

# Management's role in strategic planning and application of ICT in modern organization

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**Abstract.** *The purpose of this paper is to examine the practice and the management's role in strategic planning of information systems and to investigate how managers can be more successful in adopting and managing ICT in their companies. The focus of this research paper is on the information as an important resource of today's organization. Therefore, it is important how managers perceive and use information resources during the process of formulating effective strategic decisions in their companies. Furthermore, the paper exposes the problem of managerial support and managerial engagement in the process of ICT adoption.*

*This paper presents a qualitative and quantitative analysis of described issues, based on survey method and extensive literature analysis, both made by researchers. Survey results show the existing importance of information as a business resource. Also, results accentuate the importance of reasonable investment in information technology.*

**Keywords.** modern organization; ICT-driven changes; managerial support

## 1 Introduction

In times of new business imperatives, when the overall economy is once again reviewed for the purpose of finding better models for acceptable functioning of business systems, information and communication technology and its role in the organization are also undergoing cycles of re-evaluation. In this sensitive process, organizational leaders consider quantity, structure, level of integration and

validity of ICT within an enterprise. Thus, managers are those who ultimately decide the fate of ICT in organization - they decide when to introduce ICT, to what extent, how fast, in which business sector, which business processes will be computerized, etc. There is a great power in the hands of management, especially in terms of ICT, which becomes even greater if we take into account that the effective use of ICT achieves additional value to the organization, or indirectly, contributes to its economic growth [2].

Positive practices throughout the world show that even medium-sized companies have Chief Information Officers (CIO). However, this is not the case in Croatia, except in very large businesses where IT sector is to some extent recognized as partially important [25]. From this fact (which speaks of insufficient concern for IT by domestic managers), we can draw the following conclusion: the awareness about the importance of IT development, as well as its associated information infrastructure, is at low rates. It should be noted that, in domestic business environment, the term information infrastructure and the overall concept of the importance of information as a resource are completely blurred. Profiling managers in people sensitive to problems from the ICT domain has become increasingly important in concepts of managerial education around the world [4]. Informatics as a scientific discipline is directed precisely towards this end. Besides important disciplines which managers need to master at universities (issues of implementation, maintenance and role of ICT in business), they need to gain generic knowledge necessary for lifelong learning in the field of ICT. Only such practice will ensure the

readiness of managers for changes and challenges in the propulsive disciplines such as ICT. A big problem (and an issue waiting to be resolved) set in front of educational institutions is the fact that managers often forget to think about IT in general and often act reactively, i.e., dealing with computer problems only when they occur. Such problems are often technical and technological nature. As an example we can mention the unavoidable redesign of database when it comes to its logical disorder, due to the business processes redesign [20]. What managers perceive hardly or simply do not take into account, is the fact that the redesign of business processes must be accompanied by a redesign of related information system. Unfortunately, instead of proactive approach (which is cheaper, faster and more efficient in terms of implementation), managers engage in IT only when problems occur and usually when it's already too late to solve the problem in the best possible way. In such situations, a swift search for alternative solutions is done, but such solutions are often not entirely suitable for organizations' business technology.

## 2 Managing changes: Resistance towards ICT-driven changes in modern organization

The role of management in strategic planning and implementation of ICT can be seen through two related dimensions [10]:

*1. Managerial support to the process of informatization.* In large enterprises there is a constant struggle between CEOs and their colleagues in IT sectors. While executive managers seek to reduce costs (and to achieve that goal they save money on ICT), IT managers observe IT at a higher level and defend the position that IT will bring long-term business benefits for the company. It is difficult to reconcile these two positions, one where the information system is seen as a necessary burden, and another, where computer is perceived almost as a Holy Grail. Except in cases where incidents from IT domain are resolved reactively (exclusively when they appear), activities of strategic planning of ICT have important role in long-term positioning

of ICT importance within the business philosophy of the company. The inclusion of ICT in the strategic plans of management is a proof of their dedication to the ICT issues. As previously noted, large companies often have sufficient human resources, both in management and in the field of ICT, so the control functions of management and ICT are often separated (CEO and CIO). Such a relationship in large enterprises implies a simple conclusion: CEOs do not have to deal with the issues of ICT; it is because IT managers take care of them. At the same time, CEOs give their consent and nominal support to the process of informatization,

*2. Managerial involvement in the process of informatization* The second dimension refers to the active involvement of managers in the process of computerization, in a way that managers actively participate in planning, implementing and maintaining information technology of the company. The inclusion of management in the process of computerization is typical for smaller companies, where there is no clear demarcation between the CEOs and CIOs. In such companies, executive manager (who is often also the financial manager and performs many other functions) takes over the role of ICT expert and grapples with the challenges from the ICT domain. In such situations, the importance of managers' educational background (in the domain of ICT) comes to light even more: without proper support in the form of critical knowledge about ICT, such a manager will deal only with the daily requirements of the respective field. In the end, it is important to emphasize the operational and strategic importance of IT processes. While the large companies CEOs deal mainly with strategic reflections and planning of series of activities (including IT), managers of small businesses must deal with strategic planning and also, operational implementation of strategic plans. Often, managers of smaller companies are forced to plan, implement and maintain IT (beside their core business). In real world, stage of planning is often absent.

Many authors in the field of information science agree that the support and involvement of top management in projects from the ICT domain is one of the critical success factors for such projects. The importance of such support and involvement is evident in many areas. Primarily, when we talk about the degree of managerial involvement in the process of computerization, certain degree of such

involvement is absolutely necessary because managers must gather enough knowledge to be able to manage the business system enriched by ICT. Also, it is necessary for managers to gather sufficient knowledge to be able to make correct decisions in the domain of ICT. Furthermore, executive manager's support is important for the managers of computerization (mostly CIOs). If the CEO embraces ICT-driven change, it is likely that other members of the organization will accept the change as well, so the project of informatization can live up to its potential within the organization. Other managers often look up to the CEO, as computerization projects often require cooperation between numerous sectors within the company. Lower management support is also very important for the managers of computerization, because such support simplifies cooperation with every individual at responsible position in the company [17].

End users of IT solutions also note the level of support which a project has in the eyes of management; therefore, such a solution will be more acceptable if the end-user notices support of management. Finally, the role of management in the process of informatization becomes extremely important after the process is finished. The change that occurs due to the introduction of information technology or restructuring existing solutions can have negative effects. There are cases where customers refused to accept the solutions brought by the process of informatization. In these, for the entire organization traumatic moments, the role of management is crucial, given that management must bridge the gap that has emerged between users of new solutions and the project team who made all the important ICT decisions. In these situations, managers get a whole new role - a role of convincing users that the new solution is an important addition to the organization, which will ultimately contribute to the betterment of each organizational member [16].

### 3 Research questions and literature review

The authors present the results of thorough review of literature about information as an important resource and about management's role in adopting and managing ICT in their companies. The authors

give different kinds of view on strategic planning of ICT in different parts of world.

Authors have established the main research question: *How do managers of Croatian companies observe information, and to what extent are they involved in the processes of informatization within their companies?* The hypothesis of this research paper is based on assumption that **managers at different managerial levels in company take care of strategic potential of ICT in a different manner, according to their position.** For that reason, *the objective of this paper is to examine how CEOs, as well as other managers within the organization observe and utilize information resources.*

Subsequently, authors present results of research conducted by the means of survey method, as well as conclusions extracted through analysis of gathered primary data.

#### 3.1 The importance of information as a resource of modern organization

Good information is essential for good management and success of business, regardless of the level of decision making. According to Kaye [15], if a company wants to prosper, it must be able to comprehend its internal system of work (business processes), but also the environment in which operates, in order to be able to adapt and react to the challenges coming from the outside. Good information improves decision making, as well as organizational efficiency and provides an opportunity to create a competitive advantage over potential competitors. There is no doubt that modern organizations operate in the increasingly competitive environment. For this reason, managers in 21st century must pay greater attention towards getting continuous information from the business environment in which the company operates, as well as towards systematic approach to processing and understanding such information resources. De Souza Dias [9], exploring the behavior of managers in 55 Brazilian companies, came to the conclusion that there are 3 key motivators for using ICT in order to obtain better information: (1) perceived usefulness, (2) perceived ease of use, (3) perceived satisfaction.

Beheshti [6] came to the conclusion that a success-

ful manager must be familiar with modern technology and information systems in order to make better business decisions on the basis of information resources. With the help of Executive Support Systems, and other information systems for decision support, executive managers are able to achieve easier access to internal and external information on which the relevant strategic decisions are made. In their research, Nord and Nord [19] came to the conclusion that more and more managers at different hierarchical levels (executive managers, middle level managers and lower level managers) use ICT when making decisions.

Computer technology has become an integral part of society, as well as every organization. Proper use of computer technology can enhance business performance, and thus initiate the reduction of organizational losses. In their study, conducted with 27 information system managers, Selart, Johansen, Holmesland, Gronhaug [23] have shown how self-conscious managers are observing information technology as an innovative resource for conducting organizational activities, but not as an element of the organizational development. The authors assume that these managers want to control all activities carried out in the company. According to research by Shi and Bennett [23], the characteristics of IT managers should be: broad business experience, focused work experience and a variety of IT skills and knowledge. A study by Chow [8], conducted on managers of Hong Kong, indicates that managers use ICT with a greater level of ethical responsibility, when compared to other elements important to the company's structure. Aaltio and Huang [1] conducted a survey in China, focusing on female IT managers, wanting to explore involvement of management in the ICT in terms of gender. In their study, they came to the conclusion that female IT managers achieve more significant achievements and are more ambitious in achieving their objectives.

When it comes to information regarding the financial operations of a company, the importance of such information rises through time, especially in those situations where decision makers use specialized software packages, as concluded by Rose [22]. The importance of ICT for a systematic approach in managing business is extremely important. Mutch [18] came to the conclusion that the use of ICT leads to more complex and sophisti-

cated information system, which provides a greater source of information in a broader context, for all managerial levels in the organization. Vehovar and Lesjak [27], through an analysis of perceptions of ICT managers, on a sample of 727 Slovenian firms, showed that investment in ICT made a significant change in the organizational structure and communication between different levels of structure, but also, that the changes enacted by investing are less pronounced in company's management. However, the larger the company, investment in ICT is of greater importance. The significant effect arising from almost every ICT investment is education of managers and employees.

### 3.2 The management's role in strategic planning of information systems (SPIS)

When examining the role of ICT within the modern organization, it is primarily important to differentiate between the terms of information systems (IS) and information and communication technologies (ICT). Long ago, before the advent of ICT, organizational leaders were establishing information systems (without the presence of ICT) for the purpose of acquiring, analysing, processing, storing and disseminating information in the organization. Thus, information systems have existed long before ICT. Today, as in the times of first appearance, information systems are the information backbones of organizations, making the information infrastructure which enables information flow in the organization, and also, the constructive use of information for purpose of gaining competitive advantages and making strategic decisions. Besides the term of information infrastructure, it is important to mention another concept (of a lower level), *technological infrastructure*, which includes the technical and technological basis of any information system.

In accordance with the identified terms, the very nature of executive management's behaviour towards ICT has largely changed throughout history. Rockart [20] found that the role of IT managers (or CIOs) changed from the original, technically oriented, to more management-oriented. To date, such managerial role of CIO has deepened even further, so managerial tools and techniques are essential knowledge for every good computer expert.

According to Doll [10], top management should participate in the creation of policy and strategy of decision-making in the field of ICT, but operational implementation of such strategies should be left to heads of management information systems (Management Information System, MIS). Doing so, heads of every MIS should be given a detailed plan for the MIS development, so that top management can get an insight into the course of project implementation, the current state, desired state and the costs required to achieve the desired state.

In survey on 20 organizations from the public and private sector in America, Lederer and Mendelow [16] found that top management often does not realize strategic importance and potential of ICT and that they must be trained to realize that strategic importance. Jarvenpaa and Ives [13] have recognized the most important terms in observing the connection between the top management and ICT projects. These authors use term of managerial support to projects of informatization, which consolidates terms of inclusion and participation of management in projects of informatization. Their research establishes models of managerial support to ICT projects, and also, establishes a link between managerial knowledge and managerial perception of ICT. Study by Basu, Hartono, Lederer and Sethia [5] seeks to determine the elements which are critical to the success of ICT projects from the perspectives of top management. The main shortcomings of the top management are recognized - diminishing the strategic importance of ICT, and insufficient education on this issue, ultimately often leads to the collapse of ICT projects. Armstrong and Sambamurthy [3], in their study from 1999, found that the intensity of the relationship between the IT manager and the rest of the top management often affects the success of ICT in the organization. Research found that top management knowledge of ICT is higher in organizations which recognize the strategic potential of ICT.

Jarvenpaa and Ives [14] go further and say that it is necessary for top management to perceive information system as a component of organizational strategy, if one wishes to use its strategic potential. Authors deal with answering to many questions from the domain of managing ICT. Some of them are the following: what are the opportunities and problems brought by ICT? How is ICT important for the fulfilment of the organizational

plans? How does managerial perception of ICT evolve over time, in different industries and organizations? In survey from 2002, Byrd and Davidson [7] found that the inclusion of the top management in computerization projects can be interpreted through the amount of funding allocated to ICT. Besides the fact that managerial support to informatization projects is one of the key factors of project success, support is also reflected in the long run, in more effective investments in ICT, enhanced quality of ICT, the progressive use of ICT in all business areas, radical ICT innovations, etc. The same authors prove the hypothesis which suggests that managerial support to ICT positively affects the entire procurement chain which company is part of.

## 4 Data collection and survey results

Data were collected through empirical research on the main research objective: to examine how CEOs, as well as other managers within the organization observe and utilize information resources. The convenience sample in the survey consisted of 60 subjects aged 27 to 61 years (average: 34 years), of which 65 % were of male gender. All respondents are (or were) students of postgraduate studies (specialist and doctoral) at the Faculty of Organization and informatics Varaždin, University of Zagreb. They work in different industries (informatics, finance, teaching, public administration, agriculture, food, oil and gas, trade, pharmaceuticals and other) and have faculty diplomas. There are certain limitations in this study, primarily related to the fact that respondents were postgraduate students. Although students, respondents were members of management in a variety of Croatian companies and public institutions.

The data collection was performed by authors of this article. It was done by a web based survey. Detail analysis of primary data collected by survey show results presented in this section. The results are also discussed in light of the current practice in Croatian companies

Most of respondents work in medium levels of

management (61.4 %), while 26.32 % of respondents work in lower levels of management. The rest is employed in high level of management (12.28 %). Almost all participants which work in high level management have impact on vision, mission and strategic goals of organizations in which they work. When we observe respondents who work in medium level of management, 55 % of them have impact on strategy documents of organizations in which they work. There is a completely different situation in lower levels of management, only 23 % of participants have impact on strategy documents of organizations in which they work, which is an expected number. These initial numbers indicate an expected general trend, which proves that managerial level has a great influence on the managers' power to influence the direction in which company is heading. In the light of ICT, this power comes forward when strategic plans (which incorporate information resources and recognize them as crucial) are created.

In 97 % of cases, technologies like internet, e-mail and office tools are used on every level of management, on a daily bases, which is not surprising considering the times in which we live in. Regarding MIS (management information system), we can observe different results: 25 % organizations do not use it at all, but 37.5 % use it on a daily base (at all levels of management). When considering only high and medium levels of management - MIS is used in 80 % of cases, on a daily base. MIS is used in 78 % of service organizations, 94 % of production organizations, 33 % of educational organizations and 38 % of public organizations.

65 % of organizations have informatics departments and 82 % of them (in total) use MIS. This result shows that informatics departments still do not exist in many domestic organizations; there is no consistent approach to ICT problems. Traditional economy defines next business resources: physical capital (land, buildings, machinery etc.), physical work and financial capital (money). New knowledge and modern technology also defines information as a relevant resource. Indeed, 97.5 % of participants observe information as a resource.

Respondents gave their opinion on importance of different resources, and the results are given in next table (participants rated each resource according to their own experience):

We saw in previous table that the most impor-

Table 1: Importance of different organizational resources (source: Authors)

Resource	Average	Rank
Capital (money)	4.07	5
People	4.65	1
Business partner	4.15	4
Material resources	3.55	6
Information	4.53	2
ICT	4.35	3

tant resources are people, information and ICT. Other resources have minor importance. It is important to stress that people are actually information creators, senders and users and this fact adds to the importance of information as a resource. It is interesting to notice that respondents put the significance of information as a resource before money or valuable partner.

Information can be divided (considering different criteria) into different groups. Importance is an interesting criterion. Is all information equally important? 59 % of participants think that all information is important, and 41 % of participants think that information can be important and unimportant. Next table shows to what extent is some kind of information used.

Table 2: Information usage statistics (source: Authors)

Information variety	% of use	Rank
Numeric data	80 %	1
Text data	70 %	2
Multimedia data	47 %	4
Instructions	53 %	3
Reviews	53 %	3
Discussions	37 %	5
Critics	30 %	6
Commercials	10 %	7

Also, sources of information can vary. Mostly used sources of information and the amounts of their usage by respondents are shown in Table 4.

Information system (information infrastructure)

Table 3: Sources of information (source: Authors)

Information source	% of use	Rank
Business news	73 %	3
E-mail	92 %	1
Newsletters	35 %	6
Financial reports	62 %	5
Publications	67 %	4
Live communication	82 %	2

cannot exist without proper technical and technological infrastructure. New technologies give many possibilities for making, using and disseminating information. The amount of information is increasing rapidly every day, so we need systems for managing these large amounts. Next, results on respondents opinions on ICT investment will be given.

49 % of participants consider that investing in ICT is necessary. In 40 % of organizations, ICT investments are mentioned in organizational strategic documents.

9 % of organization did not invest in ICT. Furthermore, 7 % of organizations invested in ICT, but investment was never returned. 14 % of organizations invested, investment was not returned, nor there was any increase of organizational productivity. 27 % of organizations invested in ICT, and the investment was returned, but without increase of productivity. Finally, 43 % of organizations which invested in ICT gained return on investment and an increase in organizational productivity. These numbers show that there is great number of respondents unsatisfied with the rate of success of ICT projects (more than half of them). In many cases, investment in ICT did not produce desired effects, which resulted in deprecation towards ICT. 51 % of respondents think that investment in ICT is a necessary cost.

Very interesting result show that in 84 % of observed organizations CIOs (IT managers) are not part of top management (Board of directors). This information is very unsatisfactory and exposes a trend: there is a possibility that IT experts are not properly appreciated, or their managerial skills are inadequate, so they do not get a chance to participate in creating strategic plans.

The last important result of survey shows that only

33 % of organizations use some kind of decision support system. This is also indicative, since good decision making is based mostly on proper information delivered by some sort of decision support system.

## 5 Conclusion and implications for further research

After completing the analysis of gathered data, it can be concluded that managers at different managerial levels in various organizations in Croatia perceive information as an important resource. Croatian managers use information resources in their daily business, and they realize the importance of proper approach to the emerging topics from the domain of ICT. The problem appears when (due to many factors) organizational IT project begin to collapse, which brings to revolt and anger towards ICT. The outcomes of IT projects within organizations define and shape managerial attitude towards ICT, which evolves over time.

Results have shown a very low CIO inclusion rate in the work of top management in organizations, which indicates next: **top managers do not need the professionalism of IT experts to manage IT problems, in which case there is huge social gap between top management and IT people in organizations, or IT experts do not have enough knowledge about processes of management, and they cannot be included in processes of strategic thinking and shaping the organizations' future.**

In either case, IT experts in Croatia are left alone in managing operational implementation of executive decisions, which are often made without proper groundwork (recognizing and describing business processes). This trend brings IT experts in an unenviable situations. While often meddling with operational implementation of ICT-concerned decisions, non-IT top managers are not limited in making unlimited requirements to IT projects, which very often leads to project failure. This conclusion is supported with the figure of just 43 % of organizations which successfully carried out ICT investment.

Concerning primary hypothesis, which assumes that managers at different managerial levels in com-

pany take care of strategic potential of ICT in a different manner, according to their position, another conclusion is relevant. Hypothesis is proven if we take into account the results of survey which indicate that almost every top manager which participated in research stated that he/she has influence on making strategic decisions from the domain of ICT. Medium and low level managers care about operational implementation of those decisions. Each managerial level is important in achieving strategic potential of ICT: only constant and firm policy on ICT can produce successful projects. Vertical organizational integration is the key for such success, since real dissemination of strategic decisions regarding ICT should be planned, coordinated and maintained.

As stated earlier in the text, respondents were post-graduate students, but also members of different levels of management in a variety of Croatian companies and public institutions. Although this study cannot be seen as an extensive research applied to every manager in domestic companies, it is reasonable to assume that these results are highly indicative. These results can be seen as a guideline for explaining the role of managers and their behaviour in the process of strategic planning and application of ICT in modern organizations. Further research will be based on exploration of the various ways of top management participation in organizational IT projects. Also, authors plan to make an extensive definition of managerial and IT skills, as well as specific knowledge, needed both for non-IT top managers and managers from the ICT domain in order for them to become more productive in the framework of modern organization.

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