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# KEY ISSUES IN INFORMATION SYSTEMS MANAGEMENT: A DELPHI STUDY IN SLOVENIA

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## ABSTRACT

Formerly one of the Yugoslav republics, Slovenia declared its independence in June 1991. Together with Hungary, the Czech Republic, and Poland, Slovenia forms the group of leading IS technology markets among the new democracies in Central and Eastern Europe. The Delphi technique was used to compile a list of the key issues in information systems (IS) management in Slovenia, to quantify them, and, through iterations, to strengthen the consensus about their importance. The results are presented and compared with results obtained in similar studies in the USA. The findings indicate profound differences in IS management issues between Slovenia and the USA and are believed to be largely applicable to other new Central and Eastern European democracies.

## 1. INTRODUCTION

Major issues in IS management have been investigated in the USA every three years since 1980 (Ball and Harris 1982; Dickson et al. 1984; Brancheau and Wetherbe 1987; Niederman, Brancheau and Wetherbe 1991). Similar investigations were carried out in several other countries, for example in Australia (Watson 1989), Taiwan (Harrison and Farn 1989), Germany (Krcmar 1990), and Slovenia (Zupančič and Leskovar 1991). Watson and Brancheau (1991) compared the results of some of these studies. Their findings show that important IS management issues depend on the level of development and cultural environment, and that they also evolve over time. In other words, the evidence suggests that the understanding of a particular information technology market is not applicable globally.

The developments in Central and Eastern European countries seem to be of a particular interest to the information technology community. According to Moeller (1991), German unification and the opening up of Eastern Europe is one of the three major factors that will determine the development of the information technology market in the 1990s. Restrictions on the export of Western high technology have been lifted after the end of the Cold War, and Dyson (1993) just proposed that the future of computing is

in Eastern Europe. Kempfer (1993) predicts that the fastest growth of the value-added retail business will be in Eastern Europe, which is set to expand at an annual rate of approximately 20% during the next five years. Several observers (Angus 1990; Hotopf 1992; Saunier et al. 1993) report burgeoning information technology sales in Eastern Europe where the collapse of centralized economies has produced a huge demand for computer power and where the technological infrastructure has been severely neglected. Central and Eastern Europe are apparently very important for Western high technology vendors and for the information technology industry in general. Past studies suggest that the IS practices used in the USA and other developed countries should not be blindly transferred to this vast area.

Although the key issues in IS management were investigated in several countries including Slovenia, as mentioned before, a variety of research methodologies was used, making the comparisons of their findings rather difficult. In the previous study in Slovenia, the investigation of key issues in IS management was only one of several studied topics, the sample was relatively small (twenty-nine responses with response rate of 28%), and the participants were asked to rate a predetermined set of issues. The Delphi technique, used in a sequence of the USA studies, appears particularly appropriate for such investigation.

Brancheau and Watson recommend that future national studies adopt the Delphi format consistent with the USA studies. This way, knowledge about IS practices worldwide and understanding of the nature and extent of regional differences can begin to accumulate. This study is essentially a repetition of the USA studies performed in Slovenia.

Formerly one of the Yugoslav republics, Slovenia declared its independence in June 1991. The Yugoslav army retreated after a brief war. Slovenia, a small country of about the same size as Israel and with a population of about 2 million, has since been militarily quiet and economically relatively stable; it has been recognized by the world community as a separate country. Despite central control and a failed ideology, Slovenia has nonetheless managed to develop a respectable level of IS culture and industry. One of the reasons for this was the fact that the USA had not imposed an embargo on the sales of computer technology to former Yugoslavia because it has never been a member of the Warsaw pact. Citizens of former Yugoslavia were also free to travel abroad and to subscribe to western professional, technical, and academic journals.

Dyson identified two groups of Central and Eastern European countries. She categorized Slovenia with Hungary, the Czech Republic, and Poland into the group of four leading countries and found that the situation in other countries, such as the Baltic Republics, Romania, Ukraine, Russia, and the other countries of the Commonwealth of Independent States, was less cheerful. The results of the study reported here are believed to be indicative for the countries from the leading group. The results are also likely showing the path other Eastern European countries with similar recent histories will follow in the near future.

## **2. METHODOLOGY**

The Delphi technique is well suited for this investigation. It is a methodology for organizing and prioritizing the collective judgments of the polled group and is an excellent way to seek inputs on what may be causes or effects in problem solution (Orlich 1978, p. 109). It can be used to study a broad question and might focus upon problems (Delbecq, Van de Ven, and Gustafson 1975, p. 83). Additionally, this technique is valuable in surfacing new issues and driving participants toward consensus.

### **2.1 Delphi Technique**

The Delphi technique involves iterative surveying of the same group. The initial procedure is to prepare, distribute,

and synthesize a series of problem statements for evaluation. Participants receive feedback in the form of their previous responses and the data for the entire group with each succeeding surveying round. This iterative surveying enables the participants to reaffirm original opinions, modify some, and "collectively brainstorm" by adding new items to the list. The technique leads toward the consensus on major points, but also uncovers minority opinions.

### **2.2 Selection of Participants**

The Slovenian Governmental Office for Statistics provided a mailing list of all three hundred and thirty Slovenian industrial, commerce and service organizations with more than 300 employees. Major political and economic changes, initiated in Slovenia during the last two years, caused dynamic restructuring and adjustments of businesses to the new situation. Because the major market — the rest of former Yugoslavia — remained unstable and virtually closed for Slovenian exporters, many organizations were forced to either downsize, close down, or restructure to compete in the new markets. Although outdated, the mailing list used in this study was the best available at that time.

Table 1 shows some statistics about the Slovenian organizations participating in the fourth and last round. Data show that the highest number of employees among the organizations is 6,200 and the median is 600. The maximum number of employees in an IS unit is 100 and there are many with just a few IS professionals. Only three participating organizations have less than 100 employees and another nine have less than 300 employees. In terms of the number of employees, the vast majority of organizations are medium or large.

Table 2 shows the distribution of respondent's organizations by industry. It is noticeable that manufacturing predominates and that only a few organizations represent financial and other services. This, however, is a proper representation of Slovenian reality because at the time of the survey there were only a few banks and insurance companies, and virtually no real estate organizations, except for a number of small emerging service organizations.

Table 3 presents the organizational positions of respondents in IS departments. It comes as no surprise that almost two thirds of them are top IS executives or managers because the surveys were mailed to their attention. Table 4 presents the position of the top IS executive or manager in the overall organizational structure. The majority of them report directly to the CEO and another large group is positioned one level below that in the organizational structure.

**Table 1. Some Organizational Demographics**

	No.	Min.	Max.	Median	Mean	St. Dev.
Number of employees	144	4	6200	600	955	1025
IS Department employees	141	1	100	6	10	13

**Table 2. Distribution of Responding Organizations by Industry**

	Number	Percent
Primary metal and fabricated metal	32	21.9
Textile and apparel products	17	11.6
Wholesale trade	12	8.2
Construction	11	7.5
Chemicals	10	6.8
Lumber and furniture	10	6.8
Paper, printing, and publishing	9	6.2
Agriculture, forestry, and fishing	3	2.1
Transportation, communication, electric, gas, and sanitary services	8	5.5
Electronic equipment	6	4.1
Retail trade	5	3.4
Services (health, educational, tourism, miscellaneous repair)	5	3.4
Food and tobacco products	4	2.7
Finance, insurance, and real estate	3	2.1
Leather, rubber, and plastics products	3	2.1
Transportation equipment	3	2.1
Mining	2	1.4
Petroleum refining	2	1.4
Other	1	0.7

**Table 3. Position of Respondents in IS Unit**

	Number	Percent
Top IS executive	94	63.9
IS Department manager	27	18.4
Group leader	5	3.4
Systems analyst or programmer	10	6.8
Other	11	7.5

**Table 4. Position of Top IS Executive or Manager**

	Number	Percent
Directly subordinate to the CEO	77	53.5
Two levels below the CEO	60	41.7
Three or more levels below the CEO	7	4.9

## 2.3 Surveying

The language used in the survey administration was Slovenian. No particular translation problems were encountered because Slovenian is the first language of both investigators. Translation was rather easy also because Slovenes adopted original English terms for many new technical and management concepts.

**Round One:** The study began in October 1991. Addresses of 330 larger Slovenian organizations were used for mailing the first-round questionnaire to their unidentified IS managers. Managers were requested to specify five to ten matters that will be the most important IS management issues during the period of three to five years into the future. They were also asked to provide rationales for their choices. A total of 634 issues were provided by 105 respondents, or about six statements per respondent. Organizations were under great stress at that time and many were closing down, changing ownership, merging, disintegrating, or restructuring. The achieved response rate of 32% was considered good under such circumstances.

**Round two:** The responses from the first round were thoroughly analyzed. The proposed issues were classified according to the scheme used by Niederman, Brancheau and Wetherbe, which made the processing of such a great number of statements much easier. All issues suggested by at least five participants were synthesized, resulting in a list of twenty-six distinct IS management issues and corresponding rationales. This analysis was performed separately by the two authors. The two results were similar and needed only slight consolidation.

The resulting list of major issues in IS management in Slovenia was presented in a random sequence on the second-round questionnaire. Additional space enabled the participants to add new concerns at that time. Respondents were requested to rate the listed (and added) issues using a rating scale from 1 (unimportant) to 10 (most important), to provide new issues and rationales, and to suggest changes in wording of issue names or rationales. The second-round questionnaires were again mailed to the IS managers from the initial 330 organizations in February 1992. A total of 163 responded, yielding a response rate of 49 percent.

**Round Three:** The 144 organizations that did not respond to either of the first two rounds were dropped from the study at that point. The second-round responses were analyzed in two ways. First, rates were processed statistically and sample means were provided as a feedback to the remaining participants along with their individual second-round rates. Second, suggestions of new issues and modifications were studied. All new issues were either supported

by a single voice or overlapped with existing issues. Consequently, only the wording of two descriptions and seven rationales was strengthened.

The third-round questionnaires were mailed in June 1992 to the remaining 186 participants. They were again asked to rate the problems and provide rationales for low and high rates when their new rates differed by three or more points (on a ten point scale) from the second round group means. A total of 129 (69%) Slovenian IS managers responded in this round and provided 146 explanations for notable disagreements with group rates.

**Round Four:** A compilation of explanations for disagreements with group rates was attached to the fourth-round questionnaires that provided group and individual rates from previous rounds. They were mailed to the remaining 186 participants in September 1992, asking them to read the reasons for disagreements and rate the issues one more time. A total of 148 participants responded to this final round, yielding a response rate of 80%.

In summary, the four rounds of surveying provided one round for the compilation of major issues in IS management in Slovenia and three rounds to increase the level of consensus on the importance of those issues. In the following discussion, data are from the final round of the survey unless otherwise indicated.

## 3. FINDINGS

The prediction of the most critical issues in the eyes of Slovenian IS managers for the period of 1995 through 1997 is shown in Table 5. The importance of all twenty-six issues was rated higher than six on a ten point scale, which means that all were considered important. The seven top rated issues did not change their positions during the last round and rated somewhat higher than the others. These seven issues will be briefly discussed in the following sections. Rationales for key issues and other details can be obtained from the authors.

### 3.1 Top Seven Issues

**3.1.1 Inadequate appreciation of IS by executives and other users and lack of their involvement in IS development.** This top-ranking issue was rated distinctly higher than other major issues. Respondents reported a general lack of understanding of the strategic value of information for managerial control, strategic planning, and company growth. They feel that the executives should play a much more active role in IS planning and that users' participation

**Table 5. Key Issues in IS Management in Slovenia**

Rank	Rate	Issue Description
1	8.78	Inadequate appreciation of IS by executives and other users and lack of their involvement in IS development
2	8.42	Education of IS professionals
3	8.39	Lack of IS strategic planning
4	8.33	Management of IS function
5	8.30	Organizational problems
6	8.14	Education of IS users
7	8.09	Integration of subsystems into the comprehensive information architecture
8	7.74	Telecommunication infrastructure in Slovenia and its links to the world
9	7.73	Executive IS
10	7.64	National and ISO-compatible IS standards
11	7.58	Electronic data interchange (EDI)
12	7.52	Use of integrated IS development methodology
13	7.51	Use of modern tools for IS development
14	7.45	Equipment selection
15	7.43	Stability of national regulations
16	7.36	Implementation of relational databases
17	7.19	Use of external databases
18	7.18	Improving IS development productivity
19	6.95	Evaluation and enhancement of existing IS
20	6.94	Legal protection
21	6.89	Financial investments in IS
22	6.79	Substitution of mainframes with PCs and LANs
23	6.66	Limited supply of quality products and services
24	6.57	IS contribution measurement
25	6.45	IS costs control
26	6.39	Establishment of a national professional association for IS

in requirements definition is inadequate. Many respondents associated this issue with the lack of related education and knowledge, which is specifically addressed by the issue ranked six. One participant explained that such lack of appreciation of information as a competitive weapon has its roots in the previous economic system where there often was no competition for the market. Such conditions did not stimulate executives and managers to actively search for improved performance.

**3.1.2 Education of IS professionals.** Respondents were convinced that the future of IS as a discipline depends on the existence of highly qualified professionals. They stressed the importance of the related role of universities and research institutions as well as that of hiring practices in industry. While many participants were convinced that most of the abundantly offered seminars are ineffective, a few argued that educational opportunities exist but are not pursued by the professionals. A minority opinion related

this issue not so much to the inadequate education of IS professionals but to the information-illiterate users, as discussed above.

**3.1.3 Lack of IS strategic planning.** Participants submitted that information is an important managerial asset and thus must be identified and planned for in the long term. They associated IS planning with general corporate strategic planning. Several respondents believe that there often is no general business strategic planning and associate this situation with the lack of national long-term strategy. It should be noted that the economic situation in Slovenia was very volatile at the time of the survey, as breathtaking political, social, and economic changes were in progress.

**3.1.4 Management of IS function.** Respondents proposed that the IS function should be managed and organized the same was as any other business function. This includes concerns such as short-term planning, working in teams,

staff motivation, project management, methodology implementation, quality control, scheduling, and user support. Responses suggest that IS management practices are currently nowhere near the desired level. This experience appears to be related to issue number two and associated with the inadequate education of IS professionals.

**3.1.5 Organizational problems.** Respondents proposed that proper structure, organization, and management of business processes and functions and their stability are essential foundations for the development of effective IS which, in turn, can function as catalysts to perfect business processes. This opinion reflected both the historic neglect of such issues as organization and management and the state of transition and instability. They further reported that IS is frequently understood as something independent and parallel to other business systems instead of an integral part of them. Respondents suggested that information services, a key business function, should be appropriately positioned in the organizational structure.

**3.1.6 Education of IS users.** Educated executives and other users better understand the role of information services, explained the respondents. They can make proper decisions about strategic objectives and investments, better determine IS requirements, follow world trends, and can use information technology more effectively. Such executives also learn how management practices can be improved because of the power of information technology. The opinion that users generally are information illiterate was unanimously and loudly expressed. A few respondents felt that users should not only be information literate but also trained in end-user computing.

**3.1.7 Integration of subsystems into comprehensive information architecture.** Participants explained that computer applications have historically grown independently from individual business functions. They believe that increased organizational synergy, an important potential contribution of information services, can be achieved only with centralized planning. Centralized data dictionaries, integrated databases (although possibly physically distributed), and integration of process control and business computing provide for integration of information subsystems, enabling continuous and exhaustive control of production and other business processes.

### **3.2 Movement Toward Consensus**

In theory, the Delphi technique gradually increases consensus over the several rounds of surveying. The table in the appendix shows that consensus about the importance of specific issues has increased from the second through the

fourth round. Standard deviation, a measure of the spread of opinion, has increased from the second to the third round for only three out of twenty-six issues, and from the third to the fourth round for only four different issues. Standard deviations in the fourth round are lower than corresponding values from the second round with no exception.

### **3.3 Analysis by Industry, Number of Employees, and Respondent's Position**

Analysis of issues ratings by industry category did not reveal any interesting associations except for a few regarding some of the lower ranking and not particularly revealing cases. Pearson correlation analysis between the total number of employees in responding organizations and issues ratings also did not show any significant correlations. The number of employees from IS departments, however, revealed a number of correlations with the ratings, as shown in Table 6. All but two of these significant correlations are negative, meaning that managers from larger departments rated issues lower than those from the smaller ones. A number of issues are significantly inversely correlated with the IS department size which indicates that larger groups address most of the issues with greater success than smaller groups and thus rate them lower. However, the differences in mean rates between the group of sixty-three companies with five or less employees in an IS department and the twenty-seven organizations with IS staff of at least fifteen are less than 0.5 (on a ten point scale) for all but the low-rated Limited Product Supply and National Association in which case the difference is 0.5 and 0.6, respectively. Users Appreciation and Development Productivity show significant positive correlations, which means that they worry respondents from larger units more than those from smaller units. The differences in mean ratings between the same two groups are 0.8 and 0.6, respectively.

With only two exceptions, the organizational position of respondents as well as that of the top IS manager did not significantly influence the ratings of issues. The position of the top IS manager in the organizational structure influences ratings of Management of IS Function and Costs Control issues. The *k*-sample median Chi-square test was used to compare median issues ratings of related groups. As expected, the respondents from organizations where top IS managers are at least three levels below the top of organizational structures rated these two issues significantly ( $p < 0.05$ ) lower than others while the difference between those one level below the top compared to those two levels below is negligible.

**Table 6. Correlation Coefficients between Issues and Number of Employees**

Issue Name	Number of all Employees	Employees in IS Department
Users Appreciation	.14	.17*
Education of IS Professionals	.04	-.06
IS Strategic Planning	.01	.14
Management of IS Function	.02	-.04
Organizational Problems	-.05	-.04
Education of IS Users	.05	-.20*
System Integration	.05	.01
Communication Infrastructure	-.01	.07
Executive IS	.03	-.18*
National Standards	-.02	-.07
Electronic Data Interchange	-.01	-.04
Development Methodology	.08	-.12
Development Tools	.08	-.16
Equipment Selection	-.06	-.22**
Stability of Regulations	-.04	-.21*
Relational Databases	.02	-.05
External Databases	-.07	-.20*
Development Productivity	.11	.19*
Enhancing Existing IS	.02	-.19*
Legal Protection	-.08	-.17*
Investment in IS	-.02	-.14
Downsizing	-.01	-.04
Limited Product Supply	-.09	-.18*
Contribution Measurement	-.15	-.18*
Costs Control	-.00	-.11
National Association	-.08	-.18*

Notes: 146 cases; 2-tailed significances: \* < 0.05; \*\* < 0.01

### 3.4 Comparison with the Results from the USA

To facilitate further analysis and comparison with the results from similar studies in the USA, the issues are classified along the same three dimensions and four groups as they were by Niederman, Brancheau and Wetherbe. The classification scheme and its application is presented in Table 7. The comparison of frequencies of different classifications and groupings between this and the latest USA study does not reveal the real extent of differences between the two countries because the frequencies are comparable. Management issues dominate the top of the Slovenian list more than the USA equivalent. Twelve Slovenian issues are internal to the IS organization compared to only nine on the USA list. Finally, the Slovenian list contains ten issues from the Internal Effectiveness category and only five from Business Relationship, compared to six Internal Effectiveness and eight Business Relationship issues on the USA list. It appears that man-

agement of internal processes in the IS organization preoccupies Slovenian respondents more than American respondents, where a higher proportion of issues is external and connected to business relationships.

The substantial differences between the key issues in Slovenia and the USA become apparent when they are compared issue by issue. Table 8 contrasts the key issues in IS management in Slovenia with those observed by four comparable investigations in the USA. Table 9 is similar but shows all the latest available USA key issues and Slovenian ones ordered by the rank assigned in the USA study. It is notable that seventeen of the twenty-six Slovenian issues are not represented among the twenty-five issues observed in 1989 in the USA. The opposite is also true, of course, since only nine of the USA issues appear on the Slovenian list. This leads to a conclusion that the differences between the issues in these two countries are broad indeed.



**Table 7. Classification of Key Issues**

Issue Name	M/T	Issue Classification			Group
		P/C	I/E		
Users Appreciation	M	C	E		BR
Education of IS Professionals	M	C	I		IE
IS Strategic Planning	M	P	E		BR
Management of IS Function	M	C	I		IE
Organizational Problems	M	C	E		BR
Education of IS Users	M	C	E		BR
System Integration	T	C	I		TI
Communication Infrastructure	T	P	E		TI
Executive IS	M	C	E		TA
National Standards	M	P	E		TI
Electronic Data Interchange	T	C	E		TI
Development Methodology	T	C	I		IE
Development Tools	T	C	I		IE
Equipment Selection	T	C	I		IE
Stability of Regulations	M	C	E		TI
Relational Databases	T	C	I		TA
External Databases	T	C	E		TA
Development Productivity	T	C	I		IE
Enhancing Existing IS	T	C	I		IE
Legal Protection	M	C	E		TI
Investment in IS	M	P	E		BR
Downsizing	T	C	I		IE
Limited Product Supply	T	C	E		TI
Contribution Measurement	M	P	I		IE
Costs Control	M	C	I		IE
National Association	M	C	E		TI

Notes: Issues were classified as follows:

"M/T" indicates management (M) or technology (T);

"P/C" indicates planning (P) or control (C);

"I/E" indicates internal (I) to IS organization or external (E);

"Group" indicate business relationship (BR), technology infrastructure (TI), internal effectiveness (IE), or technology application (TA)

It can be noted that some of the high quality IS-related services that are abundant in the USA are scarce in Slovenia. This is reflected in the importance of issues such as Education of IS Professionals, Communication Infrastructure, National Standards, Stability of Regulations, External Databases, Legal Protection, Limited Product Supply, and National Association. Even some of those issues that appear on both lists are similar only by name. Education of IS Users, for example, named Facilitating Organizational Learning and Use of IS Technologies in the USA study, is related in Slovenia to information literacy while it addresses the understanding of the benefits of system integration and its influence on organizational structure in the USA. That

is, what Slovene IS managers see as a significant issue is presumed in America. Accordingly, Users Appreciation is ranked number one in Slovenia and number eleven in the USA.

Management of IS Function is an important issue in Slovenia because education or training in management in general and in IS management in particular has historically not been available. Slovenian IS managers are also concerned with other managerial and technical skills as demonstrated by the listing of issues Equipment Selection, Relational Databases, Development Productivity, Enhancing Existing IS, and Cost Control. None of these issues is even

**Table 8. Comparison of Key Issues in Slovenia with Those in the USA**

Issue Name	Issue Rank by Year and Country				
	Slov. 1992	USA 1989	USA 1986	USA 1983	USA 1980
Users Appreciation	1	11	4	15	
Education of IS Professionals	2				
IS Strategic Planning	3	3	1	1	1
Management of IS Function	4				
Organizational Problems	5	7	5	7	9
Education of IS Users	6	6	3	6	8
System Integration	7				
Communication Infrastructure	8				
Executive IS	9	17		10	5
National Standards	10				
Electronic Data Interchange	11	12	14		
Development Methodology	12	9	13	4	13
Development Tools	13	12			
Equipment Selection	14				
Stability of Regulations	15				
Relational Databases	16				
External Databases	17				
Development Productivity	18				
Enhancing Existing IS	19				
Legal Protection	29				
Investment in IS	21		20	16	
Downsizing	22				
Limited Product Supply	23				
Contribution Measurement	24	16	9	5	2
Costs Control	25				
National Association	26				

thought of as a major issue or problem in the USA, again demonstrating that important issues in IS management depend on the level of development, culture, and economic and political environment.

By contrast, it is similarly revealing to see which issues identified in the USA are absent from the Slovenian list. The first such group is related to IS strategic or mission-critical role and associated developments. The issues from this group in the USA list are Information Architecture, Data Resource, Technology Infrastructure, Competitive Advantage, Application Portfolio, Security and Control, Disaster Recovery, Organizational Structure, Technology Islands, Global Systems, and IS Asset Accounting. Technology islands appears similar to the Slovenian issue System Integration, but it really is not. Technology Islands refers to the integration of new technologies, such as image technology (facsimile machines and data scanning), into the

conventional IS arena. System Integration, on the other hand, relates to the central planning of conventional systems and databases. It appears that in Slovenia, IS is not as recognized as critical and strategically important as it is perceived to be by the IS managers in the USA.

IS Human Resources, an issue from the USA list, appears similar to the Slovenian Education of IS professionals but the two issues are again quite different. The USA issue is related to the shortage of qualified IS personnel while the Slovenian issue refers specifically to the fact that the required educational programs (rather than personnel) are not available. Similarly, the USA issue Telecommunication Systems refers to the planning of its use for competitive advantage while the Slovenian Communication Infrastructure relates to the underdeveloped national communication facilities. Again, what the developed IS culture presumes, the developing IS culture struggles with.

**Table 9. Comparison of Key Issues in USA with Those in Slovenia**

Issue Name	USA 1989	Slov. 1992
Information Architecture	1	
Data Resource	2	
IS Strategic Planning	3	3
IS Human Resources	4	
Education of IS Users	5	6
Technology Infrastructure	6	
Organizational Problems	7	5
Competitive Advantage	8	
Development Methodology	9	12
Telecommunication Systems	10	
Users Appreciation	11	1
Electronic Data Interchange	12	11
Development Tools	12	13
Distributed Systems	12	
Application Portfolio	15	
Contribution Measurement	16	24
Executive IS	17	9
End-User Computing	18	
Security and Control	19	
Disaster Recovery	20	
Organizational Structure	21	
Technology Islands	22	
Global Systems	22	
Image Technology	24	
IS Asset Accounting	25	
Education of IS Professionals		2
Management of IS Function		4
System Integration		7
Communication Infrastructure		8
National Standards		10
Equipment Selection		14
Stability of Regulations		15
Relational Databases		16
External Databases		17
Development Productivity		18
Enhancing Existing IS		19
Legal Protection		20
Investment in IS		21
Downsizing		22
Limited Product Supply		23
Costs Control		25
National Association		26

Two other USA issues not specified on the Slovenian list, Distributed Systems and Image Technology, are related to specific relatively advanced technologies, although Distributed Systems addresses a similar aspect as the Slovenian Downsizing. End-user Computing also is not specifically

recognized as a key issue in Slovenia. Data gathered with this study do not provide an explanation why end-user computing is not an important issue in Slovenia. Two previous reports addressed this issue and may provide a lead toward the explanation. Two earlier European studies

of key issues in IS management reported low end-user computing rankings (Davenport and Buday 1988; Hirschheim et al. 1988). Watson and Brancheau (1991, p. 217), noticed this and proposed that one of the reasons may be a lower level of personal computer penetration due to the relatively higher cost of personal computers in Europe. This is even much more so in Slovenia. For example, Zupančič (1993) reported a case of a company with 4,200 employees and only 150 personal computers available to the end users (one computer for twenty-eight employees). Slovenian researchers (Zupančič and Leskovar 1991) also observed that only 9% of employees in large or medium size companies use terminals or personal computers. This number is much lower than in the USA where 40% of employees are end-users (Ein-Dor and Segev 1988).

Two of the Slovenian issues absent from the USA list are related to the recent historic changes in the Slovenian political and economic systems. These two issues are Stability of Regulations and Legal Protection. Other issues, such as Communication Infrastructure, National Standards, Limited Product Supply, and (lack of) National Association are a consequence of past national neglect. The same is true for a somewhat surprising group of issues related to the lack of educational opportunities for IS managers and professionals and their deficient knowledge and skills. This group includes Education of IS Professionals, Management of IS Function, Equipment Selection, Relational Databases, Development Productivity, Enhancing Existing IS, and Cost Control. It can be noted that most of these are management rather than technology-related issues. This list shows which educational and other services are in high demand.

#### 4. CONCLUSIONS

The results of this study suggest that the key issues in IS management in Slovenia differ from those in the USA. The findings are believed to be largely applicable to other new Central and Eastern European democracies and particularly to Hungary, the Czech Republic, and Poland, which are at a comparable stage in development of their IS technology markets.

Classifying issues into categories used in the USA studies and simply comparing such categories actually hides the real scope of differences in key issues in IS management between the USA and Slovenia. Such a comparison nevertheless reveals a higher presence of management-related issues and particularly management issues internal to the IS organization as opposed to the somewhat greater number of external issues associated with business relationships in the USA.

Comparison of the two lists issue by issue reveals a number of other dissimilarities. IS-related services such as educational, legal, and professional, abundant in the USA, are still scarce or inefficient in Slovenia. The same is the case with the national information infrastructure, such as communication facilities, product supply, and external databases. Management of IS Function is an important issue in Slovenia because management education was not available before the change of political and economic systems. This lack of management skills is demonstrated by the importance of issues such as product selection, productivity, and change and project management. In other words, some of the Slovenian issues reflect the past neglect. One of the consequences is lack of knowledge and skills due to deficient education. Missing among the Slovenian issues and very much present on the USA list are the mission-critical and strategic issues such as data and systems as corporate resources and assessment of their value, technology islands and infrastructure, IS portfolio and organizational structure, global perspective, and security and recovery.

Understanding the major issues in IS management in Slovenia should help Slovenian and other Central and Eastern European executives focus and direct their attention. Domestic vendors of IS technology and services can benefit from this study because it identifies products and skills that are in short supply. The results also show foreign vendors how to adjust their practices developed in entirely different markets, cultures, and levels of IS development. Perhaps the greatest mistake a vendor of products, services, or education could make would be to presume that US issues are Slovenian (or, worse, global) issues. As we have seen, such is not the case. Last but not least, the results are relevant for local government, researchers, and educators and can be used as a guideline for their investments, planning, and program development.

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# APPENDIX

## SURVEY DATA BY SURVEY ROUND

Issue Name	Round Two			Round Three			Round Four		
	Ordinal Rank	Mean Rating	Std. Dev.	Ordinal Rank	Mean Rating	Std. Dev.	Ordinal Rank	Mean Rating	Std. Dev.
Users Appreciation	1	8.7	1.5	1	8.8	1.3	1	8.8	1.2
Education of IS Professionals	2	8.6	1.5	2	8.4	1.4	2	8.4	1.2
IS Strategic Planning	3	8.3	1.7	3	8.3	1.4	3	8.4	1.1
Management of IS Function	5	8.2	1.4	4	8.3	1.5	4	8.3	1.0
Organizational Problems	4	8.3	1.6	5	8.2	1.0	5	8.3	1.1
Education of IS Users	7	8.1	1.6	6	8.1	1.8	6	8.1	1.3
System Integration	6	8.1	1.8	7	8.0	1.4	7	8.1	1.4
Communication Infrastructure	8	7.9	1.8	10	7.7	1.5	8	7.7	1.3
Executive IS	10	7.8	1.9	8	7.8	1.5	9	7.7	1.5
National Standards	9	7.9	2.0	9	7.7	1.7	10	7.6	1.5
Electronic Data Interchange	12	7.7	1.9	14	7.4	1.8	11	7.6	1.5
Development Methodology	13	7.6	1.6	12	7.4	1.7	12	7.5	1.2
Development Tools	11	7.7	1.8	11	7.6	1.6	13	7.5	1.4
Equipment Selection	15	7.4	2.2	17	7.1	1.4	14	7.5	1.4
Stability of Regulations	14	7.6	2.1	15	7.3	1.7	15	7.4	1.5
Relational Databases	16	7.3	2.0	13	7.4	1.3	16	7.4	1.6
External Databases	17	7.2	2.0	16	7.2	1.6	17	7.2	1.3
Development Productivity	18	7.1	1.8	18	7.1	1.4	18	7.2	1.5
Enhancing Existing IS	20	7.0	1.7	19	7.0	1.7	19	7.0	1.3
Legal Protection	19	7.0	2.2	21	6.8	2.0	20	7.0	1.5
Investment in IS	21	6.9	2.4	22	6.8	1.9	21	6.9	1.7
Downsizing	22	6.9	2.6	20	6.9	1.4	22	6.8	1.9
Limited Product Supply	23	6.6	2.4	23	6.6	1.8	23	6.7	1.7
Contribution Measurement	25	6.4	2.1	26	6.3	1.7	24	6.6	1.7
Costs Control	26	6.2	2.2	25	6.3	1.9	25	6.5	1.4
National Association	24	6.5	2.5	24	6.4	2.1	26	6.4	1.9