

## Association for Information Systems AIS Electronic Library (AISeL)

---

UK Academy for Information Systems Conference  
Proceedings 2012

UK Academy for Information Systems

---

Spring 3-27-2012

# Identifying factors in the relationship between top management and IS personnel

Anton Manfreda

*University of Ljubljana, Faculty of Economics, anton.manfreda@ef.uni-lj.si*

Mojca Indihar Štemberger

*University of Ljubljana, Faculty of Economics, mojca.stemberger@ef.uni-lj.si*

Follow this and additional works at: <http://aisel.aisnet.org/ukais2012>

---

### Recommended Citation

Manfreda, Anton and Štemberger, Mojca Indihar, "Identifying factors in the relationship between top management and IS personnel" (2012). *UK Academy for Information Systems Conference Proceedings 2012*. 21.  
<http://aisel.aisnet.org/ukais2012/21>

This material is brought to you by the UK Academy for Information Systems at AIS Electronic Library (AISeL). It has been accepted for inclusion in UK Academy for Information Systems Conference Proceedings 2012 by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact [elibrary@aisnet.org](mailto:elibrary@aisnet.org).

# IDENTIFYING FACTORS IN THE RELATIONSHIP BETWEEN TOP MANAGEMENT AND IS PERSONNEL

**Anton Manfreda, Mojca Indihar Štemberger**

*University of Ljubljana, Faculty of Economics, Kardeljeva ploščad 17, 1000  
Ljubljana, Slovenia*

Email: anton.manfreda@ef.uni-lj.si, mojca.stemberger@ef.uni-lj.si

## **Abstract**

*Permanent development of new technologies, growing expectations of customers and constant struggle for surviving in the market are forcing companies to develop business innovations including innovative information systems in order to obtain competitive advantages. However, consequences of implementing them in inefficient relationship between top management and IS personnel are often neglected. There are still numerous failed IS implementation projects due to failed attempts to align business and IS spheres in the companies. Neglecting the gap between top management and IS personnel can cause severe consequences. The purpose of this research is thus to ease the understanding of the relationship between top management and IS personnel and to define key factors that are important in this relationship. 221 CIOs and 93 CEOs agreed to participate in the research and the responses were compared reciprocally. The result of the empirical investigation reveals the existence of nine factors that are important in the business-IS relationship with seven factors being perceived differently by the top management and IS management and thus causing the gap in the business-IS relationship.*

**Keywords:** business-IS relationship, IS personnel, IS managers, top management

# IDENTIFYING FACTORS IN THE RELATIONSHIP BETWEEN TOP MANAGEMENT AND IS PERSONNEL

## Abstract

*Permanent development of new technologies, growing expectations of customers and constant struggle for surviving in the market are forcing companies to develop business innovations including innovative information systems in order to obtain competitive advantages. However, consequences of implementing them in inefficient relationship between top management and IS personnel are often neglected. There are still numerous failed IS implementation projects due to failed attempts to align business and IS spheres in the companies. Neglecting the gap between top management and IS personnel can cause severe consequences. The purpose of this research is thus to ease the understanding of the relationship between top management and IS personnel and to define key factors that are important in this relationship. 221 CIOs and 93 CEOs agreed to participate in the research and the responses were compared reciprocally. The result of the empirical investigation reveals the existence of nine factors that are important in the business-IS relationship with seven factors being perceived differently by the top management and IS management and thus causing the gap in the business-IS relationship.*

**Keywords:** business-IS relationship, IS personnel, IS managers, top management

## 1. Introduction

Innovative information systems are definitely a challenge that enables companies to obtain competitive advantage and fulfil growing expectations of different clients; however, being innovative is not enough, particularly in case that top management does not perceive the business value in the IS innovativeness. Therefore efficient relationship between IS and top management is a precondition for gaining the advantage from innovativeness.

The relationship between top management and IS personnel is namely crucial for successful IS implementation; however, it is not adequate in many companies (Nord, Nord, Cormack, & Cater-Steel, 2007). It is problematic since the emergence of software applications for general business use in the 1960th (Doll & Ahmed, 1983; Ward & Peppard, 1996). The reason for problematic relationship is in the difference between business and IS sphere and is often labelled as a gap between IS personnel and top management (Ward & Peppard, 1996). This gap is causing different views and expectations from IS personnel and top managers as well, and is consequently preventing a company to develop a competitive advantages based on IS (Grindley, 1992).

Several attempts were made to improve the relationship between IS personnel and business managers. However, these attempts were not as successful as promising and there are still numerous failed IS implementation projects in the companies.

It was shown decades ago that the credibility of IS personnel is determined on the successfulness of IS implementation which depends on understanding the business needs (Doll & Ahmed, 1983). Even though, due to the gap between top management and IS personnel there are several unsuccessful IS project implementations, and therefore the credibility of IS personnel is reduced and top management is less willing to support them (Nord, et al., 2007). Consequently, the IS personnel is not appropriately positioned in the company and their solutions are not aligned with the business strategy. It is like a never-ending cycle of reducing the credibility. Contrary, only a few companies were able to successfully manage the business-IS gap (Ward & Peppard, 1996). Consequently, there were several inadequate and unsuccessful IS investments and merely a small proportion of companies were strategically investing in IS (Tallon, Kraemer, & Gurbaxani, 2000).

Therefore it is necessary to present and examine the factors and measures of business-IS relationship and thus contribute to the efficient relationship between top management and IS personnel. Merely in efficient relationship the top management will perceive the value in IS and treat IS personnel as a strategic tool and not mere as a cost.

The paper is divided into four main parts. First, the theoretical background on the relationship between top management and IS personnel is reviewed. Second the research methodology is presented followed by data analysis and presenting the results and finally implications and some directions for future research are outlined.

## **2. Literature review**

### **2.1 The relationship between top management and IS personnel**

The relationship between IS personnel and top management has been discussed for several decades. It was claimed that the relationship is problematic since the

appearance of software applications designed for wide business usage (Doll & Ahmed, 1983), namely since organizations became increasingly dependent on IS (Peppard, 2001).

The problematic relationship arises due to differences between business and IS sphere and is generally denoted as a cultural gap between IS personnel and top management (Ward & Peppard, 1996). The gap is generally defined as a lack of understanding between management and IS personnel in the company (Coughlan, Lycett, & Macredie, 2005; Peppard & Ward, 1999). In many companies business departments and IS departments namely do not have matching views and visions regarding the role of IS personnel and IS department, and consequently causing uncertainty regarding the role of IS personnel (Nord, et al., 2007).

Further, top management often perceive IS merely as a support function with the single goal of automating business process (Dos Santos & Sussman, 2000). Given that, companies are usually optimizing existing processes instead of using IS department for complete business process renovation (Kovačič, 2004). Thus, IS department and IS personnel presents merely a cost in the company and not a business value.

This problematic relationship is therefore preventing organizations from developing competitive advantages out of IS (Grindley, 1992; Ward & Peppard, 1996). It was claimed that the gap will be bridged with the advent of new more educated managers (Grindley, 1992); however, many companies are still reporting insufficient coordination of work and knowledge sharing due to the misunderstanding between business and IS departments (Martin, Hatzakis, Lycett, & Macredie, 2004).

The existence of the gap was exposed in a study (Willcoxson & Chatham, 2006) that was comparing personal characteristics of IS managers and business managers. The results exposed significant differences related to the leadership behaviour and task orientation between them. It was shown that IS managers treat IS more as a service or task role rather than a strategic or relationship oriented, which is consequently causing difficulties in the business-IS relationship. These differences in the emotional and psychological profiles are also causing that IS remains merely a supporting function in the company and confirming the previous studies (Dos Santos & Sussman, 2000).

It was already shown that organizations should emphasize managing and organizing IS within the organization instead of focusing merely on technology in order to obtain sustainable competitive advantage (Bharadwaj, 2000; Kettinger, Grover, Guha, & Segars, 1994; Mata, Fuerst, & Barney, 1995) and emphasize the business role of IS departments in order to obtain top management support (Indihar Štemberger, Manfreda, & Kovačič, 2011).

Therefore it is important to include professionals with appropriate skills and behaviour in IS project teams as this will emphasize the effective communication (Parolia, Goodman, Li, & Jiang, 2007) and consequently contribute to the improved business-IS relationship.

## **2.2 The role of IS managers**

IS managers and business managers have crucial role in the relationship and consequently for the successful IS project implementation. It was shown that possessing IS knowledge and skills by top management has positive influence on the IS adoption in the company (Armstrong & Sambamurthy, 1999). The research thus indicates that responsible management will obtain at least some of the needed skills.

Further, it was claimed that top management should understand the strategic role of IS department, possess adequate IS knowledge and provide enough resources for IS project implementation (Ranganathan & Kannabiran, 2004). Responsible top management has thus an important role, as merely considering the strategic role of IS leads to obtaining comparative advantages from IS, while technology itself is not a sufficient factor for successful IS implementation (Dhillon, 2008).

Nevertheless, it was shown decades ago that it is the role of IS managers to present IS as a strategic resource and IS implementation as a project of delivering value to the organization in order to obtain top management support (Earl & Feeney, 1994). Top management support, defined mainly as supporting initiatives of IS personnel and understanding the importance of IS (Ragu-Nathan, Apigian, Ragu-Nathan, & Tu, 2004), is crucial for successful IS implementation (Jarvenpaa & Ives, 1990; Ranganathan & Kannabiran, 2004); however, without proper communication with top

management, IS managers and IS personnel are not capable to present themselves as strategic resource (Nord, et al., 2007).

Therefore, IS managers should develop skills that ease the process of communication with top management. The importance of knowledge and skills required for IS professionals and the importance of professional activities was investigated in three levels of IS management in different industries (Wu, Chen, & Chang, 2007). The results revealed that each level of IS management perceive the importance of the professional activities differently; however, there were no significant differences considering the type of industry. Further, it was shown that implementing important IS activity involves the use of different skills and knowledge.

The importance of various skills and knowledge of IS personnel with similar findings was presented in an empirical research (Lerouge, Newton, & Blanton, 2005), where it was found that a variety of different skills and knowledge is important, including business, managerial and technological skills. It was also claimed that IS manager should have a technological background; however IS manager with a strategic orientation will more likely assist in forming a profitable company (Sobol & Klein, 2009) since managerial competences positively influence the effectiveness of IS manager (Chen & Wu, 2011).

Responsible IS managers should thus establish an efficient relationship with other business managers, and therefore various business and management skills are needed. However, communication itself is not a sufficient condition, since without knowing the factors that are important in business-IS relationship, the latter cannot be improved. Therefore, appropriate communication is merely a precondition for reaching business departments while building efficient relationship requires knowing the key factors in the relationship. This research thus examines the business-IS relationship in order to expose these factors.

Based on the literature review we hypothesize that the business-IS relationship contains several factors causing the gap between top management and IS personnel.

### **3. Research methodology**

#### **3.1 Research instrument**

The research question was empirically tested using the data from Slovenian companies. Two nearly identical questionnaires were developed, namely for IS department managers (CIOs) and for top management (CEOs). The purpose of developing two identical questionnaires was to find factors that are causing the gap between them.

The questionnaire was, among other indicators that are not relevant for this research, composed of 16 items measuring the importance of different CIO's knowledge and skills. Further there were 13 items measuring the role of IS personnel and 13 items measuring the importance and position of IS personnel in the company. The named items were measured using a structured questionnaire with 7-point Likert scales and were evaluated both by CIOs and CEOs. The whole list of items included in this research is listed in the Article Appendix.

To ensure the content validity a questionnaire was built on the basis of previous findings in the literature (Byrd & Davidson, 2003; Ward & Mitchell, 2004) and previous research (Groznič, Kovačič, Jaklič, & Indihar Štemberger, 2001; Indihar Štemberger, et al., 2011). In addition to previous research the knowledge items were defined more precisely.

#### **3.2 Data collection and sample characteristics**

Pretesting was conducted in 2010 using a focus group involving three academics interested in the field and ten semi-structured interviews with selected CIOs that were later also included in the study.

The entry criterion for including a company in the research was having at least 50 employees and net revenue from sales more than 8.800.000 euros. Based on that criterion 1495 companies were eligible to participate in the study, and consequently all CIOs in these companies were called and invited to participate. Companies where no one was formally involved in IS were excluded from further analysis. Collecting the data started in April 2011 and was concluded in August 2011. A total of 221 CIOs



agreed to participate which represents a 14.8% response rate. Responding companies present a representative sample of Slovenian medium and large companies.

Simultaneously, also CEOs were invited to participate and 93 CEOs agreed to took part in the research, representing a 6.1% response rate. Together, 312 cases that are appropriate for the analysis were obtained. The profile of respondents is shown in Table 1.

		Share in %	
		CIO survey	CEO survey
Type of organisation	Public organisation	18.2	20.4
	Private organisation	81.8	79.6
Position of CIO	Member of administration board	12.9	
	Directly subordinated to the top management	60.4	
	Indirectly subordinated to the top management	26.7	
Ownership	Mainly state ownership	22.5	24.5
	Minor state ownership	5.2	5.7
	Private domestic ownership	53.1	52.8
	Private foreign ownership	19.2	17.0

**Table 1: Profile of respondents (CEO and CIO survey)**

In both samples the share of private and public companies and ownership structure is comparable, and therefore the samples resemble enough to perform a further analysis.

## **4. Data analysis and results**

To define factors that are important in business-IS relationship an exploratory factor analysis using SPSS 19.0 was conducted and a principal axis factoring extraction method with a Varimax rotation was used.

### **4.1 Factors in the relationship**

Given that factor loadings that exceed 0.45 are reliable according to the recommendations for identifying significant factor loadings based on sample size (Hair, Anderson, Tatham, & Black, 1998), items with loadings below 0.45 are not included in factors. The results of factor analysis on questions related to the importance and position of IS department are presented in Table 2.

KMO = 0.889	Short description	Factor		
		1	2	3
imp1	IS and quality services	.186	.266	.653
imp2	IS and lower costs	.045	.124	.646
imp3	IS and successful business performance	.152	-.014	.802
imp4	IS and competitive advantage	.156	.031	.868
imp5	Top management and awareness of the importance	.768	.299	.157
imp6	Top management and active involvement	.780	.173	.238
imp7	Top management and sufficient IS knowledge	.632	.202	.149
imp8	Top management and sufficient resources	.573	.370	.050
imp9	Top management and supporting initiatives	.683	.476	.099
imp10	Top management and recognizing the merits	.683	.299	.157
imp11	Mutual reliance	.325	.748	.184
imp12	Commitment to good relationship	.418	.830	.104
imp13	Open and fair communication	.418	.756	.116

**Table 2: Rotated factor loadings – importance and position of IS department**

Factor 1 includes questions about relation between IS and top management, namely recognizing the importance of IS, providing enough resources for implementing IS projects, supporting initiatives of IS personnel, and therefore represent top management support to IS department and IS personnel. Factor 2 includes mainly questions related to reliance and fair communications between IS personnel and top management, and therefore represents mutual trust, while Factor 3 includes questions related to IS personnel providing competitive advantage, reducing costs and increasing efficiency, and therefore represent perceived value of IS personnel.

Table 3 presents the results of the factor analysis for the knowledge and skills factors. The results indicate the existence of four factors; however, in the last factor merely one variable is included. Factor 4 thus presents business knowledge and skills, Factor 5 technological knowledge and skills and Factor 6 managerial knowledge and skills. The item that loaded on Factor 7 refers to the IT governance frameworks and audit models, and therefore Factor 7 may possibly represent IT governance; however it will not be treated as a factor in the further analysis.

KMO = 840	Short description	Factor			
		4	5	6	7
kn11	Programming	-.222	<b>.638</b>	.078	.090
kn12	Operating systems	-.084	<b>.877</b>	-.012	-.031
kn13	Databases	-.096	<b>.881</b>	.085	.035
kn14	Telecommunications and networks	.068	<b>.725</b>	.010	.039
kn15	ERP	.234	.416	.149	.376
kn16	Audit models	.264	.104	.206	<b>.772</b>
kn17	Planning and organizing	<b>.678</b>	-.014	.173	.241
kn18	Motivating	<b>.731</b>	-.119	.197	.231
kn19	Project management	<b>.732</b>	-.064	.139	.219
kn110	Team working	<b>.742</b>	.077	.191	.101
kn111	Communication and coordination	<b>.854</b>	-.151	.243	-.047
kn112	Business processes	<b>.546</b>	-.054	.412	-.143
kn113	Relevant legislation	.186	.147	<b>.575</b>	.060
kn114	Risk management	.430	-.096	<b>.528</b>	.230
kn115	Individual functional areas	.140	.112	<b>.713</b>	.052
kn116	Business competitors	.210	-.012	<b>.615</b>	.157

**Table 3: Rotated factor loadings – knowledge and skills**

Factor analysis on items measuring the role of IS department revealed three additional factors. Factor 8 is composed of questions related to strategic IS planning, identifying IS needs, monitoring the performance of IS projects, and therefore represents business role of IS department. Factor 9 includes questions about assuring appropriate IS infrastructure, providing instructions and training, and therefore represents supporting role of IS department, while factor 10 represents technological role of IS department since it includes questions regarding IS architecture and developing IS solutions. Factor loadings are presented in Table 4.

KMO = 875	Short description	Factor		
		8	9	10
role1	Appropriate infrastructure	.013	<b>.882</b>	.142
role2	User support	.116	<b>.708</b>	.070
role3	Security in IS	.268	<b>.645</b>	.346
role4	Own development	.181	.320	<b>.455</b>
role5	Cooperating with external suppliers	.298	.228	.074
role6	Identifying IS needs	<b>.536</b>	.182	.399
role7	Formulating IS architecture	.361	.169	<b>.830</b>
role8	On-time conclusion of IS project	<b>.789</b>	.084	.089
role9	Proper organization	<b>.702</b>	.337	.178
role10	Considering a cost-specified range	<b>.722</b>	.111	.208
role11	Redesigning business processes	<b>.536</b>	.058	.159
role12	Strategic IS planning	<b>.733</b>	.031	.234
role13	Controlling the performance of IS projects	<b>.840</b>	.151	.219

**Table 4: Rotated factor loadings – roles of IS department**

The calculated Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) values are above 0.8 and thus indicating reliable factor analysis as values greater than 0.5 are

acceptable (Kaiser, 1974), while values greater than 0.8 are considered as very good (Hutcheson & Sofroniou, 1999). Further, Cronbach's alpha was calculated to determine the scale reliability of identified factors. Values above 0.7 are generally accepted (Kline, 1999), however in exploratory studies also values below 0.7 and above 0.50 are considered to be acceptable (Hair, et al., 1998; Nunnally, 1967). As it is evident from the Table 5, the Cronbach's alpha for all factors is above the recommended value and thus indicating high reliability of defined factors.

Therefore, the results indicate the existence of nine factors (factor 7 is excluded) that are important in the business-IS relationship:

- Top management support to the IS department (topSUP)
- Mutual trust between management and IS personnel (muTRUST)
- Perceived value of IS department (ISval)
- Managerial knowledge and skills of IS manager (manKNL)
- Technological knowledge and skills of IS manager (techKNL)
- Business knowledge and skills of IS manager (busKNL)
- Business role of IS department (busROL)
- Supporting role of IS department (supROL)
- Technological role of IS department (techROL)

These factors will be used in the further analysis to examine whether there are significant differences between top management and IS managers.

#### 4.2 CEO and CIO perception

Factor scores for identified factors were calculated using Anderson-Rubin method since this method is advised when uncorrelated and standardized factor scores are required (Tabachnick & Fidell, 2007). Independent-Samples T test was used to compare these factor scores for top management and IS managers in order to reveal significant differences in perception between them. The results of independent T test are presented in Table 5.

Factor	Cronbach alpha	T	df	Sig	Effect size
topSUP	0.89	9.752	254.778	<b>.000</b>	0.52
muTRUST	0.92	2.229	206.104	<b>.027</b>	0.15
ISval	0.84	-3.696	257	<b>.000</b>	0.22
manKNL	0.89	-1.348	115.272	.180	0.12
techKNL	0.85	6.513	184.229	<b>.000</b>	0.43
busKNL	0.75	.090	250	.928	0.01
busROL	0.89	4.562	224.599	<b>.000</b>	0.29
supROL	0.81	1.973	231.072	<b>.050</b>	0.13
techROL	0.68	2.725	214.100	<b>.007</b>	0.18

**Table 5: Reliability evaluation and independent t test**

The effect size was also calculated to examine that the effect of test statistics is meaningful and practically important. It was calculated using t values and degrees of freedom (Rosenthal, 1991). For factors with significant differences between top management and IS managers the effect size ranges from 0.13 to 0.52, indicating small (on supROL) to very large effect (on topSUP).

The results of t test are significant for seven factors while t test was not significant for the factors manKNL and busKNL. Considering the minor effect size for these two factors, it is reasonable to conclude that factor scores of top management do not differ from factor scores of IS managers.

## **5. Findings and implications**

The results indicate that seven factors, namely topSUP, muTRUST, ISval, techKNL, busROL, supROL and techROL are perceived differently by CEOs and CIOs as there are significant differences in factor scores between them, while two factors, namely manKNL and busKNL are similarly perceived. The latter signifies that IS managers assess the importance of their business and managerial knowledge similar to the expectations of top management. This finding is not reducing the importance of these two factors. Factors manKNL and busKNL are important in the business-IS relationship; though, they are not increasing the gap between top management and IS personnel. The latter has been anticipated as several researchers have been emphasizing the importance of business and managerial knowledge of IS personnel (Caldeira & Ward, 2003; Chen, Miller, Jiang, & Klein, 2005; Indihar Štemberger, et al., 2011) or emphasizing requisite skills to ease effective communication in IS project teams (Parolia, et al., 2007). Thus, it was expected that IS managers will start emphasizing business and managerial knowledge and skills.

However, this research revealed the existence of several different factors in business-IS relationships where homogeneity or at least common agreement is still not achieved, which consequently prevents companies from developing competitive advantage based on IS. Therefore efficient business-IS relationship should remain main challenge and a precondition for gaining the advantage from innovative information systems.

It is argued that in many companies CIO is the key driver of business innovation (Watts & Henderson, 2006), as information systems are an important source of innovation (Sambamurthy, Bharadwaj, & Grover, 2003). However, the prerequisite to perceive the business value in IS innovativeness is the efficient relationship between top management and IS managers. Therefore, managers on business and IS side should consider factors that are important in that relationship, particularly factors that are perceived differently and consequently causing the gap between them. It is thus important that top managers and IS personnel openly discuss the expectations and requirements on both sides. Presented factors form a guideline that should help both sides on identifying key problems in the business-IS relationship.

The research indicated that further study on relationship between top management and IS personnel is justified as there exists significant and practically important differences between them. Further research is thus needed to explore these factors into details including the research on personal characteristics; and consequently contributing to better understanding in the business-IS relationship.

## **6. Conclusion**

There are still too many failed IS projects in companies due to the inefficient business-IS relationship despite several studies in the field. Bridging the gap between top managers and IS personnel is thus highly important. Precondition for bridging the gap and being able to perceive the value in innovative information systems is to identify factors that are important in the business-IS relationship. This paper contributed to the understanding of key factors in the relationship between top management and IS managers and exposes factors where significant differences exist.

The results of the empirical investigation revealed the existence of seven factors with the underlying variables in the relationship that are perceived differently by top management and IS management, namely Top management support to the IS department, Mutual trust between management and IS personnel, Perceived value of IS department, Technological knowledge and skills of IS manager, Business role of IS department, Supporting role of IS department and Technological role of IS department; and two factors in the relationship with no significant differences

between IS managers and top management, namely Business knowledge and skills of IS manager and Managerial knowledge and skills of IS manager.

Top management and IS managers should thus consider these factors and dedicate significant effort in bridging the gap between them in order to improve mutual relationships. This will enable a successful use of innovative information systems and increase the value of IS perceived by the top management.

## References

- Armstrong, C. P. and Sambamurthy, V. (1999) *Information technology assimilation in firms: The influence of senior leadership and IT infrastructures*, Information Systems Research, 10 304-327.
- Bharadwaj, A. S. (2000) *A resource-based perspective on information technology capability and firm performance: an empirical investigation*, MIS Quarterly, 24 169-196.
- Byrd, T. A. and Davidson, N. W. (2003) *Examining possible antecedents of IT impact on the supply chain and its effect on firm performance*, Information & Management, 41 243-255.
- Caldeira, M. M. and Ward, J. M. (2003) *Using resource-based theory to interpret the successful adoption and use of information systems and technology in manufacturing small and medium-sized enterprises*, European Journal of Information Systems, 12 127-141.
- Chen, H. H. G., Miller, R., Jiang, J. J. and Klein, G. (2005) *Communication skills importance and proficiency: perception differences between IS staff and IS users*, International Journal of Information Management, 25 215-227.
- Chen, Y.-C. and Wu, J.-H. (2011) *IT management capability and its impact on the performance of a CIO*, Information & Management, 48 145-156.
- Coughlan, J., Lycett, M. and Macredie, R. D. (2005) *Understanding the business-IT relationship*, International Journal of Information Management, 25 303-319.
- Dhillon, G. (2008) *Organizational competence for harnessing IT: A case study*, Information & Management, 45 297-303.
- Doll, W. J. and Ahmed, M. U. (1983) *Diagnosing and Treating the Credibility Syndrome*, MIS Quarterly, 7 21-32.
- Dos Santos, B. and Sussman, L. (2000) *Improving the return on IT investment: the productivity paradox*, International Journal of Information Management, 20 429-440.
- Earl, M. J. and Feeney, D. F. (1994) *Is Your CIO Adding Value?*, Sloan Management Review, 35 11-20.
- Grindley, K. (1992) *Information systems issues facing senior executives: the culture gap*, The Journal of Strategic Information Systems, 1 57-62.
- Groznik, A., Kovačič, A., Jaklič, J. and Indihar Štemberger, M. (2001) *A comparison of the strategic IS planning practices in the developed and transition countries*, Journal of information technology management, 11 25-44.
- Hair, J. F., Anderson, R. E., Tatham, R. L. and Black, W. C. (1998) *Multivariate Data Analysis (5th ed.)*, New Jersey, Prentice-Hall.

- Hutcheson, G. and Sofroniou, N. (1999) *The multivariate scientist*, London, Sage Publications.
- Indihar Štemberger, M., Manfreda, A. and Kovačič, A. (2011) *Achieving top management support with business knowledge and role of IT/IS personnel*, *International Journal of Information Management*, 31 428-436.
- Jarvenpaa, S. L. and Ives, B. (1990) *Information Technology and Corporate Strategy: A View from the Top*, *Information Systems Research*, 1 351-376.
- Kaiser, H. (1974) *An index of factorial simplicity*, *Psychometrika*, 39 31-36.
- Kettinger, W. J., Grover, V., Guha, S. and Segars, A. H. (1994) *Strategic information systems revisited: a study in sustainability and performance*, *MIS Quarterly*, 18 31-58.
- Kline, P. (1999) *The handbook of psychological testing (2nd ed.)*, London, Routledge.
- Kovačič, A. (2004) *Business renovation: business rules (still) the missing link*, *Business Process Management Journal*, 10 158-170.
- Lerouge, C., Newton, S. and Blanton, J. E. (2005) *Exploring the systems analyst skill set: perceptions, preferences, age, and gender*, *Journal of Computer Information Systems*, 45 12-23.
- Martin, V. A., Hatzakis, T., Lycett, M. and Macredie, R. (2004) *Building the Business/IT Relationship through Knowledge Management*, *Journal of Information Technology Cases and Applications*, 6 27-47.
- Mata, F. J., Fuerst, W. L. and Barney, J. B. (1995) *Information technology and sustained competitive advantage: A resource-based analysis*, *MIS Quarterly*, 19 487-505.
- Nord, J. H., Nord, D. G., Cormack, S. and Cater-Steel, A. (2007) *An investigation of the effect of Information Technology (IT) culture on the relationship between IT and business professionals*, *International Journal of Management & Enterprise Development*, 4 265-292.
- Nunnally, J. C. (1967) *Psychometric theory*, New York, McGraw-Hill Education.
- Parolia, N., Goodman, S., Li, Y. and Jiang, J. J. (2007) *Mediators between coordination and IS project performance*, *Information & Management*, 44 635-645.
- Peppard, J. (2001) *Bridging the gap between the IS organization and the rest of the business: plotting a route*, *Information Systems Journal*, 11 249-270.
- Peppard, J. and Ward, J. (1999) *'Mind the Gap': diagnosing the relationship between the IT organisation and the rest of the business*, *The Journal of Strategic Information Systems*, 8 29-60.
- Ragu-Nathan, B. S., Apigian, C. H., Ragu-Nathan, T. S. and Tu, Q. (2004) *A path analytic study of the effect of top management support for information systems performance*, *Omega*, 32 459-471.
- Ranganathan, C. and Kannabiran, G. (2004) *Effective management of information systems function: an exploratory study of Indian organizations*, *International Journal of Information Management*, 24 247-266.
- Rosenthal, R. (1991) *Meta-analytic procedures for social research (2nd ed.)*, Newbury Park, Sage Publications.
- Sambamurthy, V., Bharadwaj, A. and Grover, V. (2003) *Shaping Agility through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms*, *MIS Quarterly*, 27 237-263.
- Sobol, M. G. and Klein, G. (2009) *Relation of CIO background, IT infrastructure, and economic performance*, *Information & Management*, 46 271-278.



- Tabachnick, B. and Fidell, L. (2007) *Using multivariate statistics* (5th ed.), Boston, Allyn & Bacon.
- Tallon, P. P., Kraemer, K. L. and Gurbaxani, V. (2000) *Executives' Perceptions of the Business Value of Information Technology: A Process-Oriented Approach*, *Journal of Management Information Systems*, 16 145-173.
- Ward, J. and Peppard, J. (1996) *Reconciling the IT/business relationship: a troubled marriage in need of guidance*, *The Journal of Strategic Information Systems*, 5 37-65.
- Ward, M. A. and Mitchell, S. (2004) *A comparison of the strategic priorities of public and private sector information resource management executives*, *Government Information Quarterly*, 21 284-304.
- Watts, S. and Henderson, J. C. (2006) *Innovative IT climates: CIO perspectives*, *The Journal of Strategic Information Systems*, 15 125-151.
- Willcoxson, L. and Chatham, R. (2006) *Testing the accuracy of the IT stereotype: Profiling IT managers' personality and behavioural characteristics*, *Information & Management*, 43 697-705.
- Wu, J.-H., Chen, Y.-C. and Chang, J. (2007) *Critical IS professional activities and skills/knowledge: A perspective of IS managers*, *Computers in Human Behavior*, 23 2945-2965.

## Article Appendix

Variables	Description
	<b><i>Importance and position of IS personnel in the company</i></b>
imp1	IS personnel enables implementing better and more quality services.
imp2	IS personnel enables performing operations with lower costs.
imp3	IS personnel enables successful business performance.
imp4	IS personnel enables obtaining competitive advantage.
imp5	Top management is aware of the importance of IS personnel.
imp6	Top management is actively involved in IS planning.
imp7	Top management have sufficient knowledge of IS.
imp8	Managers provide sufficient resources to implement IS projects.
imp9	Top management supports initiatives of IS personnel in the company.
imp10	Top management recognizes the merits to IS personnel for business development.
imp11	Mutual reliance exists between top management and IS personnel.
imp12	Top management is committed to good relationship with IS personnel (IS manager).
imp13	Communication between top management and IS personnel (IS manager) is open and honest.
	<b><i>The importance of different CIO's knowledge and skills</i></b>
kn1	Programming
kn2	Operating Systems
kn3	Databases
kn4	Telecommunications and networks
kn5	IS Solutions on the market (ERP)
kn6	IT governance frameworks (ITIL, COBIT)
kn7	Planning and organizing
kn8	Motivating
kn9	Project Management
kn10	Team working
kn11	Communication and coordination
kn12	Knowledge of business processes
kn13	Knowledge of relevant legislation
kn14	Risk management
kn15	Knowledge of individual functional areas (finance, marketing, production ...)
kn16	Knowledge of business competitors
	<b><i>The role of IS personnel in the company</i></b>
role1	Establishing and/or providing the appropriate infrastructure (hardware and software).
role2	Providing user support (training, assistance and advice in the use of tools and IS solutions, data extraction, and error correction).
role3	Concern for security in IS.
role4	Developing and/or the integrating IS solutions (own development).
role5	Cooperating with external suppliers.
role6	Identifying IS needs in the company.

role7	Formulating IS architecture.
role8	Concerning for on-time conclusion of open IS project (within the prescribed time frame).
role9	Concerning for the proper IS organization and/or quality (provision of relevant skills, standards, quality criteria ...).
role10	Ensuring the implementation of IS projects in a cost-specified range.
role11	Improving and redesigning business processes.
role12	Strategic IS planning.
role13	Controlling the performance of IS projects (enabling timely error detection).