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Key Issues in Information Systems Management: A Serbia's Perspective (Delphi study)

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KEY ISSUES IN INFORMATION SYSTEMS MANAGEMENT A SERBIAS PERSPECTIVE DELPHI STUDY

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I. INTRODUCTION

Our intentions are modest, and the scope for detailed analysis is limited. So do not pretend to exhaust these issues, but a text we want to provide a contribution to the study of key issues in information management systems - Delphi studies in Serbia. In this regard we have attempted, through previous research and methodology, point out the similarities and differences in management information systems (IS) between Serbia, the U.S. and other European countries. Accepting such a criterion, we imposed the need to orient our study in two directions. The first direction, Serbian compared with those key issues that are defined in previous studies (which were conducted in different countries), and were primarily related to the different times. The second line refers to a shared vision of critical an issue information system applied at different levels of the organization. Therefore, the results not related to IS staff as a whole, but data collection is limited to IS managers. Moving to the collection of data at different levels allows IS staff to examine whether the "vision" at the top IS manager associated with the perspectives of IS professionals in other organizational levels. Depending on this, the question is whether Serbia has a unique set of circumstances in compared to other countries. Bearing in mind that the Serbian economy, from the sixties suffered a lot of negative impact because the period of industrialization, and the early nineties isolation, through social and economic crisis and lack of economic development strategy long-term, stopped its social, technical and technological development. In this regard, this work tries to answer the following questions:

1. What are the ten most critical management and technical issues, and the order of importance of these issues with staff that will in Serbia to face in the next 5 years?
2. What is the consensus between the different levels of IS staff and what their significance on the key issues of IS management?
3. What is the relationship between Serbian ten critical issues in comparison with data obtained in international studies or similar during different periods?

Serbia has a continental country in the Balkans - South Eastern Europe (about 80% of the territory) and the Pannonian plain - a region of Central Europe (about 20% of the territory). In the north of the Serbian, border with Hungary to the northeast and east Romania and Bulgaria. The southern boundary with the Republic of Macedonia, while in southwest Albania, Montenegro and to the west of Croatia and Bosnia and Herzegovina. However, geographical, and climate, one part is considered in Mediterranean countries. Total length of borders with neighboring countries is 2,397 km, of which 1,717 km land and 680 km of river. Serbia since the end of First World War was the founder and integral part of a joint state with most of the Balkan South Slavic originally in the Kingdom of Serbs, Croats and Slovenes, later renamed the Kingdom of Yugoslavia. Later he was an integral part of the Socialist Federal Republic of Yugoslavia, Federal Republic of Yugoslavia and the State Union of Serbia and Montenegro. Since 2006 as a successor is, Serbia and Montenegro became a sovereign and independent state. Serbian economy was in collapse during the 1990s. In 1993, he recorded the second highest inflation in the history of economics • 1023 2.35 per cent (64% daily). Serbia introduced general sanctions the UN Security Council 1992nd. Much of the sanction lifted in 1996, 2000, 2001 and 2005, when it is fully normalized trade with the United States. Agriculture accounts for 16.6% of national GDP, industry 25.5% and service sector 57.9%.

II. PREVIOUS RESEARCH

Problems of the key issues in managing information systems, today is definitely one of the most research areas, which attracts attention with its IT

actuality thought, both in highly developed countries, and in those that are traditionally referred to as developing countries - Serbia. Dealing with the analysis of key issues in managing information systems, many

authors have also applied the Delphi method. We have deliberately called attention to this fact, to present a historical overview of major studies on the proposed topic.

Table 1 : A History of Key Issues Studies

Authors	Year of study	Country
Ball, L. & Harris, R.	1982	SAD
Martin, E.W.	1982	SAD
Dickson G.W., et al.	1984	SAD
Hartog, C. & Herbert, M.	1986	SAD
Brancheau, J.C. & Wetherbe, J.C.	1987	SAD
Rao K.V., et al.	1987	Singapore
Davenport, T. & Buday, R.	1988	Europe
Parker, T. & Idundum, M.	1988	United Kingdom
Watson, R.T.	1989	Australia
Harrison, W.L. & Farm, C.K.	1990	Taiwan
Kremar, H.O.A.	1990	Germany
Moynihan, T.	1990	Ireland
Deans P. C., et al.	1991	SAD
Zupančič, J., Leskovar, R.	1991	Slovenia
Caudle S.L., et al.	1991	SAD
Neiderman F., et al.	1991	SAD
Watson, R.T. & Brancheau, J.C.	1991	International comparison
Palvia P.C. & Palvia S. C.J.	1992	India
Badri, M.A.	1992	Gulf Coop`n Council
Clark, T.D.	1992	SAD
Doukidis G.I., et al.	1992	Greece
Pervan, G.P.	1993, 1994	Australia
Burn J., et al.	1993	Hong Kong
Dexter A.S., et al.	1993	Estonia
Wang, P. & Turban, E.	1994	Taiwan
Wrycza, S., Plata-Przechlewski, T.	1994	Poland
Galliers, R. D., et al.	1994	United Kingdom
Davis J.G., et al.	1995	New Zealand
Kim, Y.G. & Sato, O.	1995	Japan
Brancheau, J.C., et al.	1996	SAD
Deklava, S. & Zupancic, J.	1996	Slovenia
Moores, T.	1996	Hong Kong
Yang, H.L.	1996	Taiwan
Mata, F. J. & Fuerst, W.L.	1997	Costarica
Burn, J.M., Szeto C.	1998	Hong Kong
Chou, H.W. & Jou, S.B.	1999	Taiwan
Haynea, S.C. & Pollard, C.E.	2000	Canada
Gottschdk P., et al.	2000	Norwegian
Shi Y., et al.	2000	China
Berkowitz S., et al.	2001	South Africa
CSC Index	2002	World Wide
Palvia P.C., et. al	2002	International comparison
Armstrong T., et al.	2002	South Africa
Pimchangthong D., et al.	2003	Thailand
Keizer G.	2004	International comparison
Chen G., et al.	2005	China
Jerry Luftman, et al.	2005	South Africa
Dutta S., et al.	2006	International comparison
Jerry Luftman, et al.	2009	International comparison
Li D., et al.	2010	International comparison

In early eighties, the first study surveyed managers and IS managers to identify key issues in the management appeared in society for information management (SIM card) in the United States. Key issues in systems management information systems in the United States dealt with in the 1980s (Ball, L. & Harris, R., 1982, Martin, E.W. 1982, Dickson, G.W. et al., 1984, Hartog, C. & Herbert, M., 1986, Brancheau, J.C. & Wetherbe, J.C., 1987). Initially, a set of questions proposed by the Group of Experts for the SIM, and subsequently evaluated 417 members of the society. The analysis results show that the most important issues for the American organization at that time was MIS-term planning and integration, calibration MIS effectiveness and impact of communication at MIS. Later this method of collecting and reporting periodically repeated in the U.S.: Brancheau, J.C. & Wetherbe, J.C. (1987), Deans, P.C. et al. (1991), Niederman, F. et al. (1991), Caudle, S.L. et al. (1991), Brancheau, J.C. et al. (1996) and so on. Similar studies eighties carried out in several other countries, for example: Australia (Watson, R.T., 1989), United Kingdom (Parker, T. & Idundum, M., 1988), Singapore (Rao, K.V. et al., 1987) and Europe (Davenport, T. & Buday, R., 1988). Since the early nineties, the key issues in IS management dealt with other countries and regions of the world: Taiwan (Harrison, W.L. & Farm C.K., 1990, Wang, P. & Turban, E. 1994), Japan (Kim, Y.G. & Sato, O. 1995), Germany (Kremar, H.O.A., 1990), Slovenia (Zupancic, J., Leskovic, R., 1991), Estonia (Dexter, A.S., et al., 1993), Ireland (Moynihan, T. 1990), United Kingdom (Galliers, R.D. et al., 1994), Australia (Pervan, G.P., 1993.1994), New Zealand (Davis J.G. et al., 1995), Poland (Wrycza, S., Plata- Przechlewski, T., 1994), Greece (Doukidis, G.I. et al., 1992), USA (Clark, T.D., 1992, Badri, M.A., 1992).

In their study, Watson, R.T. & Brancheau, J.C. (1991) found that management information systems, depends on the degree of development and cultural environment. Meanwhile authors Deans, P.C. et al. (1991) explain the key issues in IS management and stress that depend on the political, legal, economic, cultural and technological environment in the country. In the same year (1991) in their study, Moeller, G.E.W., emphasizes that the main factors that will determine the market development of information technology (IT), German unification and the creation of Eastern Europe.

Restrictions on exports of high technology from the West built at the end of the Cold War. So Dyson, E. (1993) predicts that the development of computing - the future of the Eastern European countries, as long Kempfer, L. (1993) indicates that the fastest growth in value added in the retail business, be just in the Eastern European countries (the business is expected to expand at an annual rate of about 20%, over the next five years). Several researchers, among which mention Angus, J. (1990), Hotopf, M., 1992, Saunier, F., et al, 1993, note that the increased computer sales in Eastern Europe,

the collapse of the centralized economy, produce a great demand for computer systems, and possibly because the technological infrastructure was severely neglected and all that is happening in Europe is obviously important for hightech vehicles from the west and the IT industry in general. Therefore, Dyson (1993) identifies two groups for the development of IT. In the first group of states: Slovenia, Hungary, the Czech Republic and Poland, and another one: the Baltic republics, Romania, Ukraine, Russia and other countries - the Commonwealth of Independent States, which have promising conditions for the development of IT.

The last two decades have witnessed tremendous success of information technology (IT), who are deeply change the way companies run their business. Information systems (IS) departments of organizations today face many challenges in a rapidly changing environment, from which it follows that it is important to answer all the challenges of managing IS (Niederman, F. et al, 1991).

Key issues in systems management information systems, dealt with during the nineties and later in many countries: Canada (Haynea, S.C. & Pollard, C.E., 2000), India (Palvia, P.C. & Palvia, S.C.J., 1992), Central America (Mata, F.J. & Fuerst, W.L., 1997), Thailand (Pimchangthong, D. et al., 2003), Slovenia (Dekleva, S. & Zupancic, J., 1996), Hong Kong (Burn, J. et al., 1993, Moores, T., 1996, Burn, J.M., Szeto C., 1998), North Africa (Berkowitz S., et al ., 2001, Jerry Luftman, et al., 2005), Taiwan (Chou , H.W. & Jou, S.B., 1999, Yang, H.L., 1996). Thus, computer science Corporation (CSC) began to research the key issues in IS management systems in enterprises worldwide. In the period since 1987 the 2001 survey which referred to the key issues for IS management have been implemented 14 times, so rich in historical data accumulated, i.e. revealed some new trends in IS (CSC, 2002). Other investigators have compared the results of the above studies in different countries of the world and regions, seeking to identify and explain regional similarities and differences between them (Palvia P.C. et. al, 2002, Keizer G., 2004, Dutta S. et al., 2006, Jerry Luftman, et al., 2009, Lee D. et al., 2010). Thus, Watson, R.T. and associates (1991, 1997) points out that in both studies the key IS management issues affecting the four dominant factors: the economic structure, national culture, political / legal environment and technological status. On the other hand, Gottschalk, P. (2000) states that the key issues for the management of IS generally defined as a set of major challenges faced by IS managers in the next 3 to 5 years, which deserve the most resources, time and attention of management. The same allegations confirmed by Shi, Y. et al., (2000) and Chen G. et al., (2005) and related to the management of Chinese enterprises. However, during the nineties, the focus of IS managers has changed significantly, i.e. Right now the focus is on rapid development and construction of IT.

And that's number one issue at the beginning and middle of the 1990s, by analyzing Niederman, F. et al. (1991) in his book "The development of information architecture" and Brancheau, J.C. et al., (1996) in "Building IT infrastructure." However, the importance of computer issues, such as training of end users and IT satisfaction decreases dramatically. That is to say that facilitate organizational learning and the use of IT ranked number five in 1991 and 1996, but it turns out the Top 10 - the key IS management issues. Not only is the IS strategic planning, is no longer the number one issue in rank, but the number three on the list Niederman, F. et al. (1991), Brancheau, J.C. et al. (1996) and number nine on the list Brancheau, Janz and Wetherbe's (1987). Importance of the issue -proof of competitive advantage, falling to number two (Brancheau, JC & Wetherbe, J.C., 1987) to number eight on the list of key IS management issues (Niederman, F. et al. 1991). Above, by the fact that the IT industry in the United States, now more mature and the position of IS departments within the organization greatly strengthened. One interesting development in the early nineties of last century proceeded from the importance of the issue IS employees, recruitment, training and retention. Employment and Human Resources Development IS was ranked as number four in the early 1990s (Niederman, F. et al. 1991), but was completely knocked out of the top 20 key issues of IS management, several years later (Brancheau, J.C. et al. 1996).

III. METHODOLOGY

a) *Delphi method*

Delphi method used for organizing and prioritizing collective judgments and group means iteratively capture the same group (Scala, S., McGrath R., 1993, de Haan, J., Peters, R., 1993, Doke E.R., Swanson N.E., 1995). The starting point is the method of defining the problem for which the forecast. After is defining the problem, a group of experts who will participate in the forecasting. It is clear that the prerequisite conditions of choice of most competent experts in the subject area, those who know best studied phenomenon. Contacts with experts conducted through a series of questionnaires. Through the questionnaire, they asked a variety of information and forecasts, with the anonymity of the experts and forecasts obtained guaranteed.

The first series of questionnaires provided to the experts included the necessary information, and will ask to give their prognosis, which must supported by appropriate arguments. Based on the obtained forecasts, access to and forming a list of questions that are important for proper research.

In the second series of questionnaires that are sent to experts calculated the average forecast that represent the average of individual forecasts, as well as

the variation around the mean forecast of forecast accuracy is a measure, calculated average forecast, forecast and measure the accuracy of their forecasts of extreme reasons. Since experts then asked to reconsider their initial prognosis, do the possible corrections and submit their opinions about extreme forecasts together with the appropriate arguments. This process is done in several steps - usually four, and the final forecast is obtained as the mean forecast from the latest series of questionnaires.

The advantage of Delphi method is that the common forecast gets organized, systematic harmonization of individual forecasts and the addition of quality, can obtained, and quantitative indicators predicted phenomena. Lack of Delphi method is unable to determine the optimal size of groups of experts. In fact, it seems that a large group of experts to enhance accuracy of predictions. However, it is very difficult to assemble large enough for a competent group of experts to study the phenomenon, so that a large group usually contains a small number of true experts, specialist the studied phenomenon. Delphi technique used in a series of studies in the United States is particularly suitable to explain the key issues in systems management information systems. In this way comparable, to accumulate information and knowledge of IS practices and regional differences can be determined. This study is a repetition of American Studies, but carried out in Serbia.

b) *Method of research and data collection*

Our study conducted in 2009 and 2010. With the help of the Commercial Register of the Republic of Serbia and the Statistical Yearbook of the Republic of Serbia elected a mailing list from Serbian 360 industrial, commercial and service organizations with more than 300 employees. Greater political and economic changes started in Serbia, a dynamic enterprise restructuring and adjustment to a new situation practically narrowed the market for the former Yugoslavia Serbian exporters, many organizations forced to reduce, close, or to compete in new markets restructuring. Although outdated, the best mailing list is available at this time.

In our study, companies has classified into six main sectors: business groups, IT and electronic sectors, traditional manufacturers, commerce, trade and services and agriculture. Distribution of our sample shown in Table 2 Traditional manufacturers make up a large part in our sample. This is consistent with the percentage of production among all Serbian companies, which is about 40%.

Table 2 : Sample distribution

Sector	Number	Percentage
Business Groups	45	12,6
IT and electronics	14	3,8
Traditional manufacturers	143	39,7
Commerce and trade	62	17,2
Service	78	21,7
Agriculture	15	4,2
Others	3	0,8
Total	360	100%

Table 3 shows the organizational position of respondents. It is not surprising given that almost two-thirds of the top executives or managers, because research sent to their address.

Table 3 : Position of respondents in IS unit

Position of respondents in IS unit	Number	Percentage
Top IS executive	101	64,3
IS department manager	27	17,2
Group leader	7	4,5
Systems analyst or programmer	10	6,4
Other	12	7,6
Total	157	100

Critical Issues

Round one: Addresses of 360 major Serbian organizations used to send in the first round of questionnaires IS managers. Managers were required to include five to ten questions that they thought it would be the most important period of three to five years in the future, and to state the reasons for their choice. One hundred and fifty-seven respondents provided the 784 questions, and about 5 statements per participant. Achieved a response rate of approximately 44% and therefore considered good.

Round two: the first round responses analyzed and suggested questions classified according to the scheme used by Niederman et al. (1991). All questions proposed at least five persons were involved, resulting in a list of 49 different issues (Table 4). The analysis performed independently by the author.

List of key issues in IS management Serbia was applied to the second round questionnaire. Space allows participants to add new concerns at that time. Since each respondent was asked to rate the following questions using a scale from one (unimportant) to 10 (most important) and to propose changes in the text. In the second round, questionnaires sent to IS managers from 360 organizations starting in February 2010. One hundred and seventy-eight respondents answered the rate of 49.5%.

Table 4 : Candidate issue list

No.	Issue
1.	The status and power of person in charge of IS departments in enterprises
2.	Organizational mechanism to manage the company IS department
3.	Internal managerial and organizational level of IS department
4.	The quality of input data
5.	Support and introduction of high-level IT managers (top management support)
6.	Support for mid-level managers
7.	The ability to use computers that do not belong to the staff IS department
8.	Technology competence of employees in the IS departments
9.	Application of advanced IT in enterprises
10.	Data Security
11.	Consistency of IT policy
12.	Assessing the effectiveness of information systems
13.	Inadequate understanding of IS managers and other users and their lack of involvement in the development of IS
14.	Education IS professionals (higher education of the head of MIS)
15.	Improving IS strategic planning
16.	Management information system function
17.	Organizational problems
18.	Education IS users (continuous training and education of staff MIS)
19.	Integration of subsystems into a comprehensive information architecture (system integration)
20.	Telecommunications infrastructure and its links with the world
21.	Executive IS
22.	National standards and ISO standards compliant IS
23.	Electronic Data Interchange (EDI) - electronic development strategy
24.	The use of integrated IS development methodology (methodology development)
25.	Using modern tools for the development of IS (Development tools)
26.	Choice of equipment
27.	The stability of national regulations
28.	Implementation of relational database
29.	Use of external databases
30.	Improving the productivity of IS development
31.	Evaluation and improvement of existing IS
32.	Legal protection
33.	Financial investments in IS
34.	Replacement of the mainframe to a PC and LAN
35.	Limited supply of quality products and services
36.	IS effectiveness and measurement
37.	IS cost control
38.	Establishing a national professional association for IS
39.	Development of an appropriate IT infrastructure
40.	Facilitating and managing business process redesign
41.	Development and management of distributed systems
42.	Improving the efficiency of software development
43.	Communication between the IS department and end users
44.	IS used for competitive advantage (competitive advantage)
45.	Improving information security and control
46.	Meeting the needs of users
47.	Planning and managing communication networks
48.	Optimizing the efficiency of the organization
49.	Recruiting and developing IS human resources (human resources / personnel MIS)

Round three: one hundred and fifty-eight organizations that have not responded to the first and second round questionnaires dropped from the study. The third round questionnaire sent in June of 2010 the remaining 202 participants. They again asked to evaluate problems and provide explanations for the low and high rates when their responses differed by three or more points (on a scale of ten points) in the second round group questionnaire. One hundred and thirty-nine Serbian IS managers responded, a rate of 68.8%.

Round four: a compilation of explanations for the discrepancies related to the fourth round of questionnaires, which sent to the remaining 202 participants in September 2010. They asked to read the reasons for disagreement and the exchange rate issue again. In this round 161 participants responded, a rate of 79.7%.

IV. RESULTS

Critical management issues in information systems IS managers Serbian for the period 2009 to 2010 are shown in Table 5. The significance of all 10 questions was assessed with a score greater than seven, on a scale of ten points, so everything that is considered extremely important issues. In theory, the Delphi technique is gradually increasing consensus on key issues after several rounds of interviewing. The table below shows that consensus increased from the second to fourth rounds of interviewing. Standard deviation are increase from the second to the third round for only 1 out of 50 questions, and the third to the fourth round of the three different questions.

The ten most critical issues (after round four), which led the Serbian IS staff and what is expected to face over the next 5 years with their ranking and standard deviation are shown in Table 5, while the detailed analysis presented in Appendix A.

Table 5 : Key IS Management Issues in Serbia

Ranking	Mean	Standard Deviation	Issues *	Issue classification			
				M/T	P/C	I/E	Group
1.	8,40	2,86	IS cost control	M	C	I	BR
2.	8,09	2,93	Using modern tools for the development of IS (Development tools)	T	C	I	TI
3.	8,07	2,13	Management information system function	M	C	I	IE
4.	7,86	2,26	Improving IS strategic planning	M	P	E	BR
5.	7,83	2,64	Financial investments in IS	M	P	E	BR
6.	7,79	2,83	Education IS users (continuous training and education of staff MIS)	M	C	E	BR
7.	7,66	2,14	Organizational problems	M	C	E	BR
8.	7,63	2,37	Development of an appropriate IT infrastructure	T	C	I	TI
9.	7,36	2,93	Inadequate understanding of IS managers and other users and their lack of involvement in the development of IS	M	P	I	BR
10.	7,30	2,40	Education IS professionals (higher education of the head of MIS)	M	C	I	IE

* Issues classification (Niederman et al., 1991): M- management; T - technology; P - planning; C- control; I - internal to IS organization; E - external; Group: business relationship (BR); technology infrastructure (TI); internal effectiveness (IE); or technology application (TA);

a) Top ten issues

Each of the ten highest ranked key issues provides insight into the key issue and its relation to other matters. The most critical issues have proved to be a combination of technology management issues, strategic issues management, development of IT technology and training issues on computers of end users and managers. This shows the need to balance business, technical and human skills. Non-critical issues mainly related to the development of individual technologies must integrate to be able to provide the appropriate IT infrastructure.

i. IS cost control

Survey participants reported that IS cost control must be planned long-term costs because in many cases an obstacle to further development of information

systems. They find that managers must have a more active role in planning and control of IS costs and the inadequate participation of users. This question is put in the first place because at the time of research the economic situation in Serbia is very unstable, while the political, social and economic changes in the subjects and therefore do not have much confidence in the IS cost control word present corruption in all spheres of society.

ii. Using modern tools for the development of IS (Development tools)

Most respondents believe that one of the most important questions the use of modern development tools that enable IS: improving the efficiency of software development (reducing the backlog by developing new methods and platforms), the selection and integration of

application software (which can reduce costs and increase productivity, but can lead to integration and maintenance problems), making efficient use of data resources (databases through appropriate technology and evaluate the data as a corporate asset), the management of existing legacy applications portfolio (which may affect the integration of new technologies and the transition to the new operational environment), development and management of distributed systems (where the client-server environment provides consistency of software problems and data, as well as challenges in project management), improving information security and control, planning and portfolio management applications and the planning and use of CASE technology (in order to reach a more efficient support the process of developing the system).

iii. *Management information system function*

Respondents suggest that the IS function should manage and organize as well as other business functions. This includes short-term planning, working in teams, motivating staff, project management, implementation methodology, quality control, planning, customer support, etc. Responses suggest that management education and practice, ARE professionals are not even close to the desired level.

iv. *Improving IS strategic planning*

The volunteers were told that the important information management tool and therefore must be identified and planned for the long term. It is necessary to improve the strategic planning of information systems. Several respondents believed that there was no general business associate for strategic planning and this situation identified with a lack of national long-term strategy. It should note that the economic situation in Serbia is very unstable at the time of research, and that political, social and economic changes are underway.

v. *Financial investments in IS*

Respondents suggested that Serbia is a country in which very little is invested in IS during the past decades. The average investment in IS are necessary to increase and define the levels of financial investment because the speed of adoption of IT in the world among industries such as retail, banking, e-commerce, telecommunications and e-Government accelerated in recent years.

vi. *Education IS users (continuous training and education of staff MIS)*

Respondents state that managers and other users need to be better understanding the role of information services. They need to make an informed decision on strategic goals and investment, to better determine the conditions, follow world trends and to make information technology more efficient. It believed that managers should also learn how to improve management practices because of the power of

information technology. Most respondents believe that we need continuous training and education of staff MIS. A small number of respondents felt that users should be computer literate.

vii. *Organizational problems*

Most respondents stated that the appropriate organization structure, business process management, functions, and their stability are the essential foundation for the development of effective IS. Because the state of transition and instability this opinion is reflected as the historical neglect of issues such as organizational, information technology and management. They replied that the road and see it as something independently and in parallel with other business systems rather than as an integral part of them. Respondents suggest that critical business functions should properly positioned in the organizational structure.

viii. *Development of an appropriate IT infrastructure*

In developed countries, the construction of IT infrastructure is vital because of the changing needs of business organizations. IT infrastructure is an issue that is a combination of technological platform development, integration, custom, designed and packaged application software, as well as the rigidity of existing applications. Many leading IS organizations gradually realize that building an IT infrastructure that will support existing business applications is a key factor for long-term productivity of companies.

Respondents stated that building the appropriate IT infrastructure to: improve data integrity and quality assurance (to overcome inconsistencies between different sources of data and lack of control in the IS and user departments), the development and management of Electronic Data Interchange (to provide electronic communication with customers and suppliers), planning and integration of multi-vendor open systems technologies (in the face of a variety of operating environments and unstable conditions), the integration of data processing, office automation and telecommunications, data management and storage of documents, planning and management of networks, implementation and management of co-operation support systems (to help teams in sharing information and improve their efficiency) and the establishment of an effective Disaster Recovery options (in order to prevent risks and potential loss of business).

ix. *Inadequate understanding of IS managers and other users and their lack of involvement in the development of IS*

Subjects told that there is a general lack of understanding of relationship of strategic planning, control and growth companies. They find that managers play a more active role in planning and participation in the definition of user requirements is inadequate. Many people thought it was because of the lack of which relate to education and knowledge of IS users. One

participant explained that this gap has its roots in the previous economic system that ignores market competition and that it is necessary include IS users in their development.

x. *Education IS professionals (higher education of the head of MIS)*

The respondents were convinced that the future of IS as a discipline depends on the existence of highly skilled "professionals". They stressed the importance of universities and research institutions, and practices in the industry. While many participants were convinced that the most abundant of the seminar offered a very inefficient, few argued that there are opportunities for education, but are not enforced. A small number of respondents is of the opinion that it is not such a problem of inadequate education about IS professionals but lack of sophistication of IS users.

Non-critical issues

Matters that are rated and ranked ten least critical are shown in Table 6 From Table 6 shows that the difference of average values of the last ten issues are extremely small and amounts to 0.28 (between 40 to 49 questions). Five of the ten least critical issues related to information technologies, their implementation and consistency of its implementation (implementation of advanced IT in enterprises, use of external databases, data security, quality of input data, the consistency of IT policies), four related to human resources (internal managerial and organizational level of IS departments, support and introduction of high-level IT managers, support mid-level managers, status and power of person in charge of IS departments in companies) and one relating to the telecommunications infrastructure of Serbia and its links with the world. These results indicate that there is a problem of developing knowledge and understanding of IT in organizations.

Table 6 : The Ten Least

Ranking	Mean	Standard Deviation	Issues
40	4,29	2,36	Internal managerial and organizational level of IS department
41	4,27	2,42	Telecommunications infrastructure and its links with the world
42	4,27	2,37	Support and introduction of high-level IT managers (top management support)
43	4,25	2,44	Support for mid-level managers
44	4,12	2,46	Use of external databases
45	4,22	2,47	Application of advanced IT in enterprises
46	4,09	2,48	Data Security
47	4,09	2,80	The status and power of person in charge of IS departments in enterprises
48	4,01	2,48	Consistency of IT policy
49	4,01	2,57	The quality of input data

V. COMPARISON WITH RESULTS OBTAINED IN OTHER COUNTRIES

In order to compare the results obtained in Serbia with those of similar studies in the U.S. and other countries, the questions classified using the scheme Niederman et al. The classification scheme is give in Table 7. Significant differences can observed only if we make a comparison of all these studies as is done in Table 8 and show all the available key issues in different countries. It should noted that the displayed key IS management issues in different European and non-European countries, in different time intervals to determine at what level is a key issue in Serbia today are.

Table 7 : Key issues in Information Systems Management in other countries in different times

Rank	USA (1996) ^a	North America (2001) ^b	Slovenia (1996) ^c	Taiwan (1996) ^d	South Africa (2007) ^e	India (1992) ^f	Ireland (2001) ^g	Canada (2000) ⁱ	China (2005) ^j	Australia (2001) ^k	Hong Kong SAR (2004)	Norway (2001) ^m
1.	Development of an appropriate IT infrastructure	Optimization of enterprise - wide IS Services	Inadequate understanding of IS managers and other users	Communication between the IS department and end users	Improving information security and control	Understanding / awareness of the contribution of MIS	IS effectiveness and measurement	Development of an appropriate IT infrastructure	Top management support	Organizing and using data	Harmonization of IS and corporate goals (goal alignment)	Alignment with organizations within the company
2.	Facilitating business process redesign	Protecting and securing information systems	Education IS professionals	Top management support	Development of an appropriate IT infrastructure	Recruiting and developing IS human resources	Improving IS strategic planning	Improving IS project management in practice	Technology competence of employees in the IS departments	Optimization of enterprise - wide IS Services	Development of an appropriate IT infrastructure	IS used for competitive advantage (competitive advantage)
3.	Development and management of distributed systems	Harmonization of IS and corporate goals (goal alignment)	Improving IS strategic planning	Improving IS strategic planning	IT value management	The quality of input data	Service Delivery	Planning and managing communication networks	Internal managerial and organizational level of IS department	Connecting electronically with customers, suppliers and / or partners	Efficient use of data resources	Improving IS strategic planning
4.	Development and implementation of information architecture	Organizing and using data	Management information system function	IS used for competitive advantage (competitive advantage)	Service Delivery	Higher education of the head of MIS	Data Security	Improving the efficiency of software development	Support for mid-level managers	Harmonization of IS and corporate goals (goal alignment)	Improving IS strategic planning	Development and implementation of information architecture
5.	Planning and managing communication networks	Optimizing the efficiency of the organization	Organizational problems	Harmonization of IS and corporate goals (goal alignment)	Improving IS strategic planning	User friendliness of systems	Recruiting and developing IS human resources	Alignment with organizations within the company	Education IS users	Running cross-functional information systems	Improving the efficiency of software development	Development of an appropriate IT infrastructure
6.	Improving the efficiency of software development	Connecting electronically with customers, suppliers, and / or partners	Education IS users	Computerization of routine work	Disaster recovery	Continuous training and education of staff MIS	Efficient use of data resources	Dealing with the degree and rate of technological change	Consistency of IT policy	Protecting and securing information systems	Improving information security and control	Recruiting and developing IS human resources
7.	Efficient use of data resources	Running cross-functional information systems	Integration of subsystems into a comprehensive information architecture	Development of an appropriate IT infrastructure	IS used for competitive advantage (competitive advantage)	Software Maintenance	Alignment with organizations within the company	Development and implementation of information architecture	Financial investments in IS	Optimizing the efficiency of the organization	Development and implementation of information architecture	Improving the efficiency of software development
8.	Recruiting and developing IS human resources	Implementation of business transformation initiatives	Telecommunications infrastructure and its links with the world	Integration of subsystems into a comprehensive information architecture	Alignment with organizations within the company	The standards in hardware and software	Organizational learning	IS used for competitive advantage (competitive advantage)	Assessing the effectiveness of information systems	Integrating systems to the Internet	Alignment with organizations within the company	IS effectiveness and measurement
9.	Alignment with organizations within the company	Updating obsolete systems	Executive IS	Improving the efficiency of software development	Efficient use of data resources	Data Security	Development of an appropriate IT infrastructure	Facilitating and managing business process redesign	Application of advanced IT in enterprises	Electronic development strategy	Planning and managing communication networks	Organizational learning
10.	Improving IS strategic planning	Integrating systems to the Internet	National standards and ISO standards compliant IS	User friendliness of systems	Development and implementation of information architecture	The availability of packaged software applications	IS used for competitive advantage (competitive advantage)	Development and management of distributed systems	Organizational mechanism to manage the company IS department	Implementation of business transformation initiatives	IS effectiveness and measurement	Efficient use of data resources

Current issues	Issue rank by year and country											
	India	SAD	Slovenia	Taiwan	Canada	North America	Ireland	Australia	Norway	Hong Kong SAR	China	South Africa
2011 Rank	1992 Rank	1996 Rank	1996 Rank	1996 Rank	2000 Rank	2001 Rank	2001 Rank	2001 Rank	2001 Rank	2004 Rank	2005 Rank	2007 Rank
1												
2												
3			4									
4		10	3	3			2		3	4		5
5											7	
6	6		6								5	
7			5									
8	1			7	1		9		5	2		2
9			1									
10	4		2									
11			10									
12										6		1
13												
14												
15		6		9	4				7	5		
16												
17		2			9							
18		3			10							
19												
20												
21				4	8		10		2			7
22				1								
23						5						
24		5			3					9		
25												
26												
27												
28	2	8					1		8	10		
29												
30											9	
31												8
32			9									
33			7	8								
34												10
35												
36												2
37												
38												
39												
40												3

VI. DISCUSSION AND IMPLICATIONS

The results of this study are not surprising. Key issues in IS management in Serbia is in many ways different from other countries and the United States. These results are probably largely consistent with the other democracies of Eastern Europe, and especially the Balkans, which are at a similar stage of development.

IS cost control (# 1), the use of modern tools for the development of IS (# 2), IS management issues (# 3), financial investments in IS (# 5), organizational problems (# 7) and inadequate understanding of IS managers and other users and their lack of involvement in the development of IS (# 9) top the list, while the Serbian compared with other countries it does not belong to the key IS management issues except Slovenia, where the issue of management information systems ranked as the fourth issue of importance organizational problems were ranked Even as a fifth on the list as the first Slovenian issue is the question of inadequate understanding of IS managers and other users and their lack of involvement in the development of IS. The reason that the first three key issues to be ranked this way can be found in the fact that the Serbian economy was in collapse during the nineties, in 1993 recorded the second largest economy in the history of inflation (2.35 percent • 1023 (64% per day)) Serbia and introduced the general sanctions of the Security Council 1992nd The development of computer technology in Serbia is the last two decades was in decline and one of the reasons is that the U.S. imposed an embargo on the sale of computer technology in the former Yugoslavia. Many projects that require the use of modern tools for IS development are hampered by the lack of expertise and limited financial resources. The overlap of key issues with Slovenia can be found in the fact that she was an integral part of the former Yugoslavia, but it must be borne in mind that the research carried out in Slovenia in 1996 and is today Slovenia has made great economic growth and consequently the survey carried out today, it is certain that the key IS management issues differ greatly. Even a question on the Slovenian list of key issues among the non-critical issues listed on the Serbian and telecommunications infrastructure and its relationship with the world (# 41), while other issues are on the list of key issues in Serbia are just different ranks.

The issue of education of IS professionals (higher education leaders about MIS) (# 10) is on the list of key IS management issues in India as the fourth-ranked and Slovenia ranked second, while the education of IS users (continuous training and education of staff MIS) (# 6) overlaps with India and Slovenia as the sixth-ranked. However, five key issues in IS management have ranked India among the key issues in Serbia can be seen from Table 8 Studies in India have also done so far in 1992 we believe it is now the key IS

management issues in India far more varied. The only question is information system's education emerges, as the fifth ranked China as the improvement of strategic planning ranked as the seventh, and other critical IS management issues in China are on the list of 49 questions received in Serbia can seen in Table 8 where research is carried out in 2005. The reason for this can found in the fact that more and more IT skills are becoming necessary for ordinary employees and training has become significant. Meanwhile, although the education system in China has produced a lot more IT professionals than ever before, IT training other staff remains relatively low and therefore this question is in fifth place. The issue of improving the strategic planning of IS (# 4) overlaps with research in other countries and it ranks as a 3-in Taiwan and Norway, four ranking in Ireland and Hong Kong, 5 ranks in North Africa, except in India, Canada, Australia and North America where it is not among the top ten key management issues in IS. Rapid changes of business environment, developing new technologies, IT training and human resource needs of developing and maintaining information systems requires technical director to focus on IS strategy alignment with its strategic business enterprise. Development of an appropriate IT infrastructure (# 8) is also an issue that is among the top ten key IS management issues in other countries and as a first in Canada (4 key issues in Canada are not ranked on the list of the Serbia - Table 8), second in North Africa and Hong Kong (6 key issues are not ranked in North Africa, 3 in Hong Kong - Table 8), fifth in Norway (4 key issues in Norway are not ranked on the list of the Serbia - Table 8), seventh in Taiwan-in (3 key issues are not ranked on the list in Serbia - Table 8). In India, North America, Australia, Slovenia and the issue is not among the top ten key management issues in IS. This question has traditionally been very important in most countries. An efficient IT infrastructure is still lacking in many organizations. In many companies, the infrastructure of various types of hardware, databases, mission-critical applications are varied and uncoordinated, have different operating system platforms, and integrate them into a highly productive network is a difficult task. Different computing needs, building massive networks, and harmonization of IS functions with business functions to make building a solid infrastructure of a complex problem.

Only a matter of optimizing the efficiency of the organization (# 5) considered a key in North America and Australia where they are located on the fifth and seventh in the key ARE management issues. The issue of e-Strategy is a key issue and is in ninth place in Australia while in Serbia on 30 places. Other key management issues in IS in North America and Australia were not ranked in the Serbian list of key issues, which shows that important issues depend on the level of economic development, culture and political life of a

country. This stems from the fact that some issues related to high-quality services that are abundant in North America and Australia are, of course, scarce in Serbia. The same is the case with the national IT infrastructure such as communications, supply products and external databases. Lack of managerial skills demonstrates the importance of key issues such as choice of product, productivity, and change and project management. In other words, some of the key management issues Serbian IS reflect the past neglect. One consequence is a lack of knowledge and skills, because of limited education. Research in the United States, which was conducted in 1996 shows that there are two key IS management issues that are among the top ten key issues in Serbia and to improve strategic planning as the tenth issue of the construction of appropriate IT infrastructure ranked as the first question but also on the other hand there are three issues that are not ranked and is not on the Serbian list of key issues and are located in the U.S. can be seen in Table 8.

The list of key management issues Serbian IS missing issues such as development and implementation of information architecture, optimization of enterprise-wide IS services, protection and security of information systems, harmonization of IS and corporate goals (goal alignment), organizing and using information, electronically connecting with customers, suppliers and / or partners, launch cross-functional information system, implementation of business transformation initiatives, updating obsolete systems and so on. Understand key issues in IS management in Serbia should help the Serbian and other Eastern European and Balkan leaders on what needs to focus and direct their attention. Domestic producers of IS technologies and services can benefit, as research shows the necessity of these products and services.

VII. CONCLUSION

This study represents the first research on key issues of IS management in Serbia. We investigated the key issues in IS management based on data collected from 360 Serbian companies. We got the ranking key IS management issues in Serbia and compare them with results of previous studies in other countries. Key issues in IS management Serbia differ from those in the U.S. and other countries. Our analysis suggests that three key issues in Serbia are not in most cases the top three issues in other countries, mainly due to centralized decision-making mechanism, management style, and less experience with IT / IS applications.

These findings are likely to large overlap with other Eastern European democracies, especially in Macedonia, Montenegro, Albania, Croatia, at a similar stage of development. It is also evident that there are interesting differences between the perceptions of key IS management issues, and lower level management.

Understanding these questions may provide more Serbian executive directors, as well as guidance on current and long-term goals of business practice. The importance of this study can significantly improved by increasing the motivation of participants and adoption of Delphi method. Though the nature of the research studies generally, this study represents the first step toward determining the critical issues in Serbia and IS management team issues.

There are several limitations to this study. First, this study uses the Delphi research method. The advantage of the Delphi method to get a list of questions companies through several rounds of research administration. This method requires entities wishing to participate in the study. This condition cannot exist in the current study. There is a lack of motivation to participate in the study. Many participants do not want to participate in the second or three round of research. Another limitation is that the results apply to randomly selected companies. About 72% of respondents were from large companies. This example may not be a representative sample of the population.

A third limitation is that the importance of the business environment should be determined by the situation with which the individual, i.e. executives face, not to determine the statistical average (Niederman, Brancheau and Wetherbe, 1991). Therefore, the interpretation of these results needs to be careful. The data suggest that IS managers around the world, have to pay more attention to software development and application of IT technologies. In addition, developing countries should pay attention to the development of telecommunications infrastructure. Collecting and analyzing data on key IS management issues in different regions and their comparison we concluded that the key management issues priority IS vary with the level of economic and economic development of countries.

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