FIRM'S STRATEGIC THINKING IN THE CONTEXT OF BUSINESS INFORMATIZATION

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Abstract

This paper discusses the factors of business change management in the context of transition from traditional to computerized business systems. The factors of change management are presented as a firm's strategic characteristics in the context of the relationship between traditional and computerized business management. The purpose of the research is the systematization of strategic characteristics of business informatization, and ranking and positioning of strategic characteristics in the context of competitive relationship between traditional and computerized business management. The aim of the research is to select and systematize strategic elements of business informatization into a small number of features that can be grouped as common factors according to certain criteria.

The interdependence of strategic characteristics was established based on a factor analysis. This method was applied to real data obtained through business

informatization questionnaires. During our study on strategic characteristics of business informatization, we collected data from 41 large and medium-sized companies in Croatia in the period from 2011 to 2014.

The study included 15 strategic characteristics of business systems that were considered in the context of the factors of change management. Factor analysis of the data was performed using SPSS 21.0, and systematized into five steps:

1. *The first step was the reduction of the number of attributes and determining the initial results to extract factors.*
2. *The second step was defining the factor matrix after rotation of the factors.*
3. *The third step was the interpretation of the extracted factors.*
4. *The fourth step included testing for significance of results by determining the values of Cronbach's alpha coefficient.*
5. *The final, fifth step was the post-optimal analysis.*

By arranging the factors into groups we have focused on key areas of activity. We have also discussed various approaches to strategic thinking in the context of business informatization when combined with different levels of competitiveness.

Keywords: *strategic thinking, change management factors, factor analysis of features of computerized business management, business systems, competitiveness*

JEL Classification: L1, D8, M15

1. INTRODUCTION

The goal of enterprise informatization is to achieve higher level of fit, alignment and efficiency producing better, higher level of quality and profitable results. ICT management and strategy activities are and should be developed hand in hand- as natural synergy (Whittington, 2014). The sign of collaboration is synergy reflected as the competitive advantage in relation to direct competitor.

IT solutions mirror the complex structure of reality and therefore its implementation is demanding. The cost of maintaining such solutions within the company can be justified only with the continuous proof of value added to current market, competitor and customer expectations. Therefore it is in a continu-

al push of improvement, adjustment with fewer costs. The perceived value of IT solution depends on the organizational structure for accepting change, accepting new technological solutions and accepting new ways of business models.

The aim of this paper is to denote the strategic thinking within the context of level of IT development within the companies. The strategic thinking represents the way companies treat strategic factors known for contributing to the enterprise information system. The strategic factors are recognized as the main factors of change and can be grouped depending on the relevance. Additionally, we analyze strategic level of informatization, as a sign of development, on specific strategic factors in the context of IT processes in the Croatian companies.

With this article we contribute to the literature of strategic thinking in IT sectors in two ways. Firstly, we define strategic thinking by grouping the strategic factors of similar IT development characteristics. Therefore we offer new insights for initial stage of implementing any of the suggested framework for enterprise informatization on strategic level. Secondly, we presented the results of research in Croatian firms.

The aim of the research is to identify, systematize and analyze strategic factors, and define basic business strategy features from the perspective of the transition from traditional to computerized business systems, using empirical methods and strategic thinking approach. Pursuant to the research problem and purpose, the following hypothesis has been proposed: identification, systematization and analysis of strategic factors, and identification of the main strategic features of business process informatization to manage the transition from traditional to computerized business systems and achieve a higher level of strategic IT development in companies.

The paper is structured in six interrelated parts. In the first section, the introduction, we elaborate the purpose, objectives and methodology of research. The second part discusses the significance of strategic development of business process informatization. In the third section, we define and describe strategic factors of business process informatization that affect the effect of moving from traditional to computerized operations. The fourth part presents and analyzes the results of the analysis of strategic factors from the perspective of the relationship between traditional and computerized operations. In the fifth part, we systematize strategic factors and identify strategic characteristics of business process informatization. The conclusion summarizes the main ideas of our work.

2. THE MEANING OF STRATEGIC INFORMATIZATION DEVELOPMENT OF BUSINESS SYSTEM

Strategy is an organizational process-oriented task of gathering resources, focusing on priorities and delivering results. Strategic thinking denotes the activity of gathering insights which represent the core of the future strategy. It is recognized that idea created outside existing mental model represents the core of competitive advantage if developed and implemented in the proper way. Strategic thinking can be understood as *seeing*, a combination of numerous perspectives, which perceive the problem from different points of views Mintzberg (Mintzberg, Ahlstrand, Lampel, 1998, p.128):

- Seeing ahead- see the future of the firm,
- Seeing behind- understands the roots of today in the past,
- Seeing down- perceive the big picture of the problem,
- Seeing below- inductive thinking from close relations,
- Seeing beside- lateral thinking, challenging conventional wisdom,
- Seeing beyond- inventing the world by putting the ideas into the context, and
- Seeing it through- understanding things deeper as presented.

This article follows the strategic thinking as *seeing below* and *seeing it through*. Strategic thinking is depicted as the gathering of certain factors, their grouping and looking closer at their mutual interactions.

The marriage of strategic planning and information systems was set in the two books in mid 70-ties, *Strategic Planning of Management Information System* by Siegal (1975) and *Strategic Planninng for MIS* by McLean et al. (1977). Information systems qualified for the source of competitive advantage of the companies (Peppard, Galliers, Thorogood, 2014) and it is recognized for having the ability to shape the strategy of a business. Clemens and Row rose the contribution of IT to sustainability of competitive advantage; it does need organizational infrastructure (Kettinger et. al, 1994), an IS strategic platform (Ross et. al. 1996) while IT alone is not enough (Powell, Dent-Micallef, 1997).

Information technology qualified for the source of added value and it is recognized for being a key factor for contributing to sustainable business performance in Croatian companies. In order to become a strategic factor for business success, IT should be intensely involved in business processes and gradually

grow into a business technology, whose main goal is not only to support the business, but also allow that it exists.

A change from information technology (IT) to business technology (BT) is certainly a lot more than just a change of acronyms. At its core it is a change in company culture which involves not only the IT department and its employees, but the entire organization, from the board of directors over the senior management to the lowest level employees (Sesvećan; 2008). Managers are becoming aware that information system activities are not separate and unrelated to other enterprise activities. Incorporating IT investment in business development budget, being well-informed and closely cooperating in implementing projects through project methodology is guarantor of success. This leads to easier understanding and communicating management ideas and company goals such as: optimizing costs, increasing productivity, improving business processes. The strategic integration of business systems and information systems based on sophisticated information and communication technologies (ICT) as a function of the synergistic development and use of business applications is becoming a necessity (Evello; 2012).

The development and use of new technologies in business allows us to leave the cooperative form of cooperation (division of labor, where each person is responsible for a certain part of the job) and is increasingly being replaced by collaboration (joint work with a view to resolving any problems).

There has never been a bigger need for changing quickly in executing business processes with respect to the period of traditional business systems where it was enough to plan changes for one, three or five years to come. Lengthy time interval is contrary to the rapid changes in the business environment and focused processes become less critical, and replaced with new (Hammer, Champy; 1993). As conditions of business informatization development change, more flexibility and adaptivity is required in linking with potential and active partners in business environment. Ability of reconfiguring relevant business processes on organizational level as well as inter-organisational processes and activities in a changing business environment is critica (Vukmirović, Čapko; 2009). Strategic computerized business system based on the sinergy of iterative and incremental approach is focused on anticipating the changes in business environment and proactive functioning.

Companies that are able to adapt their information systems to new paradigms of strategy-oriented computerized business processes that rest on infor-

mation and knowledge, through a series of generally simple applications enable rapid sharing of knowledge both among employees and between the organization and its environment. In fact, this type of applications is based on cooperation and dynamism, the ability to easily connect and transfer information in new contexts, which contributes to the openness of the enterprise and its better perception of customer needs. Changing from a complex technical system to a user-oriented system that offers business applications which are synergistically linked and integrated into business is likely to be reflected in a flexible and adaptive organization that will allow rapid knowledge exchange and dissemination among managers and employees. At the same time, computerized operations would not completely replace traditional business; information systems should be able to provide greater flexibility and faster restructuring depending on the changes in the environment.

Concepts of traditional and computerized enterprise are not independent, but rather complementary to each other. This means that the concepts of computerized enterprises to a lesser extent replace, and more complement the concepts of traditional enterprises.

3. STRATEGIC FACTORS OF BUSINESS SYSTEMS INFORMATIZATION

Factors affecting change management from traditional to computerized business have been systematized according to research findings presented within E2 Conference on innovation management using business apps. Strategic factors of business systems informatization were analyzed from the perspective of traditional and computerized business using rating scale method.

Table 1 presents comparative features of traditional and computerized business, mutually opposing or complementary to each other (can also be used in combination and synergy). Directions and intensities of strategic factor orientation towards computerized or traditional business can be determined on the rating scale (5- 0 - 5). High numbers mean a strong focus on the features of the left or right side, while scores in the middle or going down to zero mean more moderate orientation with the possibility of combining the opposite features.

It should be noted that the concepts and technologies of traditional and computerized business are not mutually exclusive but can build on and complement

each other, and they can operate simultaneously. For example, when speaking of resource, information and knowledge do not exclude the use of capital, labor, material and financial resources, but they build on and complement them. Or, in terms of relationship between people and technology, technology can be alternately encouraged and driven by users and IT experts. Indeed, closer cooperation between users and IT experts is likely to be reflected in a higher level of business development.

Table 1: Strategic factors of business systems informatization

No.	Main features	Traditional business	Computerized business (e-business)
1	Purpose	Growth, Size	Development, Quality
2	Resource	Capital, Labor, Material Resources	Information, Knowledge
3	Motive	Short-Term, Profit	Long-Term, Success
4	Environmental relation	Competition	Cooperation
5	Objectives and manner of functioning	Efficiency, Execution of Tasks	Success, Actions, Results
6	Functioning in an environment	Procedural, relatively fast	Flexible, Adaptive, Momentary (Prompt)
7	Strategy	Production Planning	Production in line with market needs
8	Business perspective	Business function	Business process
9	Organizational unit	Department	Cross-functional team
10	Focus for employees	Supremacy, Competitiveness	Participation, Cooperation
11	Business tasks	Closely defined	Flexible, Comprehensive
12	Information systems	Complex technical system	Business apps
13	Relationship between people and technology	Technology driven by IT experts	Technology driven by users
14	Openness of enterprise	Departments and clear boundaries	Unmarked boundaries
15	Value chain	Supplier and consumer oriented	Business oriented

Source: As modified by the authors acc. to: Enterprise 2.0 Conference, May 2009, http://www.e2conf.com/about/what-is-enterprise2.0.php

4. RESEARCH METHODOLOGY AND RESULTS

This chapter presents and analyzes the results of the study of the strategic factors that influence enterprise informatization. In the study data were collected by a questionnaire on strategic factors affecting IT development in Croatian companies. Data from 50 large and medium-sized companies in Croatia were collected in the period from 2011 to 2014, of which a total of 41 companies

responded to all questions. Based on the findings we were able to analyze the strategic factors determining the level of IT development from the perspective of the transition from traditional to computerized business systems. The strategic factors were systematized, using a factor analysis method, enabling us to identify key strategic features of enterprise informatization.

4.1. Analysis of strategic factors from aspect of interrelationshipbetween traditional and computerized business

Table 2 presents research findings on strategic factors of business systems informatization, conducted on a sample of 50 companies. It reveals factor positions from the perspective of the transition from traditional to computerized business systems. In this context, in order to be able to reliably define factor positions, several statistical indicators have been calculated such as mean value, standard deviation, median, mode, rate, interval and level of significance.

Table 2: Strategic factors affecting business systems within the context of IT developement in companies

No	Factors	AS	STDEV	Med	Mod	Percent	Interval	Sig.
1	Purpose	2,05	2,27	2,00	0,00	22%	1,3 - 2,8	.000
2	Resource	1,56	1,90	1,00	0,00	39%	1,0 - 2,2	.000
3	Motive	2,70	2,40	3,00	5,00	36%	1,9 - 3,5	.000
4	Environmental relation	0,30	2,70	0,00	0,00	17%	-0,5 - 1,2	.459
5	Objectives of functioning	1,40	2,30	1,00	0,00	27%	0,7 - 2,2	.000
6	Functioning in an envinronment	1,70	2,40	2,00	0,00	29%	1,0 - 2,5	.000
7	Strategy	1,80	2,60	2,00	5,00	22%	1,0 - 2,7	.000
8	Business perspective	1,60	1,90	1,00	0,00	17%	1,0 - 2,2	.000
9	Organizational unit	-0,70	2,90	0,00	0,00	29%	-1,6 - 0,2	.151
10	Focus for employees	1,50	2,80	2,00	4,00	18%	0,7 - 2,4	.001
11	Business tasks	0,44	3,10	1,00	4,00	18%	-0,5 - 1,4	.373
12	Information system	2,40	2,10	3,00	4,00	24%	1,7 - 3,0	.000
13	Relationship between people and technology	0,80	3,10	0,00	0,00	20%	-0,1 - 1,8	.093
14	Openness of enterprise	-0,50	2,70	0,00	0,00	22%	-0,9 - 0,8	.908
15	Value chain	-0,80	2,80	0,00	0,00	22%	-1,7 - 0,2	.100

The table reveals that most of the strategic factors that affect enterprise informatization incline us in a varying extent to computerized operations. As indicated by all calculated statistical indicators, strategic factors that fully incline us to computerized operations are motive (3) and information systems (12). Also, we have been able to identify strategic factors that incline us to a lesser

extent to traditional business such as organizational unit (9), openness of enterprise (14) and value chain (15).

As Table 2 shows, there are two categories of change management factors that can be denoted as dichotomous factors and synergy factors. In dichotomous factors, two directions of orientation are expressed: a) towards traditional business and b) towards computerized business. Synergy factors reveal a synergy of traditional and computerized operations that can be recognized in those features where arithmetic mean equals to or is close to the mean value of 0. In other words, arithmetic mean value may not be a sure indication that the assessment tends towards zero. For example, company A can evaluate one factor by score of +5, and company B by score of -5, where the arithmetic mean would produce a neutral value of 0, with the factors being assessed by end values. It is therefore an important indicator of the number of companies that marked the 0 value. Accordingly, strategic factors that are affecting business systems informatization can be systematized into two categories: 1) shift factors, and 2) synergy factors.

Shift factors indicate hierarchical relationship between variables of traditional and computerized business being identified as different levels of strategic IT development. This means that variables of enterprise informatization are at higher levels of the hierarchy with respect to the variables of traditional business.

Information system is an example of shift factor. From the viewpoint of traditional enterprise information system functions as a complex technical system, while from the viewpoint of computerized enterprise it is recognised as a system of integrated business applications, as can be seen from the table, revealing a hierarchical relationship between traditional and computerized business. The goal is to achieve a shift from complex technical system to integrated business applications.

When speaking of synergy, both traditional and computerized business strategies are complementary to each other and interdependent. This means that variables of traditional and computerized business function synergically at the same level. An example of synergy feature is resource. From the viewpoint of traditional enterprise main resources are capital, labor and material resources, while computerized enterprises focus on information and knowledge. A key factor for the optimal and efficient use of resources is their mutual compatibility and synergy.

4.2. Identifying basic strategic attributes of business systems informatization by using factor analysis

Systematizing strategic factors and identifying basic strategic attributes of business systems informatization was done by using factor analysis. Data from 41 large and medium-sized companies in Croatia were collected in the period from 2011 to 2014. In the survey questionnaire respondents were invited to assess features of the enterprise in terms of relationship between traditional and computerized business processes by bolding or underlining the appropriate response. Based on the analyzed data, factors were complementary and comparatively systematized and analyzed. Table 3 presents the results of factor analysis after performing all methodological optimization steps.

Table 3 shows that attributes within factors have a satisfactory measure of correlation, that confirms the reliability of research. Value of coefficient Cronbach a> 0.6010 represents an acceptable level of reliability in research (Fulgosi; 1988). The high value of total coefficient Cronbach a (0,803) which is calculated and shown in the table 3. confirms the reliability of the questionnaire used.

We applied oblimin rotation as oblique rotation method wherein factors are interrelated (angles between axes may be different than 90 degrees). A saturation of the two strategic factors was observed such as environmental relation and business perspective, split into two components which reduce the internal reliability. Therefore, they were excluded from further analysis. Systematization of factors based on post optimal analysis is as follows: the first component is strategic value declaration, the second is operations, the third is attitude and the fourth is the velocity.

The first component does not correspond to classical strategic issues, rather to the declaration of values on which they founding their business. It implies wheather they base their operation on quality, knowledge, long-run business or fast growth, capital, short-run and profit. This findings are similar to the classical notion of strategic management literature. The second component- operations- is about ways how to implement the strategic declaration. It implies the ways how to bring value to the customer and be pertained for the market. It consist of the decision how to organize the flow of work, the relation toward technology and value chain producion for maximizing customers satisfaction. This component is related to the never ending problem of high rate the failure of strategy implementation that is usually overlooked in practice. - attitude

toward the strategic declaration and the way the operations are set in place. It consists of the way people collaborate and how is the information system set for the information to flow within the organization. This result is important focus of organizational behavior literature. The last, forth component is about velocity of perceived changes and the way it reacts on changes within the firm or in the relation with the environment The dynamic environment is setting the scenary for all the competitive firms that would like to compete and survive on the market. Change management is the crucial moment in leading the firm.

Table 3: Factor analysis of strategic factors

Strategic factors*	Component			
	Component 1	Component 2	Component 3	Component 4
Mission	**,882**			
Motivation	**,872**			
Resource	**,769**			
Business tasks		**,757**		
Organizational unit		**,734**		
Value chain		**,663**		
People-technology relation		**,551**	,423	
Firm openeness		**,349**	-,324	,675
Information system			**,849**	
Employee focus			**,783**	
Goal and way of operating			,380	**,454**
Mode of operating				**,751**
Production policy		-,428		**,671**
Cronbach alpha (for all 0.803)	,801	,720	,728	,621
Sum	258	-11	160	205
Number	3	5	2	3
Mean	6,29	-,275	3,904	5
Std. Deviation	5,631	10,07	4,369	5,834
Variance	31,712	101,487	19,090	34,05

N=41. Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 11 iterations. Supressed values less than 0.30. Bartlett's Test of Sphericity sig. 0.000. Kaiser-Meyer-Olkin Measure of sampling adequacy: 0.639. Variance explained 37,717 percent.

Source: Empirical analysis

Based on a postoptimal analysis, the strategic factors have been systematized as follows: I) Strategic Value Declaration, II) Operations, III) Attitude, and IV) Velocity. The table shows that the strategic factors are grouped in strategic features as follows: 1) Strategic Value Declaration (Mission, Motivation, Resource), 2) Attitude (Business tasks, Organization, Value chain, Relationship between people and technology, Openness of enterprise), 3) Operations (Objectives and manner of functioning, Functioning in an environment, Strategy) and 4) Velocity (Information systems, Focus for employees).

5. CONCLUSION

This paper presents methodology of empirical research on strategic development and management of enterprise informatization. Identifying main strategic features of business systems informatization can be useful from the perspective of managing the transition from traditional to computerized business processes and achieving a higher level of strategic IT development.

Research conducted on the basis of data collected on a sample of 50 companies and using the multivariate analysis method enabled us to reduce a large number of original attributes to a small number of attributes of common features, which lead to the shaping of factors. Based on the factor matrix made after completion of the oblimin rotation, we were able to establish that attributes indicated five immeasurable groups of attributes grouped into factors. Four factors have been extracted from the perspective of strategic business features: 1) Value, 2) Attiude, 3) Operation and 4) Velocity.

The findings will be used in further research which is aimed at recognizing and using strategic business features as the function of strategic IT development and the transition from traditional to computerized enterprise.

On the base of research, presented in this paper, we proposed the four components of strategic factors that influence the business level informatization. The following components are the component of strategic declaration of value, component of operations, component of attitude and component of velocity, depicted by Croatian firms interviewed in our research project. The components of the strategic factors partially correspond to the classical approaches in building enterprise architecture (Zachman, 1996) by answering the question of what, how, where and when. The research could be directed toward deeper

insight of wheather this way of grouping factors is the path toward competitiveness and successful long-run business operations by comparing financial and non financial data from firms in the region. The paper suggested hints for setting the strategic thinking priorities like strategic declaration of values, operations, attitude and velocity issues that should be taken into account when managing business informatization in the firm.

References

Evello d.o.o, IT consulting & business services (2012). Na koji način uskladiti IT i poslovanje? http://www.evello.hr/default.aspx?id=55

Enterprise 2.0 Conference, May (2009).
http://www.e2conf.com/about/what-is-enterprise2.0.php

Fulgosi, A. (1988). Faktorska analiza, Školska knjiga, Zagreb

Hammer, M., Champy (1993). J., Reengineering the Corporation: A Manifesto for Business Revolution, Harper Business

Kettinger, W.J., Grover, V., Guha, S., Segars, A.H. (1994). Strategic information systems revisited: a study in sustainability and performance. MIS Quarterly 18 (1), pages: 31–58

McLean, E., Soden, J., Steiner, G. (1977). Strategic Planning for MIS. John Wiley & Sons Inc., New York

Mintzberg, H., Ahlstrand, B. W., Lampel, J. (1998). Strategy Safari : A Guided Tour Through the Wilds of Strategic Management,Prentice Hall

Peppard, J., Galliers, R. D., & Thorogood, A. (2014). Information systems strategy as practice: Micro strategy and strategizing for IS, Journal of Strategic Information Systems 23(1), pages 1-10.

Powell, T.C., Dent-Micallef, A. (1997). Information technology as competitive advantage: the role of human, business, and technology resources. Strategic Management Journal 18 (5), pages 375–405

Ross, J. [et all] (1996). Develop long-term competitiveness through IT assets. Sloan Management Review 38 (1), pages 31–42

Sesvecan, V. (2008). Sve će više informaticara postajati glavni direktori, Poslovni dnevnik, Zagreb, URL:/www.poslovni.hr/85153.aspx

Siegel, P. (1975). Strategic Planning of Management Information Systems, Petrocelli Books, 1975

Vukmirović, S., Čapko, Z. (2009). Informacijski sustavi u menadžerskom odlučivanju, Ekonomski fakultet, Sveučilište u Rijeci, Rijeka

Wittington, R., (2014). Information Systems Strategy and Strategy-as-Practice: A joint agenda, Journal of Strategic Information Systems, Volume 23 Issue 1, March, 2014, pages 87-91