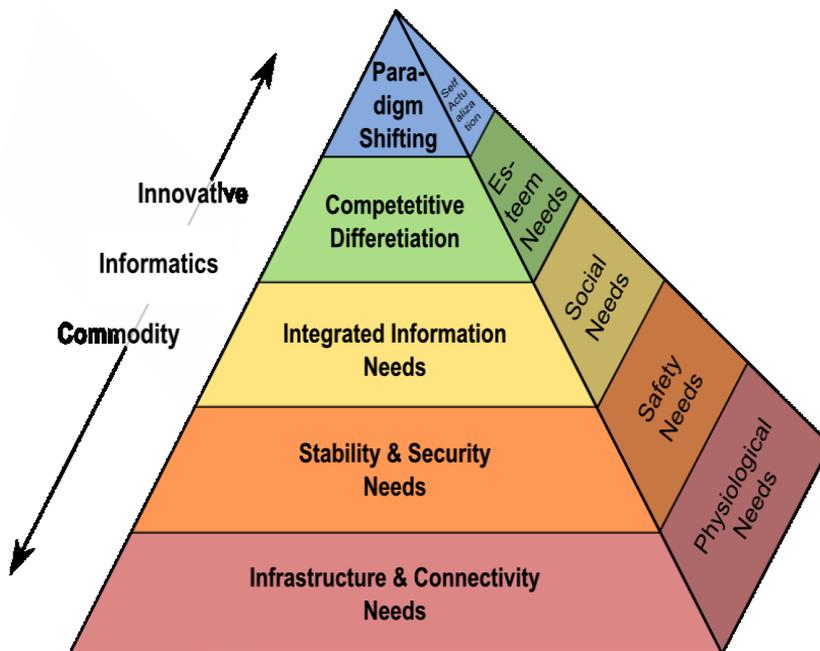


Figure 1: Informatics needs on Maslow’s hierarchy

At the basic level, mid-to-large sized companies need IT infrastructure and connectivity in order to survive. Upon meeting this need, they seek stability and security of the technology infrastructure. As they achieve acceptable levels of security and stability, the need for integrated information systems to provide accurate and consistent information with which to make sound business decisions becomes the focus. In general, many organizations feel reasonably satisfied reaching this level of maturity. In many cases, however, companies can achieve a higher level of maturity by using information technology to attain competitive differentiation or even as a means to fundamentally change consumer behavior and expectations. (Urwiler & Frolick, 2008)

Resources have to be rare, context specific and not easily imitable. Physical IT resources do not matter in creating a competitive advantage, because an efficient factor market exists for these resources. The true source of competitive advantage is seen as the managerial IT knowledge, the overlapping pool of shared knowledge that IT managers possess about the business processes and the shared knowledge that line managers possess about the potential to apply IT to improve performance (Ray, Barney, & Muhanna, 2004).

There are also hazards related to high capital risk and uncertain outcomes of IT projects, the time and cost involved in system development and change, the contracting difficulties that might ensue if IT is used to lock in customers and suppliers, and the fact the IT

systems are easily imitated or can even be bought off the shelf. Competitors also become more homogeneous by sourcing raw materials and components from the same vendors, thus eroding their own company's distinctiveness. Increased outsourcing also tends to increase price competition and lower industry's profitability (Porter, 2001).

All these assumptions indicate that just putting money into informatics (people and technology) itself does not mean that company is gaining a competitive advantage from IT capabilities. As mentioned before, legacy systems have a huge impact on IT ability to adopt changes or transform business models. On the other side, standardized IT technology and system solutions cannot provide a competitive advantage on their own.

Executives' perception of information technology's business value

Executives struggle with a host of complex issues involved in determining payoffs from investment in information technology and guessing how IT projects contribute to achieve competitive advantage. Management recognizes the potential of informatics and its ability to accomplish company's strategy but they also strive to have an active role in decisions on where and how to engage IT resources. Apart from the fact that information technology is ubiquitous on manager's agendas, they still have critical perception of informatics (Tallon, Kraemer, & Gurbaxani, 2000).

Even if it is hard to find objective data, top management's perception can at least show fields within the organization where informatics is creating value. Legitimacy of executives' perception is however questionable because self-reported information has option that managers will exaggerate their views on importance of IT because of being decision makers or because of self-promotion. The ability of IT to create added value for organization is heavily related to top management's perception. Executives can see IT as an enabler for exercising organizations' business strategy or as a basic supporting function for keeping infrastructure in shape. To fully understand executives' perception of IT we have to observe company's goals for IT and perceive if usage of informatics' resources is aligned with business strategy.

Maturity level of company's' informatics

Maturity model enables enterprises not only to benchmark their present IT performance but also to identify future targets for improvements. COBIT's maturity model is influenced by the organization's business goals, the operating environment and the

industry practices. Maturity modeling for control over IT processes is based on a method of evaluating the organization, so that it can be rated from a maturity level of non-existent (0) to optimized (5). The maturity levels are designed as profiles of IT processes that an enterprise would recognize as description of possible current and future status.

- Level 1: Random – processes, capability and innovation maturity, where they exist at all, are inconsistent, ad-hoc, chaotic, unpredictable and unstable.
- Level 2: Emerging – emerging managed processes, capability and innovation structures are showing signs of definition but are still at very low levels of maturity.
- Level 3: Specified – processes, capability and innovation maturity structures are being defined, specified and implemented providing for effective quantitative and qualitative management ability.
- Level 4: Measurable – as processes, capability and innovation maturity is managed quantitatively and they become more easily predicted.
- Level 5: Aligned – the whole organization is involved in on-going improvement and development and the processes, capabilities and innovation have become maturely aligned.

Executives' goals for IT

Porter (2008) states that organizations differentially focus on two main business objectives; operational effectiveness and strategic positioning. For great organization's performance both are needed, but each works in a unique way. Operational effectiveness entitles performing similar activities better than competitors, while strategic positioning means performing different tasks or performing similar tasks but in a strategically different way. Porter (2008) also says for organizations focusing on operational effectiveness that "get more out of their inputs than others because they eliminate wasted effort, employ more advanced technology, motivate employees better, or have greater insights into managing particular activities".

Porter's division between operational effectiveness and strategic positioning can also be applied onto goals for IT. Efficiency can be achieved by using informatics for cost reduction or for productivity improvements. Effectiveness can be achieved by using IT for greater flexibility and responsiveness to changing market requirements.

Figure 2 shows alignment of corporate goals for IT and organization's classification regarding operational effectiveness and strategic positioning (Tallon, et al., 2000).

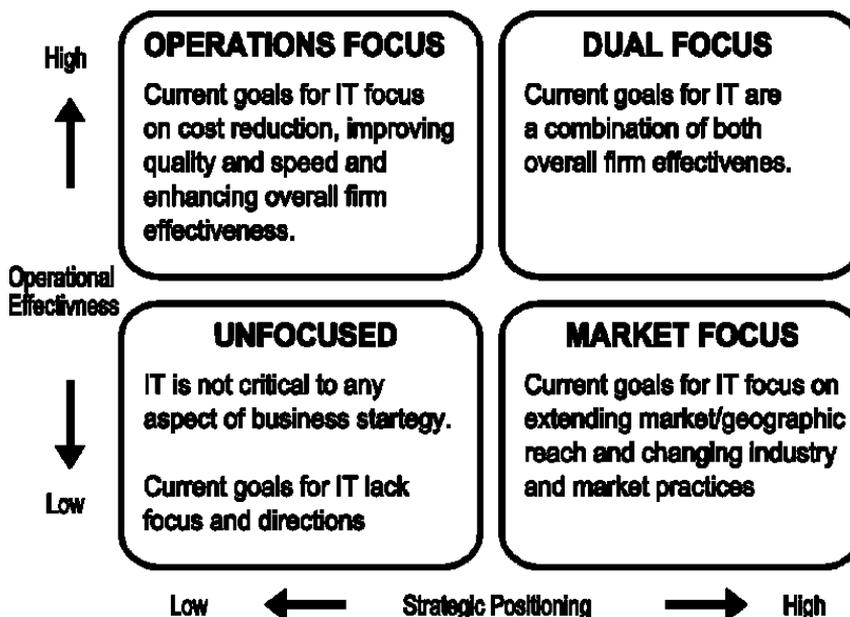


Figure 2: Corporate goals for IT

Unfocused: executives are indifferent toward IT and they will more likely underestimate or mismanage their investments in informatics. This leads to a negative cycle that nullifies the potential for realizing payoffs from both current and future IT investments.

Operations-focused organizations in the upper left quadrant in figure 2 have clear goals on how informatics can help to achieve operational effectiveness. These companies primarily use IT for cost reduction and to improve overall effectiveness of business operations by focusing on flexibility, quality, speed and time to market.

Market-focused organizations in the bottom right quadrant of figure 2 use informatics to enhance their strategic positioning. Market-focused firms use IT to create or enhance a value proposition for their customers. Tallon (2008) also suggests that market-focused firms might be more externally focused in their goals for IT, but are not much different at using IT for operational purposes.

There are also some organizations focusing on using IT for operational effectiveness or strategic positioning. These organizations could be found in the upper right corner of figure 2. Many companies recognize that IT can support both fields simultaneously. Companies capable of dual approach extend their use of informatics beyond operational effectiveness to include market reach and new market creation.

Research model

Research model shown in Figure 3 consists of three parts. The first part is related to the **impact** that executives have on areas covered in this study. It is interesting to examine some of influencing factors. In this research I examined business strategy, top management support and customers' satisfaction. These variables were chosen because prior research found them to be important. Although there are also other variables, I decided to focus only on these variables in order to limit the length of the survey.

The second part consists of the observed areas of **informatics**. As I mentioned in the introduction, I am using the term "informatics" as a wider area which also covers human resources and processes. For the purpose of this study I asked executives responsible for IT to evaluate maturity level of each part of informatics. In my survey I defined what is representative for each maturity level and executives gave their estimate level on how they see maturity of their informatics. Executives' view is biased but this is exactly what I wanted to do in this research: to evaluate their perception of efficiency of IT. At the end, they take final decisions and they are responsible for them, not CIO? The third part is related to strategies for gaining a competitive advantage. As stated in previous chapters, companies use informatics for a variety of reasons. In some companies it may be basic maturity level which means only internet presence while in others informatics may be used for purpose of business integration or transformation of existing processes. Different levels of maturity and different levels of management's support are therefore likely to give different degrees of competitive advantage. Based on a review of academic perspectives on competitive strategies and advantages, there are five strategic thrusts to enhance a company's competitive advantage. These are differentiation, cost reduction, innovation, growth and alliance (Brown, Gatian, & James O. Hicks, 1995).

Prepositions

Based on relevant literature and examination of both fields: informatics and competitive advantage, I placed the following prepositions:

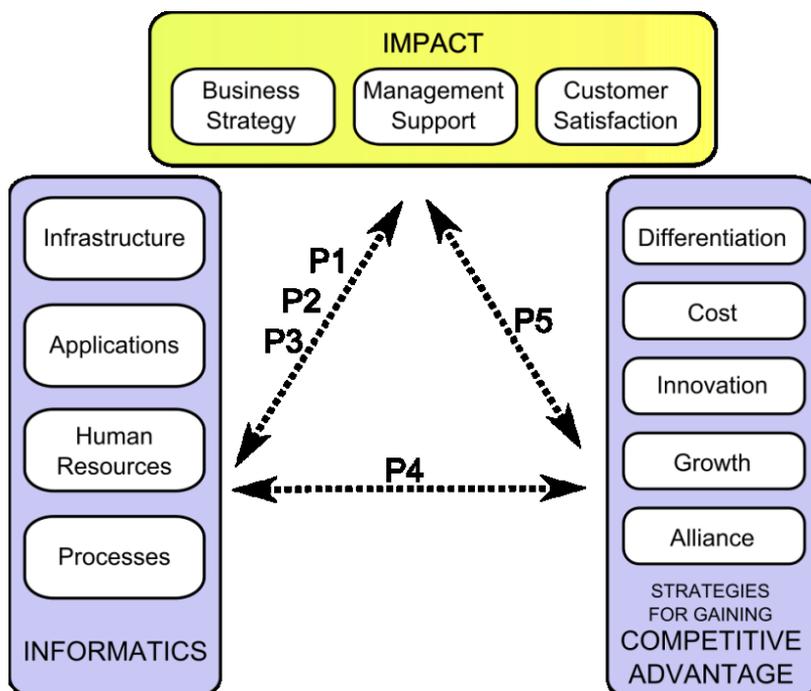


Figure 3: Research model and prepositions

- P1: Supportive, encouraging and positive perception of usage of informatics among top management has positive impact on maturity level of company's informatics.
- P2: Maturity level of company's informatics is higher if investment in IT is aligned with corporate strategic goals.
- P3: Usage of current technologies and application versions have positive impact on company informatics maturity level.
- P4: Companies with higher maturity level tend to use innovation as a strategy for gaining competitive advantage more often.
- P5: Business strategy and management support is in positive correlation with strategies of gaining competitive advantage.

Strategies for gaining competitive advantage

Differentiation

Information technology helps a company to differentiate itself not only through price but also with product innovation, short time-to-market and customer service (Bhatt & Grover, 2005). If organizations have the ability to collect and analyze a big amount of different data about market, customers and competition, they will have greater competitive differentiation edge.

Cost Reduction

Wise investment in informatics can reduce transaction costs and can dramatically reduce the costs of obtaining, processing and transmitting information, thus changing the way firms do business (Porter, 2008). Usage of sales channels, possible because of internet can reduce the cost of marketing, advertising, and business operations because of less expensive product promotion, cheaper distribution channels and direct savings.

Innovation

An innovation advantage usually generates an effect on product and process R&D, purchase and transportation of raw materials, manufacturing of parts and components, assembly, testing, quality control, marketing and wholesale distribution. The impact of the IT on innovation can cover information about customer's needs which can assist in process of generation of new product ideas (Pijpers & Kees van, 2005). Informatics can also help facilitate R&D production process in cooperation network within a company and between business partners. Close relationship among business partners along the supply chain can provide opportunities to improve distribution process.

Growth

Informatics, especially internet can help organizations expand their markets and increase market shares, thus facilitating a firm's growth strategy. Usage of IT affects a firm's growth ability by increasing its scope and extends its core business through market penetration and development, or product development (Fruhling & Siau, 2007). Based on information technology, especially internet usage, a company is able to quickly and effectively expand its geographical markets regionally and globally. It can also open new markets and new distribution channels.

Alliance

Internet and informatics are creating many new inter-relationships among businesses and extending the scope of industries in which a firm must compete to achieve competitive advantage (Porter, 2008). To maintain a successful alliance, communication between partners plays a significant role.

Method and instrument

A questionnaire was used to collect data for this research. The sample was selected from the www.Gvin.com where the criteria were:

company in Slovenia with more than 200 employees and I got 286 results. Before the formal survey, two rounds of interviews were conducted. In the first phase two executives were involved. Based on an unstructured interview, a questionnaire was prepared and I tested it in the second round with one executive in order to improve clarity and readability. These questionnaires were mailed to executives or top management responsible for IT. In some companies, the financial department or other departments were in charge of IT. In the cover letter, I assured to respondents that any information provided would be kept strictly confidential. I also made it clear that individuals and firms would not be identified in any reports as only aggregate data would be reported. In total, 32 responses were received, giving a response rate of 11.18%.

Results

Analyzing results in SPSS gave some interesting relations between variables. Figure 4 schematically shows them in research model. All marked correlations are positive but those marked with (*) are not statistically significant. Based on these findings I can arrive to conclusion that I can accept preposition P1 “supportive, encouraging and positive perception of usage of informatics among top management has positive impact on maturity level of company's informatics”. Management support has positive impact on processes and applications. I can assume that management comes more often in contact with applications and processes than infrastructure, but it is surprise that I didn’t find correlation between management support and people working in informatics (human resources).

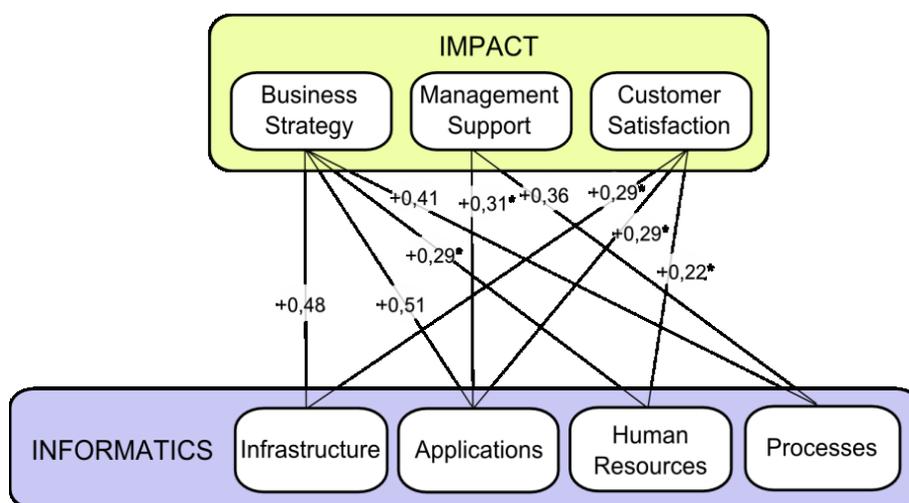


Figure 4: Correlations among variables in research model

Correlation factors on figure 4 also show that I can accept preposition P2 stated as “maturity level of company's informatics is higher if investment in IT is aligned with corporate strategic goals” and preposition P3: “usage of current technologies and application versions have positive impact on company informatics maturity level”. Business strategy aligned with IT goals have medium positive impact on maturity level of organization's informatics, especially on infrastructure and applications and less on human resources. Based on SPSS analysis I can accept both prepositions.

I also found that exist correlation (+0.455) between maturity level of informatics (infrastructure) and innovation as strategy for gaining competitive advantage, which is statistically significant, so I can also accept preposition P4 “companies with higher maturity level tend to use innovation as a strategy for gaining competitive advantage more often”. On other hand I cannot find statistically significant relation between “impact” group of variables and “strategies for gaining competitive advantage” group, so I cannot accept P5 preposition stated: “Business strategy and management support is in positive correlation with strategies of gaining competitive advantage”. Reason for this lays in fact, that my research was mainly focused on informatics and their relation to management and competitive advantage. Questions were therefore mainly focused on management and Informatics and less on management and strategies for gaining competitive advantage and consequently I couldn't get significant results for last preposition. Another reason for that is also relatively low response rate and therefore small sample.

In this research I focused on maturity level of informatics in observed companies. Figure 5 summarizes correlations among fields of “informatics” group in my research. Maturity level (1-5) among responders is above average with highest 3.47 for processes and lowest for applications (3.13) with highest standard deviation ($\sigma=1,31$). Such high standard deviation could be explained because of specifics with applications. Implementations are complex and many companies hesitate and stick to legacy applications. Responders in my research evaluate their maturity level of applications very high or very low with only few in average.

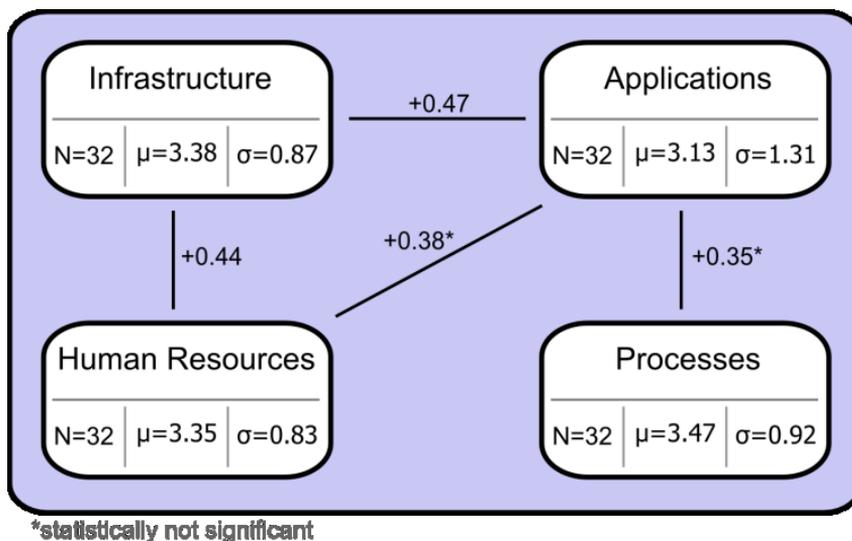


Figure 5: Correlations among informatics variables

Conclusions

Informatics can play crucial role in organization and have huge impact on business and competitive advantage if management sees it as important. On other hand informatics can play only supportive role, serving only as an infrastructure provider. In this case IT is just a commodity as explained in “IT Doesn’t Matter” by Nicolas Carr (2003).

In my research I found that IT human resources are most important for top management. They are aware that technology and information systems without motivated and skilled people can’t represent valuable asset for company. Second most important field of informatics are by managements’ opinion applications and processes. They are putting infrastructure on last place.

Even if study was made among Slovenian companies, results could be used for additional in-depth researches over the region with focus on maturity level of informatics or how companies gain competitive advantage in nowadays turbulent environment. Another objective for further research is sustainable competitive advantage. Gaining sustainable competitive advantage is much harder to achieve and also challenging to research. Companies build their advantage, especially sustainable competitive advantage into products, services, processes, supply chain, R&D and they are hiding it not to become to easily imitate.

References

- Bhatt, G. D., & Grover, V. (2005). Types of Information Technology Capabilities and Their Role in Competitive Advantage: An Empirical Study. *J. Manage. Inf. Syst.*, 22(2), 253-277.
- Brown, R. M., Gatian, A. W., & James O. Hicks, J. (1995). Strategic information systems and financial performance. *J. Manage. Inf. Syst.*, 11(4), 215-248.
- Fruhling, A. L., & Siau, K. (2007). ASSESSING ORGANIZATIONAL INNOVATION CAPABILITY AND ITS EFFECT ON E-COMMERCE INITIATIVES. *Journal of Computer Information Systems*, 47(4).
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370-396. doi: 10.1037/h0054346
- Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Information technology and organizational performance: an integrative model of it business value. *MIS Q.*, 28(2), 283-322.
- Pijpers, G. G. M., & Kees van, M. (2005). An Investigation of Factors that Influence Senior Executives to Accept Innovations in Information Technology. *International Journal of Management*, 22(4), 542-555.
- Porter, M. E. (2001). *Strategy and the Internet*: Harvard Business School.
- Porter, M. E. (2008). *Competitive Advantage: Creating and Sustaining Superior Performance*: Free Press.
- Ray, G., Barney, J. B., & Muhanna, W. A. (2004). Capabilities, business processes, and competitive advantage: choosing the dependent variable in empirical tests of the resource-based view. *Strategic Management Journal*, 25(1), 23-37. doi: 10.1002/smj.366
- Tallon, P. P., Kraemer, K. L., & Gurbaxani, V. (2000). Executives' perceptions of the business value of information technology: A process-oriented approach. *Journal of Management Information Systems*, 16(4), 145-173.
- Urwiler, R., & Frolick, M. N. (2008). The IT Value Hierarchy: Using Maslow's Hierarchy of Needs as a Metaphor for Gauging the Maturity Level of Information Technology Use within Competitive Organizations. *Inf. Sys. Manag.*, 25(1), 83-88. doi: 10.1080/10580530701777206

Note on the author

MITJA SEVER spent 15 years in IT starting as a programmer, later as a project manager and recently as director of IT department. He has experiences in a variety of industries, including consumer goods, management consulting, insurance and financial services. His understanding of infrastructure, business processes and market needs is combined with his awareness of new technology trends.

Recently he joins Gea College – Faculty of Entrepreneurship as IT expert. He is master's degree student.