MEASURING THE SUCCESS OF THE STRATEGIC INFORMATION SYSTEMS PLANNING IN ENTERPRISES IN SLOVENIA

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Received: 17. 3. 2010 Preliminary communication
Accepted: 10. 6. 2010 UDC 65.012:007>(497.4)

As consultants for the largest enterprises in Slovenia, we found that even though the literature lists plenty of strategic information systems planning (SISP) methods with clear theoretical merits, the enterprises find these methods too abstract and/or too cumbersome to use in practice. To address this issue, we developed a new approach for the measurement of SISP success that attempts to combine key predictors of SISP success from the fields of strategic information systems planning and strategic business planning in a way that would be as practical as possible for everyday use in enterprises. We hope that our method will thus enable enterprises to validly, reliably and with greater ease measure and control the outcome of the SISP process by clearly defining the SISP success predictors that need to be monitored and by identifying the stakeholders responsible for their management.

1. INTRODUCTION

Contemporary enterprises work in a very competitive and rapidly changing environment where information technology can significantly affect the economic success of the enterprise (e.g. competitive advantage, improvement in productivity). As such, IT should be well managed at the strategic and operational level. We define strategic information systems planning (SISP) as a

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continuous learning process, encompassing the IS/IT strategy formulation and implementation activities, in which various stakeholders tightly cooperate to assure maximum utilization of IT to gain sustainable economic success of the enterprise.

Past SISP definitions (Lederer & Sethi, 1988; Earl, 1993) and the most popular SISP methodologies (e.g. Business Systems Planning, Information Engineering) treated SISP only as a process of IS/IT strategy formulation, lacking the activity of planning the necessary resources for its implementation and the definition of processes that should be executed during the implementation (e.g. monitoring and evaluation of the progress of implementation, change management). The application of such a conceptual view of SISP caused unsuccessful implementations of IS/IT plans in around half of the enterprises, making their entire SISP process unproductive (Lederer & Sethi, 1988; Hartono et al., 2003). These worryingly low implementation success rates lead to the realization that SISP is a significantly more complex process that has to address not only the relevant technological issues but also organizational, behavioural and managerial aspects. A successfully implemented SISP process thus does not end with the implementation of a technologically superior IS, but also encompasses appropriate organizational changes, business process reengineering and organizational learning for a more productive use of IT. In our experience, it is especially important that the capabilities of the SISP process constantly improve to reflect changing technology and business related developments. Based on such an understanding of the SISP process that builds on the theory of SISP (Lederer & Salmela, 1996), the insights of different versions of Scott-Morton models (Gimenez et al., 2004), as well as on the Interaction model (Beath et al., 1995), we present our view of SISP in Figure 1.

To fulfill the goal of this article and make important advances concerning the practical (efficient and effective) application of SISP as seen in Figure 1, we need to address the following research questions: Which are the key predictors of SISP success in the enterprise? Which key stakeholders in the enterprise carry the responsibility of successfully managing them? Do these predictors correlate with statistically significant differences in the economic success of enterprises in Slovenia and their efficiency of IT use? What influences do different stakeholder groups exhibit on the efficiency of IT use and the economic success of the enterprise?

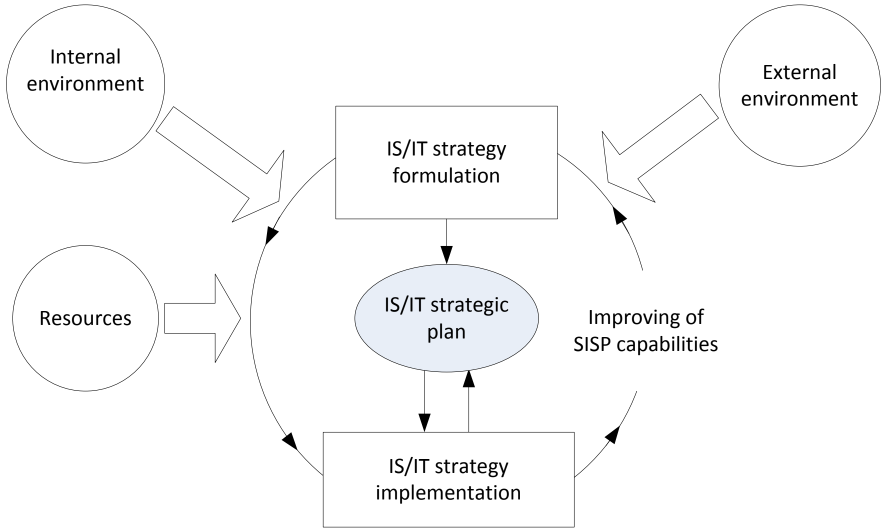

Figure 1. Continuous learning process of Strategic Information Systems Planning

Source: Krisper & Rožanec (2009)

To answer the above stated questions, we structured our paper as follows. In the first section, we review the relevant literature to develop a model we can empirically test. In the second section, we present the methodology through which we developed the questionnaire, selected the appropriate statistical procedures to conduct our empirical test and analyzed the appropriateness of our sample. In the third section, we present the results of the empirical tests of our model in order to answer this paper's research questions. We conclude the paper with the discussion of our main results and possible directions for further research.

2. LITERATURE REVIEW AND RESEARCH MODEL

The review of the relevant literature indicates that major issues (Lederer & Sethi, 1988; Earl, 1993; Gottschalk, 1999; Ang & Teo, 2001) impeding SISP success in the enterprises occur almost irrespective of the used method, are mostly organizational, and usually arise in the implementation phase of the SISP process. Our method will attempt to address these issues by clearly defining all key success predictors an enterprise needs to manage to successfully deploy SISP. Since we want our method to be useful in practice, we review the literature to compile a list of predictors of SISP success in a way that will enable us to clearly state which stakeholders in the enterprise are responsible for the successful management of specific SISP success predictors. These key stakeholders in the enterprise are: top management, IT management and middle management. Before we discuss the merits behind the inclusion of each specific SISP success predictor into our model, we present in Table 1 all 14 key predictors of SISP success and the stakeholders responsible for their successful deployment in an enterprise.

Table 1. The SISP success predictors and the stakeholders responsible for their deployment

	Key SISP success predictors:	**Responsibility:**
1	**Top management commitment and involvement**	Top management
2	**Quality of strategic business planning**	Top management
3	**The role of IT in strategic business planning**	Top management
4	**Alignment of key internal business and IT strategies**	Top management, IT management
5	**Alignment of key external business and IT strategies**	Top management, IT management
6	**Consistency of a priority list of IT projects for the realization of internal business strategies**	Top management, IT management
7	**Consistency of a priority list of IT projects for the realization of external business strategies**	Top management, IT management
8	**The quality of work of the project teams**	Middle management
9	**The design and implementation of organizational changes**	Top management
10	**The design and implementation of technical changes**	IT management
11	**Adaptation of the organization to fit the acquired IT**	Top management
12	**Key user involvement**	Middle management
13	**End user training for IT use**	Middle management
14	**Control and evaluation of the selection, implementation and use of IT**	Top management

- **Top management commitment and involvement**

There is an overwhelming consensus in the literature that no other process predicts the SISP success as well as top management commitment and active participation (Lederer & Sethi, 1988; Earl 1993; Bingi et al., 1999; Ang & Teo, 2001; Bechor et al., 2010). Top management plays a key role at enabling good communication and cooperation between different departments and different stakeholders which have specific information needs and opinions about IT issues. Other important areas of top management involvement are: the promotion of the commitment to change, the control of the SISP implementation and the initiation of regular updates of the SISP plan.

- **Quality of strategic business planning**

Strategic business planning represents the most sophisticated and complete process of strategic thinking that provides the enterprise with the capability of continuous control and analysis of the long term alignment between all relevant environmental and enterprise characteristics (Ruohonen, 1996). This process is composed of four phases (Hunger & Wheelen, 1998): environment scanning, strategy formulation, strategy implementation and strategy evaluation and control. Top management sophistication measured as the quality of top management knowledge and know-how through all four phases of the strategic business planning process was proven to have an important positive effect on the efficiency and spread of IT use in the enterprises (Gupta et al., 1997). Thus, we include it on our list of key SISP success predictors.

- **The role of IT in strategic business planning**

Until the ’90s, most authors considered the role of IT limited to the operational level of planning (Garg et al., 1996) and did not consider IT as a technology that could create important competitive strategic advantages (Griffiths et al., 1990). However, in the last 20 years, such views significantly changed. Today, IT is considered one of the key general purpose technologies (Bresnahan, 2001) that can deliver strategic advantages through all the four phases of strategic planning (Garg et al., 2002) and radically change the process of the creation of goods in the enterprises (Hit & Snir, 1999). Thus, it has become essential that the top managers themselves become power users of IT since without the first-hand knowledge and personal experience, top managers can hardly be able to successfully manage SISP and capture the potential of IT.

- **Alignment of key internal business and IT strategies**

The need to align the business strategy and the IT strategy has long been advocated as necessary for an enterprise to gain sustainable competitive advantages by both researchers and practitioners (Chan & Sabherwal, 2001; Garg et al., 2002). For this reason, copying the IS from competitors does not create large benefits unless the enterprises have very similar business strategies (Chan & Sabherwal, 2001). The need to align IT with business needs is thus a recognised SISP objective (Earl, 1993) present in several SISP success models (Grover & Segars, 1998). There is, however, no widely established way to monitor such an alignment since most authors prefer to develop their own measuring scales (Hovelja, 2006).

- **Alignment of key external business and IT strategies**

To stay true to our goal of practical usefulness, we decided to monitor separately internal and external alignment between business and IT strategies by using Porter's Industrial Organization Perspective. This perspective is namely the most used by enterprises in the planning of competitive advantages (Hedman & Kalling, 2001). The leading authors of Porter's I/O perspective identified four major areas where IT deployment creates strategic opportunities (Bakos & Tracy, 1986): improvement of operational efficiency and functional effectiveness, product innovation with IT, exploitation of inter organizational synergies and acquisition of bargaining advantage over one's customers and suppliers. The first two areas are internal to the enterprise, while the last two are external. Since the know-how and skills needed to develop and align the internal and external business and IT strategies differ, monitoring both alignments through a single measure would significantly impair the ability of enterprises to detect and address the underlying causes of misalignment. For this reason, we suggest that enterprises measure both alignments individually.

- **Consistency of a priority list of IT projects for the realization of internal business strategies**

Enterprises have limited resources to invest in IT. Consequently, evaluating and prioritizing IT projects become important in order to ensure efficient and effective allocation of the available resources. For this reason, a priority system positively influences the success of the IS/IT strategy implementation (Hartono et al., 2003) and is thus recognised as an important activity that influences SISP success (Grover & Segars, 1998; Ang & Teo 2001; Bechor et al., 2010). Such a system should not be a reflection of the power of any stakeholder group, but rather reflect the importance of an IT project for the achievement of a business strategy.

- **Consistency of a priority list of IT projects for the realization of external business strategies**

The strategic business planning literature posits that enterprises cannot at the same time successfully follow two strategies if one is aimed at achieving cost leadership and the other at achieving product differentiation (Millar & Porter, 1985). The priority list of IT projects ought to reflect the strategic path an enterprise decides to take. For this reason, the choice to prioritize IT deployment to one or the other internal strategic area of IT use indicates consistency between IT investments and the internal strategic orientation of an enterprise towards cost leadership or product innovation. The same can be said for the prioritization of IT deployment to one or the other external strategic area of IT use. Separate monitoring of the internal and external business strategies again grants enterprises additional insights of where potential problems with consistency lie. Such division takes into account the different know-how and skills the two areas require and profits from the familiarity enterprises have with the concept of two internal and two external strategic areas of IT use introduced by the strategic alignment of SISP success predictors.

- **The quality of the project teams**

Good personal and professional competences of project team members lead to successful management of IT and result in projects that are, with high probability, completed on time and on budget. The ability to obtain sufficiently competent project leaders and team members from the ranks of the middle management was thus soon recognized as a critical SISP success factor (Earl, 1993; Nelson & Somers, 2001). In SISP, competence includes more than just familiarity with the technical aspects of systems development. Business process identification, knowledge about business processes, as well as interpersonal skills are even more important since they facilitate greater integration between the business planning and the SISP process (Ang et al., 1997).

- **The design and implementation of organizational changes**

There is a wide spread consensus in the literature that enterprises can only gain the majority of benefits from IT investments if they complement such investments with changes in business strategy, structure, processes and culture (OECD, 2004). The successful design and implementation of the organizational changes required for a productive use of IT is, however, one of the hardest SISP success predictors to manage successfully because it is accompanied by significant risks, increased complexity and large costs (Appleton, 1999). Thus, it is not surprising that the underestimation of the magnitude and number of difficulties an enterprise encounters while managing this SISP success predictor is the most common reason that the deployment of IT ends unsuccessfully (Nelson & Somers, 2001).

- **The design and implementation of technical changes**

Several authors include the design and implementation of technical changes in the overall success predictor of change management (Kuang et al., 2001; Nelson & Somers, 2001). However, establishing IS goals, planning software functionality, choosing appropriate applications and managing the conversion from the old to the new IS require specific know-how which differs from the know-how needed to manage organizational change. Since monitoring these two "change" success predictors separately enables a clearer attribution of task responsibility to individual internal stakeholders (IT management vs. top management), we suggest that enterprises conduct a separate analysis for each predictor to gain a better understanding of specific issues that need to be confronted in each of them.

- **Adapting the organization to fit the IS**

When deciding how to implement an IS, the enterprises can choose one of two options (Davis, 1998). They can adapt the organization to fit the newly deployed IS with the goal to create specific competitive advantages or they can buy an IS that best fits the present organization or even modify the newly deployed IS so that it fits the present organization. Empirical research showed (Davis, 1998; Bresnahan, 2001) that the second option creates significantly less benefits from IT use because when an enterprise adapts an IS to its present organization, it loses the opportunity to gain new competitive advantages and effectively postpones any organizational change until the deployed IS itself is replaced. By adapting the IS to the organization, the enterprises also lose the benefits of all the regular upgrades and patches released by the software manufacturer which significantly raises the costs of the IS upkeep (Davis, 1998). Thus, we recommend strict monitoring of the costs of additional development and technical changes made to the IS so that the internal stakeholders do not pick the easier but more expensive option.

- **Key user involvement**

The importance of user satisfaction and acceptance of the new IS as a predictor of a successful SISP implementation is well documented (Gottschalk, 1999; Bechor et al., 2010). When an enterprise involves key users in the SISP process, they get a broader understanding of the significance of the SISP process for the enterprise as a whole and better comprehend the necessity to change their tasks (Bingi et al., 1999) which lowers their overall resistance to change. User involvement in SISP thus positively impacts the flexibility of the

IS, which in today's uncertain environment is often an important benefit (Palanisamy, 2005).

- **End user training for IT use**

End user training is necessary when enterprises implement SISP because it provides the necessary knowledge to end users for efficient execution of their tasks within the newly deployed IS. The goal of the training should be to enable the users to perform new tasks, do existing tasks faster and increase their quality of work. Good user training also significantly reduces the resistance to change from the end users (Mahrer, 1999). Gottschalk (1999) also found out that if enterprises pay attention to user training during the planning stages of SISP, user training becomes a good predictor of the success of SISP implementation.

- **The control and evaluation of the SISP process**

As implementation of the strategic IS/IT plan usually lasts from three to five years, the constant control and evaluation of the entire SISP process by top management is essential. Without it, an enterprise cannot establish a positive SISP learning loop that improves the quality of decisions made through the entire SISP process (Kuang et al., 2001). Since researchers found out that control and evaluation of the SISP process are most seldom conducted even though they have a significant impact on the SISP success (Lederer & Newkirk, 2006), we encourage top management to not shrink back from their strategic responsibility to actively manage the SISP process.

After defining our 14 SISP success predictors, we complete the literature review by identifying the variables that the literature considers best measures the successfulness of the SISP process. Since the literature recognizes the process approach for modeling the deployment of IT as superior to the »black box« variance modeling approach (Devaraj & Kohli, 2003), we used the process approach to measure the successfulness of our SISP method. The process approach requires researchers to first measure the quality of SISP in an enterprise with their SISP method. Then, a comparison should be made between the individual SISP scores achieved by enterprises and the variables that directly measure enterprise success at the deployment and use of IT. Only then should the comparison be widened to include the variables of economic success (usually variables of productivity). The added benefit of such an approach is that it helps enterprises identify not only the quality of the employed SISP method, but also find out if the issues with the deployment of IT lie in the limited use of IT or in the fact that IT use itself is not generating economic benefits.

To find a direct measure for the deployment and actual IT use in the enterprises, we modified the scales of capacity utilization that are used by the US Federal Reserve (Fed) to measure the average rate of efficiency with which all technologies available to a nation are used (Morin & Stevens, 2004). The Fed measures the average efficiency (utilization rate of all available technologies) by comparing the current total output of an enterprise to the highest possible output that an enterprise could achieve in a time of need (war, natural disasters, etc.).

To find the best suited variable of economic success, we reviewed the published studies from the OECD area and found that the IT deployment models that used added value per employee or the growth of added value per employee had the most explaining power of all the type of models (Dedrick et al., 2003). The exception is Strassman's (1990) model where Return on Sales showed a similar explaining power. Since empirical evidence showed that enterprises in Slovenia, in general, behave as wage maximizers and not profit maximizers (Prašnikar & Svejnar, 1998), a variable that is based on the generated profit as a measure of success would be inadequate. Thus, we used the variable of the added value per employee as the key monetary variable of economic success since non-monetary alternatives such as the satisfaction of customers in Slovenia did not prove themselves yet by producing significant results (Škerlavaj, 2003).

3. METHODOLOGY

In this section, we address all the procedural issues related to the statistical validity and reliability of the results of the empirical test of our SISP method. We split the issues into three sections all researchers have to address during the course of an empirical research. Those are: preparation of the questionnaire, selection of the appropriate statistical method to conduct the test and analysis of the sample adequacy for parametric testing.

3.1. Preparation of the Questionnaire

The first issue we addressed when designing the questionnaire was how to measure our 14 key predictors of SISP success that together form our SISP success scale. To stay true to our goal of practical usability, we decided to employ the five-point Likert scales (strongly positive, positive, indifferent, negative and strongly negative) because of its conceptual unambiguousness and widespread use. There is namely a long established practice of using Likert scales when measuring social phenomena (Newsom, 2005), even though Likert scales were considered ordinal by Stevens (1946) and, as such, inappropriate to be used as interval scales for purposes of computing sample averages and standard deviations. Following Stevens' assertions, multiple empirical tests in the social science literature examined his claim and concluded that "for many statistical tests, rather severe departures (from intervalness) do not seem to affect Type I and Type II errors dramatically" (Jaccard, Wan 1996: 4). In addition, there is a large body of literature that on a theoretical level opposes Stevens' (1946) view that parametric tests should not be used to test factors measured by any type of ordinal scale. Their view is that as long as the scale has five or more points and the distribution of the measured variable does not severely violate the assumptions of normal distribution, one can proceed with parametric testing independent of the type of measuring scale (Barrett et al., 2005; Newsom, 2005).

The second issue we needed to solve became apparent after we received feedback from enterprises that helped us test if our questionnaire is ready for use. Unfortunately, during this phase of questionnaire development, several enterprises expressed their inability to estimate our direct measure of IT deployment that was based on the measure used by the US Fed; the maximum potential output of all the deployed IT. Hence, a further adjustment to the measurement scales of direct IT deployment and use had to be made. The scales were still based on the empirically confirmed concept that IT creates value through its use in the processes of added value generation (Buonanno et al., 2002; Guimaraes et al., 2002) as defined by Millar and Porter (Millar & Porter, 1985). However, instead of asking about the direct effect of the actual and potentially maximum use of the deployed IT on the output, enterprises were asked to estimate the percentages of work hours that are actually spent using IT and the percentage of work hours that would have to be spent using IT to gain all the benefits from the deployed IT. No additional issues arose with the third key variable in our research, the data on economic success. Since this data is publicly available in the government AJPES database (AJPES, 2005), we did not need to collect it ourselves.

3.2. Method selection

With all the issues concerning the questionnaire resolved, we focused on the process of the selection of the adequate statistical test to examine the empirical usefulness of our SISP method. We tried to pick a statistical test that would be as robust and simple as possible in order to accomplish our goal of creating an easy to use method. Since multivariate tests drastically raise the amount of data an enterprise has to collect in order to hold all important influences on the examined variables in the model constant, they are not very easy to use. Thus, our selection process focused on finding the appropriate univariate test. In the end, we decided to use Student's independent sample t-test. This test is namely one of the most widely used by the scientific community when one is confronted with several independent interval variables and one ordinal dependant variable (Sharma, 1996). When selecting our ordinal dependent variable, we paid special attention to the fact that enterprises have to quickly and firmly grasp the concept behind our statistical testing. Our binomial ordinal variable thus divides the sampled enterprises into two clearly distinguishable groups. The first group is composed of enterprises that achieved 33.3% of the highest SISP scores in the sample. The second group is composed of enterprises that achieved 33.3% of the lowest SISP scores in the sample. In our opinion, statistically significant differences between these two groups clearly, robustly and on a very intuitive level present to the public the key differences between the enterprises that manage SISP with success and the ones that do not.

The decision to use the arbitrary cut-off point of one-third was made as a compromise between two conflicting goals of the statistical analysis. The first goal is to clearly confirm that the scores enterprises achieve when using our SISP method actually correlate with statistically significant differences in the use of IT and the economic success of the enterprise. This goal would, of course, lead us to raise and lower the inclusion point for an enterprise to be selected in the top or bottom group as far as possible in order to achieve as high a difference in the average SISP score as possible between the top and bottom group. However, the second goal works in the opposite direction and desires the inclusion of as many enterprises as possible into the two groups so that the robustness of our SISP method is demonstrated. In our opinion, the grouping of one-third of the top and bottom ranked enterprises in each group adequately joins these two conflicting goals. Such a cut-off point namely still presents a very robust number of included enterprises in both groups. However, it also does not trivialize the importance of the difference between the SISP scores of enterprises that barely managed to achieve the cut-off SISP score for the top or the bottom group when we express this difference as a percentage of the standard deviation of the sample average SISP score.

3.3. Analysis of Sample Adequacy for Parametric Testing

We collected the needed data for the empirical test of our SISP method in the scope of a broader survey on the use of IT in enterprises in Slovenia (Hovelja, 2006). The survey was conducted between January and May of 2005 and targeted the population of the 1000 largest non-financial enterprises in Slovenia based on the added value they generate. This group generated 40% of the total added value in the country in 2003 and employed 31% (285.357) of the workforce (AJPES, 2005). To prevent any issues caused by specific differences between large and small enterprises, we followed the recommendations in the reviewed OECD literature and limited the studied population to enterprises with 25 or more employees. In addition, we limited the studied population to enterprises that did not exhibit larger fluctuations in earnings and employment than +/- 50% in the studied year (2004). In this way, we limited the probability that the studied enterprises in the studied year would not be having an average business year. After we imposed these two limits, our target population of 1000 enterprises diminished to 914 which received the questionnaires by mail. From the managers of their IT departments, we received 94 appropriately completed questionnaires.

Based on personal and by phone communication with the managers of the involved 914 IT departments, we concluded that the relatively low 10.28% response rate was mainly caused by the lack of time and/or knowledge needed to fill out the questionnaire. Since redoing the survey with an even more simplified questionnaire would have severely hampered the goals, quality and completeness of our research, we tried to determine if the 94 "surveyed" enterprises adequately represent the studied population. A sample that is obtained in the above described way is considered adequate for parametric testing when one can assume that the sample's studied variables are not affected by the non-response bias that causes the confidence interval of a sample estimate to not include the actual population value of a studied variable (Fogliani, 2002).

Since the variability of the studied variables is the most important cause for a given non-response rate to produce a non-response bias, we analyzed the sample variability of the economic variables with known population values to find out the amount of variability that can be reached, before the sample confidence intervals of their averages stop including the population averages. The Z-tests showed that for the economic variables with known population values provided by the AJPES database, the variability measured by the relative standard deviation in the sample of 110% or higher caused the 95% confidence intervals of the sample estimates to not include the actual population values. The only two economic variables that exhibited such large variability were the number of employees and the created added value per enterprise per year (AJPES, 2005). Since the sample relative standard deviations for the studied variables with unavailable population data (SISP scale variables and variables of IT deployment and use) were lower than 65% of the relative standard deviation, it can be assumed that the economic size bias in the sample, favoring enterprises of larger size, in all probability does not statistically significantly affect the variables of interest for this paper. Further tests also showed that the skewness and kurtosis of the studied variables did not exceed the ranges that would greatly violate the assumptions about the normal distribution of the variables and thus make parametric testing problematic (Ozgur & Strasser, 2004; Barrett et al., 2005).

The reliability of the IT managers responding to the survey was tested with the intra-class correlation coefficient (ICC). Since we are developing a method of measuring SISP that will hopefully be used by others, we conducted the ICC test with the help of the Two-Way Random model (Ricard, 2009). Given that different scores by different IT managers on the five-point Likert scales can be seen as disagreements, we used the Absolute Agreement type model (Ricard, 2009). Since the units of our analysis are the means of the ratings of the enterprises in the two studied groups, the ICC reliability test was based on the average ICC measures (Garson, 2009). The survey's average ICC measure was 0,992. By convention, an ICC above 0.7 is considered acceptable and above 0,9 very good (Garson, 2009); thus, we proceeded with the analysis of the results, under the assumption that the analyzed data is sufficiently reliable to be generalizable to all possible judges (Garson, 2009). With the help of Cronbach's alpha, we also tested the appropriateness of combining the grades of our 14 key success predictors into a single SISP scale. The widely-accepted social science cut-off that the alpha should be 0.70 or higher for a set of items to be considered a scale (Garson, 2010) was surpassed with an alpha score of 0.743. Based on the results of all the above described tests, we can that the sample data validly and reliably represents the studied parameters of the targeted population.

4. RESULTS OF THE EMPIRICAL RESEARCH

In Table 2, we present the average scores of our 14 key predictors of SISP success and our overall SISP method scores. Thus, the provided data can be a major asset for the enterprises that want to benchmark themselves with the help of our method against the sample average values of the studied variables, average values of the studied variables for the low scoring group (bottom third of enterprises based on our SISP method score), and average values of the high scoring group (top third of enterprises based on our SISP method score) in order to find out how successfully they are managing the 14 key SISP success predictors and where they rank based on our SISP method score.

Table 2. Average scores of SISP predictors and overall SISP method scores

Key SISP process predictors, overall SISP score, measures of IT deployment, IT use, IT utilization rate and economic success	*Sample average (n=94)*	*Sample stand. dev.*	*Low score SISP group avg.*	*High score SISP group avg.*	*Independent Sample T test P-value (2-tailed)*
Top management commitment and involvement	3.606	0.907	2.939	4.212	0.0001
Quality of strategic business planning	4.191	0.78	3.667	4.576	0.0001
IT role in strategic business planning	3.968	0.873	3.333	4.485	0.0001
Alignment of key internal business and IT strategies	4.431	0.49	4.379	4.47	0.4695
Alignment of key external business and IT strategies	4.367	0.673	4.379	4.318	0.7345
Consistency of a priority list of IT projects for the realization of internal business strategies	1.394	0.553	1.333	1.455	0.3989
Consistency of a priority list of IT projects for the realization of business strategies	1.553	0.713	1.394	1.606	0.1792
Quality of work of the project teams	3.521	0.758	3	4.121	0.0001
The design and implementation of organizational changes	3.138	0.837	2.455	3.727	0.0001
The design and implementation of technical changes	3.043	0.891	2.485	3.455	0.0001
Adaptation of the organization to fit the acquired IT	3.234	0.86	3.242	3.515	0.1974
Key user involvement	3.245	0.9	2.667	3.788	0.0001
End user training for IT use	3.511	0.852	2.879	3.939	0.0001
Control and evaluation of IT selection/implementation/use	3.191	0.942	2.455	3.97	0.0001
SISP score	**46.394**	**5.364**	**40.606**	**51.636**	**0.0001**
Deployed IT potential (% of all work hours)	**63.445**	**20.767**	**51.865**	**69.491**	**0.0005**
Actually used IT (% of all work hours)	**51.070**	**20.243**	**39.472**	**57.371**	**0.0002**
IT utilization rate	**0.792**	**0.136**	**0.750**	**0.821**	**0.0490**
Added Value per employee 2004 (Euro)	**35778**	**27396**	**30930**	**47140**	**0.0278**

Thanks to the methodological work done in the previous section, we are able to state that any difference in averages of the variables between the two groups of enterprises with the lowest and highest SISP scores in Table 2 has a statistical significance for the studied population, when the independent sample t-test shows a 95% degree of confidence in the difference of averages (P-value < 0.05). Thus, we can state that our SISP method ranked enterprises into two groups that exhibit important and statistically significant differences in the direct measures of IT deployment and use, as well as in the amount of created added value per employee. Based on these findings, we can conclude that we achieved the major goal of our research and developed a method that can be easily used in practice while delivering statistically proven results. The empirical tests namely showed that the enterprises ranked higher by our SISP method also statistically significantly better deploy and use IT, achieve a higher IT capacity utilization rate and realize a higher economic success measured by the created added value per employee.

The analysis of individual SISP success predictors can give us further insights into the reasons why the group of enterprises with the high SISP scores achieved statistically higher values of the variables measuring SISP success. Based on the comparison of individual SISP success predictor scores between the high and low SISP scoring groups of enterprises (Table 2), we can see that the major differences between the groups were caused by nine success predictors. These are: top management commitment and involvement, quality of strategic business planning, the role of IT in strategic business planning, the quality of work of the project teams, the design and implementation of organizational changes, the design and implementation of technical changes, key user involvement, end user training for IT use, and the control and evaluation of the selection, implementation and use of IT. By using Table 1 to identify the stakeholder groups that are responsible for the management of these nine SISP success predictors, we can conclude that the higher economic and operational success of the high scoring SISP group is based on the significantly better performance of stakeholders that do not come from the IT field. Hence, top management and middle management from the high scoring SISP group are significantly more involved in the overall SISP process in the enterprise and are better at executing their tasks, especially in the implementation phase of SISP. Based on such results, we call on enterprises with limited involvement of non-IT stakeholders in the implementation phase of their SISP processes to seriously rethink their approach and embrace a conceptually broader understanding of SISP management that evolved in the literature in recent years.

The analysis of individual SISP success predictors exposes another problematic issue; this issue, however, concerns the group of enterprises with high SISP scores that compared to the low scoring SISP group does not statistically better manage five of our SISP success predictors. These five predictors are the ones that focus on the creation of competitive advantages through the strategic use of IT. The OECD literature review made it clear that the alignment of business and IT strategies and the consistency of the priority list of IT projects are crucial building blocks of a successful SISP process because they raise IT planning from an operational level onto the strategic level. This conceptual advancement in SISP management theory does not seem to be significantly present in Slovenia, even in enterprises that achieved high SISP scores. As a result of this, we would encourage top and IT management, which are both responsible for the successful execution of these success predictors, to start working together as a team. Top management should thus consider IT management an equal partner when it comes to the generation of ideas on how IT deployment and use could achieve competitive advantages and how to prioritize IT investments and align them with business strategies. IT management should likewise abandon the concept that their job is done when the IS technically works and realize that their job is only done when the IS brings significant competitive advantages to the enterprise.

5. CONCLUSIONS AND DISCUSSION

In the previous three sections, we addressed all four research questions posed in the introduction of the paper. To identify the key predictors of SISP success, we conducted an extensive literature review. Based on it, we defined our 14 key predictors (Table 1) in a way that enabled us to also answer the second research question about which stakeholders carry the responsibility to successfully manage them. With the help of the literature, we then identified three internal stakeholders (top management, IT management, middle management) that carry the responsibility of adequately managing our 14 key SISP success predictors.

To answer the third research question that asked about the correlation between our SISP method scores on one side and the direct measures of IT deployment and use and the economic success of an enterprise on the other side, we had to first conduct an empirical study. Without it, we also could not answer the fourth research question that asked about the success of internal stakeholder groups at managing SISP success predictors. The results of our empirical test showed that the overall SISP score an enterprise achieved by grading its performance in our 14 key SISP success predictors correlates with the statistical significance with a more efficient deployment of IT, higher IT use and higher economic success of the enterprise in terms of created added value per employee. The results also show that the main differences between enterprises in Slovenia that manage SISP successfully (high SISP score) and the ones that do not (low SISP score) are in the top management support for the SISP process and in the quality of execution of the SISP implementation phase. In the SISP implementation phase, crucial non-IT stakeholder groups of top and middle management in the low scoring SISP enterprises namely complete their responsibilities to a significantly lower standard than in the high scoring ones.

However, even the group of high SISP scoring enterprises in Slovenia exhibits significant deficits in the quality of SISP management when we compare their performance in the 14 SISP success predictors to the performance of enterprises from the OECD area. The deficit is visible mainly in the success predictors of the SISP planning phase that require of an enterprise to align its IT and business strategies and prioritize its IT investments in a way that creates important strategic competitive advantages. In these success predictors, the high SISP scoring group of enterprises unfortunately did not show any significant improvements in performance when compared to the low SISP scoring group. Thus, we can conclude that both low and high SISP scoring enterprises in Slovenia have to significantly improve their execution of the SISP planning phase through the improvement of the teamwork between top and IT managers.

We hope that the above identified issues of SISP process management as well as the suggested solutions will improve the quality of SISP management in enterprises in Slovenia and abroad that recognize themselves in the above described situation. Thus, further research should follow two goals. The first goal is to gather empirical data on the usefulness of our SISP method in different countries in order for the method to develop into a standardized management tool. The second goal is to gather additional insights into the workings of the SISP process by widening the analysis onto environmental and organizational characteristics that affect the success of SISP so that even better practical SISP management solutions can be developed.

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MJERENJE USPJEHA STRATEŠKOG PLANIRANJA INFORMACIJSKIH SUSTAVA U PODUZEĆIMA U SLOVENIJI

Sažetak

Kao konzultanti za najveća slovenska poduzeća, konstatirali smo da iako se u literaturi nalazi mnogo metoda strateškog planiranja informacijskih sustava (SISP), njih poduzeća još uvijek ne upotrebljavaju. S namjerom da istražimo ovaj problem razvili smo novi pristup za evalvaciju uspjeha SISP, u kojem na praktičan način kombiniramo najvažnije prediktore uspjeha SISP s područja strateškog planiranja informacijskih sustava i strateškog poslovnog planiranja. Nadamo se da će naš pristup omogućiti poduzećima da ocjenjuju i kontroliraju rezultate prediktora uspjeha SISP procesa i da identificiraju sudionike koji su odgovorni za upravljanje njima.