UNIVERSITY OF LJUBLJANA

FACULTY OF ECONOMICS

ANTON MANFREDA

BUSINESS KNOWLEDGE AND ORIENTATION OF IT PERSONNEL AS FACTORS OF PARTNERSHIP WITH TOP MANAGEMENT

DOCTORAL DISSERTATION

Ljubljana, 2012

UNIVERSITY OF LJUBLJANA

FACULTY OF ECONOMICS

ANTON MANFREDA

BUSINESS KNOWLEDGE AND ORIENTATION OF IT PERSONNEL AS FACTORS OF PARTNERSHIP WITH TOP MANAGEMENT

POSLOVNA ZNANJA IN USMERJENOST INFORMATIKOV KOT DEJAVNIKA PARTNERSKEGA ODNOSA Z VODILNIM MANAGEMENTOM

DOCTORAL DISSERTATION

Ljubljana, 2012

AUTHORSHIP STATEMENT

The undersigned *Anton Manfreda*, a student at the University of Ljubljana, Faculty of Economics, (hereafter: FELU), declare that I am the author of the doctoral dissertation entitled *»Business knowledge and orientation of IT personnel as factors of partnership with top management (Poslovna znanja in usmerjenost informatikov kot dejavnika partnerskega odnosa z vodilnim managementom)«*, written under supervision of *prof. dr. Mojca Indihar Štemberger*.

In accordance with the Copyright and Related Rights Act (Official Gazette of the Republic of Slovenia, Nr. 21/1995 with changes and amendments) I allow the text of my doctoral dissertation to be published on the FELU website.

I further declare

- the text of my doctoral dissertation to be based on the results of my own research;
- the text of my doctoral dissertation to be language-edited and technically in adherence with the FELU's Technical Guidelines for Written Works which means that I
    - cited and / or quoted works and opinions of other authors in my doctoral dissertation in accordance with the FELU's Technical Guidelines for Written Works and
    - obtained (and referred to in my doctoral dissertation) all the necessary permits to use the works of other authors which are entirely (in written or graphical form) used in my text;
- to be aware of the fact that plagiarism (in written or graphical form) is a criminal offence and can be prosecuted in accordance with the Copyright and Related Rights Act (Official Gazette of the Republic of Slovenia, Nr. 21/1995 with changes and amendments);
- to be aware of the consequences a proven plagiarism charge based on the submitted doctoral dissertation could have for my status at the FELU in accordance with the relevant FELU Rules on Doctoral Dissertation.

Date of public defense: 3 October 2012

Committee Chair: prof. dr. Jurij Jaklič

Member: prof. dr. Andrej Kovačič

Member: prof. dr. Dušan Lesjak

Member: prof. dr. Vesna Bosilj Vukšić

Supervisor: prof dr. Mojca Indihar Štemberger

Ljubljana, 27 September 2012 Author's signature: _____

POSLOVNA ZNANJA IN USMERJENOST INFORMATIKOV KOT DEJAVNIKA PARTNERSKEGA ODNOSA Z VODILNIM MANAGEMENTOM

Povzetek

Odnos med vodilnim managementom in informatiki je predmet raziskav že več kot 50 let, saj je ta odnos pogosto neučinkovit in onemogoča učinkovito uporabo informacijskih sredstev v podjetju. Nerazumevajoč odnos med managerji in informatiki se v literaturi pogosto označuje kot prepad oziroma razkorak med omenjenima stranema.

Ta razkorak je posledica različnih pogledov in pričakovanj tako s strani informatikov kot vodilnih managerjev glede vloge informatikov v podjetju in posledično preprečuje, da bi podjetje razvilo konkurenčne prednosti na podlagi informatike. Neustrezni odnos ima negativne posledice za podjetje, saj onemogoča učinkovito investiranje v informatiko, zaradi česar je veliko projektov informatizacije neuspešnih, ter predvsem onemogoča izrabo informatike kot konkurenčne prednosti in prepoznavanje poslovne vrednosti v informatiki. Kljub prizadevanjem po premostitvi razkoraka med informatiki in managementom je ta v veliko podjetjih še vedno prisoten, podjetja pa se še vedno premalo zavedajo posledic neustreznega odnosa.

Prav zaradi razsežnosti, ki jih ima odnos med managementom in informatiki, je namen te disertacije prispevati k razumevanju razkoraka med vodilnim managementom in informatiki ter izboljšati sodelovanje med njimi.

Disertacija tako prikazuje dejavnike, ki so pomembni v odnosu med vodilnim managementom in informatiki ter proučuje in natančneje definira pojem razkoraka med njimi. Poleg tega izpostavlja dejavnike, ki ta razkorak povzročajo oziroma kjer so razhajanja največja, ter hkrati prikazuje dejavnike, ki na razkorak ne vplivajo oziroma kjer so pričakovanja vodilnega managementa usklajena z informatiki.

Osrednja tema disertacije je doseganje partnerskega odnosa, zato so v disertaciji predstavljeni dejavniki, ki ustvarjajo partnerski odnos med informatiki in managementom in tako omogočajo boljše sodelovanje med njimi, prepoznavanje poslovne vrednosti v informatiki in učinkovito izkoriščanje informatike za pridobivanje konkurenčnih prednosti. Glede na to, da je podpora vodstva informatiki eden izmed ključnih dejavnikov uspešne informatizacije, je prikazan tudi način, kako lahko informatiki dosežejo podporo vodilnega managementa.

Ključne besede: vodilni management, direktor službe za informatiko, informatiki, služba za informatiko, poslovna znanja, poslovni-IT razkorak, partnerski odnos.

BUSINESS KNOWLEDGE AND ORIENTATION OF IT PERSONNEL AS FACTORS OF PARTNERSHIP WITH TOP MANAGEMENT

Summary

The relationship between top management and IT personnel or the business-IT relationship has been the subject of research for over 50 years since this relationship is often inefficient and prevents the effective use of IT in the company. This inefficient relationship is often denoted as a gap between the two sides.

The gap is a consequence of different views and expectations on both business and IT sides regarding the role of IT personnel, and thus prevents the company developing competitive advantages based on IT. This gap has negative consequences for the company as it makes it difficult to invest in IT successfully, therefore causing several IT implementation projects to fail, preventing the use of IT as a competitive advantage and thwarting the identification of the business value of IT. Despite considerable efforts to narrow the business-IT gap, it is still present in many companies, while companies are still not sufficiently aware of its consequences.

Due to the significance of the business-IT relationship, the purpose of this dissertation is to contribute to understanding of the gap between top management and IT personnel, and to improve the cooperation between them.

The dissertation thus presents the factors that are important in the business-IT relationship, while also examining and precisely defining the notion of the gap between top managers and IT personnel. Further, it reveals factors that are causing this gap and where major differences exist, and it also shows those factors that do not affect the gap or where the expectations of top management are aligned with those of IT personnel.

The central theme of the dissertation is concerned with achieving a partnership relation. Therefore, the dissertation presents factors that create or lead to a partnership between top management and IT personnel. These factors allow better cooperation between the business and IT sides, while facilitating recognition of the business value of IT and the effective use of IT to gain a competitive advantage. Given that top management support to IT is one of the key factors of successful IT implementation, the dissertation also presents how IT personnel can obtain top management's support.

Keywords: top management, IT manager, IT personnel, IT department, business knowledge, business-IT gap, partnership relation

TABLE OF CONTENT

1 INTRODUCTION 1

1.1 DESCRIPTION OF THE PROBLEM 1
1.2 RELEVANCE OF THE PROBLEM 2
1.3 PURPOSE AND GOALS OF THE DISSERTATION 5
1.4 BRIEF LITERATURE REVIEW 5
1.4.1 The gap between top management and IT personnel 5
1.4.2 Business-IT alignment 7
1.4.3 Business-IT partnership 9
1.4.4 Top management support 13
1.4.5 Knowledge and skills of IT personnel 14
1.4.6 The role of IT personnel 15
1.4.7 Perceived value of IT 16
1.4.8 Literature overview 18
1.5 HYPOTHESES 20
1.6 DESCRIPTION OF THE RESEARCH METHODS 22
1.7 CONTRIBUTION TO SCIENCE 23
1.8 STRUCTURE OF THE DISSERTATION 24

2 ARTICLE DESCRIPTION AND RESEARCH METHODS 25

2.1 DEVELOPING A THESIS THROUGH THE ARTICLES 25
2.1.1 The first article 25
2.1.2 The second article 25
2.1.3 The third article 26
2.1.4 The fourth article 26
2.2 RESEARCH INSTRUMENT 27
2.3 DATA COLLECTION AND SAMPLE CHARACTERISTICS 28
2.4 DATA ANALYSIS 31
2.4.1 Article 1 31
2.4.2 Article 2 31
2.4.3 Article 3 and Article 4 32
2.4.4 Dealing with missing data 33
2.5 MODEL CONSTRUCTION – ARTICLE 3 33
2.5.1 Model conceptualisation 33
2.5.2 Path diagram construction 34
2.5.3 Model specification 34
2.5.4 Model identification 35
2.5.5 Parameter estimation 36
2.5.6 Assessment of the model fit 37
2.6 MODEL CONSTRUCTION – ARTICLE 4 37
2.6.1 Model conceptualisation 37
2.6.2 Path diagram construction 38
2.6.3 Model specification 38
2.6.4 Model identification 41

2.6.5 Parameter estimation and assessment of the model fit ... *42*
2.6.6 Power assessment ... *42*
2.6.7 Model modification ... *43*

3 ARTICLE 1: IMPORTANT FACTORS IN THE RELATIONSHIP BETWEEN TOP MANAGEMENT AND IS PERSONNEL ... 44

3.1 INTRODUCTION ... 45
3.2 LITERATURE REVIEW ... 46
3.2.1 The relationship between top management and IS personnel ... *46*
3.2.2 The role of top management and IS managers ... *47*
3.3 RESEARCH METHODOLOGY ... 48
3.3.1 Research instrument ... *48*
3.3.2 Data collection and sample characteristics ... *49*
3.4 DATA ANALYSIS AND RESULTS ... 50
3.4.1 Factors in the relationship ... *50*
3.4.2 CEO and CIO perceptions ... *53*
3.5 FINDINGS AND IMPLICATIONS ... 53
3.6 CONCLUSION ... 55
ARTICLE APPENDIX ... 56

4 ARTICLE 2: THE GAP BETWEEN TOP MANAGEMENT AND IS PERSONNEL: HOW FAR APART ARE THEY? ... 58

4.1 INTRODUCTION ... 59
4.2 LITERATURE REVIEW ... 60
4.2.1 The gap between business and IS personnel ... *60*
4.2.2 Business-IS alignment ... *61*
4.2.3 The importance of knowledge and skills ... *62*
4.3 RESEARCH METHODOLOGY ... 64
4.3.1 Research instrument ... *64*
4.3.2 Data collection and sample characteristics ... *64*
4.4 DATA ANALYSIS AND RESULTS ... 66
4.4.1 Differences between the IS managers and top managers ... *66*
4.4.2 Examining differences in knowledge and skills in detail ... *69*
4.5 DISCUSSION ... 73
4.5.1 Findings and Implications ... *73*
4.5.2 Limitations and further research ... *75*
4.6 CONCLUSION ... 75

5 ARTICLE 3: ACHIEVING TOP MANAGEMENT SUPPORT WITH BUSINESS KNOWLEDGE AND ROLE OF IT/IS PERSONNEL ... 76

5.1 INTRODUCTION ... 77
5.2 THEORETICAL BACKGROUND AND RESEARCH MODEL ... 78
5.2.1 Top management support to IT/IS ... *78*
5.2.2 Business and managerial knowledge and skills of IT/IS personnel ... *79*
5.2.3 Business role of IT/IS ... *80*
5.2.4 Research hypotheses and model conceptualisation ... *82*

5.3 RESEARCH METHODOLOGY 83
5.3.1 Research instrument 83
5.3.2 Data collection and sample characteristics 83
5.3.3 Model construction 84
5.3.4 Data analysis and Results 85
5.3.5 Validity of the defined constructs 85
5.3.6 Confirmatory analysis using structural equation modelling 86
5.4 DISCUSSION 91
5.4.1 Findings and Implications 91
5.4.2 Limitations and further research 92
5.5 CONCLUSION 92

6 ARTICLE 4: CREATING A PARTNERSHIP BETWEEN TOP MANAGEMENT AND IS PERSONNEL 93

6.1 INTRODUCTION 94
6.2 LITERATURE REVIEW 95
6.2.1 The business-IS partnership 95
6.2.2 Orientation of IS personnel 96
6.2.3 The role of knowledge and skills 98
6.2.4 Reasons for forming a partnership and the perceived value of IS 99
6.3 RESEARCH HYPOTHESES AND MODEL CONCEPTUALISATION 100
6.4 RESEARCH METHODOLOGY 102
6.4.1 Research instrument 102
6.4.2 Data collection and sample characteristics 104
6.4.3 Research methods 105
6.5 DATA ANALYSIS AND RESULTS 105
6.5.1 Exploratory analysis 105
6.5.2 Confirmatory analysis using structural equation modelling 108
6.6 DISCUSSION 115
6.6.1 Findings and Implications 115
6.6.2 Limitations and further research 116
6.7 CONCLUSION 117

7 FINAL CONCLUSION 118

7.1 ACHIEVING THE GOALS 118
7.2 CONFIRMING THE HYPOTHESES 120
7.3 LIMITATIONS AND FURTHER RESEARCH 121

REFERENCES 123

APPENDICES ..... A

POVZETEK V SLOVENSKEM JEZIKU ..... B

LIST OF TABLES

Table 1: Reasons for the business-IT gap 7
Table 2: Research topics in different periods 19
Table 3: The profile of respondents (IT managers) 29
Table 4: The profile of the respondents (top management) 30
Table 5: Comparison of the original and modified models 43
Table 6: Profile of respondents (CEO and CIO surveys) 49
Table 7: Rotated factor loadings – importance and position of the IS department 50
Table 8: Rotated factor loadings – knowledge and skills 51
Table 9: Rotated factor loadings – roles of the IS department 52
Table 10: Reliability evaluation and independent T-test 53
Table 11: Profile of the respondents – IT managers 65
Table 12: Profile of respondents – top management 65
Table 13: Importance and position of IS personnel in the company 67
Table 14: The role of IS personnel in the company 68
Table 15: Knowledge and skills important for the IS manager 69
Table 16: Quality of the knowledge and skills possessed by the IS manager 70
Table 17: Distribution of responses by activity 84
Table 18: Rotated Factor Matrix for the entire model 86
Table 19: Fit indices 88
Table 20: Completely standardised loading estimates and t-values 89
Table 21: R^2 values for indicators 90
Table 22: Participating method and profile of the respondents 105
Table 23: Factor loadings for the exogenous variables 106
Table 24: Factor loadings for the endogenous variables 107
Table 25: Scale reliability of factors in the partnership model 108
Table 26: Fit indices for the original and modified models 109
Table 27: Fit indices for the partnership model 110
Table 28: Validity and reliability assessment for the partnership model – Lambda Y 112
Table 29: Validity and reliability assessment for the partnership model – Lambda X 113
Table 30: Construct reliability in the partnership model 114
Table 31: Discriminant validity for the partnership model 114

LIST OF FIGURES

Figure 1: Number of articles related to IT or IS and failure 4
Figure 2: Number of articles related to IT or IS and alignment 4
Figure 3: Strategic alignment model 8
Figure 4: The model of partnership success 12
Figure 5: Conceptual model of the business-IT relationship 21
Figure 6: The conceptual model of the partnership relation 22
Figure 7: Position of the IT manager 29
Figure 8: Shareholder status 30
Figure 9: Factors in the business-IS relationship 54
Figure 10: Mann-Whitney U test on variables measuring technological knowledge 71
Figure 11: Mann-Whitney U test on variables measuring managerial knowledge 72
Figure 12: Mann-Whitney U test on variables measuring business knowledge 73
Figure 13: The business-IS gap related to knowledge and skills 74
Figure 14: Conceptual Model 83
Figure 15: Path diagram of the conceptualised model 87
Figure 16: Base model of the business-IS partnership 101
Figure 17: Conceptual model of the partnership relation 102
Figure 18: Path diagram for the partnership model 109

1 INTRODUCTION

1.1 Description of the problem

The relationship between IT and top managers has been the subject of research for over 50 years. In the expert literature it is usually claimed that the relationship between business and IT spheres has been problematic since the emergence of computer applications for general business use in the 1960s (Doll & Ahmed, 1983; J. Ward & Peppard, 1996). An inefficient relationship between managers and IT personnel is often referred to in the literature as a gap or even a 'cultural' gap between the two sides (Coughlan, Lycett, & Macredie, 2005; Grindley, 1992; Peppard & Ward, 1999). The gap is generally defined as a lack of understanding between management and IT personnel in the company (Coughlan, et al., 2005; Peppard & Ward, 1999). The gap leads to different views and expectations from both IT personnel and top managers and thus prevents the company developing a competitive advantage based on IT (Grindley, 1992). Only a few companies have been able to successfully bridge the gap (Peppard & Ward, 1999), and therefore companies are still insufficiently aware of the consequences of this inappropriate relationship.

The gap is also apparent from the different views regarding the role of the IS department since top management often considers the IT department only as a support function, whose sole goal is simply the automation of business processes (Dos Santos & Sussman, 2000). As a result, companies often only automate existing business processes rather than use the IT department to redesign the business process (Kovačič, 2004b). Thus, the IT department in companies mostly represents only a cost and not a business value, which further aggravates the relationship between top management and the IT personnel.

In the last few decades the role of IT personnel has significantly changed along with the growing importance of IT departments (Nord, Nord, Cormack, & Cater-Steel, 2007). More than a decade ago, it was shown that many IT managers were uncertain whether the primary role of IT personnel was to participate in business process renovation or merely support other departments in the company (J. Ward & Peppard, 1996).

However, a problematic relationship with top management and uncertainty regarding the role of IT personnel still remains as it turns out that in many companies business departments and IT departments do not share identical views on the role of IT personnel (Nord, et al., 2007). Consequently, the gap between business and IT personnel is present in various companies and often neglected. Further, IT personnel repeatedly lack top management support for their initiatives.

Because of the extension and consequences of the relationship between top management and IT personnel for a company's performance, authors in professional and scholarly literature devote considerable effort to this issue and try to capture the factors that affect this relationship.

Several attempts have been made to improve the relationship between IT personnel and business managers (Milis, Fairchild, Smits, & Ribbers, 2008). It was already shown that one of the most important factors of successful IT implementation is top management support (Byrd & Davidson, 2003; Ranganathan & Kannabiran, 2004); however, how to obtain that support is still only vaguely answered.

Further, the literature still lacks research into the differences between top management and IT personnel. It claims the relationship is problematic and has caused several failed IT implementation projects; however there is no clear definition of the gap between top management and IT personnel and no clear identification of the important factors in this relationship.

Moreover, the professional and academic literature also lacks research on how to provide sufficient conditions for establishing an efficient relationship between top managers and IT personnel. An efficient relationship indicates a special form of relationship between them, namely a partnership relationship, since it has been recommended that companies establish partnerships in order to attract valuable customers, increase profits (Teng, 2003) and obtain a collaborative advantage (Kanter, 1994). However, the term partnership is an additional term that is not researched in the academic literature when it comes to the relationship between top management and IT personnel. It has been claimed that the business-IT partnership is important for organisations because companies can thus concentrate on implementing IT in order to realise the business strategy (Papp, 1999), although there are no guidelines concerning how to achieve this partnership.

1.2 Relevance of the problem

The study of the relationship between top management and IT personnel is not a new research area. It is evident from the brief description of the literature review that the gap between top managers and IT personnel is a frequently researched topic in the professional and academic literature. The theme is thus very topical since, despite the many contributions and efforts to bridge this gap, the latter is still present and significantly affects the process of implementing IT in the company. It is therefore necessary to develop an appropriate business-IT relationship because dynamic market conditions demand a particular form of partnership between top management and IT personnel in order to create competitive advantages and to perceive IT as a strategic resource rather than merely a cost.

Despite several efforts to bridge the gap between top management and IT personnel, it is still found in many companies. The consequences of an inappropriate relationship are harmful to the company as they not only prevent efficient investment in IT and consequently lead to the failure of numerous IT implementation projects, but also prevent the use of IT as a competitive advantage, while spending on IT can be particularly high (D. E. Avison, Cuthbertson, & Powell, 1999).

Although there were several different opinions in the past on the measures needed to establish effective relationships, they have become much more uniform in recent times. Authors largely focus on the mutual knowledge of both top managers and IT professionals (Byrd & Turner, 2001; Green, 1989; Ranganathan & Kannabiran, 2004; Wade & Parent, 2001 59). For a successful relationship between top managers and IT manager, it is important that the latter possess appropriate business skills to allow proper communication with the leadership. Only successful IT implementation leads to greater confidence and increases the credibility of IT personnel (Nord, et al., 2007) and ultimately fosters a partnership between IT personnel and top management.

By contrast, in companies where the IT department merely represents a supporting function, often it is only the existing processes that are automated, which may be ineffective and inappropriate for the IT implementation (Kovačič, Jaklič, Indihar Štemberger, & Groznik, 2004). Therefore, an efficient relationship between top managers and IT personnel is particularly important.

The relevance and importance of the research topic is also evident from Figure 1 and Figure 2. Both figures illustrate the number of articles published in the last 20 years related to the research topic. The publication databases included in the figures are:

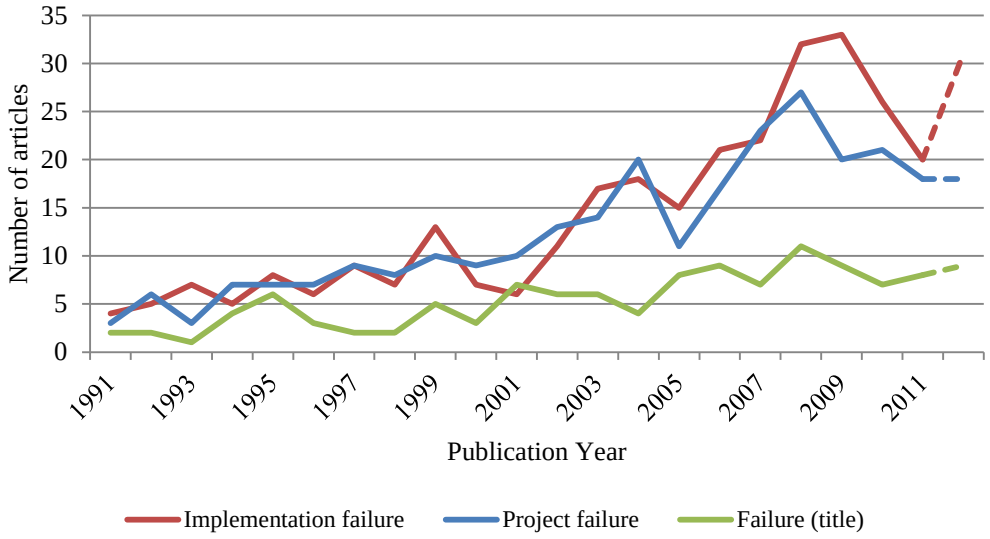
- Science Citation Index Expanded (SCI-expanded)
- Social Sciences Citation Index (SSCI)

Figure 1 presents the number of published articles in each year since 1991 that include the keywords “information technology” or “information systems” together with:

- “implementation failure” in the topic of the article; or
- “project failure” in the topic of the article; or
- “failure” in the title of the article.

The number of articles in 2012 is only approximate since it is calculated based on a linear forecast till the end of the year. This estimate is based on data that were available in May 2012 (the latest available data).

Figure 1: Number of articles related to IT or IS and failure



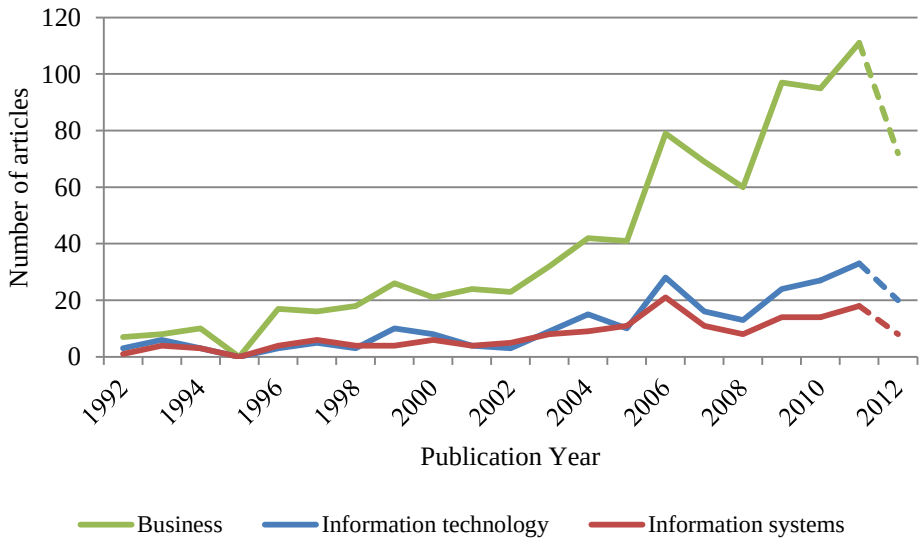
Source: Web of Science (Web of Knowledge)

Figure 2 presents the number of published articles in each year since 1992 that include the keyword "alignment" together with:

- "business" in the topic of the article; or
- "business" and "information technology" in the topic of the article; or
- "business" and "information systems" in the topic of the article.

The number of articles in 2012 is also an estimate since it is calculated based on a linear forecast till the end of the year. The approximated calculation is based on data that were available in April 2012 (the latest available data).

Figure 2: Number of articles related to IT or IS and alignment



Source: Web of Science (Web of Knowledge)

As is evident from the two figures, the number of published articles related to the research topic is increasing, thereby indicating that the problem is relevant and important.

Given the consequences of unsuccessful IT implementation, which in the contemporary business environment can be fatal for the company, the problem relevancy of the proposed topic is growing and there is an ever stronger desire to bridge the gap and increase cooperation between top management and IT personnel.

1.3 Purpose and goals of the dissertation

The purpose of the dissertation is to improve understanding of the gap between top management and IT personnel and contribute to creating a partnership between them. The central research question is thus related to bridging the gap between top management and IT personnel. The intention is not to eliminate the differences between them, but to find the factors that enhance the cooperation between the two sides.

The research question therefore relates to identifying factors that reduce this gap and consequently bring business and IT managers together in the pursuit of common goals. Further, the research question also involves examining to what extent individuals, such as business or IT managers, can contribute to the partnership.

The goals of the thesis are:

1. to identify the key factors in the business-IT relationship;
2. to identify the main factors causing or increasing the gap;
3. to examine and define the notion of the gap between business and IT managers;
4. to present factors that lead to obtaining top management support; and
5. to reveal the factors that lead to partnerships and consequently enable better cooperation between top managers and IT personnel.

The subjects of the survey are therefore top managers, IT managers and IT personnel and their mutual relationships, while the focus of the research is on the IT side, namely examining the role of the IT department and the important knowledge and skills of IT personnel. However, the influence of the IT knowledge possessed by top management is also presented.

1.4 Brief literature review

1.4.1 The gap between top management and IT personnel

By using software applications intended for wide business use, companies have become more dependent on IT (Peppard, 2001) and therefore the importance of the relationship between IT personnel and business personnel has grown strongly. Since that relationship is often problematic, it is referred to in the literature as a gap between the two sides (Coughlan, et al., 2005; Grindley, 1992; Peppard & Ward, 1999). This problematic relationship is in some

research also denoted as a ‘cultural’ gap between IT personnel and top management (J. Ward & Peppard, 1996).

The term ‘cultural’ gap has come to represent a situation that is both causing a problem and also a situation that companies are either unable or unwilling to address (Peppard & Ward, 1999). Yet it has been claimed that the culture argument is often an excuse, and not a cause, for ineffective working relationships between the IT side and the rest of the business (Peppard & Ward, 1999).

The gap is defined as a lack of understanding between the management side and the IT side in the company (Coughlan, et al., 2005; Peppard & Ward, 1999). It arises from poor understanding of knowledge in organisations and a holistic approach to relationship management should therefore be implemented to bridge the gap (Martin, Hatzakis, Lycett, & Macredie, 2004). Further, the gap generally represents the problematic relationship between the business and IT spheres as a consequence of the difference between them (J. Ward & Peppard, 1996).

These differences mainly involve varying views concerning the role of the IT department. Top management namely often considers the IT department to merely have a supporting function where automating the business processes is its sole purpose (Dos Santos & Sussman, 2000). Companies thus often focus merely on the existing business processes and their automation, and do not take advantage of the IT department to completely redesign the business processes (Kovačič, 2004b). Thus, IT is mainly viewed in companies as a cost and not an enabler of business value, which consequently even worsens the relationship between top management and IT personnel.

The gap therefore causes different views and expectations from IT personnel and top management and hence prevents organisations from developing competitive advantages arising from IT (Grindley, 1992; J. Ward & Peppard, 1996). It was claimed that the gap would be bridged with the advent of new managers able to connect the business and IT sides (Grindley, 1992); however, it is still present as many companies report the insufficient coordination of work and knowledge sharing due to misunderstanding between the business and IT departments (Martin, et al., 2004). Despite several attempts to reduce the gap, business departments and IT departments in many companies still do not share identical views regarding the role of IT personnel (Nord, et al., 2007). Although several studies confirm that the business-IT relationship is poor in many companies, there is still hardly any guidance on how to bridge the gap (Peppard, 2001).

The presence of the gap in the business-IT alignment has also been reported in the public sector (Atafar, Akbari, & Bidmeshk, 2011) where it has been found that an alignment gap exists between business and IT strategies according to four criteria, namely: management and leadership, applied systems and electronic services, technical infrastructure, and human resources.

Table 1 presents the main reasons for the business-IT gap based on the literature review presented in the research by Nord (Nord, et al., 2007).

Table 1: Reasons for the business-IT gap

Author	Problems in the business-IT relationship
(Smith & McKeen, 1992)	Disagreement about control of computerisation Differences in goals and timeframes of managers Lack of measurable benefits Disagreement over roles and responsibilities during systems development
(J. Ward & Peppard, 1996)	Differences in perceptions, roles and metaphors
(J. Ward & Griffiths, 1996)	Lack of shared values No agreed strategies Failed projects and systems
(Martin, et al., 2004)	Lack of a common vision Lack of a common understanding between business and IT personnel Lack of knowledge sharing between business and IT personnel

Source: Adapted from Nord (2007) and extended

It is evident from the table that the gap is chiefly a consequence of IT and business personnel having different perceptions of the role and responsibilities of IT and not sharing the same values.

1.4.2 Business-IT alignment

Business-IT alignment denotes applying IT in an appropriate and timely way in harmony with the business strategies, goals and needs (Luftman, 2004) and has been one of the foremost concerns of business and IT executives and IT practitioners for almost two decades (Luftman, 2005).

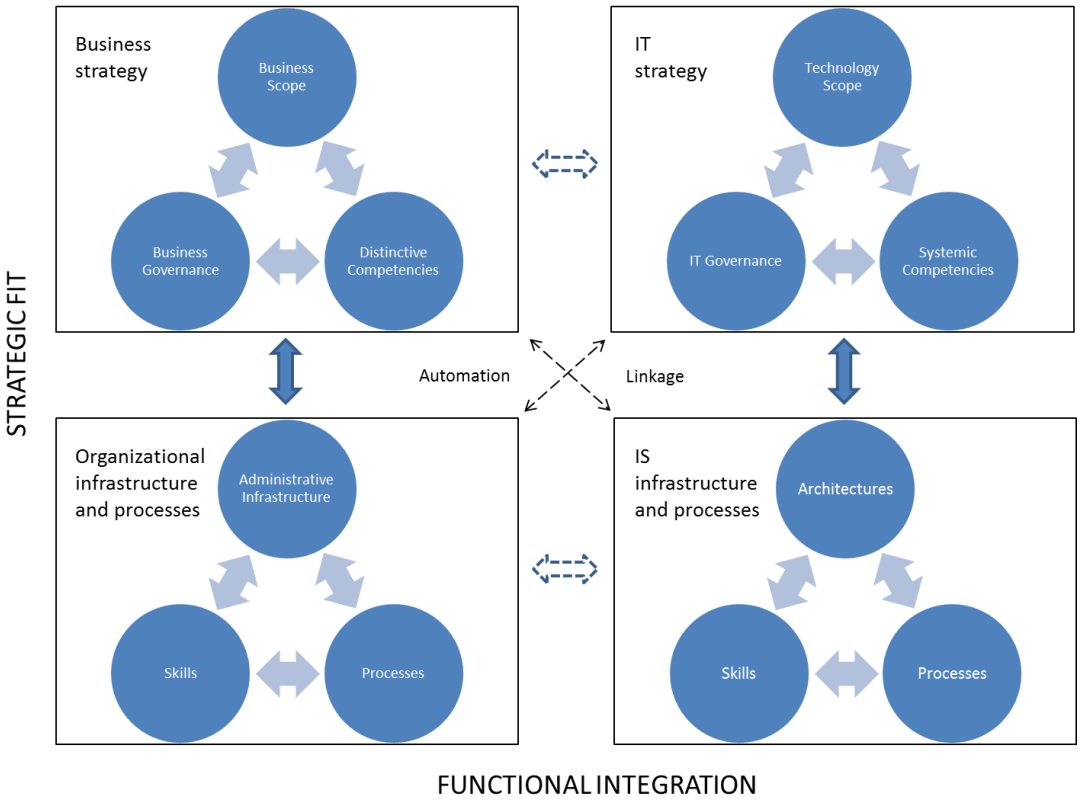
Business-IT alignment is important for companies since it enables a company to maximise its IT investments and achieve consonance with its business strategies and plans, and consequently greater profitability. It namely eases the development and implementation of efficient IT strategies, thus enabling that company to focus on the IT implementation to improve the business (Papp, 1999).

The importance of an alignment between business and IT increased when companies attempted to achieve a competitive advantage in changing and diverse markets (Cardinali, 1992). With the rising importance of alignment, extensive research was done on the links between business and IT (Chan & Huff, 1993; Luftman, Lewis, & Oldach, 1993). However, Henderson and Venkatraman were some of the first to present the relations between business strategies and IT in a model (De Haes & Van Grembergen, 2004) which is today probably the most widely cited alignment model (Chan & Reich, 2007).

They developed a strategic alignment model based on two main parts, namely strategic fit and functional integration, as it is evident from Figure 3. Strategic fit indicates that any strategy has to deal with external (business market) and internal (administrative structure) domains. Considering functional integration, there are two types of it in the model, namely strategic and operational integration. Strategic integration represents the link between the business and the IT strategy. More specifically, it represents the capability of IT to form and support the business strategy. On the other hand, operational integration represents the link between organisational infrastructure and processes and IS infrastructure and processes (Henderson & Venkatraman, 1993).

The model is widely used in the business-IT alignment theories (Coleman & Papp, 2006) since the model's main emphasis is very clear, namely in order to become a successful company the IT strategy should be fully aligned with the business strategy.

Figure 3: Strategic alignment model



Source: Adapted from Henderson and Venkatraman (1993)

Strategic alignment is one of the key focus areas among business managers since integration of the business and IT strategy enables a greater competitive advantage to be achieved (Papp, 1999). The model has also been empirically tested with several companies that successfully used it to assess their level of alignment (Dong, Liu, & Yin, 2008; Papp, 2004) and applied it to strategy formulation for sustainable development in cities and regions (Diaz, 2011). The model was extended by focusing on technical requirements (Luftman, et al., 1993), providing practical ways to achieve alignment (D. Avison, Jones, Powell, & Wilson, 2004), including

additional functional and strategic layers, namely information providers (Maes, Rijsenbrij, Truijens, & Goedvolk, 2000), adding strategic, tactical, and operational levels (L. Chen, 2010), including the learning process concept (Baihareth & Liu, 2011). However, the strategic model proposed by Henderson and Venkatraman remains the base model in the business-alignment area.

Strategic alignment presented a new view on IT and its role in the development of business strategies (Papp, 1999) since it deals with both strategy and infrastructure concerns to achieve an alignment between the business and IT.

Traditional methods of developing business strategies namely failed to take full advantage of IT. Before the 1990s, technology was generally viewed merely as a 'cost' and not an enabler of business value; however, this perspective became outdated as leading companies searched for how IT could transform their business (Pyburn, Ernst, & Young, 1991). Companies started to recognise that IT has an important role to play in obtaining a competitive advantage; thus several frameworks were proposed to consider this strategic issue regarding the role of IT as a source of competitive advantage (Boynton, Victor, & Pine, 1993; Chan & Huff, 1993; Luftman, et al., 1993).

A recent study has shown that mutual understanding between an organisation's top management and IT managers regarding the role of IT leads to an IT strategic alignment, while an IT strategic alignment generally leads to a higher IT contribution to the organisation (Johnson & Lederer, 2010) and thus increases the contribution of IT to the business performance. Mutual understanding describes a degree of agreement between individuals on a topic (Ensley & Pearce, 2001).

It was also shown that strategic alignment has a positive influence on managing enterprise resource planning (ERP) projects, namely enabling shorter and more cost-efficient ERP projects, faster reaction times to business events, and a positive influence on the benefits of ERP systems (Velcu, 2010).

1.4.3 Business-IT partnership

In the management discipline the term partnership describes the relations between companies or organisations. It has been claimed that business-to-business partnerships are attracting attention in management and in academic research (Ploetner & Ehret, 2006).

It has been recommended that companies establish partnerships in order to create top products, attract valuable customers and increase profits (Teng, 2003). It has been claimed that organisations that manage alliances effectively obtain a key corporate asset, namely a collaborative advantage (Kanter, 1994).

However, there have been some attempts to define the term partnership in connection with the business-IT relationship. In the business-IT relationship, the term partnership refers to the

organisational ability to combine cross-functional efforts in deploying information systems to support and form business opportunities (Tian, Wang, Chen, & Johansson, 2010) since the effective utilisation of IT resources mainly depends on the relationship between the IT department and business departments inside the company (Bassellier, Reich, & Benbasat, 2001). It has been claimed that the business-IT partnership is the most important factor of successful IT implementation because a partnership relationship can make the process of adopting IT easier (Tian, et al., 2010).

This research is one of the few studies to present measures for defining a business-IT partnership. Four items to measure a cross-functional partnership are used, namely mutual understanding, mutual trust, mutual involvement and conflict resolution. The measures for the business-IT partnership are adapted from a study (Ravichandran & Lertwongsatien, 2005) examining how IS resources and capabilities influence the company's performance, and were transformed into the following statements to be assessed in a survey:

- The IS department and business units understand each other's working environments very well.
- There is a high degree of trust between our IS department and business units.
- The goals and plans for IT projects are jointly developed by both the IS department and business units.
- Conflicts between IS departments and business units are always resolved through dialogue and mutual adjustment.

It has been claimed (Tian, et al., 2010) that strategic IT flexibility and the business-IT partnership have a direct impact on competitive advantages, while business-IT alignment has an indirect impact. The research presented an attempt to define partnership, although it does not state how to achieve a partnership. Moreover, the definition and measures of a business-IT partnership merely focus on the aspect of mutual understandings, neglecting the possibility of applying the cross-company partnership concept to a cross-department or cross-functional partnership.

The term partnership was also used in the study, claiming that the business-IT partnership is important for organisations since, by understanding it, organisations can concentrate on implementing the IT in order to enable the business strategy (Papp, 1999); yet the research gave no evidence on how to achieve this partnership.

Further, the relationship between alignment and partnership was confirmed in research claiming that alignment results in a partnership between IT managers and top executives in developing and achieving their strategies and goals (L. Chen, 2010). In this research, partnership relates to the mutually perceived contribution of both IT and the business, also including the role of IT in strategic business planning and sharing the rewards and risk between IT and business functions. The research referred more to the maturity of the partnership rather than the business-IT partnership in general. Variables measuring

partnership maturity in this research were constructed based on the strategic alignment model (Luftman, 2000; Sledgianowski, Luftman, & Reilly, 2006), namely:

- businesses' perception of the role of IT;
- the role of IT in strategic business planning;
- the integrated sharing of risks and rewards; and
- the formality and effectiveness of partnership programmes.

Since the purpose of the research was to examine the role of partnership maturity (among other alignment maturity constructs) in the IT strategic alignment, the research did not describe how to achieve the partnership.

Partnership in the business-IT relationship was mentioned in the early 1990s when it was claimed that only ensuring an appropriate alignment with global business drivers does not provide a guarantee of success. Thus, different approaches should be applied in companies to overcome obstacles like managing project risk, utilising partnerships, and building global infrastructure (Ives, Jarvenpaa, & Mason, 1993). Partnership in this research has been denoted as one of the most important risk management approaches. Further, it is claimed in the research that partnerships between headquarters and subsidiary IT organisations and user areas are critical since "no single group or individual is likely to have a complete picture of where similarities and differences lie". However, once again the research did not identify the factors that are important for achieving a partnership.

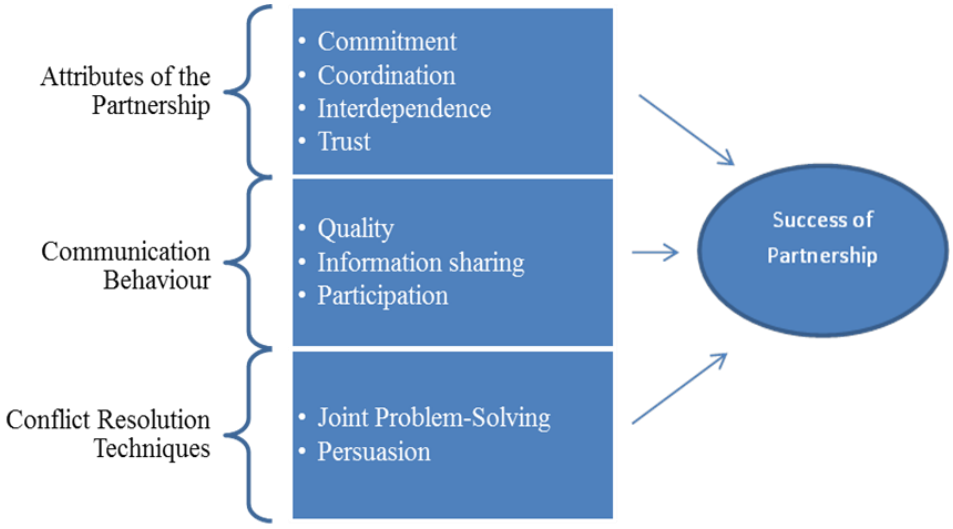
An attempt to define partnership was made in research presenting the rationality behind the fusion approach to managing IT (Keen, 1993), claiming that the key to business and IT alignment is to ensure that the core organisational resources of business processes, people, and technology are properly included in the business dialogue. Fusion in that research means that the planning processes and implementation processes are so interwoven that the technology in the company cannot be distinguishable from the business processes and services that use the technology. It has been claimed that a fusion map enables IT to become a more central and accepted part of the business dialogue. Fusion in this sense is similar to the term partnership; however, authors of the research did not use the term partnership in their research.

The term partnership related to business-IT is also used in research expressing principles of good IT governance (Chris, 2005). It has been claimed that "good IT governance is an enterprise-wide partnership between business and IT in which both sides have decision rights, accountabilities, processes and controls designed to ensure that, on the business side, the business knows what to ask for, how to ask for it and how to monitor and assess success; and on the IT side, IT knows how to design solutions, advise and deliver to business expectations". Even more, it has been claimed that efficient IT governance is equally important on the business and IT sides of the partnership. However, the research does not present any definition of partnership nor any indicators measuring it.

Since the term partnership is generally not used in the business-IT relationship, the indicators measuring partnership on the company level, namely partnership between companies, were applied to relations between departments, more specifically to relations between top management and IT personnel and used in this dissertation. Thus, a definition of the partnership construction in presented below.

Figure 4 presents a model of partnership success that was partly used to define the construct in the dissertation. According to this model, the attributes important for successful partnerships include commitment, coordination, interdependence and trust (Mohr & Spekman, 1994). It has been claimed that when these attributes exist in a partnership relation, the partnering businesses are aware of their interdependence and are willing to act towards a valuable relationship (Tuten & Urban, 2001).

Figure 4: The model of partnership success



Source: Adapted from Mohr and Spekman (1994)

Several items in the model measuring the success of partnership among companies were used to form the construct partnership relation in this dissertation, namely:

- top management trusts IT personnel to perform their obligations in a quality way;
- communication between top management and IT personnel (IT manager) is open and honest;
- top management is committed to a good relationship with the IT personnel (IT manager);
- IT personnel are involved in the company's development; and
- The IT manager is involved in formulating business strategies.

In the dissertation additional items were included to measure the partnership relation, based on the research examining the relationships between non-governmental development organisations (Malena, 1995), where it has been claimed that partnership should involve a

range of value-based partnership principles such as: (1) a jointly agreed purpose and values; (2) mutual trust and respect; (3) reciprocal accountability; (4) transparency; (5) understanding of each other's political, economic, cultural context; and (6) a long-term commitment to work together.

Therefore, additional items were included, namely:

- top management can rely upon IT personnel;
- mutual reliance exists between top management and IT personnel; and
- top management is prepared to cooperate with the existing IT personnel (IT manager) in the long term.

However, the abovementioned value-based partnership principles have been criticised due to problems with their operationalisation, their universal appropriateness and subjective justification (Brinkerhoff, 2002). Thus, it was suggested to map partnership practice on scalar dimensions, namely to use mutuality and organisation identity as relevant dimensions for defining partnership.

Mutuality represents the principles of the partnership, while organisation identity represents the justification and motivation for selecting particular partners. More specifically, mutuality denotes equality in decision-making, the state of mutual trust and respect, the possibility to have an opportunity to influence the shared objectives, and also jointly agreed values and purpose (Brinkerhoff, 2002).

Based on the abovementioned research, three additional items to measure a partnership relation were included, namely: (1) IT personnel are independent in accepting their decisions; (2) top management respects the work of the IT personnel; and (3) the IT objectives are aligned with the business objectives.

1.4.4 Top management support

Top management support is identified mainly as supporting initiatives of IT personnel and participating in IT implementation projects (Ragu-Nathan, Apigian, Ragu-Nathan, & Tu, 2004). It was claimed that a lack of top management support in the company causes resources to be allocated to other projects perceived as important by top management (Kappelman, McKeeman, & Zhang, 2006). Consequently, it causes unsuccessful IT activities and a resistance to IT implementation (Newman & Zhao, 2008). Top management is therefore even less willing to cooperate with IT personnel, which further aggravates the relationship between them (Nord, et al., 2007).

Top management support is thus one of the foremost factors for successful IT initiatives and an enabler of the efficient use of IT investments (Sirkka L. Jarvenpaa & Ives, 1990). Further, it has also been claimed that top management support is the most important success factor for successful IT projects (Young & Jordan, 2008).

Several empirical studies confirm that top management support also has an impact on the success of IT implementation (Caldeira & Ward, 2002; Ragu-Nathan, et al., 2004). Nevertheless, it has been shown that top management support particularly contributes to an increase in IS project performance (Parolia, Goodman, Li, & Jiang, 2007). Moreover, top management support may also result in positioning IT personnel properly in the organisation, and the IT manager's position in the organisational hierarchy (Caldeira & Ward, 2002; Ragu-Nathan, et al., 2004).

However, obtaining that support does not depend solely on IT personnel. It is important that top management understands the strategic role of IT personnel, possesses adequate IT knowledge and provides enough resources for IT project implementation (Ranganathan & Kannabiran, 2004).

Responsible top management thus has an important role as simply considering the strategic role of IT and its integration into business processes leads to comparative advantages, while technology itself is not a sufficient factor of successful IT implementation (Dhillon, 2008). However, it is the role of the IT manager to present IT as a strategic resource and the IT implementation as a project of delivering value to the organisation (Earl & Feeney, 1994), while the responsible top management possessed with adequate IT skills should accept the strategic role of IT. The responsible IT manager should therefore establish efficient and collaborative relations with other managers, and therefore various business and management skills are needed.

1.4.5 Knowledge and skills of IT personnel

The knowledge of the IT personnel and IT manager are quite important factors in the relations between them and top management. Differences in the knowledge and skills acquired by individuals on both sides are often reported as a major cause of misunderstanding between top and IT managers, consequently leading to the 'cultural' gap between them. Almost two decades ago, it was already shown that the development of business skills among IT personnel is an important factor in reducing that cultural gap (Grindley, 1992).

The debate about the importance of different knowledge and skills is as old as IT field itself, although up until the 1980s the importance of technical versus business and management skills was mainly emphasised (Byrd & Turner, 2001; Vitalari, 1985). That view gradually changed in the 1990s when it became obvious that IT personnel need a combination of technical, business and interpersonal skills (Mata, Fuerst, & Barney, 1995). A similar opinion still prevails today as it has been shown that technical and managerial skills are some of the determining factors of successful IT implementation (Caldeira & Ward, 2003). Similarly, the importance of the different skills and capabilities of IT personnel was confirmed in various studies (Lerouge, Newton, & Blanton, 2005; Parolia, et al., 2007; Wade & Parent, 2001).

Management on both sides, IT and business, have a crucial role for the partnership and consequently for successful IT implementation. It was shown that top management's IT skills

have a direct influence on the extension of IT adoption in the company (Armstrong & Sambamurthy, 1999). Research indicates that responsible management will acquire at least some of the needed skills.

However, the skills of IT personnel and IT manager are not merely a consequence of organisational needs but are mainly the product of education systems. Because of the rapid changes in the IT field, top managers and professors at universities were dealing with the knowledge and skills needed to effectively operate in a changing technological and business environment (Nelson, 1991; Niederman, Brancheau, & Wetherbe, 1991). It was shown that many curriculums at universities were not harmonised with business needs as there were numerous technical subjects with no real value in the market (D. M. S. Lee, Trauth, & Farwell, 1995). Even more recent research (S. Lee & Fang, 2008; Yen, Chen, Lee, & Koh, 2003) confirms that the curriculum is still lagging behind the actual needs of the market.

However, IT personnel in the company are often divided between service users and top management. While users expect technical skills which must exceed the users' knowledge, managers expect adequate communication skills. Thus, IT personnel can successfully present and implement IT projects merely by possessing a wider range of skills and knowledge. The fact that the knowledge of IT personnel affects the success of IT implementation was confirmed by a survey in the most successful US companies (Byrd & Turner, 2001).

1.4.6 The role of IT personnel

In the last few decades the role of IT personnel has significantly changed, particularly the role of the IT manager. In the 1970s the IT department was understood as a closed unit that could be completely ignored by the management (Nord, et al., 2007). Consequently, the period was known for its repeated project failures (Doll & Ahmed, 1983) which affected the credibility of the IT department in companies.

Later, the importance of the IT department became increasingly more important and therefore a problematic relationship with the top management and uncertainty regarding the role of IT personnel appeared. Many IT managers were uncertain whether the primary role of IT personnel is to participate in business process renovation or merely to support other departments in the company (J. Ward & Peppard, 1996) and even top management was uncertain whether the IT department represents a strategic resource or merely an expense (Earl & Feeney, 1994).

To improve the relations and reduce the uncertainty, it was suggested that the role of IT personnel should be clearly defined, including a definition of the contribution of IT personnel, ensuring the alignment of the IT personnel's objectives with the business objectives and sharing knowledge with top management (Nord, et al., 2007). It was shown that a lack of alignment between the business environment and IT creates additional IT implementation costs (Chang, Wang, & Chiu, 2008) and therefore it is particularly important that the role of IT managers is to reflect both the firm's IT infrastructure and strategy (Chun & Mooney,

2009). Further, it was suggested that it is important to present IT as a tool for achieving business goals and not merely as a supporting department (Coughlan, et al., 2005).

Similarly, it was claimed that the IT manager should present IT as a strategic resource and IT as a source of providing value to the organisation (Earl & Feeney, 1994). The IT manager has namely an important role to play by presenting the importance of IT for the company's performance improvements and for establishing the strategic role of IT as an alternative to merely a supporting role. It is the role of the IT manager to establish an appropriate relationship with other managers in the company.

A particularly important indicator of the status of IT personnel and consequently their role in the company is the position of the IT manager in the organisational hierarchy. It is recommended that the IT manager have an important role in the company. More specifically, it is suggested that the IT manager should be a member of the top management board or at least directly subordinate to top management (Earl & Feeney, 1994; Philip, 2007; Ranganathan & Kannabiran, 2004).

The positive implication of including the IT manager in the management board is to stimulate informal interactions between the IT sphere and the business sphere, consequently strengthening the business knowledge of the IT manager (Armstrong & Sambamurthy, 1999) and increasing top management's understanding of the importance of IT (Ragu-Nathan, et al., 2004), leading to a trusting relationship between them (Scott, 2007).

1.4.7 Perceived value of IT

Studying the influence of IT on the business value has been a main challenge for researchers in the last few decades (Luo, Fan, & Zhang, 2012; Piccoli & Ives, 2005; Wagner & Weitzel, 2007). Given the important role of IT, it has been suggested that presenting the value of investing in IS is a particularly important contribution of the IT discipline since understanding the impact of IT encourages ideas concerning future IT applications (Agarwal & Lucas Jr, 2005). Therefore, several researchers have been motivated to understand the influence that applying IT within organisations has on improved organisational performance (Melville, Kraemer, & Gurbaxani, 2004). Moreover, understanding the strategic value of IT has led to three related streams emerging in the literature, namely strategic IT planning, the alignment between the IT strategy and the business strategy, and the use of IT for competitive advantages (D. Q. Chen, Mocker, Preston, & Teubner, 2010).

It has been claimed that since the focus of the IT strategy should be on creating business value, the IT strategic plan and the business strategic plan should be merged into a single document, "causing that the underlying strategy remains the same while the execution of the plan can be easily modified" (Philip, 2007).

IT should be an essential component of the strategy since mere technology does not by itself contribute to organisational performance, but contributes by being part of an overall system that improves the creation of economic value (Piccoli & Ives, 2005).

It has been argued that IT is enabling business process reengineering, strategic alliances and competitive advantages (D. E. Avison, et al., 1999), and consequently IT can present its value to the organisation and, even more, it has the opportunity to participate in high-level business decisions (McKeen & Smith, 1996). After all, IT creates business value by enabling business processes and enables organisations to perform their functional activities better compared to their competitors (Luo, et al., 2012). Further, IT helps organisations be innovative by providing appropriate infrastructures and consequently sustaining competitiveness (Hewitt, 1995). Despite its potential, the IT department was still merely considered as a secondary activity (D. E. Avison, et al., 1999). Nevertheless, by adjusting the business to the new technologies, the need for skilled IT personnel appeared in order to maintain a competitive advantage with value adding activities and by performing cost-efficient tasks (Kakabadse & Korac-Kakabadse, 2000).

However, it has been claimed that the opportunities for obtaining strategic advantages from IT are disappearing, since companies with the largest IT investment rarely perform the best financial results, thus many companies will have to deeply examine how they invest in IT and manage their systems (Carr, 2003). In short, Carr (2003) argued that IT has become a commodity for organizations and therefore does not create a competitive advantage. The latter was confirmed in the study (Henriksen & Rukanova, 2011) claiming that infrastructure technologies are not of strategic importance but are rather a commodity. On the contrary, the argument of IT as commodity was also criticized (Hackathorn, 2003) claiming that it is important to consider also the procedures and processes behind business activities that IT supports since these procedures are an asset that cannot be bought and treated as a commodity.

The research identifying factors that present value in the partnership relationship and thus stimulate managers to form a business-to-business partnership (Tuten & Urban, 2001) revealed several categories ranked by their importance, namely: (1) a desire for lower costs including reductions in the duplication of unnecessary work; (2) providing increased services including satisfying customer needs satisfactorily; (3) enhancing competitive advantage; (4) improving organisational performance including market share and profitability; (5) increasing the quality of products and services; and (6) gaining different benefits from a partner, including a reliable source of supply.

Mohr and Spekman's model (Mohr & Spekman, 1994) has thus been further developed with the antecedents of the business-to-business partnership relation, namely with the expectations of lower costs, increased services, competitive advantages, increased quality, sales, profitability and market share. These antecedents signify the expectations a potential partner has regarding the each particular partnering relationship (Tuten & Urban, 2001).

However, in the research (Tuten & Urban, 2001) it has also been shown that the actual benefits of entering into a partnership relation differs from the factors that cause organisations to enter into partnerships. Actual benefits were namely ranked as: (1) improving performance; (2) a desire for lower costs; (3) gaining various benefits from the relationship; (4) providing increased service; (5) getting word-of-mouth advertising; (6) increasing product or service quality; and (7) improving competitive advantages.

Consequently, if no benefits are expected from the partnership relation there is no intention to form a partnership. Thus, the antecedents from Mohr and Spekman's extended model were used in this dissertation to form a construct of the perceived value of IT as an important factor of a partnership relationship.

1.4.8 Literature overview

Table 2 presents an overview of the literature regarding various topics concerning the business-IT relationship, namely technical skills, communication skills, business and managerial skills, role of IT personnel, top management support, the business-IT gap, strategic alignment and a partnership relation, based on the brief literature review presented above. Various studies that were performed regarding these topics are classified in different periods of time.

It is evident from the table that the main focus of research before the 1990s was on the technical perspective of the relationship, namely emphasising the importance of technological knowledge and skills. Later, the focus shifted to emphasising a combination of various knowledge and skills as an important factor in the business-IT relationship.

Further, in the last 10 years the research focus has been on the importance of top management support and strategic alignment between business and IT. In the last few years, the term partnership in the business-IT relationship has also been used in research.

Table 2: Research topics in different periods

Period / Research topic	Before 1990	1990 - 2000	2000 - 2005	After 2005
Technical skills	(Vitalari, 1985; Watson, Young, Miranda, Robichaux, & Seerley, 1990)	(Clark, Cavanaugh, Brown, & Sambamurthy, 1997)	(Byrd & Turner, 2001; Caldeira & Ward, 2003)	
Business and managerial skills	(Green, 1989; Jenkins, 1986)	(Armstrong & Sambamurthy, 1999)	(H. H. G. Chen, Miller, Jiang, & Klein, 2005)	
A combination of skills		(Mata, et al., 1995)	(Caldeira & Ward, 2003; Litecky, Arnett, & Prabhakar, 2004; Wade & Parent, 2001) (Melville, et al., 2004)	(Lerouge, et al., 2005; Parolia, et al., 2007)
Role of IT personnel	(Doll & Ahmed, 1983; Keen, 1991)	(Venkatraman & Loh, 1994)	(M. A. Ward & Mitchell, 2004)	(Chun & Mooney, 2009; Nord, et al., 2007)
Top management support		(Earl & Feeney, 1994)	(Ragu-Nathan, et al., 2004) (Ranganathan & Kannabiran, 2004) (Caldeira & Ward, 2002)	(Kappelman, et al., 2006; Parolia, et al., 2007; Young & Jordan, 2008)
Business-IT gap		(Grindley, 1992; Peppard & Ward, 1999; Smith & McKeen, 1992; J. Ward & Griffiths, 1996)	(Coughlan, et al., 2005; Martin, et al., 2004)	(Atafar, et al., 2011; Nord, et al., 2007)
Strategic alignment		(Cardinali, 1992; Chan & Huff, 1993; Henderson & Venkatraman, 1993; Luftman, et al., 1993; Papp, 1999)	(Luftman, 2004, 2005)	(Baihareth & Liu, 2011; Chan & Reich, 2007; Chang, et al., 2008; L. Chen, 2010; Coleman & Papp, 2006; Dong, et al., 2008; Johnson & Lederer, 2010)
Partnership relation		(Ives, et al., 1993; Keen, 1993; Malena, 1995; Mohr & Spekman, 1994; Papp, 1999)	(Brinkerhoff, 2002; Chris, 2005)	(L. Chen, 2010; Ravichandran & Lertwongsatien, 2005; Tian, et al., 2010)

1.5 Hypotheses

Based on the literature review, top management support is a particularly important factor of successful IS implementation (Byrd & Davidson, 2003); however, the success factors for obtaining it are not clearly defined. It was argued (Martin, et al., 2004) that the gap between business and IT is a consequence of inadequate knowledge on both sides which leads to poor communication between IT personnel and business personnel. It was also claimed that top management support can be attained by presenting IT as a strategic resource (Earl & Feeney, 1994). IT personnel namely obtain an important role when top management realises the business value of IT in the company. Therefore, it is necessary to modify the role of IT personnel from technology- to business-oriented.

Regarding the literature review, in-depth interviews with chief information officers (CIOs) and chief executive officers (CEOs) and previous research (Groznik, Kovačič, Jaklič, & Indihar Štemberger, 2001; Kovačič, 2001), the following research question was proposed: the IT-business gap derives from different views regarding the role of IT personnel and differences in the knowledge and skills between them. An important factor for creating a partnership between top management and IT personnel is the business orientation of the IT department which can be achieved when CIOs have the proper business knowledge and skills.

On the basis of the professional and scholarly literature, lectures by top management and IT department managers and various conferences, I have formulated the following fundamental thesis:

"The lack of cooperation between top management and IT personnel derives from different views regarding the role of IT personnel, which leads to a gap between them. To reduce this gap, it is important to create a partnership relation between top management and IT personnel. One of the most important factors for this is the business orientation of IT personnel which depends on the business and managerial knowledge and skills of the IT manager. Another important precondition for a partnership relation is top management support."

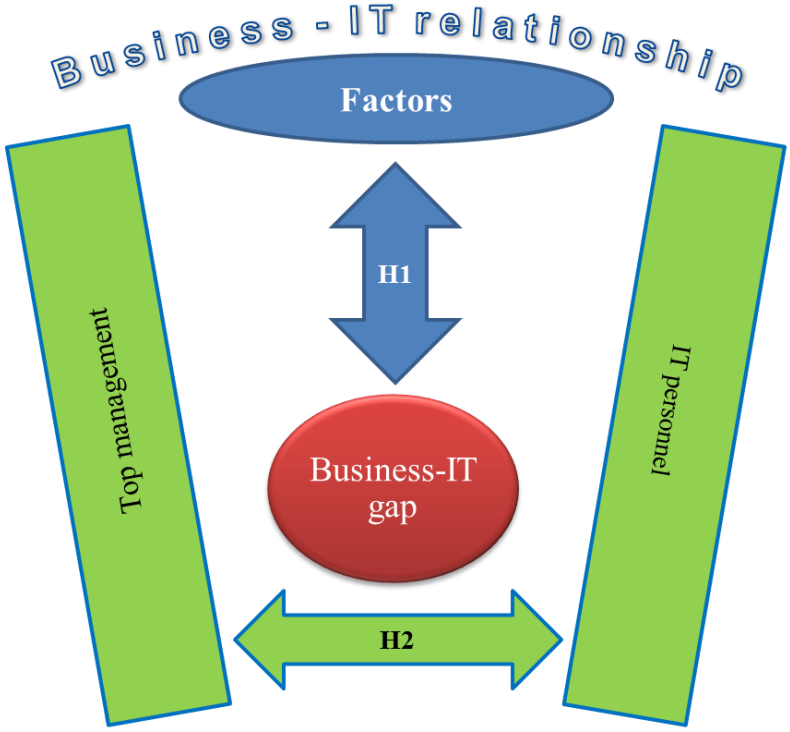
The following hypotheses of the dissertation are derived from the above fundamental thesis. Some of the proposed hypotheses are presented in the conceptual model in Figure 5 and Figure 6.

- H1: Several factors in the business-IT relationship are increasing the gap.
- H2: Top management's view regarding the role of the IT department is different from the view of IT personnel.
- H3: The business and managerial knowledge and skills of the IT manager and a business-oriented IT department have a positive impact on top management support.
- H4: The business knowledge and skills of the IT manager have a positive impact on a business-oriented IT department.

- H5: The managerial knowledge and skills of the IT manager have a positive impact on a business-oriented IT department.
- H6: The high assessment of technological knowledge and skills has a positive impact on technology-orientated IT department.
- H7: A business-oriented IT department has a positive impact on the partnership between top management and IT personnel.
- H8: A technology-oriented IT department has a negative impact on the partnership between top management and IT personnel.
- H9: The perceived value of IT positively influences the partnership between top management and IT personnel.

The figures below show the conceptual model and the proposed hypotheses. Figure 5 presents the conceptual model with hypotheses H1 and H2, namely that several factors are increasing the business-IT gap and that the view regarding the role of the IT department varies between top management and the IT personnel.

Figure 5: Conceptual model of the business-IT relationship



A prerequisite for creating a partnership relation and perceiving the value of IT is to obtain top management's support, as suggested in H3.

Figure 6: The conceptual model of the partnership relation

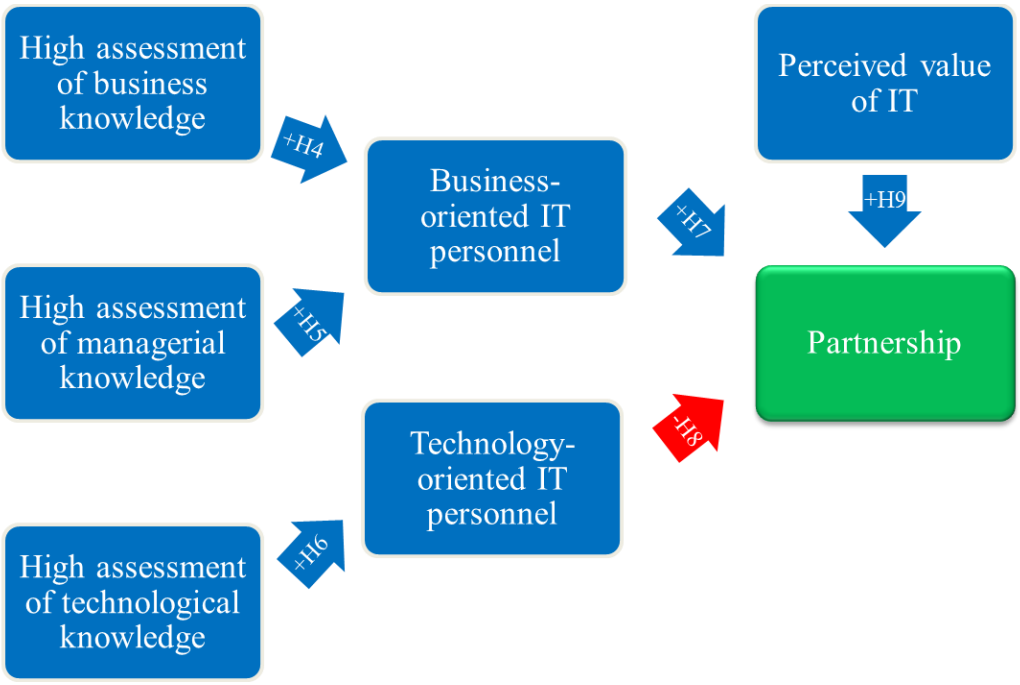


Figure 6 on the other hand shows the conceptual model of the partnership relations with the proposed hypotheses, namely that business-oriented IT personnel have a positive influence on the partnership; while technology-oriented IT personnel negatively influence it. Further, the perceived value of IT also has a positive effect on the partnership.

1.6 Description of the research methods

The dissertation is a collection of connected articles. Each article is composed of theoretical and empirical work. In the first part of each article, the purpose and objectives are presented, followed by a literature review. The literature review in each article is based on the description method and describes both the scholarly and professional literature in the field of studying the business-IT relationship. These parts focus on understanding the broader issues in that field and on establishing the grounds for developing the hypotheses.

In the empirical part of each article, which is based on two surveys, quantitative methods dominate. To verify the hypotheses I used a research instrument – a questionnaire of "Business Informatics in Slovenia 2009" which was upgraded and expanded. For the purpose of this doctoral thesis, a specific set of questionnaires was namely adapted. The survey consisted of interviews with IT managers in medium and large enterprises in Slovenia. The second questionnaire was designed for top management. The purpose of this survey, which was partly based on the "Business Informatics in Slovenia 2009" research, was to present the differences in views between top managers and IT personnel since it allows a comparison of the responses of top management with the responses of IT managers or persons responsible for IT. This in fact also enables the factors that are causing the gap between top management

and IT personnel to be identified, as well as the factors that lead to greater cooperation between them.

In analysing the data several statistical methods were used such as descriptive statistics for general sample characteristics, exploratory factor analysis and linear structural equation modelling. The method used is different for each article, namely:

- Article 1: Exploratory factor analysis together with an independent sample T-test
- Article 2: Exploratory factor analysis together with the Mann-Whitney U Test
- Article 3: Exploratory factor analysis and linear structural equation modelling
- Article 4: Exploratory factor analysis and linear structural equation modelling

Each method used is briefly described under research methods in Section 2.

1.7 Contribution to science

The dissertation has both a scientific and practical contribution since it upgrades the existing literature on the relationship area. The hypotheses of the dissertation are easily transferable to other environments and can thus represent a challenge for various authors in upgrading their contributions to the business-IT relationship. The scientific contributions of the doctoral dissertations involve:

- Defining the gap – most authors mainly mention the gap and outline its implications. Further, in the scholarly literature there is no clear definition regarding the term gap and outlining the factors causing this gap is missing. The parallel survey among the top management and IT personnel enables the gap to be defined and the elements that form the gap to be presented.
- Upgrading the existing models – in their research authors have mostly focused on individual factors that reduce the gap. Many studies claim that top management support is crucial for successful IT implementation and therefore for an efficient business-IT relationship; however, it is unclear how to obtain top management's support. Further, factors in the business-IT relationship are often only crudely defined.
- Enabling further research – the presented results and proposed model will allow further research to be conducted and to expand the model in terms of:
    - studying the impact of top management support to IT personnel's initiatives on improved business processes, business performance…;
    - applying the model to the relationship between business and other spheres in various companies, namely researching the relationship between top management medical staff, engineers…; and
    - examining the impact of the education system on individual characteristics and attitudes, and consequently on the relationship between top managers and IT personnel.

Practical contribution of the doctoral dissertation is chiefly evident from presenting the factors that are increasing the gap since top managers and IT managers should consider the identified factors and dedicate substantial effort and time to improve their mutual relationships and consequently reduce the gap between them. This will increase the chances of successful IT implementation in companies. Further, companies will have the opportunity to compare the positions within their organisation with the presented model. This will enable them to react more quickly, especially when the relationship between the observed entities does not allow the optimal utilisation of IT for improving the company performance.

1.8 Structure of the dissertation

The dissertation is a collection of four articles. It starts with an introduction where the topic is briefly described, the purpose and goals are presented and the hypotheses established.

The second part is divided into two main sub-parts. The first sub-part describes the purpose of each article and explains the connections between them, thereby developing the main thesis in the context of the four articles. The second sub-part briefly presents the research instrument used in this dissertation and the research methods employed in each article.

The third part is the core part of the dissertation since it presents a collection of four articles. It is composed of four sections, namely;

- *Article 1* entitled "Important factors in the relationship between top management and IS personnel."
- *Article 2* entitled "The gap between top management and IS personnel: How far apart are they?"
- *Article 3* entitled "Achieving top management support with business knowledge and role of IT/IS personnel."
- *Article 4* entitled "Creating a partnership between top management and IS personnel."

The last part of the dissertation offers concluding remarks and emphasises the main achievements and results. It also indicates the main limitations of the research.

The research, results and implications set out in this dissertation refer to information technology (IT) and information systems (IS). These terms are used interchangeably regarding the purpose and demands of each article. The term IS is often used to denote IT itself, data and procedural knowledge (Travica, 2005). In the literature these terms are also used interchangeably and are usually considered as synonymous (Holtsnider & Jaffe, 2007, p. 4).

2 ARTICLE DESCRIPTION AND RESEARCH METHODS

2.1 Developing a thesis through the articles

The four articles that form the main part of the dissertation are closely linked and related to each other. They are organised in the direction of development, namely from setting the basis for the research to presenting partnership as the key part of the dissertation.

2.1.1 The first article[1]

The first article identifies factors that exist in the business-IT relationship and consequently provides the basis for the further research since the identified factors are also used in the other articles. The purpose of the first article is therefore to enhance the understanding of the relationship between top management and IS personnel by defining the key factors in this relationship. The first article should thus succeed in achieving the first and second goals of the dissertation, namely:

- to identify the key factors important in the business-IT relationship; and
- to identify the main factors causing or increasing the gap.

It should also confirm the first hypothesis, namely:

- several factors in the business-IT relationship are increasing the gap.

2.1.2 The second article[2]

The second article develops these factors in detail since it describes the differences between top management and IT managers. The article compares individual answers of each entity in the relationship. The purpose of the article is thus to describe the notion of the gap and to expose the key differences between top management and IT managers. The second article should thus succeed in achieving the second and third goals of the dissertation, namely:

- to identify the main factors causing or increasing the gap.
- to examine and define the notion of the gap between business and IT managers; and

[1] A shorter version of the first article was presented at the United Kingdom Academy for Information Systems (UKAIS) in 2012. UKAIS is the leading annual conference based in the UK for Information Systems, Management and Information Technology academics and professionals. The shorter version of the article is thus published in the proceedings of the UKAIS conference. The article was seen as being appropriate for publication in the Journal of Enterprise Information Management (JEIM). Therefore, the shorter version of the article was updated and extended and submitted for consideration to the JEIM (an INSPEC-indexed journal). This extended version of the article forms part of this dissertation. The article has just been accepted to be published in the JEIM.

[2] The article has not been published yet.

It should also confirm the second hypothesis, namely:

- top management's view regarding the role of the IT department is different from the view of IT personnel.

2.1.3 The third article[3]

The third article develops the thesis further by observing the relations between the identified factors in order to obtain top management support as it is a precondition for creating a partnership. The purpose of this article is hence to show how IT personnel can achieve top management's support. The third article should thus succeed in achieving the fourth goal of the dissertation, namely:

- to present factors that lead to obtaining top management support.

It should also confirm the third hypothesis, namely:

- the business and managerial knowledge and skills of the IT manager and a business-oriented IT department have a positive impact on top management support.

2.1.4 The fourth article[4]

The fourth article presents the overall model for creating a partnership between top management and IT personnel. It includes the research from the previous articles and upgrades it by including the term partnership and establishing the relations between the identified factors that lead to a partnership. The purpose of this article is thus to present the mode for achieving a partnership in the business-IT relationship. The fourth article should thus succeed in achieving the last goal of the dissertation, namely:

- to reveal the factors that lead to partnerships and consequently enable better cooperation between top managers and IT personnel.

It should also confirm hypotheses four to nine, namely:

- the business knowledge and skills of the IT manager have a positive impact on business-oriented IT department;
- the managerial knowledge and skills of the IT manager have a positive impact on business-oriented IT department;

[3] The article was published in the International Journal of Information Management (IJIM). It has been available online since 12 March 2011. IJIM is a SSCI-indexed journal with an impact factor of 1.532 in 2011. It is ranked in the first quarter (A1) within the category Information Science & Library Science.

[4] The article has not been published yet.

- the high assessment of technological knowledge and skills has a positive impact on technology-orientated IT department;
- a business-oriented IT department has a positive impact on the partnership between top management and IT personnel;
- a technologically-oriented IT department has a negative impact on the partnership between top management and IT personnel; and
- the perceived value of IT positively influences the partnership between top management and IT personnel.

The collection of all four articles in the proposed order therefore explains, develops and evolves the hypotheses of the dissertation.

2.2 Research instrument

The research question was empirically tested using data from Slovenian medium and large companies. Two similar questionnaires were developed, one for IT department managers and another for top management in order to enable comparing the two sides. Both questionnaires (in the Slovenian language) are enclosed in Appendix A and Appendix B.

The questionnaire for top management was only in online form, while the questionnaire for the IT managers was in online and printed from. Top managers were thus invited to participate in an online survey, while the IT managers participated in an online survey or in the form of structured interviews. All participants had to agree in advance to participate.

Both questionnaires were, alongside some general questions, composed of:

- 10 items measuring the importance and position of IT personnel;
- 11 items measuring the partnership relation;
- 16 items measuring the importance of different skills and knowledge for IT managers; and
- 13 items measuring the role of IT personnel.

The questionnaire for IT managers had an additional 16 items measuring the quality of the knowledge and skills possessed by the individual IT managers who participated in the research.

The questionnaires were built on the basis of different findings in the literature (Byrd & Davidson, 2003; M. A. Ward & Mitchell, 2004) and previous research (Groznik, et al., 2001; Indihar Štemberger, Manfreda, & Kovačič, 2011). Items measuring the importance of knowledge and skills were defined in greater detail and broken down comparing to the abovementioned research. Pretesting was conducted in 2010 using a group involving three academics interested in the research area and ten semi-structured interviews with selected IT managers who were later also included in the study.

The items used in the research were measured using a structured questionnaire with 7-point Likert scales. There were also some open questions in the questionnaire; however, they were not used in the research.

The only exception is Article 3 where the dataset were obtained from the research "Business Informatics in Slovenia 2006" which in particular related to the knowledge and skills of IT personnel and the role of IT in the company. The data were collected in 2006 through interviews with 152 IT managers. This research thus relates solely to IT managers. The sample characteristics are presented in Article 3, and are therefore not presented in the section below since that dataset was only used in Article 3. The structure of the questionnaire resembles the structure of the questionnaire for the IT managers presented above.

2.3 Data collection and sample characteristics

The empirical research was done on medium and large Slovenian companies. According to Slovenian legislation – Companies Act (Zakon o gospodarskih družbah), the entry condition for including a company in the research is that it had to satisfy at least two of the criteria listed below:

- to have at least 50 employees;
- a net turnover exceeding EUR 8,800,000; and
- an asset value exceeding EUR 4,400,000.

Consequently, 1,495 companies were suitable to participate in the research. All these companies were contacted by telephone and their IT managers were invited to participate. Companies where no one was formally involved in IT were excluded and did not participate in the research.

The data collection started in April 2011 and was concluded in August 2011. The semi-structured interviews were conducted with 100 IT managers, while 121 managers participated in the on-line survey. Altogether, a total of 221 IT managers participated in the survey, representing a 14.8% response rate.

At the same time, top managers were also invited to participate in the research. From the total 1,495 eligible companies, 450 top managers were randomly selected and invited to participate in the study. Ninety-three top managers agreed to take part in the research, thus representing a 20.7% response rate.

Altogether, 314 cases suitable for the analysis were obtained. The respondent companies constitute a representative sample of Slovenian medium and large companies. The profile of the respondents is shown below.

Table 3: The profile of respondents (IT managers)

		Share in %
Type of organisation	Public organisation	18.4
	Private organisation	81.6
Ownership	Mainly state ownership	22.7
	Minor state ownership	5.6
	Private domestic ownership	52.8
	Private foreign ownership	19.0
Organisation of the IT department	IT department is a special organisational unit	43.4
	IT department is a part of other organisational unit	23.3
	Individuals are responsible for IT	26.0
	No one is formally involved	7.3

Table 3 presents the profile of the 221 IT managers that participated in the research, namely the type of organisation, ownership and IT department organisation within the company. The majority of respondents come from a private organisation with private domestic ownership and a special organisational unit. Figure 7, on the other hand, presents the position of the IT manager within the company. It is evident that most of the IT managers are subordinated to the top management, while only a small share of IT managers is a member of the management board.

Figure 7: Position of the IT manager

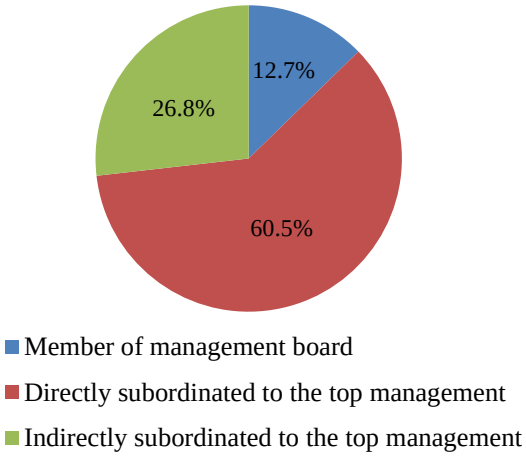


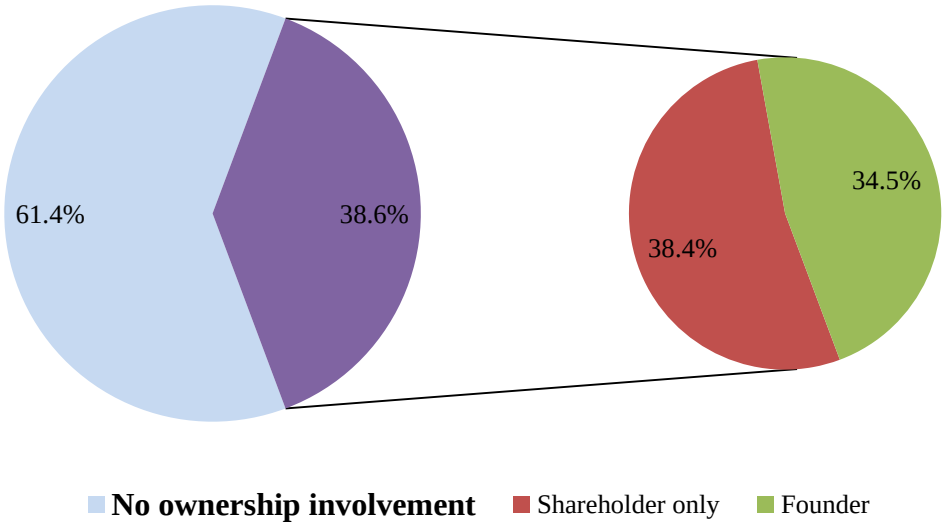
Table 4 presents the profile of the 93 top managers who participated in the research, namely the type of organisation and ownership structure. The majority of top managers come, like the IT managers, from a private organisation with private domestic ownership.

Table 4: The profile of the respondents (top management)

		Share in %
Type of organisation	Public organisation	20.4
	Private organisation	79.6
Ownership	Mainly state ownership	24.5
	Minor state ownership	5.7
	Private domestic ownership	52.8
	Private foreign ownership	17.0

Further, there were two additional questions for top managers only, namely the shareholder status of the top managers regardless of the share in the company, and the founder status. As it is evident from Figure 8, the great majority of top managers participating in the research do not own shares in the respondent companies. However, almost 40% of the top managers are shareholders of the respondent companies, with 34.5% of them being a founder of the respondent company. Therefore, 13.3% of all top managers participating in the research are founders (entrepreneurs) of the respondent company.

Figure 8: Shareholder status



As it is evident from Table 3 and Table 4, in both samples the distribution regarding the type of organisation and the ownership structure is similar, and therefore the samples resemble each other enough to enable the further analyses.

2.4 Data analysis

2.4.1 Article 1

An exploratory factor analysis using SPSS 19 was conducted and a principal axis factoring extraction method with a Varimax rotation was used to define factors that are important in the business-IT relationship. Exploratory factor analysis enables identifying the factor structure for a set of variables (Stevens, 2002). The purpose of rotation is to simplify and clarify the data structure (Costello & Osborne, 2005) and thus to facilitate interpretation (Hair, Anderson, Tatham, & Black, 1998). Numerous different methods are available; however, a Varimax rotation is commonly used (Costello & Osborne, 2005).

For each identified factor, a factor score was calculated using the Anderson-Rubin method (Anderson & Rubin, 1956). Factor scores generally represent the weighted proportion of each variable involvement in a pattern (Rummel, 1967). They signify the degree to which each individual respondent scores high on the group of items that have a high loading on a factor (Hair, et al., 1998). The Anderson-Rubin method is a variation of the Bartlett procedure with an adjusted formula to provide factor scores that are uncorrelated with other factors, and also uncorrelated with each other (DiStefano, Zhu, & Mîndrilă, 2009).

Further, independent samples T-test was used to identify factors that are increasing the gap between top management and IT personnel. The independent samples T-test enabled the comparison of the calculated factor scores for the top management and IT managers and thus to identify factors where significant differences in perceptions between them exist.

2.4.2 Article 2

To test whether a significant difference exists in the responses between top management and IT personnel, to empirically verify the hypotheses and to define the notion of the gap the Mann-Whitney U test was used.

The Mann-Whitney U test (Wilcoxon rank sum test) is a non-parametric test that is equivalent to the parametric independent t test. The difference is that the Mann-Whitney U test examines the differences in the ranked positions of scores in different groups. In addition, a t-test is valid on the assumption that values for each group are normally distributed, while a distributional assumption is not required for the Mann-Whitney test (Crichton, 2000).

The Mann-Whitney U test is based on a test statistic U which is the number of times a value in the first group precedes a value in the second group when values are sorted in ascending order (Conover, 1980).

The U statistic is calculated using the sample sizes of each group and the sum of ranks for the particular group (Field, 2009). Another non-parametric test is the Wilcoxon ran-sum test

(Wilcoxon, 1945); however, it is similar to the Mann-Whitney U test and produces almost the same results and therefore the Mann-Whitney U test is used in the article.

2.4.3 Article 3 and Article 4

An exploratory factor analysis using SPSS 19 was conducted and a principal axis factoring extraction method with a Varimax rotation was used to verify the construct validities of the measurement model. A Varimax rotation is an orthogonal method of rotation that produces uncorrelated factors and more easily interpretable results. Therefore, it is more widely used (Costello & Osborne, 2005), although all orthogonal rotation methods aim to produce comparable results (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Moreover, orthogonal rotation methods are also more commonly used since analytical techniques for executing oblique rotations are not as prevalent as orthogonal ones (Hair, et al., 1998).

To empirically verify the hypotheses in the conceptualised models, the Structural Equation Modelling (SEM) method and LISREL 8.51 in Article 3 and LISREL 8.80 in Article 4 was used. SEM as a confirmatory method was used to verify that the proposed relations among unobservable variables and between unobservable and measurable variables are consistent with the obtained empirical data (Diamantopoulos & Siguaw, 2000).

The same method was used in both articles since the purpose of both is to test the conceptualised model, namely:

- Article 3: To test the influence of the business and managerial knowledge and skills and business-oriented role of IT personnel on top management support; and
- Article 4: To test the conceptualised model in Figure 7 as the overall model of the dissertation.

The models in Articles 3 and 4 were constructed after considering several steps recommended for structural equation modelling (Diamantopoulos & Siguaw, 2000):

1. Model conceptualisation
2. Path diagram construction
3. Model specification
4. Model identification
5. Parameter estimation
6. Assessment of the model fit
7. Model modification
8. Model cross-validation

These recommended steps are presented in detail in section 2.5 for Article 3 and in section 2.6 for Article 4 since both articles only include a brief description of each step due to publisher's limitations. However, steps 5 and 6 are described in the articles and are thus not presented in detail below. Phase 7, namely model modification, was not done in Article 3 since there was

no theory behind the proposed modifications, while the partnership model was slightly modified. The last suggested step, namely cross-validation, was skipped in both articles due to the unfeasibility of repeating the model on different data.

2.4.4 Dealing with missing data

Since only IS managers and top managers who agreed to participate in the research were included in the semi-structured interviews and on-line surveys, there were merely a few missing data completely at random. Missing completely at random denotes the probability that a missing observation is unrelated to the value of the observation or to the value of any other variables (Howell, 2007).

In the exploratory factor analysis, an option to exclude cases listwise was used in all articles. Missing values are more problematic when dealing with structural equation modelling, therefore they should be handled correctly (B. G. Tabachnick & L. S. Fidell, 2007), which thus relates particularly to Articles 3 and 4.

It has been claimed that datasets where missing data represent less than 5% on a single variable in a data set are not problematic (R. B. Kline, 2011; Rubin, 1976) and in those cases selecting the method for dealing with missing data is arbitrary (R. B. Kline, 2011). Although replacing the missing values is therefore possible since in the obtained dataset no variable had more than 5% of missing data (as it is evident from Appendix G for the partnership model), the method for replacing the missing data was not used. Regarding the small number of missing values, a listwise deletion instead of replacing the data was used in both articles.

2.5 Model construction – Article 3

2.5.1 Model conceptualisation

The purpose of model conceptualisation is to develop theory-grounded hypotheses that help identify relations between latent variables with each other and with their corresponding indicators (Diamantopoulos & Siguaw, 2000).

Considering the structural part, three latent variables were identified in the research: (1) The business and managerial knowledge and skills of IT personnel (bmKNL); (2) The business role of the IT department (busRO); and (3) Top management's support to IT personnel (supMAN). Two latent variables in the model are exogenous latent variables, while one is an endogenous latent variable. The relations between the latent variables were specified as:

- The business and managerial knowledge and skills of IT personnel have a positive impact on top management's support to IT personnel.
- The business role of the IT department has a positive impact on top management's support to IT personnel.

Considering the measurement part, several multi-item measures for all three latent variables were used. All measurement variables have the form of reflective indicators. These measures are presented in detail in Article 3.

2.5.2 Path diagram construction

Path diagram graphically represents how different elements of the model specified above relate to each other and enables an easier understanding of the model. The model in Article 3 is composed of two confirmatory factor models – one for two latent exogenous variables and one for one endogenous variables linked together by a structural model. The relationships between the latent variables and their indicators are represented by arrows starting at the latent variable and ending at the indicators (Diamantopoulos & Siguaw, 2000) and therefore all indicators have the form of reflective indictors, while the model has a recursive form since there are no reciprocal relations between the latent variables.

2.5.3 Model specification

In order to understand the model specification, it is necessary to introduce a standard Lisrel notation. The exogenous latent variables are called KSI, therefore in the model KSI-1 (ξ_1) represents "bmKNL" and KSI-2 (ξ_2) represents "busRO", while endogenous latent variables are called ETA, so in the model ETA-1 (η_1) represents "supMAN". Directional relationships between the exogenous and endogenous latent variables are denoted with GAMMA (γ) and the appropriate subscripts (γ_{11} and γ_{12}). The relationships between the latent variables and their indicators are denoted with LAMBDA (λ) and the relevant subscripts.

Each indicator is also linked with an error term that represents "errors in measurement". In Lisrel, measurement errors for indicators of exogenous variables are denoted with DELTA (δ), while measurement errors for indicators of endogenous variables are denoted with EPSILON (ε). The error term is also associated with the endogenous latent variables and represents "errors in equations". In Lisrel, these error terms are denoted as ZETA (ζ).

It is important to transform all the relations presented above into a system of linear equations in order to proceed with the model identification and estimation. Firstly, the model specification at a basic level and afterwards using standard Lisrel notation is presented.

Structural equations:

- Top management support = f(Business and managerial knowledge, Business role of the IT department, Error)

Measurement equations for endogenous variables:

- Importance of IT = *f*(Top management support, Error)
- Participating in IT planning = *f*(Top management support, Error)
- Sponsoring IT personnel initiatives = *f*(Top management support, Error)
- Managerial IT knowledge = *f*(Top management support, Error)

Measurement equations for exogenous variables:

- Importance of managerial skills = *f*(Business and managerial knowledge, Error)
- Quality of managerial skills = *f*(Business and managerial knowledge, Error)
- Importance of business skills = *f*(Business and managerial knowledge, Error)
- Quality of business skills = *f*(Business and managerial knowledge, Error)
- Assessing IT needs in the company = *f*(Business role of the IT department, Error)
- Organising and quality of IT = *f*(Business role of the IT department, Error)
- Improving business processes = *f*(Business role of the IT department, Error)
- Strategic IT planning = *f*(Business role of the IT department, Error)

However, for further analysis and interpreting the output it is more convenient to express basic specifications above in the mathematical form using standard Lisrel notation.

Structural equations:

- $\eta_1 = \gamma_{11}*\xi_1 + \zeta_1$
- $\eta_2 = \gamma_{12}*\xi_2 + \zeta_2$

Measurement equations for exogenous variables:

- $x_1 = \lambda_{11}*\xi_1 + \delta_1$
- $x_2 = \lambda_{21}*\xi_1 + \delta_2$
- $x_3 = \lambda_{31}*\xi_1 + \delta_3$
- $x_4 = \lambda_{41}*\xi_1 + \delta_4$
- $x_5 = \lambda_{52}*\xi_2 + \delta_5$
- $x_6 = \lambda_{62}*\xi_2 + \delta_6$
- $x_7 = \lambda_{72}*\xi_2 + \delta_7$
- $x8 = \lambda 82*\xi 2 + \delta 8$

Measurement equations for endogenous variables:

- $y_1 = \lambda_{11}*\eta_1 + \varepsilon_1$
- $y_2 = \lambda_{21}*\eta_1 + \varepsilon_2$
- $y_3 = \lambda_{31}*\eta_1 + \varepsilon_3$
- $y_4 = \lambda_{41}*\eta_1 + \varepsilon_4$

From the above equations, it is evident that 27 independent parameters are required to be estimated in the proposed model. The complete list of parameters is shown in Appendix D.

2.5.4 Model identification

Model identification indicates whether there is enough information to obtain a unique solution for the parameters that will be estimated (Diamantopoulos & Siguaw, 2000).

In order to ensure whether the model achieves the minimum requirements for identification, the following formula is suggested for use:

$$t \leq \frac{s}{2} \qquad [1]$$

where (t) is the number of estimated parameters; (s) is the number of variances and covariances between the manifest variables and is calculated as:

$$s = (p + q) * (p + q + 1) \qquad [2]$$

where (p) is the number of indicators of endogenous latent variables and (q) is the number of indicators of exogenous latent variables.

To ensure there is a unique solution for the estimated parameters and that additional information for model testing remains, the model should be over-identified and therefore equation *[1]* should be as follows:

$$t < \frac{s}{2} \qquad [3]$$

In the case of over-identified model the degrees of freedom (df) are positive and calculated as:

$$df = \frac{s}{2} - t \qquad [4]$$

In the specified model for Article 3 the following formula entries are identified:

p = 4; q = 8; s = 156;

Therefore s/2=78, which presents the number of items in a covariance matrix or in other words the amount of information that is available.

On the other hand, there are 27 parameters to estimate as it is evident from Appendix D. One indicator of an endogenous latent variable was used as a reference value to scale the construct, and therefore there is one fixed parameter (λ_{11} = 1 for the endogenous latent variable) in the model (t = 26).

Considering equation *[3]*, the model is over-identified as t<s/2, with 51 degrees of freedom and the model is therefore suitable for parameter estimation and testing.

2.5.5 Parameter estimation

As a result of Simplis input shown in Appendix C, both Simplis and Lisrel outputs were obtained. The complete outputs produced by Lisrel are shown in Appendix E.

2.5.6 Assessment of the model fit

Assessment of the model fit allows evaluating the quality and reliability of the measurement and structural part in the model. It shows whether the hypothesised model is consistent with the data, namely comparing the model-based covariance matrix and the samples covariance matrix.

Overall fit assessment

The purpose of the overall fit assessment is to determine whether the model as a whole is consistent with the empirical data (Diamantopoulos & Siguaw, 2000). Several fit indices have been developed to measure overall model fit, however they perform differently depending on the sample size, estimation procedure, model complexity and variable independence (Byrne, 1998), while there is no agreement on the overall index (Hayduk, 1996). All fit indices provided by Lisrel are shown in Appendix F.

Assessment of the measurement model

In order to assess the measurement model, the focus is on the relationship between the latent variables and their manifest variables. The aim is to determine the validity and reliability of the measures used to represent the construct of interest.

To confirm their validity, the relations between manifest variables and latent variables should be significantly different from zero (t-values should exceed 1.96 in absolute terms), while reliability depends on squared multiple correlation values (high values indicate high reliability for each indicator).

Assessment of the structural model

Three parts are important for assessing the structural model, namely the signs of the parameters, the magnitudes of the parameters and squared multiple correlation values. The purpose of this assessment is to examine whether theoretical relations that were specified in the model conceptualisation are supported by the data.

2.6 Model construction – Article 4

2.6.1 Model conceptualisation

Eight latent variables were identified based on the exploratory factor analysis; however, one factor was not used for the structural equation modelling since only two variables loaded on that factor. The rotated factor matrix using a Varimax rotation is presented in Appendix H. Seven latent variables were thus used for the model conceptualisation, namely: (1) the perceived value of IS (ValIS); (2) technological knowledge and skills of the IT manager (TECknl); (3) managerial knowledge and skills of the IT manager (MANknl); (4) business knowledge and skills of the IT manager (BUSknl); (5) technology-oriented role of the IT

department (TECori); (6) business-oriented role of the IT department (BUSori); and (7) partnership between top management and IT personnel (PART). Four latent variables in the model are exogenous latent variables, while three are endogenous latent variable. The relations between the latent variables were specified as:

- The technological knowledge and skills of the IT manager have a positive impact on technology-oriented role of the IT department.
- The managerial knowledge and skills of the IT manager have a positive impact on business-oriented role of the IT department.
- The business knowledge and skills of IT personnel have a positive impact on business-oriented role of the IT department.
- The perceived value of IT has a positive impact on the partnership relation.
- The technology-oriented role of the IT department has a negative impact on the partnership relation.
- The business-oriented role of the IT department has a positive impact on the partnership relation.

Several multi-item measures for the latent variables described above were used. All measurement variables have the form of reflective indicators and are presented in section 2.6.3 (Model specification).

2.6.2 Path diagram construction

The path diagram is presented in Article 4 and is thus not presented in this section. The model is composed of two confirmatory factor models – one for four latent exogenous variables and one for three endogenous variables linked together by a structural model. The model has a recursive form since there are no reciprocal relations between the latent variables.

2.6.3 Model specification

In the model there are four exogenous latent variables, thus KSI-1 (ξ_1) represents "valIS", KSI-2 (ξ_2) represents "TECknl", KSI-3 (ξ_3) represents "MANknl" and KSI-4 (ξ_4) represents "BUSknl", while there are three endogenous latent variables, thus ETA-1 (η_1) represents "TECori", ETA-2 (η_2) represents "BUSori" and ETA-3 (η_3) represents "PART".

Directional relationships between the exogenous and endogenous latent variables are denoted with GAMMA (γ) and the appropriate subscripts (γ_{12}, γ_{23}, γ_{24}, γ_{34} and γ_{31} in the model). Directional relationships between the endogenous variables are denoted with BETA (β) and the corresponding subscript (β_{31} and β_{32} in the model). Measurement errors for indicators of exogenous variables are denoted with DELTA (δ), while measurement errors for indicators of endogenous variables are denoted with EPSILON (ε). The error term associated with the endogenous latent variables is denoted as ZETA (ζ).

Before identifying and estimating the model, the relations presented above were transformed into a system of linear equations. Firstly, the model specification at a basic level and afterwards using standard Lisrel notation is presented.

Structural equations:

- Business-oriented role of the IT department = *f*(Managerial knowledge, Business knowledge, Error)
- Technology-oriented role of the IT department = *f*(Technological knowledge, Error)
- Partnership = *f*(Perceived value of IS, Business-oriented role of the IT department, Technology-oriented role of the IT department, Error)

Measurement equations for the endogenous variables:

- *Identifying IS needs = *f*(Business-oriented role of the IT department, Error)
- *Formulating IS architecture = *f*(Business-oriented role of the IT department, Error)
- On-time concluding IS projects = *f*(Business-oriented role of the IT department, Error)
- Proper IS organisation = *f*(Business-oriented role of the IT department, Error)
- Implementing IS projects in a cost-specified range = *f*(Business-oriented role of the IT department, Error)
- Improving and redesigning business processes = *f*(Business-oriented role of the IT department, Error)
- Strategic IS planning = *f*(Business-oriented role of the IT department, Error)
- Controlling the performance of IS projects = *f*(Business-oriented role of the IT department, Error)
- Independent IT personnel = *f*(Partnership, Error)
- Top management relies on IT personnel = *f*(Partnership, Error)
- Top management respects the work of IT personnel = *f*(Partnership, Error)
- Trusting IT personnel to quality perform obligations = *f*(Partnership, Error)
- Mutual reliance = *f*(Partnership, Error)
- Involvement in the company development = *f*(Partnership, Error)
- Aligned objectives = *f*(Partnership, Error)
- Long-term cooperation = *f*(Partnership, Error)
- Commitment to a good relationship = *f*(Partnership, Error)
- Open and honest communication = *f*(Partnership, Error)
- Involvement in formulating business strategies = *f*(Partnership, Error)
- Establishing the appropriate infrastructure = *f*(Technology-oriented role of the IT department, Error)
- Providing user support = *f*(Technology-oriented role of the IT department, Error)
- Concern for security in IS = *f*(Technology-oriented role of the IT department, Error)
- *Developing IS solutions = *f*(Technology-oriented role of the IT department, Error)

- *Cooperating with external suppliers = *f*(Technology-oriented role of the IT department, Error)

Measurement equations for the exogenous variables:

- Planning and organising = *f*(Managerial knowledge, Error)
- Motivation = *f*(Managerial knowledge, Error)
- Project management = *f*(Managerial knowledge, Error)
- Team-working = *f*(Managerial knowledge, Error)
- Communication and coordination = *f*(Managerial knowledge, Error)
- Knowing business processes = *f*(Managerial knowledge, Error)
- Knowing relevant legislation = *f*(Business knowledge, Error)
- Risk management = *f*(Business knowledge, Error)
- Knowing individual functional areas = *f*(Business knowledge, Error)
- Knowing business competitors = *f*(Business knowledge, Error)
- Enabling quality services = *f*(Perceived value of IS, Error)
- Enabling operations with lower costs = *f*(Perceived value of IS, Error)
- Enabling successful business performance = *f*(Perceived value of IS, Error)
- Enabling competitive advantage = *f*(Perceived value of IS, Error)
- Programming= *f*(Technological knowledge, Error)
- Operating systems = *f*(Technological knowledge, Error)
- Databases = *f*(Technological knowledge, Error)
- Telecommunications and networks = *f*(Technological knowledge, Error)

These basic specifications are expressed below in mathematical form using standard Lisrel notation.

Structural equations:

- $\eta_1 = \gamma_{11}*\xi_1 + \gamma_{12}*\xi_2 + \zeta_1$
- $\eta_2 = \gamma_{24}*\xi_4 + \zeta_2$
- $\eta_3 = \beta_{31}*\eta_1 + \beta_{32}*\eta_2 + \gamma_{33}*\xi_3 + \zeta_3$

Measurement equations for exogenous variables:

- $x_1 = \lambda_{11} * \xi_1 + \delta_1$
- $x_2 = \lambda_{21} * \xi_1 + \delta_2$
- $x_3 = \lambda_{31} * \xi_1 + \delta_3$
- $x_4 = \lambda_{41} * \xi_1 + \delta_4$
- $x_5 = \lambda_{52} * \xi_1 + \delta_5$
- $x_6 = \lambda_{62} * \xi_1 + \delta_6$
- $x_7 = \lambda_{72} * \xi_2 + \delta_7$
- $x_8 = \lambda_{82} * \xi_2 + \delta_8$
- $x_9 = \lambda_{92} * \xi_2 + \delta_9$
- $x_{10} = \lambda_{10\,2} * \xi_2 + \delta_{10}$
- $x_{11} = \lambda_{11\,3} * \xi_3 + \delta_{11}$
- $x_{12} = \lambda_{12\,3} * \xi_3 + \delta_{12}$
- $x_{13} = \lambda_{13\,3} * \xi_3 + \delta_{13}$
- $x_{14} = \lambda_{14\,3} * \xi_3 + \delta_{14}$
- $x_{15} = \lambda_{15\,4} * \xi_4 + \delta_{15}$
- $x_{16} = \lambda_{16\,4} * \xi_4 + \delta_{16}$
- $x_{17} = \lambda_{17\,4} * \xi_4 + \delta_{17}$
- $x_{18} = \lambda_{18\,4} * \xi_4 + \delta_{18}$

Measurement equations for endogenous variables:

- $^{*}y_1 = \lambda_{11} * \eta_1 + \varepsilon_1$
- $^{*}y_2 = \lambda_{21} * \eta_1 + \varepsilon_2$
- $y_3 = \lambda_{31} * \eta_1 + \varepsilon_3$
- $y_4 = \lambda_{41} * \eta_1 + \varepsilon_4$
- $y_5 = \lambda_{51} * \eta_1 + \varepsilon_5$
- $y_6 = \lambda_{61} * \eta_1 + \varepsilon_6$
- $y_7 = \lambda_{72} * \eta_1 + \varepsilon_7$
- $y_8 = \lambda_{82} * \eta_1 + \varepsilon_8$
- $y_9 = \lambda_{93} * \eta_3 + \varepsilon_9$
- $y_{10} = \lambda_{10\,3} * \eta_3 + \varepsilon_{10}$
- $y_{11} = \lambda_{11\,3} * \eta_3 + \varepsilon_{11}$
- $y_{12} = \lambda_{12\,3} * \eta_3 + \varepsilon_{12}$
- $y_{13} = \lambda_{13\,3} * \eta_3 + \varepsilon_{13}$
- $y_{14} = \lambda_{14\,3} * \eta_3 + \varepsilon_{14}$
- $y_{15} = \lambda_{15\,3} * \eta_3 + \varepsilon_{15}$
- $y_{16} = \lambda_{16\,3} * \eta_3 + \varepsilon_{16}$
- $y_{17} = \lambda_{17\,3} * \eta_3 + \varepsilon_{17}$
- $y_{18} = \lambda_{18\,3} * \eta_3 + \varepsilon_{18}$
- $y_{19} = \lambda_{19\,3} * \eta_3 + \varepsilon_{19}$
- $y_{20} = \lambda_{20\,2} * \eta_2 + \varepsilon_{20}$
- $y_{21} = \lambda_{21\,2} * \eta_2 + \varepsilon_{21}$
- $y_{22} = \lambda_{22\,2} * \eta_2 + \varepsilon_{22}$
- $^{*}y_{23} = \lambda_{23\,2} * \eta_2 + \varepsilon_{23}$
- $^{*}y_{24} = \lambda_{24\,2} * \eta_2 + \varepsilon_{24}$

[*]Items are dropped in the modified model

It is evident from the above equations that 96 independent parameters are required to be estimated in the proposed model. The complete list of parameters is shown in Appendix K.

2.6.4 Model identification

In the originally specified model for Article 4, the following formula entries are identified:

p = 24; q = 18; s = 1806;

Therefore, s/2=903, which presents the number of items in the covariance matrix or in other words the amount of information that is available.

On the other hand, there are 103 parameters to estimate (t = 96) as it is evident from Appendix K. Seven indicators for each latent variable in the model were used as a reference value to scale the construct, and therefore there are seven fixed parameters, namely four for the exogenous latent variables and three for the endogenous latent variables.

The model is thus over-identified as t is smaller than s/2, with 807 degrees of freedom, therefore the model is suitable for parameter estimation and testing.

2.6.5 Parameter estimation and assessment of the model fit

As a result of the Simplis input shown in the Appendix, both Simplis and Lisrel outputs were obtained. The complete outputs produced by Lisrel are shown in Appendix M.

The procedure of assessing the model fit in Article 4 is similar to the procedure in Article 3 and so it is not presented again here.

2.6.6 Power assessment

Another important issue in model evaluation is the statistical power related with testing the model (Diamantopoulos & Siguaw, 2000). Statistical power is defined as the probability that an incorrect model will be rejected. Power levels of about 0.80 are usually treated as sufficient.

Power estimates for the partnership model are obtained from Table 2 in (MacCallum, Browne, & Sugawara, 1996). For a model with more than 100 degrees of freedom (the original model has 807 df) and a sample size of 200 (206 in the model), the power estimate for the test of an exact fit is more than 0.904 and 0.955 for a close fit. Both values are above the recommended power, which may indicate that the analysis is sufficiently powerful. Since the table does not provide the power estimates for a model with more than 100 degrees of freedom, the following code was generated using a web utility (Preacher & Coffman, 2006):

```
#Power analysis for CSM
alpha <- 0.05 #alpha level
d <- 807 #degrees of freedom
n <- 206 #sample size
rmsea0 <- 0.05 #null hypothesized RMSEA
rmseaa <- 0.08 #alternative hypothesized RMSEA
#Code below this point need not be changed by user
ncp0 <- (n-1)*d*rmsea0^2
ncpa <- (n-1)*d*rmseaa^2
#Compute power
if(rmsea0<rmseaa) {
   cval <- qchisq(alpha,d,ncp=ncp0,lower.tail=F)
   pow <- pchisq(cval,d,ncp=ncpa,lower.tail=F)
}
if(rmsea0>rmseaa) {
   cval <- qchisq(1-alpha,d,ncp=ncp0,lower.tail=F)
   pow <- 1-pchisq(cval,d,ncp=ncpa,lower.tail=F)
}
print(pow)
```

The code was pasted into the R console window using R version 2.15.1. A statistical power of 1.0 was calculated, confirming that the analysis is sufficiently powerful since the value exceeds 0.8.

2.6.7 Model modification

Based on the confirmatory analysis, some indicators were removed from the model since their loadings were small and therefore did not represent reliable measures of the latent variables. Measurement items with standardised loadings below 0.6 were dropped from the modified model. Thus four items were dropped, namely:

- role4 reflecting the technology-oriented role of IT personnel
- role5 reflecting the technology-oriented role of IT personnel
- role6 reflecting the business-oriented role of IT personnel
- role7 reflecting the business-oriented role of IT personnel

Due to the dropped items in the modified model, there are 95 parameters to estimate. The variance of seven latent variables was fixed to 1 to define the unit of measurement, therefore 88 free parameters are required to be estimated in the modified model (instead of 96 independent parameters in the original model). The modified model is also over-identified as t (88) is smaller than s/2 (p=20; q=18; s =1482), with 653 degrees of freedom.

These suggestions are merely improving the model fit and not the model itself as they are changing the measures for latent variables. In Table 5 fit indices are presented for the original and modified models. The model with dropped indicators is labelled Model 1.

Table 5: Comparison of the original and modified models

	$\chi 2$	$\chi 2$ per df	RMSEA	NNFI	CFI	std. RMR
Original model	1687.40	2.09	0.073	0.952	0.955	0.0973
Model 1	1281.41	1.96	0.0685	0.963	0.966	0.0843

As it is evident from the table above, the model was improved by removing four indicators. In Article 4, only the final version of the model is presented since it has a better model fit and is not confronted with the theory; however it is stated in the article that the model was modified.

3 ARTICLE 1: IMPORTANT FACTORS IN THE RELATIONSHIP BETWEEN TOP MANAGEMENT AND IS PERSONNEL

Abstract

Purpose – Numerous IS implementation projects have failed due to unsuccessful attempts to align business and IS spheres in companies. The purpose of this research is thus to improve the understanding of the relationship between top management and IS personnel and to identify the key factors that are important in this relationship.

Design/methodology/approach – Two separate questionnaires were used for IS department managers and top management to identify key factors in the relationship. 221 CIOs and 93 CEOs agreed to participate in the research. To identify factors in the business-IS relationship an exploratory factor analysis was used. Further, factor scores were calculated and the independent samples T-test was used to compare these factor scores to reveal any significant differences in perceptions between CIOs and CEOs.

Findings – The empirical investigation reveals the existence of nine factors that are important in the business-IS relationship. Seven factors are perceived differently by top management and IS management and thus increasing the gap in the relationship, while two factors are similarly perceived.

Practical implications – Ignoring the gap between top management and IS personnel can have serious consequences. The paper thus presents the key areas where business and IS personnel should pay attention to.

Originality/value – The paper contributes to understanding the key factors in the relationship between top and IS managers since it identifies factors where significant differences exist. Therefore, it enables reducing the business-IS gap by considering the identified factors and dedicating significant effort to the factors with significant differences. The study is also valuable for researchers since it enables future research in exploring these factors in detail.

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

3.1 Introduction

The permanent development of new technologies, growing expectations of customers and constant struggle for market survival are forcing companies to develop business innovations, including innovative information systems (IS), in order to obtain competitive advantages.

Innovative IS are definitely a way for companies to obtain a competitive advantage and fulfil the growing expectations of different clients (De Haes & Van Grembergen, 2009); however, being innovative is not enough particularly where top management does not perceive the business value of IS innovativeness. Therefore, an efficient relationship between IS and top management is a precondition for gaining an advantage from IS innovativeness. The consequences of implementing them in the context of an inefficient relationship between top management and IS personnel are often neglected.

The relationship between top management and IS personnel is namely crucial for implementing IS successfully, however it is inadequate in many companies (Nord, et al., 2007). It has been a problematic since the emergence of software applications for general business use in the 1960s (Doll & Ahmed, 1983; J. Ward & Peppard, 1996). The reason for this problematic relationship lies in the difference between the business and IS spheres which is often labelled as the gap between IS personnel and top management (J. Ward & Peppard, 1996). This gap creates different views and expectations from both IS personnel and top managers and is consequently preventing a company from developing competitive advantages based on IS (Grindley, 1992).

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

It was shown decades ago that the credibility of IS personnel is determined by the successfulness of implementing IS which depends on an understanding of business needs (Doll & Ahmed, 1983). In addition, due to the gap between top management and IS personnel there have been several unsuccessful IS project implementations, thereby reducing the credibility of IS personnel and making top management less willing to support them (Nord, et al., 2007). Consequently, IS personnel are 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 their credibility. On the contrary, only a few companies have been able to successfully manage the business-IS gap (J. Ward & Peppard, 1996). Consequently, there have been several inadequate and unsuccessful IS investments and only a small proportion of companies have been strategically investing in IS (Tallon, Kraemer, & Gurbaxani, 2000).

It is therefore necessary to investigate the factors and measures of the business-IS relationship and thus contribute to an efficient relationship between top management and IS personnel. An efficient relationship will lead to top management perceiving the value of IS and treating IS personnel as a strategic tool and not merely a cost. Therefore, there is a need for the

responsible management on IS and the business side that is aware of the inefficient relationship and its consequences.

The term IS is used in this paper; however, the research and results also refer to IT. Companies included in the research defined their departments differently, namely as IT or IS departments, without any significant differences in their actual roles. Also in the literature these terms are used interchangeably and are usually considered as synonymous (Holtsnider & Jaffe, 2007, p. 4); therefore, IS as a broader term is used in the paper.

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 presentation of the results while, finally, implications and some directions for future research are outlined.

3.2 Literature review

3.2.1 The relationship between top management and IS personnel

The relationship between IS personnel and top management has been discussed for several decades. It has been claimed that this relationship has been problematic since the appearance of software applications designed for wide business usage (Doll & Ahmed, 1983), namely since organisations became increasingly dependent on IS (Peppard, 2001).

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

Further, top management often perceives IS merely as a support function with the single goal of automating the business process (Dos Santos & Sussman, 2000). As a result, companies usually optimise existing processes instead of using the IS department to undertake a complete business process renovation (Kovačič, 2004a). The IS department and IS personnel thus merely represent a cost for the company and not a business value. It was also shown that medium and large organisations perceived these differences in a similar way (Gutierrez, Orozco, & Serrano, 2009).

This problematic relationship is therefore preventing organisations from developing competitive advantages from IS (Grindley, 1992; J. Ward & Peppard, 1996). It has been claimed that the gap will be bridged with the advent of new more educated managers (Grindley, 1992), although many companies are still reporting the insufficient coordination of

work and knowledge sharing due to a misunderstanding between the business and IS departments (Martin, et al., 2004).

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

It had already been shown that organisations should emphasise the managing and organising IS within the organisation instead of focusing just on technology in order to obtain a sustainable competitive advantage (Bharadwaj, 2000; Kettinger, Grover, Guha, & Segars, 1994; Mata, et al., 1995) and emphasise the business role of IS departments in order to obtain top management's support (Indihar Štemberger, et al., 2011).

It is therefore important to include professionals with appropriate skills and behaviour in IS project teams as this will emphasise the effective communication (Parolia, et al., 2007) and hence contribute to an improved business-IS relationship.

3.2.2 The role of top management and IS managers

IS managers and business managers have a crucial role in the relationship and consequently for a successful IS project implementation. It has been shown that when top management possesses IS knowledge and skills this positively influences the adoption of IS in the company (Armstrong & Sambamurthy, 1999). The research thus indicates that responsible management will acquire at least some of the requisite skills.

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

Nevertheless, it was shown decades ago that it is up to IS managers to present IS as a strategic resource and IS implementation as a project of delivering value to the organisation (Earl & Feeney, 1994) in order to obtain top management's support.

Top management support, mainly defined as supporting the initiatives of IS personnel and understanding the importance of IS (Ragu-Nathan, et al., 2004), is crucial for successfully implementing IS (Sirkka L. Jarvenpaa & Ives, 1990; Ranganathan & Kannabiran, 2004); yet

without proper communication with top management IS managers and IS personnel are incapable of presenting themselves as a strategic resource (Nord, et al., 2007).

Therefore, IS managers should develop skills that improve the process of communicating with top management. The importance of knowledge and skills required for IS professionals and the importance of professional activities was investigated at three levels of IS management in different industries (Wu, Chen, & Chang, 2007). The results revealed that each level of IS management perceives 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 was presented in an empirical research (Lerouge, et al., 2005) with similar findings, 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 the IS manager should have a technological background, although an IS manager with a strategic orientation will more likely assist in forming a profitable company (Sobol & Klein, 2009) since managerial competencies positively influence the effectiveness of the IS manager (Y.-C. Chen & Wu, 2011).

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

3.3 Research methodology

3.3.1 Research instrument

The research question, namely defining factors which are increasing the business-IS gap, was empirically tested using data from Slovenian companies. Two questionnaires were developed, namely for IS department managers (CIOs) and for top management (CEOs). The purpose of developing the two questionnaires was to identify the factors that are creating the gap between them.

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

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

3.3.2 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 who were later also included in the study.

The entry criteria for including a company in the research were to have at least 50 employees and net sales revenue of more than EUR 8,800,000. Accordingly, 1,495 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. The data collection started in April 2011 and was concluded in August 2011. A total of 221 CIOs agreed to participate, representing a 14.8% response rate.

Simultaneously, 450 CEOs from the 1,495 eligible companies were selected and invited to participate in the study. 93 of them agreed to take part in the research, representing a 20.7% response rate.

Together, 314 cases appropriate for the analysis were obtained. The respondent companies constitute a representative sample of Slovenian medium and large companies. The profile of the respondents is shown in Table 6.

Table 6: Profile of respondents (CEO and CIO surveys)

		Share in %	
		CIO survey	CEO survey
Type of organisation	Public organisation	18.4	20.4
	Private organisation	81.6	79.6
Position of CIO	Member of management board	12.7	
	Directly subordinated to the top management	60.5	
	Indirectly subordinated to the top management	26.8	
Ownership	Mainly state ownership	22.7	24.5
	Minor state ownership	5.6	5.7
	Private domestic ownership	52.8	52.8
	Private foreign ownership	19.0	17.0

In both samples the share of private and public companies and the ownership structure is comparable, and therefore the samples resemble each other enough to continue the analysis.

3.4 Data analysis and results

To define the factors that are important in the 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.

3.4.1 Factors in the relationship

Given that factor loadings exceeding 0.45 are reliable according to the recommendations for identifying significant factor loadings based on sample size (Hair, et al., 1998), only loadings above 0.45 are presented in the tables. The results of the factor analysis for questions related to the importance and position of the IS department are presented in Table 7.

Table 7: Rotated factor loadings – importance and position of the IS department

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 recognising 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*

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

Table 8 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 only one variable is included. Factor 4 thus presents managerial knowledge and skills, Factor 5 technological

knowledge and skills and Factor 6 business 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, although it will not be treated as a factor in the further analysis.

Table 8: Rotated factor loadings – knowledge and skills

KMO = 840	Short description	Factor			
		4	5	6	7
knl1	Programming	*-.222*	**.638**	*.078*	*.090*
knl2	Operating systems	*-.084*	**.877**	*-.012*	*-.031*
knl3	Databases	*-.096*	**.881**	*.085*	*.035*
knl4	Telecommunications and networks	*.068*	**.725**	*.010*	*.039*
knl5	ERP	*.234*	*.416*	*.149*	*.376*
knl6	Audit models	*.264*	*.104*	*.206*	**.772**
knl7	Planning and organising	**.678**	*-.014*	*.173*	*.241*
knl8	Motivating	**.731**	*-.119*	*.197*	*.231*
knl9	Project management	**.732**	*-.064*	*.139*	*.219*
knl10	Team working	**.742**	*.077*	*.191*	*.101*
knl11	Communication and coordination	**.854**	*-.151*	*.243*	*-.047*
knl12	Business processes	**.546**	*-.054*	*.412*	*-.143*
knl13	Relevant legislation	*.186*	*.147*	**.575**	*.060*
knl14	Risk management	*.430*	*-.096*	**.528**	*.230*
knl15	Individual functional areas	*.140*	*.112*	**.713**	*.052*
knl16	Business competitors	*.210*	*-.012*	**.615**	*.157*

Factor analysis on items measuring the role of the 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 the business role of the IS department. Factor 9 includes questions about assuring an appropriate IS infrastructure, providing instructions and training, and therefore represents the supporting role, while factor 10 represents the technological role of the IS department as it includes questions regarding IS architecture and developing IS solutions. The factor loadings are presented in Table 9.

Table 9: Rotated factor loadings – roles of the IS department

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

The calculated Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) values are above 0.8, thereby indicating a reliable factor analysis as values greater than 0.5 are acceptable (Kaiser, 1974) and 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 the identified factors. Values above 0.7 are generally accepted (P. Kline, 1999), although in exploratory studies values below 0.7 and above 0.50 are also considered to be acceptable (Hair, et al., 1998; Nunnally, 1967). As Table 10 shows, Cronbach's alpha for all factors is above the recommended value and thus indicates the high reliability of the identified 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 the IS department (Isval)
- Managerial knowledge and skills of the IS manager (manKNL)
- Technological knowledge and skills of the IS manager (techKNL)
- Business knowledge and skills of the IS manager (busKNL)
- Business role of the IS department (busROL)
- Supporting role of the IS department (supROL)
- Technological role of the IS department (techROL)

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

3.4.2 CEO and CIO perceptions

Factor scores for the identified factors were calculated using the Anderson-Rubin method since this method is advised when uncorrelated and standardised factor scores are required (B. Tabachnick & L. Fidell, 2007). The independent samples T-test was used to compare these factor scores for the top management and IS managers and to reveal any significant differences in perceptions between them. The results of the independent T-test are presented in Table 10.

Table 10: Reliability evaluation and independent T-test

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

The effect size was calculated to examine whether the effect of the test statistics is meaningful and practically important. It was calculated using t values and df (Rosenthal, 1991). For factors with significant differences between the top management and IS managers the effect size ranges from 0.13 to 0.52, indicating a 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 reasonably to conclude that factor scores of top management do not differ from factor scores of IS managers.

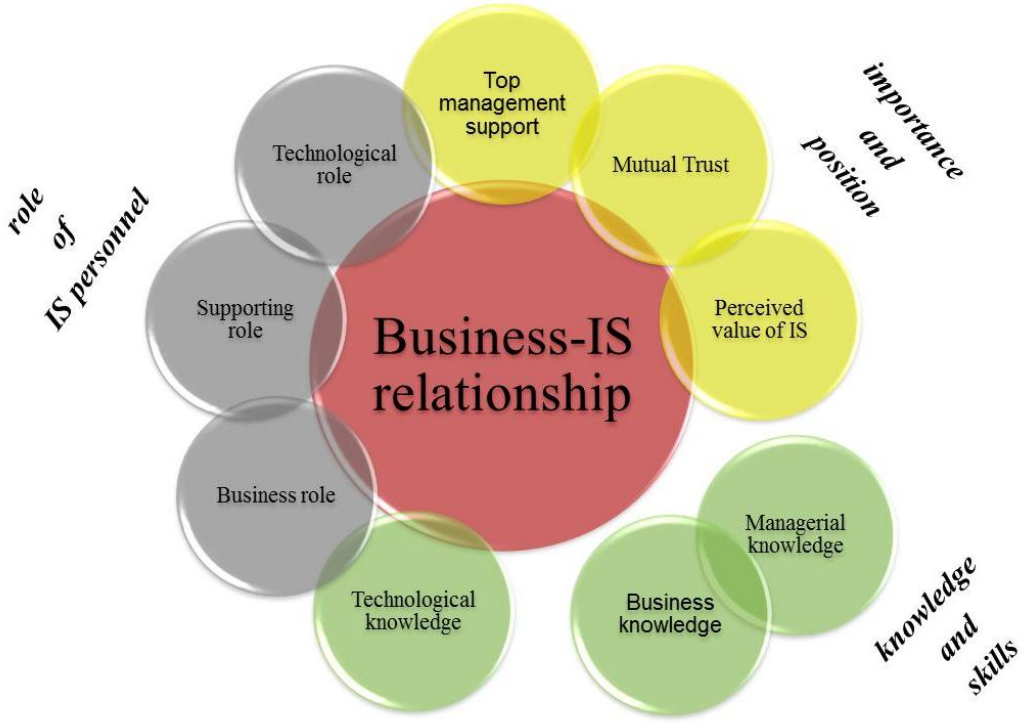
3.5 Findings and implications

The results indicate that seven factors, namely topSUP, muTRUST, Isval, techKNL, busROL, supROL and techROL, are perceived differently by the CEOs and CIOs as there are significant differences in factor scores between them, while two factors, namely manKNL and busKNL, are perceived similarly. The latter signifies that the IS managers assess the importance of their business and managerial knowledge similarly to the expectations of top management. The finding is not reducing the importance of these two factors since manKNL and busKNL are important in the business-IS relationship; though, they are not increasing the gap between top management and IS personnel. This finding was anticipated as several

researchers emphasise the importance of the business and managerial knowledge of IS personnel (Caldeira & Ward, 2003; Indihar Štemberger, et al., 2011) or emphasise requisite skills to improve effective communication in IS project teams (Parolia, et al., 2007) and it was expected that IS managers would start emphasising 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 agreement is still not being achieved, which then prevents companies from developing a competitive advantage based on IS. Therefore, an efficient business-IS relationship should remain the main challenge and a precondition for taking advantage of innovative information systems. The above mentioned factors are presented in Figure 9 with the distinction between factors that are similarly (crossing the business-IS relationship circle) and factors that are differently (outside the business-IS relationship circle) perceived by the CEOs and CIOs.

Figure 9: Factors in the business-IS relationship



It is argued that in many companies the CIO is the key driver of business innovation (Watts & Henderson, 2006) as information systems are an important source of innovation (Gordon & Tarafdar, 2007; Sambamurthy, Bharadwaj, & Grover, 2003). However, the prerequisite to perceive the business value of IS innovativeness is an efficient relationship between the top management and IS managers. Therefore, managers on the business and IS sides should consider factors important in that relationship, particularly factors that are perceived differently and hence causing the gap between them. It is thus important that top managers and IS personnel openly discuss their respective expectations and requirements. The factors

presented above form guidelines that should help both sides to identify key problems in the business-IS relationship.

The research indicated that further study of the relationship between top management and IS personnel is justified as there are significant and practically important differences between them. More research is thus needed to explore these factors in detail, including research on personal characteristics, to contribute to better understanding in the business-IS relationship.

3.6 Conclusion

Too many IS projects are still failing in companies due to an inefficient business-IS relationship, despite several studies in the field. Bridging the gap between top managers and IS personnel is thus highly important. A precondition for bridging the gap and being able to perceive the value of innovative information systems is identifying factors that are important in the business-IS relationship. This paper contributed to understanding the key factors in the relationship between top management and IS managers and identifies factors where significant differences exist.

The results of the empirical investigation reveal 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 the IS department, Technological knowledge and skills of the IS manager, Business role of the IS department, Supporting role of the IS department and Technological role of the IS department; and two factors in the relationship with no significant differences between IS managers and top management, namely Business knowledge and skills of the IS manager and Managerial knowledge and skills of the IS manager.

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

Article Appendix

Importance and position of IS personnel in the company

Variables	Description
imp1	IS enables implementing better and more quality services.
Imp2	IS enables performing operations with lower costs.
Imp3	IS enables successful business performance.
Imp4	IS enables a competitive advantage to be obtained.
Imp5	Top management is aware of the importance of IS.
Imp6	Top management is actively involved in IS planning.
Imp7	Top management has sufficient knowledge of IS.
Imp8	Managers provide sufficient resources to implement IS projects.
Imp9	Top management supports the initiatives of IS personnel in the company.
Imp10	Top management recognises the merits to IS personnel for business development.
Imp11	Mutual reliance exists between top management and IS personnel.
Imp12	Top management is committed to a good relationship with IS personnel (IS manager).
Imp13	Communication between the top management and IS personnel (IS manager) is open and honest.

Knowledge and skills important for a CIO

Variables	Description
knl1	Programming
knl2	Operating Systems
knl3	Databases
knl4	Telecommunications and networks
knl5	IS Solutions (ERP) on the market
knl6	IT governance frameworks (ITIL, COBIT)
knl7	Planning and organising
knl8	Motivating
knl9	Project Management
knl10	Team working
knl11	Communication and coordination
knl12	Knowledge of business processes
knl13	Knowledge of relevant legislation
knl14	Risk management
knl15	Knowledge of individual functional areas (finance, marketing, production …)
knl16	Knowledge of business competitors

The role of IS personnel in the company

Variables	Description
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	Concern for on-time conclusion of an unfinished IS project (within the prescribed time frame).
role9	Concerning for the proper organisation and/or quality (provision of relevant skills, standards, quality criteria…) in the IS field.
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).

4 ARTICLE 2: THE GAP BETWEEN TOP MANAGEMENT AND IS PERSONNEL: HOW FAR APART ARE THEY?

Abstract

Several attempts have been made to align business and non-business spheres in companies with a particular interest in business-IS alignment. However, many of them were not successful and the business-IS gap is still present in many companies causing several failed IS implementation projects. Therefore, there is still a need to bridge the gap between both sides.

However, aligning business-IS is not possible without a clear notion of the gap or knowing the particular items that are causing the gap. The purpose of this research is thus to present the gap by revealing items with significant differences between top management and IS managers.

The aim is therefore to define the gap and reveal the key factors causing the gap with a particular emphasis on the knowledge and skills factor. Two surveys were developed for IS managers and top management, and the responses of both groups were compared to define the gap using the non-parametric Mann-Whitney U test. The results of the empirical investigation confirmed the existence of several statistically significant differences in the business-IS relationship. The research also revealed several parts related to knowledge and skills where an alignment between top management and IS managers may be seen as being already achieved; however, a deeper examination of knowledge and skills factors exposed significant differences between them that are increasing the gap between them.

Keywords: business-IS gap, business-IS alignment, top management, IS personnel, Mann-Whitney U Test

4.1 Introduction

Strategic alignment is one of the key areas of interest to business managers since the integration of business and IS strategy leads to greater competitive advantages (Papp, 1999). Therefore, business-IS alignment has been considered as one of the main concerns for IS managers in the last few decades (Luftman, 2005).

However, aligning IS and the business is not possible without knowing the particular items causing the differences between them. Despite extensive research in the areas of business-IS alignment (Gutierrez, et al., 2009; Hind & Bill, 2006; Leida, 2010; Luftman, 2003), strategic alignment (D. Avison, et al., 2004; Burn & Szeto, 2000; Campbell, Kay, & Avison, 2005; Henderson & Venkatraman, 1993), several claims that IS personnel and managers must attempt to attain a close relationship or various presented guidelines on how the gap in that relationship can be bridged (Peppard, 2001), there is still little evidence about the factors that are causing the gap. Therefore, detail research on the differences between top management and IS personnel regarding the role and importance of IS personnel and especially the knowledge and skills of IS managers is essential.

The purpose of this research is thus to shed light on the gap by revealing items where significant differences between top management and IS managers exist. Different attempts were studied to align IS departments and the rest of the business in companies (Dong, et al., 2008; Henderson & Venkatraman, 1993; Papp, 1999). However, these attempts were not as successful as promised since the gap between business and IS personnel is still present in many companies (Martin, et al., 2004) and is preventing them from obtaining a competitive advantage from IS. Nevertheless, the rapid development of the new technologies emerging in the IS area are namely introducing new opportunities and enabling new advantages for organisations and businesses (Jorfi, Md Nor, & Najjar, 2011).

This research thus enhances the understanding of the gap between top management and IS personnel and defines the gap by exposing the key factors causing it with a particular emphasis on the knowledge and skills factors.

It was suggested to use an instrument to assess the role of IS by both the IS manager and top management since responses from both executives may identify the gap in mutual understanding regarding the importance of IS for the business (Raghunathan, Raghunathan, & Tu, 1999). Two surveys were thus developed, namely for top management and IS managers, and the answers were compared to define the gap using the non-parametric Mann-Whitney U test. The results of the empirical investigation proved the existence of several factors where significant gaps between top management and IS personnel exist.

The paper is divided into four main parts. It begins by examining the theoretical background on the business-IS gap and the factors relevant to the research question. Second, the research method is described. Third, the data analysis and the results are presented. At the end,

findings are discussed and concluding remarks are presented along with research implications and further research opportunities.

4.2 Literature review

4.2.1 The gap between business and IS personnel

The gap between business and IS personnel is generally defined as a lack of understanding between the management side and the IS side in the company (Coughlan, et al., 2005; Peppard & Ward, 1999) and represents the problematic relationship between the business and IS spheres as a consequence of the differences between them (J. Ward & Peppard, 1996).

These differences mainly refer to the varying views regarding the role of the IS department. Top management namely often considers the IS department as simply a supporting function (Dos Santos & Sussman, 2000) with the result that IS departments and also companies as a whole often focus solely on the existing business processes and their automation, without taking advantage of the IS department to completely redesign the business processes (Kovačič, 2004b).

The gap is therefore causing different views and expectations from IS personnel and top management and is consequently preventing organisations from developing competitive advantages from the IS (Grindley, 1992; J. Ward & Peppard, 1996). It was claimed that the gap would be bridged with the advent of new managers who would be able to connect the business and IS sides (Grindley, 1992); however, the gap is still present as many companies report the insufficient coordination of work and knowledge sharing due to misunderstanding between business and IT departments (Martin, et al., 2004).

It was found in in-depth interviews with IT managers in Jordan (Al Majali & Dahlin, 2010) that leadership, structure and process, service quality, values and belief are the most important factors representing the cultural gap between the IT strategy and the business strategy and that the lack of these factors prevents companies from obtaining benefits from IT investments, yet there is no empirical evidence confirming the existence of these factors and, even more importantly, the reasons for the gap.

Despite several attempts to reduce the gap, business departments and IS departments in many companies still do not share identical views regarding the role of IS personnel (Nord, et al., 2007). Although several studies (Kappelman, et al., 2006; Martin, et al., 2004; Teo & Ang, 2001) confirm that the business-IS relationship is poor in many companies, there is still hardly any guidance on how to bridge the gap (Peppard, 2001).

It has also been claimed that the importance of a strong business-IS relationship should not be underestimated (Peppard, 2001) and that organisations should focus less just on the technology, and more on the process of organising and managing the IS (Bharadwaj, 2000; Kettinger, et al., 1994).

4.2.2 Business-IS alignment

Business-IS alignment denotes applying the IS in an appropriate and timely way in harmony with the business strategies, goals and needs (Luftman, 2004) and has been one of the most important concerns of business and IS managers and IS practitioners for almost two decades (Luftman, 2005). Henderson and Venkatraman (1993) were some of the first authors to present the relationship between business strategy and IT strategy in a model labelled strategic alignment.

Strategic alignment is claimed to be one of the most important areas for business managers since integration of the business and IS strategy enables a greater competitive advantage to be achieved (Papp, 1999). The importance of an alignment between the business and the IS has increased after companies attempted to achieve a competitive advantage in changing and diverse markets (Cardinali, 1992). With the rising importance of alignment, extensive research was done on the relationship between the business and the IS (Chan & Huff, 1993; Luftman, et al., 1993). In the last few years strategic alignment has also been one of the most important priorities of IT managers (Luftman & Kempaiah, 2007; Preston & Karahanna, 2009).

The recent economic recession has even increased the importance of strategic alignment as a challenge for business and IS managers to rethink the role of strategic alignment in connection with the permanent adaption of processes to the business environment (Baihareth & Liu, 2011). On the contrary, companies cannot be competitive if their business and IT strategies are not aligned (Jorfi, et al., 2011).

Business-IS alignment is thus important for companies because it enables a company to maximise its IS investments and achieve consonance with its business strategies and plans, consequently bringing greater profitability. It namely makes the development and implementation of efficient IS strategies easier, thus enabling the company to focus on implementing the IS to improve the business (Papp, 1999).

Moreover, several business and IS performance implications of alignment have been demonstrated empirically and through case studies with findings that companies which successfully align their IS strategy with their business strategy perform better than companies without such alignment (Chan, Huff, Barclay, & Copeland, 1997; Irani, 2002; G.S. Kearns & Lederer, 2003). Further, it has been claimed that, besides the external, also an appropriate alignment between the internal elements of IS unit is important for achieving a successful overall business-IS alignment (Onita & Dhaliwal, 2011).

Similarly, the importance of mutual understanding defined as the degree of agreement among individuals on a particular topic (Ensley & Pearce, 2001) on strategic alignment has been shown in research (Johnson & Lederer, 2010) claiming that mutual understanding among top management and IS managers regarding the role of the IS has a positive impact on strategic alignment, and consequently increases the contribution of the IS to the business performance.

The influence of strategic alignment on business performance has also been shown in a study (Bergeron, Raymond, & Rivard, 2004) that defined and empirically validated the operational model of strategic alignment. The research showed that low performing companies have a conflicting alignment pattern of business strategy, business structure and IT strategy.

Despite the extensive research on business-IS alignment, it is still not achieved in many companies and therefore remains a main concern of business executives (Jorfi, et al., 2011). However, the literature lacks on identifying the factors and variables that prevent the alignment of the business and IS spheres, consequently leading to a continuation of the gap between them. More specifically, the literature still lacks a clear notion of variables in the business-IS gap.

4.2.3 The importance of knowledge and skills

The knowledge of the IS personnel and IS manager are quite an important factor in the relations between them and top management. Different knowledge and skills acquired by individuals on both sides are often reported as a major cause of misunderstanding between top managers and IS managers, which consequently leads to the 'cultural' gap between them. Almost two decades ago, it was shown that the development of business skills among IS personnel is an important factor for reducing that cultural gap (Grindley, 1992).

The debate about the importance of different knowledge and skills is as old as the IS field itself, however up until the 1980s it was the importance of technical versus business and management skills that was mainly emphasised (Byrd & Turner, 2001). This view gradually changed in the 1990s when it became obvious that IT personnel need a combination of technical, business and interpersonal skills (Mata, et al., 1995). A similar opinion still prevails as it has been shown that technical and managerial skills are some of the determining factors of successful IT implementation (Caldeira & Ward, 2003). Similarly, the importance of different skills and capabilities of IT personnel has been confirmed in various studies (Lerouge, et al., 2005; Parolia, et al., 2007; Wade & Parent, 2001).

However, the skills of IS personnel and IS managers are not merely a consequence of organisational needs but mainly derive from education systems. Because of the rapid changes in the IS field, top managers and professors at universities were dealing with the knowledge and skills needed to effectively operate in a changing technological and business environment (Nelson, 1991; Niederman, et al., 1991). It was shown that many curriculums at universities were not harmonised with business needs as there were numerous technical subjects with no real value in the market (D. M. S. Lee, et al., 1995). Even more recent research (S. Lee & Fang, 2008; Yen, et al., 2003) confirms that the curriculum is still lagging behind actual market needs.

IS personnel in the company are often divided between service users and top management. While users expect technical skills, which must exceed the users' knowledge, managers expect adequate communication skills. Thus, IS personnel can successfully present and

implement IS projects merely by possessing a wider range of skills and knowledge. The fact that the knowledge of IS personnel affects the success of IS implementation was confirmed by a survey in the most successful US companies (Byrd & Turner, 2001).

The awareness of a wide range of knowledge and skills of IS managers has been present for almost two decades (Earls & Skyrme, 1992; Skyrme & Earl, 1990) especially after the introduction of the term hybrid manager as a person who obtains both technical skills and business knowledge (Earl, 1996). The introduction of a hybrid manager was seen as an attempt to educate individuals with wide business knowledge and technical IS skills (Peppard, 2001).

However, it was claimed (Peppard & Ward, 1999) that those individuals with a wide range of knowledge contribute little to the improved relationship, especially where top management does not view the IS as a strategic tool or strategic IS leadership is missing. Nevertheless, it has already been shown (Indihar Štemberger, et al., 2011) that business knowledge and skills are particularly important in obtaining top management support which can result in improved relationships with management and the improved status of IS personnel in the company. Therefore, neglecting the importance of knowledge does not seem to be a long-term reasonable approach in the business-IS gap research.

It is namely important that IS managers effectively communicate with the top management. Therefore, possessing business knowledge should also be one of the priorities of IS managers since top management is generally not skilled in technical language (Feeny, Edwards, & Simpson, 1992) (Smaltz, Sambamurthy, & Agarwal, 2006).

Further, it has been empirically shown that shared language and shared domain knowledge influence the development of a shared understanding between IS managers and top management (Preston & Karahanna, 2009), although measures used for business knowledge in this research merely related to business strategy, industry competitors and industry practices. Therefore, the literature still does not identify specific areas regarding knowledge and skills where considerable differences exist between top management and IS managers, leading to a continuation of the gap between them.

Based on the literature review, the following hypothesis is proposed: several items exist in the business-IS relationship that are causing or increasing the gap between top management and IS managers. Further, the hypothesis that there is a gap due to the difference between top management's perception of the importance of IS knowledge and skills and IS managers' possession of that knowledge is proposed.

4.3 Research Methodology

4.3.1 Research instrument

The research question was empirically tested using data from medium and large Slovenian companies. With the intention to test the proposed hypotheses, two questionnaires were developed; one for IS managers and one for top management with the intention to find differences and define the gap between top management and IS personnel.

In order to ensure content validity, a questionnaire was built on the basis of previous findings in the literature (Byrd & Davidson, 2003; M. A. Ward & Mitchell, 2004) and our previous research (Groznik, et al., 2001; Indihar Štemberger, et al., 2011). Pretesting was conducted in 2010 using ten semi-structured interviews with selected IT managers that were later also included in the study. Based on the pretesting phase, a set of measurement items that was used in previous research was designed in even greater detail. More specifically, business, managerial and technological knowledge and skills were formed into greater detail with more indicators. The indicators were measured using a structured questionnaire with 7-point Likert scales.

Both questionnaires were, alongside some general questions, composed of 10 items measuring the importance and position of IT personnel, 11 items measuring the partnership relation, 16 items measuring the importance of different skills and knowledge for IT managers and 13 items measured the role of IT personnel. The questionnaire for IT managers also had an additional 16 items measuring the quality of the possessed knowledge and skills of the individual IT managers who participated in the research.

4.3.2 Data collection and sample characteristics

The data collection started in April 2011 and was concluded in August 2011. IT managers in medium and large companies in Slovenia were invited to participate in the research.

In 2011 there were 1,495 medium and large companies according to the legislative criteria for Slovenian medium and large companies. IT managers from all these companies were invited to participate in the research and were contacted by telephone. Companies that completely outsourced all activities connected with IT and where no one was formally involved in IT were not included in this research. A total of 221 IT managers participated in the survey, representing a 14.8% response rate. The number of respondent companies represents a representative sample of Slovenian medium and large companies.

In order to define the gap and compare the differences between top and IT managers, the same questionnaire was repeated on randomly selected companies from the same population. Consequently, 450 top managers were randomly selected from the 1,495 eligible companies. These top managers were invited to participate in the study and 93 of them agreed to take part in the research, thereby representing a 20.7% response rate.

Altogether, 314 cases suitable for the analysis were obtained, 221 on the IS managers side and 93 on the top management side. The profile of the respondents is shown below.

Table 11: Profile of the respondents – IT managers

		Percent (%)
Type of organisation	Private	81.6
	Public	18.4
Position of CIO	Member of administration board	12.7
	Directly subordinated to the top management	60.5
	Indirectly subordinated to the top management	26.8
Organisation of IT department	Separate IT department	43.4
	IT is part of other organisational unit	23.3
	Only individuals involved in IT	26.0
	No formal involvement	7.3

Table 11 presents the profile of the IT managers. The term IT manager is used since departments in the sample are generally labelled IT departments, although according to their actual role the term IS manager is more appropriate. Therefore, in the following parts the term IS manager is used.

Table 12: Profile of respondents – top management

		Percent (%)
Type of organisation	Private	79.6
	Public	20.4
Ownership	Mainly state ownership	24.5
	Minor state ownership	5.7
	Private domestic ownership	52.8
	Private foreign ownership	17.0
CEO is owner of the company (regardless of the share)	Yes	38.6
	No	61.4
CEO is founder of the company	Yes	13.3
	No	86.7

In both samples, the share of private and public companies is comparable and therefore the samples resemble each other enough in order to allow further analysis.

4.4 Data analysis and results

The Mann-Whitney U test and SPSS 19.0 were used to empirically verify the hypotheses and test whether a significant difference exists in the responses between the IS managers and top management. The Mann-Whitney U test is a non-parametric test (Mann & Whitney, 1947) that is equivalent to the independent t-test. The difference is that the Mann-Whitney test examines the differences in the ranked positions of scores and not the actual data.

Non-parametric tests are also identified as assumption-free tests since they involve fewer assumptions about the data type. They are also claimed as distribution-free tests since they are less restrictive about the distribution of the data compared to parametric tests (Field, 2009).

The Mann-Whitney U test requires an ordinal level of measurement and is more powerful than the median test as it uses the ranks of the cases. It is based on a test statistic U which is the number of times a value in the first group precedes a value in the second group when values are sorted in ascending order (Conover, 1980).

4.4.1 Differences between the IS managers and top managers

Differences between the top managers and IS managers were compared based on the factors identified in the business-IS relationship, namely top management support to the IS department, mutual trust between management and IS personnel, the perceived value of the IS department, the managerial knowledge and skills of the IS manager, the technological knowledge and skills of the IS manager, the business knowledge and skills of the IS manager, the business role of the IS department, the supporting role of the IS department and the technological role of the IS department (Manfreda & Indihar Štemberger, 2012).

These factors are organised in three main sets, namely the importance and position of IS personnel in the company, the role of IS personnel in the company and the knowledge and skills important for the IS manager. The tables below present the results based on the Mann-Whitney U test in each set. Significant differences between top management and IS management are shown in bold.

Table 13: Importance and position of IS personnel in the company

Factor	Variable	Mann-Whitney U statistic	Sig (2-tailed)
Perceived valve of IS	IS enables better and higher quality services to be implemented.	9,084.500	.511
	IS enables operations to be performed at lower costs.	9,596.500	.361
	IS enables successful business performance.	9,406.000	.102
	IS enables a competitive advantage to be obtained.	10,033.000	**.023**
Top management support	Top management is aware of the importance of the IS.	3,241.500	**.000**
	Top management is actively involved in IS planning.	5,728.500	**.000**
	Top management has sufficient knowledge of the IS.	8,548.500	.215
	Managers provide sufficient resources to implement IS projects.	5,974.500	**.000**
	Top management supports the initiatives of IS personnel in the company.	5,495.500	**.000**
	Top management recognises the merits to IS personnel for business development.	4,289.000	**.000**
Mutual trust	Mutual reliance exists between top management and IS personnel.	7,093.500	.218
	Top management is committed to a good relationship with IS personnel (the IS manager).	5,431.500	**.000**
	Communication between the top management and IS personnel (the IS manager) is open and honest.	5,954.500	**.001**

As seen in Table 13, there are no significant differences between the IS managers and top management regarding the perceived value of the IS, except for perceiving a competitive advantage in the IS. On the contrary, there are several significant differences regarding top management support and mutual trust indicating that these factors in Table 13 are increasing the business-IS gap.

Table 14: The role of IS personnel in the company

Factor	Variable	Mann-Whitney U statistic	Sig (2-tailed)
Supporting role	Establishing and/or providing the appropriate infrastructure (hardware and software).	7,328.000	.411
	Providing user support (training, assistance and advice in the use of tools and IS solutions, data extraction, and error correction).	7,224.000	.238
	Concern for security in the IS.	6,736.000	**.027**
Technological role	Developing and/or the integrating IS solutions (own development).	5,507.000	**.000**
	Formulating IS architecture.	5,787.500	**.001**
Business role	Identifying IS needs in the company.	7,583.500	.441
	Concern for the on-time conclusion of an unfinished IS project (within the prescribed time frame).	5,777.000	**.000**
	Concerning for the proper organisation and/or quality (provision of relevant skills, standards, quality criteria...) in the IS field.	5,592.000	**.000**
	Ensuring the implementation of IS projects in a cost-specified range.	6,579.000	.072
	Improving and redesigning business processes.	8,846.500	.170
	Strategic IS planning.	5,420.000	**.000**
	Controlling the performance of IS projects (enabling timely error detection).	5,525.500	**.000**

The IS managers' perceptions are distinguished from those of top management also regarding the technological role and business role of the IS department, as shown in Table 14. There are a few variables where both perceptions are quite identical; however, mostly differences prevail.

The supporting role of IS personnel is perceived quite similarly by IS managers and top management, with the only exception being for security concerns. In other supporting items, namely establishing the infrastructure or providing user support, no significant differences between top management and IS managers exist, indicating that supporting role is not a factor that is considerably increasing the business-IS gap.

Even with the business role factor, there are two items with no significant differences, namely implementing an IS project in a cost-specified range and improving and redesigning business processes. The reason for no significant differences in the latter item is the strong emphasis on its importance in the last decade.

Table 15: Knowledge and skills important for the IS manager

Factor	Variable	Mann-Whitney U statistic	Sig (2-tailed)
Technological knowledge	Programming	3,724.500	**.000**
	Operating Systems	4,863.500	**.000**
	Databases	4,227.000	**.000**
	Telecommunications and networks	6,666.000	**.037**
IT governance	IT governance frameworks (ITIL, COBIT)	5,893.500	**.042**
Managerial knowledge	Planning and organising	8,250.000	.448
	Motivating	8,514.000	.107
	Project management	7,956.000	.706
	Team working	7,379.500	.431
	Communication and coordination	8,943.500	.086
	Knowledge of business processes	8,151.000	.808
Business knowledge	Knowledge of relevant legislation	7,399.500	.295
	Risk management	8,494.500	.238
	Knowledge of individual functional areas (finance, marketing, production ...)	7,618.500	.777
	Knowledge of business competitors	8,243.000	.381

Table 15 presents a comparison regarding the perception of the importance of different knowledge and skills. Except for technological knowledge and skills, there are no significant differences between the IS managers and top managers. This signifies that IS managers perceive the importance of their business and managerial knowledge and skills quite similarly to the expectations of top managers.

4.4.2 Examining differences in knowledge and skills in detail

Many recent studies have emphasised that business and managerial knowledge and skills should be important for IS managers (Caldeira & Ward, 2003; H. H. G. Chen, et al., 2005; Indihar Štemberger, et al., 2011; Parolia, et al., 2007). It is thus expected that there are no significant differences between top management expectations and IS managers' considerations regarding business and managerial knowledge.

However, deeper research on knowledge and skills is needed to examine whether IS managers are merely aware of the importance of business and managerial knowledge or they also possess these knowledge and skills. Therefore, besides the importance of different knowledge and skills, the quality of these knowledge and skills possessed by IS managers was also examined. Test statistics are presented in Table 16.

A comparison of Table 16 with Table 15 reveals that, although IS managers are aware of the importance of business and managerial knowledge and skills, they are still not sufficiently possessing these skills. More specifically, top managers expect more business and managerial skills from IS managers than IS managers actually possess. The same is true for technological knowledge and skills; however, these findings are expected since IS managers already valued their importance lower comparing to the top managers' perceptions.

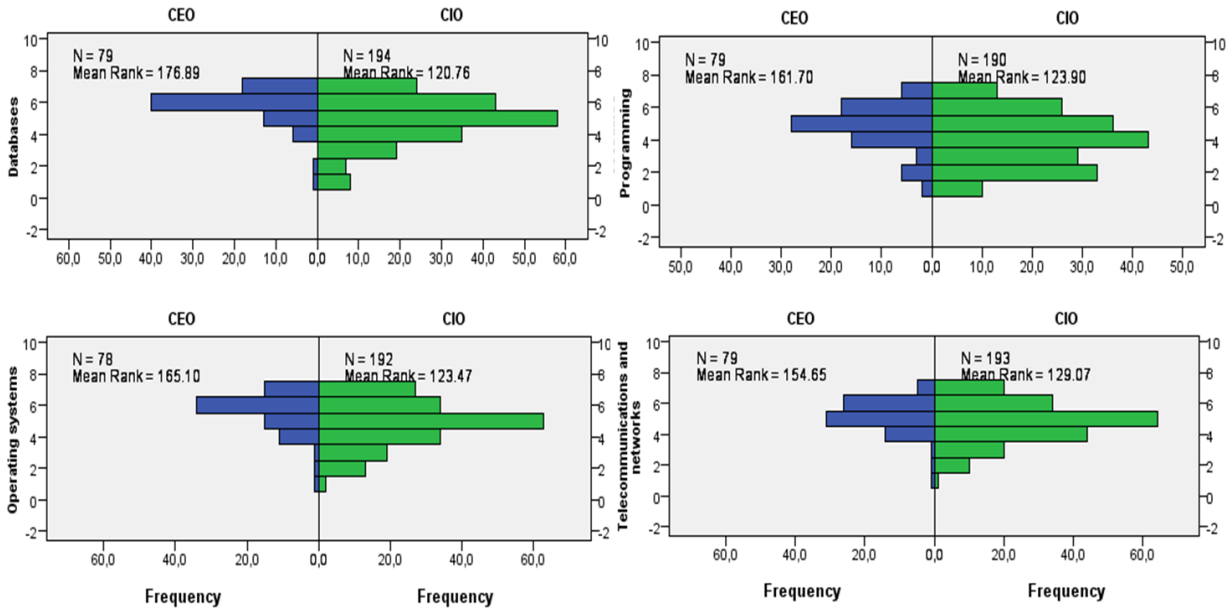
Table 16: Quality of the knowledge and skills possessed by the IS manager

Factor	Variable	Mann-Whitney U statistic	Sig (2-tailed)
Technological knowledge	Programming	5,395.500	**.000**
	Operating systems	5,179.000	**.000**
	Databases	4,511.500	**.000**
	Telecommunications and networks	6,189.500	**.012**
IT governance	IT governance frameworks (ITIL, COBIT)	3,958.500	**.000**
Managerial knowledge	Planning and organising	5,829.000	**.001**
	Motivating	6,004.000	**.008**
	Project management	5,926.500	**.004**
	Team working	4,932.500	**.000**
	Communication and coordination	5,806.500	**.001**
	Knowledge of business processes	5,263.500	**.000**
Business knowledge	Knowledge of relevant legislation	4,737.500	**.000**
	Risk management	5,904.000	**.007**
	Knowledge of individual functional areas (finance, marketing, production ...)	6,829.000	.159
	Knowledge of business competitors	6,642.000	.180

The distribution of the answers regarding different variables is presented in the figures below. The left side of each graph (CEO) presents top management's perception regarding the importance of IS managers possessing particular knowledge and skills, while the right side of each graph (CIO) presents the knowledge and skills obtained or possessed by IS managers.

Figure 10 presents the independent samples Mann-Whitney U test for all four variables from the technological knowledge factor. In all variables, significant differences exist between IS managers and top management since it is evident that the distribution of the answers by both groups is significantly different. It is also evident that top management expects IS managers to possess more technological knowledge and skills.

Figure 10: Mann-Whitney U test on variables measuring technological knowledge



The distribution of the answers for IT governance frameworks is not presented since only one variable was included in the IT governance factor.

Figure 11 presents the independent samples Mann-Whitney U test for all six variables from the managerial knowledge and skills factor. Also, this factor consists of variables with significant differences between IS managers and top management.

The distribution of the answers obtained from both groups is also significantly different. It is also evident that top management expects IS managers to possess more managerial knowledge and skills, especially skills related to team working, communication and knowledge of business processes. IS managers' knowledge of business processes is regarded as quite valuable for top managers since the majority of top managers ranked it as very important, while the majority of IS managers do not possess the desired level.

Figure 11: Mann-Whitney U test on variables measuring managerial knowledge

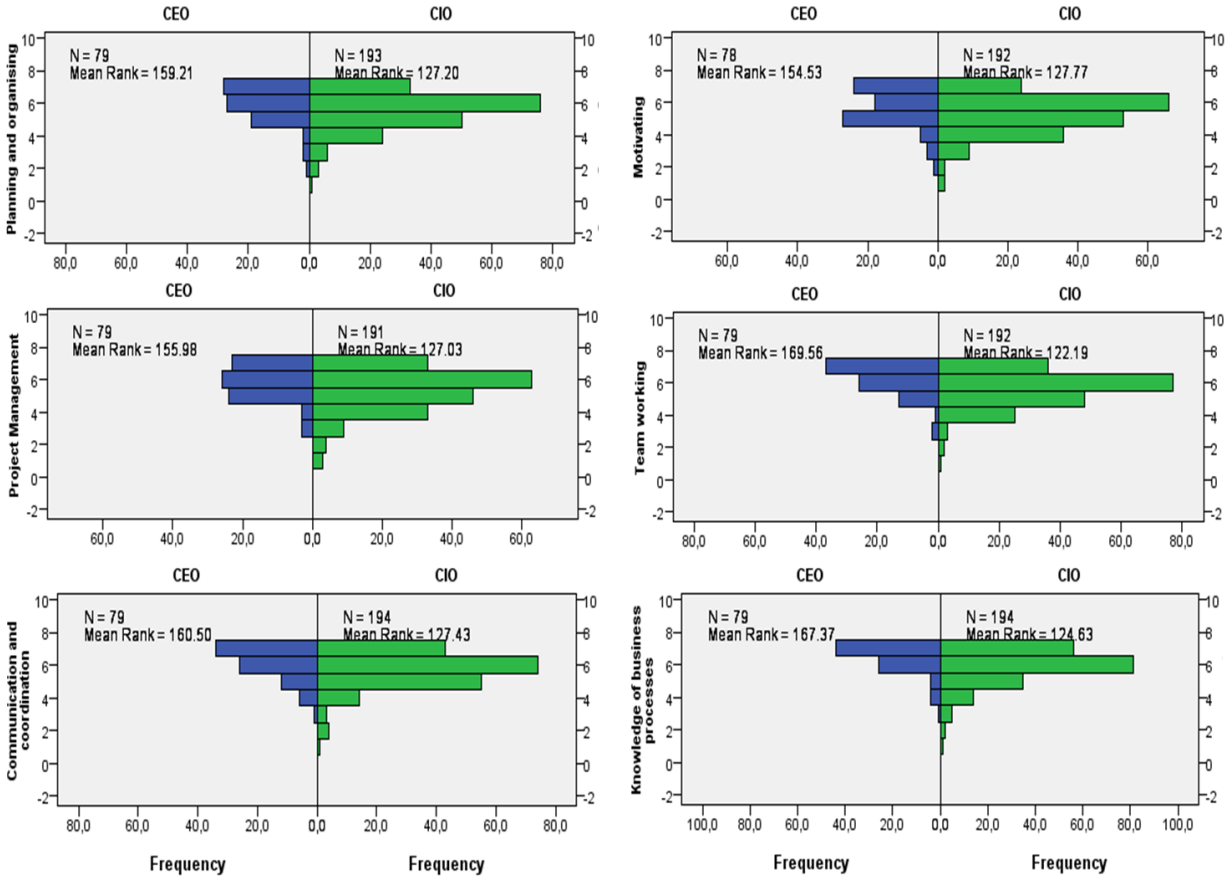
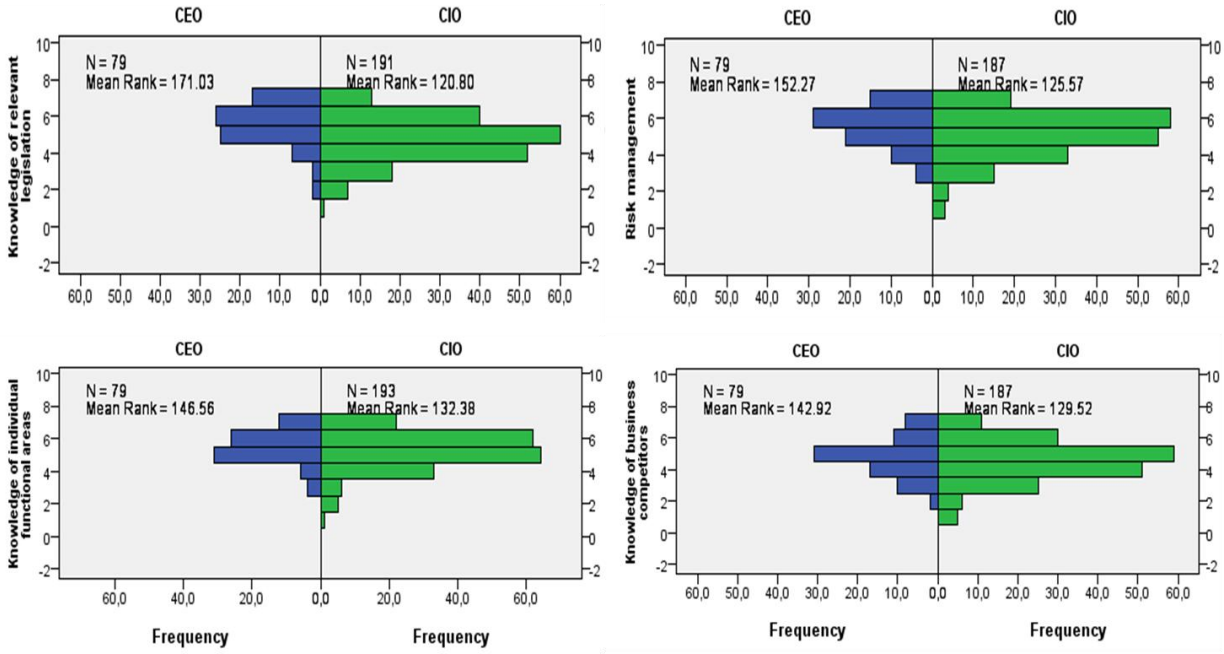


Figure 12 presents the independent samples Mann-Whitney U test for four variables measuring the business knowledge and skills factor. This factor consists of two variables with significant differences between IS managers and top management and two variables without significant differences.

The distribution of the answers obtained from both groups is therefore significantly different only for two variables, namely for knowing the relevant legislation and risk management skills. It is evident that top management expects the slightly higher possession of these two skills; while the distribution of the answers regarding knowing individual functional areas and business competitors is similar for both groups. The latter signifies that top management's perception of the importance of these two skills is aligned with the knowledge of these skills IS managers possess.

Figure 12: Mann-Whitney U test on variables measuring business knowledge



The above figures confirm that, despite an apparent alignment in treating the importance of several skills by both the IS managers and top management, there is still a gap between top management's perceptions regarding the importance and IS managers' actual possession of these knowledge and skills.

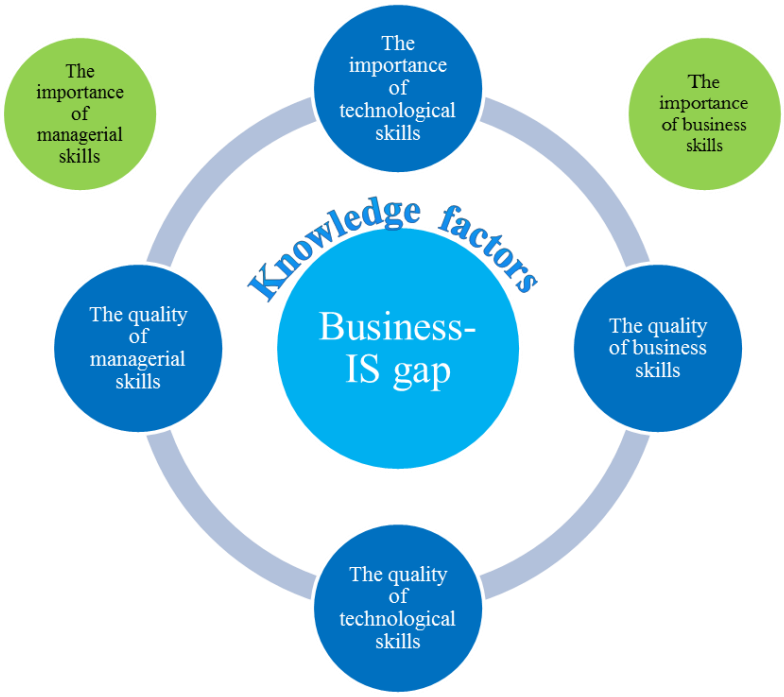
4.5 Discussion

4.5.1 Findings and Implications

The research findings indicate that the biggest differences between top managers and IS managers exist in perceptions of top management's support, mutual trust, the technological role of IS personnel and the business role of IS personnel. The research also revealed that IS managers are aware of the importance of business and managerial skills and their awareness is aligned with top management's expectations; however, the quality of the IS managers' skills is significantly lower than the top management's expectations.

The latter is a particularly important contribution of the research as it sheds light on the hidden part of the gap that is therefore often neglected. This part of the business-IS gap is presented in Figure 13. Outside the inner circle two factors where an alignment between top management and IS managers may be seen as having been already achieved are presented, namely the importance of managerial skills and the importance of business skills. However, detailed research examining the difference between the importance of various skills and the actual quality of the skills possessed revealed that significant differences exist between top management and IS managers in all three knowledge factors, namely technological, managerial and business skills.

Figure 13: The business-IS gap related to knowledge and skills



The research thus presents the gap between top management and IS managers as the difference between top management and IS management's perceptions regarding the importance and position of IS personnel in the company, the role of IS personnel in the company and the IS managers' knowledge and skills. The latter was presented from a general perspective, namely comparing the importance of various skills, and also from an often neglected perspective, namely comparing the actual possession of these skills.

The research findings suggest that IS managers should devote considerable effort to improving the quality of skills where significant differences exist. More specifically, IS managers should improve their knowledge and skills related to planning and organising, motivating, project management, team working, communication and coordination, business processes, relevant legislation and risk management. It has already been shown that managerial and business knowledge and skills of IS managers lead to IS personnel obtaining top management support (Indihar Štemberger, et al., 2011). Therefore, improving the quality of the mentioned skills should be given a high priority in alignment endeavours.

Moreover, it is also evident from the research findings that both the importance and quality of technological knowledge and skills are underestimated by IS managers compared to top management's expectations. This may be a consequence of several researchers emphasising the importance of business knowledge in the last few decades, making IS managers give preference to these skills and neglecting the importance of technological skills. The reason for the gap in technological knowledge may also be a result of high expectations by top management, anticipating that IS managers should excel in both technological and managerial skills.

4.5.2 Limitations and further research

The findings in the research are combined into one sample, and therefore the results are not related to the situation in a specific industry. It is recommended that further research be performed to analyse possible differences between industry sectors and the relationship between top management and IS personnel within a particular sector.

Further, the research findings are constrained by the sample which was performed in one country; however, since the whole population was invited to participate in the research, enabling to obtain 314 cases, the research may also represent the general situation. Nevertheless, further research in different regions is advised in order to cross-validate the research findings.

Moreover, future research should also examine differences in personal attitudes and characteristics and their influence on the gap in the business-IS relationship. Further, the reason for top management's high and strict expectations of IS managers should be examined in depth.

4.6 Conclusion

Bridging the gap between business departments and IS personnel is particularly important since this gap is still present in many companies. However, it is not possible to bridge the gap without a clear notion of it or knowing the particular items that are causing it. The contribution of the research was thus presenting the gap by revealing items where significant differences exist between top management and IS managers.

The research has contributed to understanding the business-IS relationship and more specifically to understanding the gap between top management and IS managers. The research has revealed several items that form the business-IS gap with a special emphasis on the various skills needed to achieve an alignment between top managers and IS managers and by exposing the often neglected quality of the skills that are possessed by IS managers as an important factor of the business-IS gap.

5 ARTICLE 3: ACHIEVING TOP MANAGEMENT SUPPORT WITH BUSINESS KNOWLEDGE AND ROLE OF IT/IS PERSONNEL

Abstract

The business-IT gap is still present in many companies and IT/IS professionals often impute the responsibility for this to management and claim they lack top management's support for their initiatives. The aim of this paper is to show how IT/IS personnel can achieve top management support. Based on more than 10 in-depth interviews with CIOs and CEOs in the last ten years we hypothesise that top management support can be attained with the business and managerial knowledge and skills of IT/IS personnel as well as with the business-oriented role of the IT/IS department. The impact was empirically tested via structural equation modelling (SEM) by using data from 152 Slovenian companies with more than 50 employees. Based on findings some implications for top managers and IT/IS professionals are given, especially for CIOs, on how IT/IS personnel can contribute to bridging the gap.

Keywords: information management; business IT gap; business IT alignment; top management support; business role of IT/IS; structural equation modelling

5.1 Introduction

Many companies encounter the inadequate coordination of work, knowledge sharing and information systems due to the business-IT gap (Martin, et al., 2004). On average, only one in three directors has enough knowledge about the operation of IT/IS in their company, whereas this share is between 60% and 80% in successful companies (Weill & Ross, 2005). Consequently, there are many inadequate and failed IT/IS investments since just 31% of large global companies invest in IT/IS strategically, while 16% of companies invest aimlessly (Tallon, et al., 2000). It is also evident that a gap exists between business requirements and the ability of IT/IS personnel to understand these requirements (Kovačič, 2004a).

IT/IS projects are successful when they involve an increase in the efficiency and effectiveness of an organisation relative to planned content, time and budget criteria (Wateridge, 1998). This is not only achieved by IS implementation, since a detailed consideration of the strategic directions of management, organisation, knowledge and business processes is also needed. However, instead of a complete business renovation companies merely use IS solutions to improve their current practice (Dos Santos & Sussman, 2000). Therefore, IT/IS must shift from the traditional support function in the background without proper directions from management to a mechanism which management treats as a resource to achieve the objectives of the organisation. The aim is to create a partnership between management and IT/IS personnel.

Research in the past has shown that top management support is extremely important for successful IS planning (Philip, 2007; Teo & Ang, 2001) and successful IS implementation (Byrd & Davidson, 2003; Caldeira & Ward, 2003; Sirkka L. Jarvenpaa & Ives, 1990; Ranganathan & Kannabiran, 2004); however, it is not obvious how IT/IS personnel and CIO can actually acquire that support. Therefore, the purpose of this paper is to research some critical success factors that are important for IT/IS personnel to obtain top management's support.

Based on more than 50 in-depth interviews with CIOs and CEOs from the private and public sectors in the last ten years we hypothesise that top management support can be achieved with the business and managerial knowledge and skills of IT/IS personnel as well as with the business-oriented role of the IT/IS department. The results of the empirical investigation proved that the business and managerial knowledge and skills of IT/IS personnel and the business role of IT/IS in the company have a positive impact on obtaining top management's support and consequently help establish a partnership between IT/IS personnel and management.

The article is divided into five main parts. First, the theoretical background on knowledge and skills, the role of IT personnel and top management support is reviewed. Second, the hypotheses and conceptual model are presented. Third, the research method is described. Fourth, the data analysis and results are presented and finally, implications and directions for

future research are outlined. The findings form part of the research results "Business Informatics in Slovenia 2006" which in particular relate to the knowledge and skills of IT/IS personnel and the role of IT/IS in the company.

5.2 Theoretical background and Research model

5.2.1 Top management support to IT/IS

Top management's support to IT/IS is identified as understanding the importance of IT/IS, supporting initiatives of IT/IS personnel and participating in projects of IS activities (Ragu-Nathan, et al., 2004). It reflects top management's opinion about the importance of IS activities for the company in improving operational efficiency, realising the strategy and achieving competitive advantages. Research on large Indian companies (Ranganathan & Kannabiran, 2004) has shown that top management contributes to successful IS implementation mainly by understanding the strategic role of IS, having sufficient IS knowledge, active involvement in IS planning and providing IT/IS department with sufficient funds. Top management support is typically presented as one of the key success factors of IS effectiveness (Thong, Yap, & Raman, 1996). Research has also revealed that a lack of top management support leads to resources being allocated to other projects that are important for top management (Kappelman, et al., 2006) and consequently to unsuccessful IS activities (Teo & Ang, 2001) and a resistance to IS implementation (Newman & Zhao, 2008).

It has been shown that top management support is one of the most important factors in ensuring the success of IT initiatives and the efficient use of an IT investment (Sirkka L. Jarvenpaa & Ives, 1990). It has also been claimed that top management support is the most important critical success factor for successful IS projects (Young & Jordan, 2008). Several empirical studies (Byrd & Davidson, 2003; Caldeira & Ward, 2002; Ragu-Nathan, et al., 2004) have confirmed the impact of top management's support on the success of IT implementation. The results have shown a direct and indirect impact of top management support, mainly through the proper positioning of IT/IS personnel in the organisational hierarchy. It has also been demonstrated that (Parolia, et al., 2007) top management's commitment contributes to an improvement in IS project performance.

Research on CIOs and other members of top management in US companies (Grover S. Kearns, 2006) has shown that top management support is positively related to CIO participation in business planning, the alignment of IS with the business plan and the use of IS as a competitive advantage. It has been concluded that top management support is important for the successful use of IT. IT alone is, namely, not an adequate factor for a successful IS strategy since organisational processes involving all managers are also needed (Hackney & Little, 1999). Similarly, it has been shown (Dhillon, 2008) that only accepting the strategic role of IT and its integration with business processes can lead to a sustainable competitive advantage, while mere technological strengths are not an adequate driving factor for successful IS implementation.

5.2.2 Business and managerial knowledge and skills of IT/IS personnel

Discussions about the importance of different knowledge and skills of IT personnel have been going on for over 40 years. In the 1960s and early 1970s a major debate in the literature was the importance of technical versus business and management skills (Byrd & Turner, 2001). Most researchers reported that technical skills were more important as this was a period when IT employees were mainly programmers and system analytics, and when software application had a long development cycle time and a low strategic focus (Clark, et al., 1997).

In the 1980s a strategic view on IS appeared and, as a consequence, the perception of the skills needed by IT personnel began to change. Different investigations, e.g. (Jenkins, 1986), showed that business and management skills are necessary for reaching higher positions in the IS department. Some researchers (Green, 1989) even concluded that business knowledge and communication skills were more important for entry-level positions in IT. However, a majority of researchers agreed that technical skills were the most important for IT personnel (Byrd & Turner, 2001).

In the 1990s the prevalent opinion was that IT professionals need a combination of technical, business, managerial and interpersonal skills (Mata, et al., 1995). This opinion still prevails as it has been claimed that technical IT/IS, managerial IT/IS and general management skills are determining factors for IT/IS success (Caldeira & Ward, 2003). However, one of the areas that is still under-investigated is the synergy of the technical, business and managerial knowledge and skills of IT/IS personnel and their joint impact on business performance and competitive advantage (Melville, et al., 2004). There has been some research in this field in the past. For example, an empirical investigation (Byrd & Turner, 2001) among CIOs from Fortune 2000 companies has shown that IT personnel skills affect IS success. Technical skills were found to be the most important; however, the authors believe it is a consequence of the fact that most of the CIOs have a technical background and that the results would have been different had the investigation been performed among other managers.

Some interesting research has been carried out about the knowledge expected from system analysts. Research into the knowledge and skills expected from system analysts when hired by Fortune 500 companies has revealed that various skills are expected (C. K. Lee, 2005). In this research, more than 900 job advertisements were examined. In most of them knowledge concerning the field of IS development was required, although 90% of companies were looking for business knowledge like knowledge about business processes. Besides, 75% of advertisements required managerial skills, first of all organisational and leadership skills and project management skills.

Similar findings have been made in an empirical research (Lerouge, et al., 2005) where the importance of various skills of IS workers and knowledge which is prioritised was observed on 124 system analysts from the most successful American companies. It was found that a whole range of different skills and capabilities is important, from business and managerial

skills to technological skills; however, the most important were interpersonal and system development skills, while there were statistically significant differences in preferences among gender and age. Similarly, it was previously shown (Wade & Parent, 2001) that for analysts organisational skills (such as communication, teamwork and general managerial skills) are more important than technological skills (programming). Recent research has shown (Parolia, et al., 2007) that project managers should include professionals with requisite skills and behaviour in IS project teams as this will contribute to more effective communication between the team members.

Other research (Litecky, et al., 2004) divided the knowledge of IT personnel into two groups: IT knowledge and soft skills (kindness, communication, organisational and teamwork skills). It pointed to an employment paradox whereby employers mainly require IT knowledge while searching for IT personnel; yet, when selecting candidates soft skills prevail. Therefore, a two-step procedure for the selection of suitable candidates is suggested. The first step focuses on the selection of candidates having appropriate IT knowledge, and the focus of the second step is to select one of them based on his/her soft skills. It has been emphasised (Litecky, et al., 2004) that IT personnel requires a diverse range of skills and it is therefore recommended that study courses include not only IT knowledge but also soft skills.

The importance of business and managerial skills for IT personnel was confirmed in empirical research (H. H. G. Chen, et al., 2005) where the importance and quality of the communication skills of IT personnel were analysed by observing IT personnel (mainly analysts) and users (not including any managers). The results showed a statistically significant difference in the importance and quality of communication skills of IT personnel. The main difference lay in the perception of both groups about the ability of IT personnel to make written communication. IT personnel namely ranked their written communication skills much higher than they were perceived by the users.

5.2.3 Business role of IT/IS

The role of IT/IS has substantially changed over the years and consequently caused a business-IT gap (Nord, et al., 2007). In the 1970s it was considered more as a back-room function (Keen, 1991) and therefore business managers could ignore it. As a result, that decade was known for repeated project failures (Doll & Ahmed, 1983) that had an impact on the credibility of IT/IS personnel in organisations. Due to the large expansion of PC technology during the 1980s, the role of IT/IS gained in importance (Nord, et al., 2007), consequently causing relationship problems with the rest of the business.

In the 1990s the role of IT/IS shifted from managing a mere technical "portfolio" to managing a relationship "portfolio" (Venkatraman & Loh, 1994). The main problem was that the role of IT/IS personnel was not clearly defined and therefore CIOs were unsure whether the role of the IT/IS personnel was to merely facilitate the activities of others or to be involved in business process renovation. This lack of an agreed role had a negative impact on the

relationship between managers and IT/IS personnel (J. Ward & Peppard, 1996), although it was suggested to approach the IT/IS function in a more similar way to the business function (Earl, 1992). Similarly, a study on 17 CIOs from different businesses has shown that the CIO's job has changed over the past few years and now the role of interviewed CIOs is to reflect both the firm's IS infrastructure and strategy (Chun & Mooney, 2009).

A recent research (Nord, et al., 2007) has indicated that the role of IT/IS should be clearly defined, including the alignment of IT/IS goals with the goals of an organisation, defining the contribution of the IT/IS personnel and sharing knowledge with business. Joint meetings between IT/IS personnel and management, at which the role of IT/IS is clarified, are therefore essential. It has been argued (Henderson & Venkatraman, 1993) that the alignment between IT and business strategy is important for recognising the value of IT investments. It has been shown in a single longitudinal case study that the lack of IT alignment prevents the development of IT competency in the company (R.-S. Chen, Sun, Helms, & Jih, 2008). Further, a case study in four Chinese companies has shown that the lack of alignment between the business environment and IT caused additional IT implementation costs (Chang, et al., 2008).

The role of IT/IS, more precisely the critical success factors for successful IS implementation in American large-sized companies and public administration, has also been investigated (M. A. Ward & Mitchell, 2004). The empirical research pointed out differences between private and public sectors. IT/IS departments in both sectors were found to be business-oriented; however, a business orientation is more strongly present in the private sector where the CIOs of examined companies classified priorities such as: (1) simplification of business processes because of IS; (2) the use of IT to improve services for customers and other stakeholders; and (3) building a good relationship with the management of the company. The public sector found the most important priorities to be: (1) formulating the IT architecture of the organisation; (2) establishing an appropriate atmosphere for introducing e-business; and (3) providing adequate employees. Both sectors ranked IS planning in compliance with the vision and strategy of the organisation in fourth place.

One of the most important indicators of the status of IT/IS personnel in a company is the position of the CIO. It is recommended that (Earl & Feeney, 1994; Nord, et al., 2007; Philip, 2007; Ranganathan & Kannabiran, 2004) the CIO should play an important role in the company and should therefore be a member of the administration board or at least directly subordinate to a CEO. Further, membership in the top management board and informal interactions with it also strengthens the business knowledge of a CIO (Armstrong & Sambamurthy, 1999) and increases the trusting relationship the CIO has with top management (Scott, 2007).

In addition, it has been claimed (Earl & Feeney, 1994) that the crucial role of the CIO is to present IT as a strategic resource and IS as delivering value to the organisation. Namely, the CIO has an important role in establishing the strategic role of IS instead of merely a

supporting role by way of presenting the importance and influence of IS on improvements for the company's performance. The CIO should therefore establish proper relations with other managers in the company, and accordingly his/her business orientation and change management capabilities are as important as IT/IS knowledge. Similarly, it has recently been suggested that it is important to show that IT is a tool for achieving business goals and is not just an additional supporting department (Coughlan, et al., 2005).

5.2.4 Research hypotheses and model conceptualisation

The literature largely supports the view that top management support is one of the most important critical success factors for successful IS implementation (Byrd & Davidson, 2003; Sirkka L. Jarvenpaa & Ives, 1990; Ragu-Nathan, et al., 2004); although the critical success factors for obtaining top management's support are not clearly defined. Based on past research and practical experience we believe that IT/IS personnel itself can significantly contribute to top management's support for their initiatives. Therefore, our goal was to empirically verify the business and managerial knowledge and skills of IT/IS personnel and the business role of the IT/IS department as two critical success factors in obtaining top management support for their initiatives.

It has been claimed (Martin, et al., 2004) that the business-IT gap is a consequence of inadequate knowledge on both sides, leading to poor communication and consequently to the ineffective alignment of IT solutions with business needs. Several studies have confirmed that a combination of technical, business and managerial skills is an important factor for successful IS implementation (Caldeira & Ward, 2003; Mata, et al., 1995). It has also been shown that unsuccessful IS implementation, as a consequence of a wrong understanding of business needs, influences the credibility of IT/IS personnel in the company (Doll & Ahmed, 1983), which consequently negatively impacts top management's support (Nord, et al., 2007). The business and managerial knowledge and skills of IT/IS personnel, especially of CIOs, are important for efficient communication and aligning the IT strategy with business goals. According to these findings and our findings from more than 50 in-depth interviews with CIOs and CEOs in the last ten years, we propose the following hypothesis:

H1. The business and managerial knowledge and skills of IT/IS personnel have a positive impact on top management's support to IT/IS personnel.

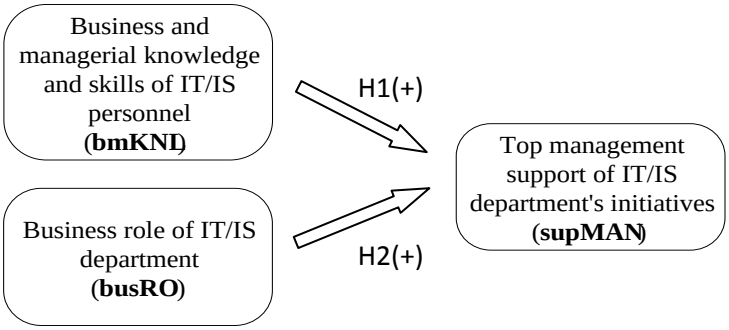
The role of IT/IS is another important factor with a particular impact on successful IS implementation and the company's performance (Melville, et al., 2004). IT/IS personnel obtain an important role immediately when management realises the business value of IS in the company. Top managers who do not perceive IS as a strategic tool are more reluctant to participate in strategic IS planning (Grover S. Kearns, 2006). Further, top management's support can be obtained merely by presenting IT as a strategic resource and as delivering value to the organisation (Earl & Feeney, 1994). It is thus necessary to modify the role of IT/IS from being technology- to business-oriented, namely from merely programming and

developing IS towards building relationships, strategic planning and business process renovation. Thus, we proposed the following hypothesis:

H2. The business role of the IT/IS department has a positive impact on top management's support to IT/IS personnel.

The conceptual model with relations between the proposed hypotheses is shown in Figure 14. Construct notations are described in Section 5.3.3.

Figure 14: Conceptual Model



5.3 Research Methodology

5.3.1 Research instrument

In order to test our hypotheses we started developing our questionnaire by building on previous findings reported in the literature and our previous research (Groznik, et al., 2001; Kovačič, 2001) in order to ensure content validity. Pre-testing was conducted using a focus group involving six academics interested in the field and five semi-structured interviews with selected CIOs who were later also the subject of the study. On that basis, a set of measurement items was formed. We used a structured questionnaire with five-point Likert scales.

5.3.2 Data collection and sample characteristics

In 2006, empirical data were collected through a survey of 600 randomly selected Slovenian companies from all companies with more than 50 employees that were invited to participate in the survey. The survey was conducted as an interview with CIOs. A total of 152 companies responded, representing a 25.3% response rate. The responding companies provide a representative sample of Slovenian companies (Table 17).

Table 17: Distribution of responses by activity

Activity	Responding companies		All medium and large sized companies	
	Number	%	Number	%
Agriculture and forestry	-	-	-	-
Fishing	-	-	-	-
Mining and quarrying	0	0.0%	7	0.4%
Manufacturing	72	47.4%	626	36.6%
Electricity, gas and water supply	7	4.6%	41	2.4%
Construction	15	9.9%	138	8.1%
Wholesale and retail trade; repair of motor vehicles and motorcycles	27	17.8%	580	33.9%
Hotels and restaurants	5	3.3%	36	2.1%
Transportation, storage and communication	12	7.9%	99	5.8%
Financial intermediation	0	0.0%	37	2.2%
Real estate, renting and business activities	14	9.2%	148	8.6%
Other community, social and personal service activities	-	-	-	-

Source: Survey of Business Informatics in Slovenia 2006, Faculty of Economics, Institute of Business Informatics, 2006

5.3.3 Model construction

To test the above hypotheses three constructs were applied in our research: (1) The business and managerial knowledge and skills of IT/IS personnel (bmKNL), which determines the quality and relevance of business and managerial skills; (2) The business role of the IT/IS department (busRO); and (3) Top management's support to IT/IS (supMAN). The first two constructs in our model are exogenous latent variables, while the last one is an endogenous latent variable.

The constructs in the model are latent variables and measured by manifest variables. We measured the first construct (bmKNL) with four variables:

- the importance (impMAN) and quality (qMAN) of managerial skills (organisation, management, communication, teamwork, project management…) and
- the importance (impBUS) and quality (qBUS) of business skills (business processes and functions, knowing legislation, business competitors and business partners…).

To measure the second construct, the business role of IT/IS in the company (busRO), we included several tasks confirmed by previous research (M. A. Ward & Mitchell, 2004) as being priorities of business-oriented IT/IS. To measure this construct, we evaluated the importance of several tasks in an IT/IS department. We used the following variables:

- the importance of assessing IS needs in a company (roNDS);
- the importance of concern for appropriate organisation and quality (ensuring adequate knowledge, standards, criteria for quality…) of IT/IS (roQ);
- the importance of improving business processes through IS (roPROC) and
- the importance of strategic IS planning (roSTR).

It has already been stated that top management's support to IT/IS is a critical success factor for successful IS implementation and can be defined as supporting the initiatives of IT/IS personnel, participating in strategic IS planning and understanding the importance of IS (Ragu-Nathan, et al., 2004). To measure this latent variable (supMAN), we applied similar measures as (Byrd & Davidson, 2003), namely the respondents had to express their agreement with the following statements:

- top management is aware of the importance of IT/IS (manIMP);
- top management actively participates in IS planning (manPART);
- top management sponsors initiatives taken by IT/IS personnel (manSUP) and
- top management has enough knowledge about IT/IS (manKNL).

5.3.4 Data analysis and Results

To empirically verify the hypotheses we used the Structural Equation Modelling (SEM) method and the LISREL 8.51 tool. SEM is a confirmatory method as it is intended to verify that the hypothetical relations among the latent (unobservable) variables and relationships between the latent and manifest (observed) variables are in accordance with obtained empirical data (Diamantopoulos & Siguaw, 2000); it is therefore appropriate for analysing theoretical models or research designs (Schreiber, 2008). It has been recently widely used in empirical scientific research, especially in the social sciences. The method and LISREL tool was already described in detail (Diamantopoulos & Siguaw, 2000; Hair, et al., 1998).

5.3.5 Validity of the defined constructs

An exploratory factor analysis using SPSS 16.0 was conducted to verify the construct validities of the measurement model. A principal axis factoring extraction method with a Varimax rotation was used to examine whether the questionnaire items measure the defined model. The results of the factor loadings are presented in Table 18.

Table 18: Rotated Factor Matrix for the entire model

Variable	Label	Factor		
		1	2	3
manIMP	Top management's awareness of the importance of IT/IS		0.740	
manPART	Top management's active participation in IS planning		0.713	
manSUP	Top management's sponsorship of initiatives taken by IT/IS personnel		0.688	
manKNL	Top management's knowledge about IT/IS		0.645	
impMAN	Importance of managerial knowledge of IT/IS personnel			0.543
impBUS	Importance of business knowledge of IT/IS personnel			0.730
qMAN	Quality of managerial knowledge of IT/IS personnel			0.459
qBUS	Quality of business knowledge of IT/IS personnel			0.718
roNDS	Importance of assessing IS needs in a company	0.750		
roQ	Importance of concerning about quality and organisation	0.776		
roPROC	Importance of improving business processes because of IS	0.769		
roSTR	Importance strategic IS planning	0.778		

[a] *Factor loadings below 0.4 are not presented*

As the table shows, Factor 1 consists of several roles of IT/IS personnel that are connected with the business and therefore represents a business role of IT/IS. Factor 2 consists of managerial perceptions and relations with IT/IS personnel and therefore represents management's support to IT/IS personnel, while Factor 3 represents the business and managerial knowledge of IT/IS personnel. Although one item loading on the third factor did not reach 0.50, we decided to keep it in our analysis as its loading was very close to the prescribed one and is theoretically justified as it is evident from the theoretical background. The limit of 0.45 would be appropriate according to the guidelines for identifying significant factor loadings based on sample size (larger than 150), although values greater than 0.50 are desired while loadings of 0.30 to 0.40 are minimally acceptable (Hair, et al., 1998).

Therefore, all three factors are in accordance with the defined constructs.

5.3.6 Confirmatory analysis using structural equation modelling

Model fit signifies the level of consistency of a hypothesised model and the data (Diamantopoulos & Siguaw, 2000). It is examined in three stages: (1) an overall fit assessment; (2) an assessment of the measurement model; and (3) an assessment of the structural model. The path diagram of the model is presented in Figure 15.

Figure 15: Path diagram of the conceptualised model

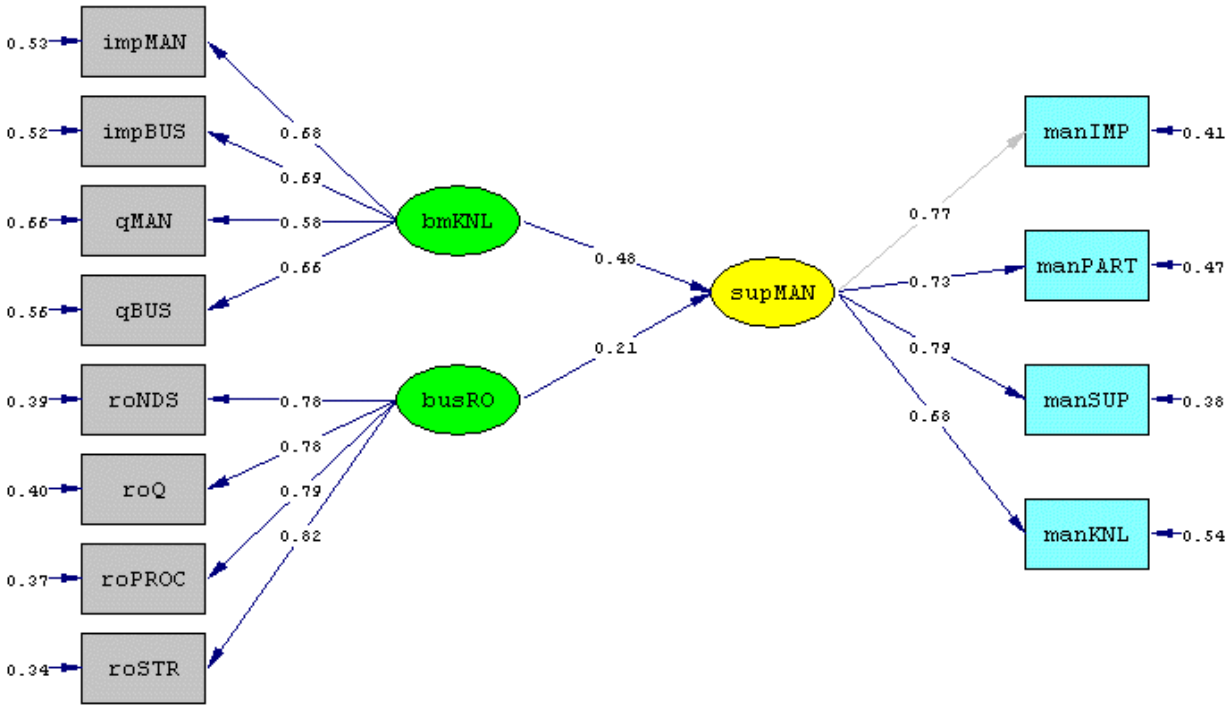


Figure 15 shows the path diagram with the standardised parameter estimates of the hypothesised model. The purpose of the path diagram is to facilitate the presentation of the model, while a detailed explanation of the parameter estimates is given under Table 20 and in section Assessment of the structural model on page 90.

5.3.6.1 Overall fit assessment

The aim of assessing the overall model fit is to determine the consistency level of a model as a whole with the available empirical data (Diamantopoulos & Siguaw, 2000). Several fit indices have been developed to measure the overall model fit, but they perform differently depending on the sample size, estimation procedure, model complexity and variable independence (Byrne, 1998) and there is no agreement on the characteristics an overall index should have (Hayduk, 1996). For that reason, in Table 19 we present fit indices that are most commonly used together with the reference values.

Table 19: Fit indices

Fit indices	Model value	Reference Value	Overall Model fit
χ^2/df	1.90	<5.00	Yes
NCP	46.05	>22.05 <77.85	Yes
RMSEA	0.084	<0.10	Acceptable
ECVI	1.18	<ECVI saturated (1.22) <ECVI independence (8.45)	Yes
AIC	151.05	<AIC saturated (156.00) <AIC independence (1081.94)	Yes
CAIC	255.26	<CAIC saturated (457.07) <CAIC independence (1128.26)	Yes
Standardised RMR	0.061	<0.05	No
GFI	0.89	>0.90	Acceptable
NNFI	0.92	>0.90	Yes
CFI	0.94	>0.90	Yes
IFI	0.94	>0.90	Yes

Index $\chi 2$ per degree of freedom indicates a reasonable fit when the ratio is lower than 5.00 (Herbert W. Marsh & Hocevar, 1985); however, ratios between 1.00 and 2.00 are recommended (Hair, et al., 1998). The next index presented is a non-centrality parameter (NCP) where lower numbers are desired. The third index in the table is the root mean square error of approximation (RMSEA) where values below 0.05 indicate a good fit, while values between 0.08 and 0.10 are indicative of a mediocre fit (MacCallum, et al., 1996). The next is the expected cross-validation index (ECVI) which focuses on overall error. The value of the index should be lower than the value of the compared models (saturated and independence), indicating that the model is likely to cross-validate between samples of the same size from the same population (Diamantopoulos & Siguaw, 2000).

Akaike's information criteria (AIC) and the consistent version of AIC (CAIC) are known as information criteria and are designed to compare models. Their values should also be lower than the values of the compared models. The next measure of fit in the table is the standardised root mean square residual (standardised RMR), where values below 0.05 are indicators of good fit. The goodness of fit index (GFI) should range between 0 and 1, where values larger than 0.90 are desired.

The last three indices in the table measure the improvement of the model fits compared to a baseline model where values close to 1 represent a good fit (Diamantopoulos & Siguaw, 2000). In the table all three indices, namely the non-normed fit index (NNFI), the comparative fit index (CFI) and the incremental fit index (IFI), are larger than 0.90 and therefore indicate the reasonable relative fit of the model.

Generally the chi-square test together with RMSEA, ECVI, standardised RMR, GFI and CFI indices are considered to be informative enough to assess the overall model fit (Diamantopoulos & Siguaw, 2000). However, researchers primarily use the $\chi 2$ per degree of freedom, comparative fit index (CFI,) and non-normed fit index (NNFI) to assess the model fit (Koufteros, 1999). We can therefore conclude that the described indices indicate that the model has a good fit.

5.3.6.2 Assessment of the measurement model

The next step is to assess the measurement model with the focus being on the relationship between the latent variables and manifest variables. The aim is to determine the validity and reliability of the measures used to represent the construct of interest. Validity signifies the extent to which an indicator measures what it is supposed to measure. The relationship between manifest variables and latent variables should be significantly different from zero (t-values should exceed 1.96 in absolute terms). As Table 20 shows, all t-values are larger than 1.96. The construct validity is thus achieved.

Table 20: Completely standardised loading estimates and t-values

	LAMBDA-Y		
Latent Variable	Manifest Variable	Completely Standardised factor loading	t-Value
supMAN	manIMP	0.77	- [a]
	manPART	0.73	7.14
	manSUP	0.79	8.31
	manKNL	0.68	7.27
	LAMBDA-X		
bmKNL	impMAN	0.68	7.69
	impBUS	0.69	7.80
	qMAN	0.58	6.32
	qBUS	0.66	7.37
busRO	roNDS	0.78	10.04
	roQ	0.78	9.92
	roPROC	0.79	10.20
	roSTR	0.82	10.62

[a] *Indicates a fixed parameter at 1.00 in the original solution*

In the table LAMBDA-Y shows the values of the completely standardised estimates and t-values for the indicators of the endogenous latent variable supMAN, whereas LAMBDA-X shows the values of the completely standardised estimates and t-values for the indicators of the exogenous latent variables bmKNL and busRO. In the completely standardised solution the latent variables and their measurable indicators are standardised, and therefore measure

the relative contribution of the independent latent variables to the endogenous latent variables (Diamantopoulos & Siguaw, 2000). It is evident that, besides all the values being significantly different from zero, they are also relatively high, indicating the important impact on the latent variables.

The second part of assessing the measurement model is to determine its reliability, which refers to the consistency of measurement. Reliability is examined by assessing the reliability of individual indicators and composite reliability. The former is measured by squared multiple correlations (R^2) which show the share of variance in an indicator that is explained by its latent variable (Diamantopoulos & Siguaw, 2000). In our model, the least reliable indicator is qMAN with 0.34, while other indicators range from 0.44 to 0.66 (Table 21).

Table 21: R^2 values for indicators

Indicator	R^2
manIMP	0.59
manPART	0.53
manSUP	0.62
manKNL	0.46
impMAN	0.47
impBUS	0.48
qMAN	0.34
qBUS	0.44
roNDS	0.61
roQ	0.60
roPROC	0.63
roSTR	0.66

It is evident from the table that the most reliable indicator of bmKNL (The business and managerial knowledge and skills of IT/IS personnel) is impBUS (The importance of business skills) as 48% of the variance in impBUS is explained by bmKNL. The most reliable indicator of supMAN (Top management's support to IT/IS) is manSUP (Top management sponsors initiatives taken by IT/IS personnel), while the most reliable indicator of busRO (The business role of the IT/IS department) is roSTR (The importance of strategic IS planning).

In addition to the reliability of the individual indicators, it is possible to calculate a composite reliability value (ρ_c) for each latent, where values should exceed 0.6 (Bagozzi & Yi, 1988). In our model, all indicators as a set provide a reliable measurement for each construct as their values are higher than proposed (ρ_c(bmKNL)=0.75, ρ_c(busRO)=0.87 and ρ_c(supMAN)=0.83).

5.3.6.3 Assessment of the structural model

The last part of the model fit assessment is a structural model fit assessment with the aim to evaluate whether the data support the theoretical relationships in the conceptualisation model

(Diamantopoulos & Siguaw, 2000). The evaluation consists of three steps; namely examining: (1) whether signs of parameters representing a relationship between latent variables indicate the same direction as hypothesised; (2) the statistical significance and magnitude of estimated parameters; and (3) the squared multiple correlation (R^2) for structural equations.

In our model the signs of both parameters (bmKNL and busRO) are consistent with the hypothesised relationships between the latent variables. Moreover, both parameters are statistically significant (t-values 4.15 and 2.05) and moderately high (0.48 and 0.21). Lastly, R^2 for both hypotheses (0.35) indicates that the independent latent variables (bmKNL and busRO) explain 35% of the variance in the endogenous latent variable (supMAN), which points to a strong relationship.

Considering all three aspects of the model fit, the confirmatory analysis has verified both hypotheses.

5.4 Discussion

5.4.1 Findings and Implications

The most important finding in our research is that the IT/IS personnel can acquire top management's support if they have an adequate role, knowledge and skills. As shown by the above model, adequate knowledge mainly includes business and managerial knowledge and skills, while an adequate role is the business role of IT/IS in the company. CIOs and other IT/IS personnel should therefore increase their business and managerial knowledge and skills and realise their importance. Besides, CIOs should focus on and direct the role of the IT/IS department more towards a business role. In particular, the IT/IS personnel should primarily be devoted to improving business processes.

The research did not cover all aspects that may have an influence on an improvement in the top management support. Some aspects have already been detected in earlier research. It has namely been shown that successful communication is crucial for the partnership (Coughlan, et al., 2005; Huang & Hu, 2007) and that CIOs should be attentive to communication with users and top management (Earl & Feeney, 1994). We therefore suggest that CIOs should have active communication with users and constantly present IT to the top management as an effective tool for achieving business goals.

However, business managers often perceive CIOs as being introversive and technically-oriented and therefore not treating them as equals, which is another problem in establishing a partnership. The validity of this stereotype was examined by studying the personality and behavioural characteristics of 100 CIOs in the UK and comparing them with business managers (Willcoxson & Chatham, 2006). The results showed some significant differences in emotional and behavioural characteristics, particularly in the areas of leadership and control. It appeared that business managers are oriented towards building relationships between employees, while CIOs prioritise task implementation. Further, CIOs are less self-confident

and prefer shared responsibility. According to research (Willcoxson & Chatham, 2006) differences in these psychological profiles may impact on the fact that IT is still a supporting function in the company rather than a business partner.

To achieve top management's support CIOs should be attentive to the fact that a company employs IT/IS personnel who already have business and managerial knowledge. In addition, constant knowledge and skill improvement is crucial. It was shown (Allen, Armstrong, Reid, & Riemenschneider, 2008) that organisations appreciate IT/IS personnel with a broader skill set and are prepared to invest resources in them. Our study did not research what specific knowledge and skills employers expect from IT job candidates, although other research (C. K. Lee, 2005; Litecky, et al., 2004) has shown that IT knowledge is still prioritised. Therefore, CIOs as well as other IT/IS personnel should consider acquiring knowledge from business schools, especially if they have technical background.

5.4.2 Limitations and further research

The findings of this research are constrained by the sample which was limited to a single country and therefore the sample of 600 companies and 152 respondents may not represent the general situation. Moreover, the study results do not present the situation in a specific industry and are combined into one sample. It is recommended that further research should be performed to analyse possible differences between industry sectors and the relationship between top management and IT/IS personnel within a particular sector.

The research also demonstrated that further study of the relationship between top management and IT/IS personnel is justified. More research is needed to explore in detail the most important factors that lead to establishing a successful partnership. The literature on top management support and IT/IS personnel skills is abundant, yet there is still a lack of practical support and implications for top managers and CIOs.

5.5 Conclusion

This paper has contributed to the understanding of some critical success factors that are important for bridging the infamous business-IT gap. The results of the empirical investigation confirmed that the business and managerial knowledge and skills of IT/IS personnel and the business role of IT/IS have a positive impact on achieving top management support. IT/IS personnel can use these results to improve their relationships with management and their status in the company.

6 ARTICLE 4: CREATING A PARTNERSHIP BETWEEN TOP MANAGEMENT AND IS PERSONNEL

Abstract

The relationship between top management and IS personnel is often inefficient and is denoted as a business-IS gap. It prevents the use of IS as a competitive advantage and consequently prevents identifying the business value of IS, leading to several failed IS implementation projects. Despite significant efforts to bridge that gap, it is still present in many companies. The purpose of this paper is thus to present a special form of business-IS relationship, namely a partnership relation, and to present factors that lead to such a partnership. Based on a literature review and several in-depth interviews with IS managers and top managers, a model for creating a partnership relation is presented. The partnership construct has been developed based on interdisciplinary studies and transferred to the business-IS relationship since it is not generally used in IS disciplines. The model has been empirically tested with structural equation modelling using data from 221 IS managers in Slovenian medium and large companies. Based on the research findings, suggestions for top managers and IS managers are discussed.

Keywords: business-IS partnership, business-IS gap, top management, IS personnel, IS department, structural equation modelling

6.1 Introduction

The business-IS relationship has been the subject of research for over 50 years. Several studies have been conducted to examine and improve the relationship between top management and IS personnel (Milis, et al., 2008). In the last few decades, the role of IS personnel has changed substantially since IS departments have become increasingly more important, and therefore a problematic relationship arises due to the different perceptions of the role of IS personnel by business departments and IS departments (Nord, et al., 2007).

This problematic relationship between top managers and IS personnel is often referred to in the literature as a business-IS gap and denotes the lack of understanding between them (Coughlan, et al., 2005; Grindley, 1992; Peppard & Ward, 1999). Due to the consequences of an inefficient business-IS relationship on the success of IS implementation and the company's overall performance, several authors have devoted considerable effort to bridging the gap and improving the business-IS relationship.

However, the professional and academic literature lacks research on how to provide sufficient conditions for establishing a relationship that will enable better cooperation between top management and IS personnel and enable the use of the IS as a competitive advantage. An efficient relationship indicates a special form of business-IS relationship, namely a partnership relation, since a partnership has been recommended for companies in order to attract valuable customers, increase profits (Teng, 2003) and obtain a collaborative advantage (Kanter, 1994). Nevertheless, the focus in the literature is mainly on business-to-business partnerships, while definitions of the term partnership in the business-IS context are lacking.

Although it has been claimed that the business-IS partnership is the most important factor for successful IS implementation, since it makes the process of adopting the IS easier (Tian, et al., 2010), the literature does not set out the factors that lead to a partnership relation. The term partnership was also used in a study claiming that by understanding the business-IT partnership, organisations can focus on the application of IT to realise the business strategy (Papp, 1999); yet the research gave no guidelines on how to achieve such a partnership. Similarly, a study of partnership maturity (L. Chen, 2010) has presented the relationship between alignment and partnership, although the focus of the research was to examine the role of partnership maturity in connection with alignment maturity constructs on the IS strategic alignment, and therefore the research did not cover the business-IS partnership in its broad meaning, nor the factors that are important for creating that partnership.

The purpose of this paper is thus to present the partnership relation between top managers and IS personnel and to identify factors that are important for the partnership. Since the term partnership is generally not used in the business-IS relationship literature, indicators measuring the partnership on the organisational level, namely measuring the partnership relation between organisations, were applied to the relationship between top management and IS personnel.

The paper is divided into five main parts. First, the theoretical background on the term partnership, the orientation of IS personnel, the perceived value of the IS and the role of knowledge and skills is reviewed. Second, the research hypotheses and the model conceptualisation based on the literature review are presented. The third part presents the research instrument and research methods, followed by data analysis and the results. Finally, some implications are discussed and directions for future research are outlined.

6.2 Literature review

6.2.1 The business-IS partnership

Partnership in the business-IS context was first mentioned in the early 1990s when claiming that simply ensuring an appropriate alignment with global business drivers does not provide a guarantee of success. Therefore, organisations should apply different approaches to manage the obstacles, namely managing project risk, utilising partnerships, and building global infrastructure (Ives, et al., 1993). Partnership in this study was merely specified as one of the most important risk management approaches, but without defining it.

It has been recommended that companies establish partnership relations in order to create top products, attract valuable customers and increase profits (Teng, 2003), and consequently to obtain a collaborative advantage (Kanter, 1994). Although the term partnership is generally used in management disciplines describing the relations between companies or organisations, there have already been some attempts to place it in the business-IS relationship context.

An attempt to define partnership was made in research presenting the rationale behind the fusion approach to managing the IS (Keen, 1993), claiming that the main element in business-IS alignment is to assure that the core organisational resources of business processes, technology and people are properly involved in business dialogue. Fusion in this context is similar to the term partnership; however, authors did not use the term partnership in their research.

In the business-IS context, the partnership signifies the organisational ability to join cross-functional efforts in deploying the IS with the purpose of creating new business opportunities (Tian, et al., 2010) since the effective use of IS resources depends on the relationship between the IS department and business departments inside the organisation (Bassellier, et al., 2001). Moreover, it has also been claimed that the business-IS partnership is the most important factor of successful IS implementation because the partnership relation can make the process of adopting the IS easier (Tian, et al., 2010).

Partnership has also been defined as how the IS department and business department perceive each other's contribution, including the role of the IS in strategic business planning and sharing the rewards and risk between the IS department and the business functions (L. Chen, 2010). However, the measures used in the research referred to partnership maturity and not to the business-IS partnership in general. Measuring partnership maturity in this research was

developed based on the strategic alignment model (Luftman, 2000; Sledgianowski, et al., 2006), and therefore included business' perception of the role of the IS, the role of the IS in strategic business planning, the integrated sharing of risks and the effectiveness of partnership programmes.

On the contrary, in a model of partnership success Mohr and Spekman employed several attributes that are important for successful business-to-business partnerships, namely commitment, coordination, interdependence and trust (Mohr & Spekman, 1994). These attributes make the partnering organisations aware of their interdependence and them willing to act towards a valuable relationship (Tuten & Urban, 2001).

Partnership is related to the IS and business and has also been used in research expressing principles of good IS governance (Chris, 2005), claiming that efficient governance is similar to an enterprise-wide partnership between business and the IS where both sides have the right understanding of each other. However, the research offered no definition of partnership, nor the indicators to measure the partnership or the factors influencing it.

A recent study (Tian, et al., 2010) has attempted to present measures for defining a business-IS partnership by using four items to measure a cross-functional partnership, namely mutual understanding, mutual trust, mutual involvement and conflict resolution. These measures were adopted from a study (Ravichandran & Lertwongsatien, 2005) examining the influence of IS capabilities and resources on the company's performance. Mutuality in this context refers to equality in decision-making, the state of mutual respect and also jointly agreed values and purpose (Brinkerhoff, 2002).

A study examining the relations between non-governmental development organisations (Malena, 1995) claimed that partnership should involve a range of value-based partnership principles such as jointly agreed values, mutual trust, reciprocal accountability, transparency, understanding each other's political, economic, cultural contexts and long-term commitment to working together. However, these value-based partnership principles were criticised due to problems with their operationalisation and subjective justification, and it was therefore suggested to map partnership practices on scalar dimensions (Brinkerhoff, 2002).

6.2.2 Orientation of IS personnel

The role of IS personnel has particularly changed in the last few decades. While in the 1970s the IT department was understood as a closed unit completely ignored by management (Keen, 1991), and therefore making the period known for several failed IT implementation projects (Doll & Ahmed, 1983), it has become increasingly important with the growth of technology and systems for business use (Nord, et al., 2007). Consequently, an ambiguity regarding the role of IS personnel appeared since IS managers were uncertain whether the role was to participate in business process redesign or merely to support business departments in the organisation (J. Ward & Peppard, 1996). Moreover, it was not even clear whether IS personnel represent a strategic resource or merely an expense (Earl & Feeney, 1994). It has

even been argued that this ambiguity has negatively influenced the business-IS relationship (J. Ward & Peppard, 1996).

However, in the 1990s the focus of the role of IS personnel moved from managing just a technical perspective, namely from being merely technology-oriented to managing a relationship perspective (Venkatraman & Loh, 1994). A recent study showed that even the role of IS managers has changed in the last decade and reflects both the IT infrastructure and the organisational strategy (Chun & Mooney, 2009), signifying that both aspects, namely technology orientation and business orientation, are covered.

It has also been found that significant differences exist between business personnel and IS personnel that derive from top management's perception that IS personnel are technology-oriented and unable to communicate properly (Willcoxson & Chatham, 2006). These differences are causing problems in establishing a partnership relation since they are increasing the business-IS gap which stems from the lack of understanding between the management side and the IS side in the company (Coughlan, et al., 2005; Peppard & Ward, 1999).

It has been claimed that the growth of electronic commerce may improve the status of IS personnel since technology will be recognised as a source of revenue rather than a cost, and consequently the IS will become part of the business and not merely a support function (Gantz, 1997). Moreover, it has been claimed that several business changes like business process redesign have also been considered to have an important impact on the role of IS personnel (Kakabadse & Korac-Kakabadse, 2000). However, at the same time the role of IS managers is still perceived as a service role (Burn & Szeto, 2000).

Nevertheless, top management's perception that IS managers are not good regarding the decision-making process in uncertain circumstances (Willcoxson & Chatham, 2006) may mean that IS departments are still treated as a supporting function in the organisation and not a business partner or a strategic resource (J. Ward & Peppard, 1996). Further, since IS managers are more task-oriented, their focus is on the service-providing-oriented IS department rather than the strategic-decisions-oriented department which is creating additional problems in the business-IS relationship (Willcoxson & Chatham, 2006). On the contrary, it has been shown that the stereotype of a technically-oriented IS manager as someone with less interpersonal skills has little empirical support (Enns, Huff, & Golden, 2003), although the results highlighted the need for further research on this topic. Nevertheless, even though the IS can transform the business, top management often perceives the IS department as having a secondary status within the organisation (D. E. Avison, et al., 1999).

It has been suggested that the role of IS personnel should be clearly defined in order to improve the business-IS relationship. This includes defining the contribution of IS personnel, aligning the IS objectives with the business objectives and sharing knowledge with top

management (Nord, et al., 2007). Further, it is essential to present the IS and the IS department as a means for achieving business goals and not merely as a supporting department (Coughlan, et al., 2005). Therefore, the role of the IS manager is to ensure that the IS is considered a strategic resource that provides value to the organisation which can be achieved by establishing the strategic role of the IS instead of merely a supporting role (Earl & Feeney, 1994).

In order to improve the business-IS relation, it has been recommended that the IS manager should have an important role in the organisation, namely by being directly subordinated to the top management or even a member of the management board (Philip, 2007; Ranganathan & Kannabiran, 2004). The proper positioning of the IS manager in the organisation triggers several informal business-IS interactions and increases the probability that top management will understand the importance of the IS (Ragu-Nathan, et al., 2004), which consequently presents an opportunity to create a trusting relationship between them (Scott, 2007).

6.2.3 The role of knowledge and skills

The discussion regarding the importance of different knowledge and skills is as old as the IS field itself, although in the 1980s the importance of technical skills rather than business and managerial ones was emphasised (Byrd & Turner, 2001). However, this view slowly changed in the 1990s when it became apparent that IS personnel need a combination of business, technical and interpersonal skills (Mata, et al., 1995). This view still prevails today since it has been shown that it is essential that IS managers and IS personnel have various skills and capabilities (Lerouge, et al., 2005; Parolia, et al., 2007). On the contrary, it was shown that technical skills were the most important for IS managers (Byrd & Turner, 2001), probably given that most IS managers generally had a technical background (Chatham & Patching, 2000). However, it had been argued before that IS managers lack communication skills and therefore a special effort should be devoted to improving those skills (Todd, McKeen, & Gallupe, 1995).

Nevertheless, it was claimed decades ago that IS professionals of the twenty-first century will have to be multi-skilled individuals as they will have to possess a combination of technical, business and interpersonal knowledge in order to adjust to the new opportunities, properly analyse problems and implement business processes utilising new information technology (Farwell, Kuramoto, Lee, Trauth, & Winslow, 1992).

The knowledge and skills of the IS manager are an important factor in the business-IS relationship since differences in the knowledge and skills acquired by individuals on both sides are often seen as the main reason for misunderstanding between top managers and IS managers. It was already shown decades ago that the development of business skills among IS personnel is an important factor for reducing the business-IS gap (Grindley, 1992) since misunderstanding business needs causes unsuccessful implementation of the IS and reduces the credibility of the IS personnel in the organisation (Doll & Ahmed, 1983). On the contrary,

acquiring business and managerial skills by IS managers is an important part of achieving top management support (Indihar Štemberger, et al., 2011).

Nevertheless, it has been claimed that insufficient knowledge and skills on both sides, namely on the business side and the IS side, are creating the business-IS gap (Martin, et al., 2004). Moreover, it has even been confirmed that a combination of managerial, business and technical knowledge is an essential factor of successful IS implementation (Caldeira & Ward, 2003; Mata, et al., 1995).

Similarly, it has been argued that IS professionals should develop a combination of skills that are less technology-specific and more context-oriented due to more educated end-users regarding the IS and even more importantly due to the increased outsourcing of software development and infrastructure maintenance (Kakabadse & Korac-Kakabadse, 2000).

Further, it has been shown that IS personnel can successfully present and implement IS projects merely by possessing a wider range of skills and knowledge (Byrd & Turner, 2001) as they are often divided between service users that expect technical skills and top management that expects sufficient communication skills.

Nevertheless, regarding knowledge and skills, both top management and IS management have an important role in creating a partnership and consequently in successful IS implementation since it has been shown that top management's IS knowledge positively influences the success of IS adoption in organisations (Armstrong & Sambamurthy, 1999) and influence the level of top management's support (Indihar Štemberger, et al., 2011). However, the lack of proper knowledge and skills on both sides also derives from curricula of the education system since many universities are not adjusted to business needs (S. Lee & Fang, 2008 117).

6.2.4 Reasons for forming a partnership and the perceived value of IS

Examining the influence of the IS on the business value remains a key challenge for IS researchers (Luo, et al., 2012; Piccoli & Ives, 2005; Wagner & Weitzel, 2007). Due to the important role of the IS, it has been suggested that it is particularly vital to present the value of investing in the IS since understanding the impact of the IS encourages ideas for future IS applications (Agarwal & Lucas Jr, 2005). Therefore, several researchers have been motivated to understand the influence of applying the IS within firms on improved organisational performance (Melville, et al., 2004). Moreover, understanding the strategic value of the IS has meant that three related streams have emerged in the literature, namely strategic IS planning, the alignment between the IS strategy and the business strategy, and the use of the IS for competitive advantages (D. Q. Chen, et al., 2010).

Further, the IS should represent an essential component of the strategy as only technology by itself does not contribute to organisational performance, yet it contributes as part of an overall system that improves the creation of economic value (Piccoli & Ives, 2005).

It has been argued that the IS enables business process reengineering, strategic alliances and competitive advantages (D. E. Avison, et al., 1999) and it can consequently represent value to the organisation. Further, IS helps organisations be innovative by providing appropriate infrastructures and thus by sustaining competitiveness (Hewitt, 1995). In addition, the IS generates business value by enabling business processes and enables organisations to perform their functional activities better than their competition (Luo, et al., 2012).

Regardless of its potential, the IS department was still considered merely as a secondary activity (D. E. Avison, et al., 1999). However, by adjusting the business to new technologies, the need for skilled IS personnel with value-adding activities and performing cost-efficient tasks emerged (Kakabadse & Korac-Kakabadse, 2000). Nevertheless, due to numerous instances of promises being unfulfilled several business managers perceived these adjustments and investments merely as wasted costs and consequently increased their scepticism regarding the value of the IS strategy (J. Ward, 2012).

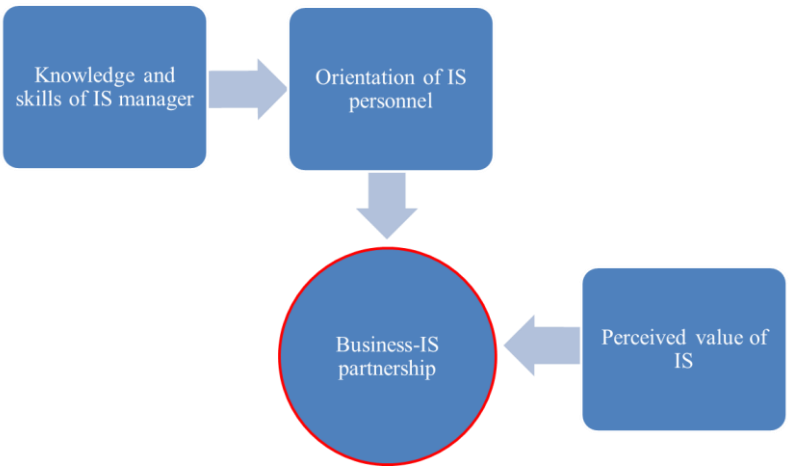
The research examining factors that encouraged managers to form a business-to-business partnership (Tuten & Urban, 2001) revealed several categories ranked by their importance, namely: (1) a desire for lower costs including reductions in the duplication of unnecessary work; (2) providing increased services including satisfying customer needs satisfactorily; (3) enhancing competitive advantages; (4) improving organisational performance including market share and profitability; (5) increasing the quality of products and services; and (6) gaining different benefits from a partner including a reliable source of supply. These factors extended Mohr and Spekman's model (Mohr & Spekman, 1994) and denote the antecedents of the business-to-business partnership relation since they signify the expectations the potential partner has regarding each particular partnering relation (Tuten & Urban, 2001).

Consequently, if there are no benefits expected from the partnership relation there is no intention to form a partnership. Thus, the most important antecedents of the partnership between organisations, namely expectations of lower costs, the increased quality of services, competitive advantages and increased profitability were transferred to the business-IS relation and used in the paper to form a construct of the perceived value of the IS as an important factor of partnership relation.

6.3 Research hypotheses and model conceptualisation

Figure 16 illustrates the relation between the factors presented in the literature review, namely achieving a partnership relationship through the knowledge and skills of the IS manager, the orientation of the IS personnel and the perceived value of the IS.

Figure 16: Base model of the business-IS partnership

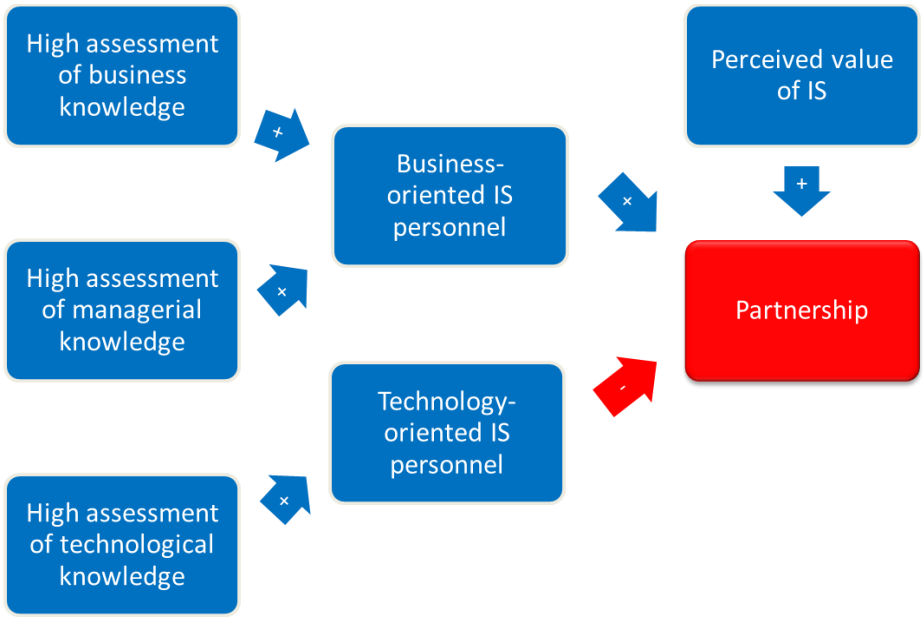


Considering the literature review, past research and in-depth interviews with IS managers, the following hypotheses were proposed.

- H1: The business knowledge and skills of the IS manager have a positive impact on business-oriented IS department.
- H2: The managerial knowledge and skills of the IS manager have a positive impact on business-oriented IS department.
- H3: A high assessment of technological knowledge and skills has a positive impact on technology-oriented IS department.
- H4: A business-oriented IS department has a positive impact on the partnership between top management and IS personnel.
- H5: A technology-oriented IS department has a negative impact on the partnership between top management and IS personnel.
- H6: The perceived value of IS positively influences the partnership between top management and IS personnel.

Figure 17 shows the conceptual model of the business-IS partnership relations with the proposed hypotheses.

Figure 17: Conceptual model of the partnership relation



To test the proposed hypotheses, seven constructs were defined, namely: (1) the business knowledge of the IS manager; (2) the managerial knowledge of the IS manager; (3) the technological knowledge of the IS manager; (4) the perceived value of the IS; (5) business-oriented IS personnel; (6) technology-oriented IS personnel; and (7) a partnership relation. The first four constructs in the model are exogenous latent variables, while the last three are endogenous latent variables.

6.4 Research methodology

6.4.1 Research instrument

A questionnaire for the IS managers was developed to empirical test the proposed model. To ensure the content validity, the questionnaire was based on previous findings in the literature (Byrd & Davidson, 2003; Kakabadse & Korac-Kakabadse, 2000; M. A. Ward & Mitchell, 2004) and previous research (Groznik, et al., 2001; Kovačič, 2001 Indihar Štemberger, 2011 #491). Pretesting was accomplished in 2010 using ten semi-structured interviews with selected IS managers that were later also included in the study. Based on the pretesting phase, a set of measurement items that was used in previous research was designed in even more detail, namely items measuring the role of IS personnel and items measuring the knowledge and skills of IS managers were expanded and formed with more indicators. The knowledge and skills of the IS manager were thus measured by 16 variables:

- Programming (knl1)
- Operating systems (knl2)
- Databases (knl3)
- Telecommunications and networks (knl4)

- Knowing IS solutions (ERP) on the market (knl5)
- IT governance frameworks (knl6)
- Planning and organising (knl7)
- Motivation (knl8)
- Project management (knl9)
- Team-working (knl10)
- Communication and coordination (knl11)
- Knowing business processes (knl12)
- Knowing relevant legislation (knl13)
- Risk management (knl14)
- Knowing individual functional areas (knl15)
- Knowing business competitors (knl16)

Further, 13 variables were used to measure the role of IS personnel in assessing the importance of the following tasks:

- Establishing the appropriate infrastructure (role1)
- Providing user support (role2)
- Concern for IS security (role3)
- Developing IS solutions (role4)
- Cooperating with external suppliers (role5)
- Identifying IS needs (role6)
- Formulating IS architecture (role7)
- On-time concluding IS projects (role8)
- Proper IS organisation (role9)
- Implementing projects in a cost-specified range (role10)
- Improving and redesigning business processes (role11)
- Strategic IS planning (role12)
- Controlling the performance of IS projects (role13)

The perceived value of the IS was measured based on an extended Mohr and Spekman model (Tuten & Urban, 2001) using the antecedents of the business-to-business partnership relation and transferring them to the business-IS context. Therefore, perceived value was measured by four variables identifying the importance of the IS as:

- Enabling quality services (imp1)
- Enabling operations with lower costs (imp2)
- Enabling successful business performance (imp3)
- Enabling competitive advantage (imp4)

Finally, based on the studies of the partnership between organisations (Brinkerhoff, 2002; Luftman, 2000; Malena, 1995; Mohr & Spekman, 1994; Teng, 2003) and the attempts to

define partnership in the business-IS context (L. Chen, 2010; Keen, 1993; Tian, et al., 2010), the partnership construct in this research was measured by 11 variables identifying the relationship between top management and IS personnel:

- IS personnel is independent regarding accepting decisions (part1)
- Top management relies on IS personnel (part2)
- Top management respects the work of IS personnel (part3)
- Top management trusts IS personnel will perform its obligations in a quality way (part4)
- Existence of mutual reliance (part5)
- IS personnel is involved in the company's development (part6)
- IS objectives are aligned with organisation objectives (part7)
- Long-term cooperation (part8)
- Commitment to a good relationship (part9)
- Open and honest communication (part10)
- IS manager's involvement in formulating the business strategy (part11)

All latent variables in the model were measured by items using a 7-point Likert scale.

6.4.2 Data collection and sample characteristics

The research question was empirically tested using data from medium and large Slovenian companies. The target population was therefore composed of 1,495 companies that were invited to participate in the research. Companies where no one was formally involved in the IS were excluded from further research.

Altogether, a total of 221 IS managers agreed to participate in the research, which represents a 14.8% response rate. The collection of the data in the form of semi-structured interviews and on-line surveys was carried out between April and August 2011. The number of respondent companies represents a representative sample of Slovenian medium and large companies. The profile of the respondents is shown in the table below.

Table 22: Participating method and profile of the respondents

		Percent (%)
Number of respondents	221	
Method of participation	Semi-structured interview	45.2
	On-line survey	54.8
Company hierarchy - position of IS manager	Member of management board	12.7
	Directly subordinated to the top management	60.5
	Indirectly subordinated to the top management	26.8
Organisation of IS department	Separate IS department	43.4
	IS department is part of other organisational unit	23.3
	Only individuals involved in the IS	26.0
	No formal involvement	7.3

6.4.3 Research methods

A combined exploratory and confirmatory approach was used in the research. In the field of information systems, exploratory techniques are generally applied for measurement purposes and the results of exploratory studies are later used in further confirmatory analysis (Koufteros, 1999). Exploratory factor analysis using SPSS 19.0 was thus undertaken to verify the construct validities of the measurement model. A principal axis factoring extraction method with a Varimax rotation was used to examine whether the questionnaire items measure the defined model.

In the confirmatory analyses, structural equation modelling (SEM) and the LISREL 8.80 tool were used to empirically verify the model and the hypotheses. SEM as a confirmatory method is used to verify that the proposed relations between the latent variables and relations between the latent and observed variables are consistent with the empirical data (Diamantopoulos & Siguaw, 2000). Since it is a covariance-based method, SEM compares a covariance matrix that is generated from a particular sample with a covariance matrix that is generated by a proposed model (Wayment & Cordova, 2003).

6.5 Data analysis and results

6.5.1 Exploratory analysis

The purpose of the exploratory factor analysis was to examine the extent to which the items in the measurement instrument are related to the hypothesised latent constructs. The tables below present the factor loadings for the variables included in the partnership model. The factor loadings are divided into two tables only to allow a clearer factor representation. Table 23 namely represents exogenous variables in the proposed partnership model, while Table 24 represents endogenous variables.

Considering the guidelines for identifying significant factor loadings based on sample size, the limit of 0.40 is appropriate for a sample size larger than 200, although values larger than 0.50 are desired to also ensure practical significance (Hair, et al., 1998). Therefore, loadings greater than 0.50 are used to represent a specific factor.

Table 23: Factor loadings for the exogenous variables

	Short description	Factor (KMO = 0.900)							
		1	2	3	4	5	6	7	8
imp1	Enabling quality services	*.367*	*.112*	*.179*	*-.020*	*.186*	**.665**	*.033*	*-.014*
imp2	Enabling operations with lower costs	*.212*	*.178*	*.160*	*.037*	*.030*	**.709**	*.233*	*.057*
imp3	Enabling successful business performance	*.289*	*.164*	*.147*	*-.033*	*-.074*	**.784**	*.073*	*.016*
imp4	Enabling competitive advantage	*.328*	*.224*	*.207*	*.035*	*.008*	**.780**	*.102*	*.021*
knl1	Programming	*-.239*	*-.241*	*.050*	**.633**	*-.002*	*-.081*	*-.085*	*.341*
knl2	Operating systems	*-.121*	*-.116*	*-.029*	**.826**	*.236*	*-.060*	*-.039*	*-.085*
knl3	Databases	*-.123*	*-.122*	*-.048*	**.867**	*.026*	*.031*	*.044*	*.133*
knl4	Telecommunications and networks	*-.096*	*.019*	*-.107*	**.841**	*.057*	*.059*	*.063*	*-.033*
knl5	IS solutions (ERP) on the market	*.076*	*.248*	*.018*	*.320*	*.231*	*.100*	*.369*	*.417*
knl6	IT governance frameworks	*.064*	*.374*	*.132*	*-.030*	*-.026*	*.005*	*.301*	**.662**
knl7	Planning and organising	*.223*	**.719**	*.129*	*-.068*	*.039*	*.089*	*.199*	*.166*
knl8	Motivation	*.190*	**.724**	*.090*	*-.091*	*.028*	*.255*	*.160*	*.032*
knl9	Project management	*.214*	**.791**	*.083*	*-.120*	*-.003*	*.128*	*.167*	*.079*
knl10	Team-working	*.144*	**.784**	*.181*	*.044*	*-.072*	*.183*	*.064*	*.097*
knl11	Communication and coordination	*.197*	**.791**	*.178*	*-.143*	*.055*	*.024*	*.166*	*-.072*
knl12	Knowing business processes	*.284*	**.530**	*.090*	*-.072*	*.003*	*.032*	*.370*	*-.092*
knl13	Knowing relevant legislation	*.204*	*.217*	*.002*	*.045*	*.081*	*.084*	**.723**	*-.046*
knl14	Risk management	*.170*	*.373*	*.229*	*-.147*	*.037*	*.106*	**.577**	*-.024*
knl15	Knowing individual functional areas	*.106*	*.231*	*.263*	*.074*	*.056*	*.131*	**.673**	*-.043*
knl16	Knowing business competitors	*.259*	*.216*	*.098*	*.006*	*-.210*	*.154*	**.615**	*.235*

As Table 23 shows, there are three factors measuring knowledge and skills, namely Factor 2 that consists of several managerial skills and therefore represents managerial knowledge and skills, Factor 4 that includes variables measuring technological knowledge and skills, while Factor 7 represents business knowledge and skills. The fourth factor in the table, namely Factor 6, includes variables measuring the importance and the value of the IS, and therefore represents the perceived value of the IS.

Table 24: Factor loadings for the endogenous variables

	Short description	Factor							
		1	2	3	4	5	6	7	8
part1	Independent IT personnel	**.718**	*.296*	*.252*	*.016*	*-.131*	*.147*	*-.031*	*-.101*
part2	Top management relies on IT personnel	**.573**	*.280*	*.319*	*-.037*	*-.027*	*.181*	*.081*	*-.079*
part3	Top management respects the work of IT personnel	**.894**	*.125*	*.150*	*-.022*	*.055*	*.065*	*.144*	*-.056*
part4	Trusting IT personnel to perform obligations in a quality way	**.839**	*.130*	*.164*	*-.022*	*.019*	*.076*	*.144*	*-.057*
part5	Mutual reliance	**.831**	*.198*	*.189*	*-.083*	*.033*	*.085*	*.208*	*-.098*
part6	Involvement in the company's development	**.780**	*.111*	*.240*	*-.099*	*-.067*	*.272*	*.055*	*.057*
part7	Aligned objectives	**.725**	*.114*	*.171*	*-.135*	*-.037*	*.265*	*.207*	*.097*
part8	Long-term cooperation	**.843**	*.125*	*.052*	*-.101*	*-.025*	*.153*	*.124*	*.025*
part9	Commitment to a good relationship	**.890**	*.141*	*.082*	*-.108*	*.003*	*.101*	*.096*	*.033*
part10	Open and honest communication	**.844**	*.177*	*.072*	*-.151*	*-.007*	*.119*	*.114*	*-.017*
part11	Involvement in formulating business strategies	**.711**	*.045*	*.180*	*-.090*	*-.153*	*.206*	*.013*	*.125*
role1	Establishing the appropriate infrastructure	*-.085*	*-.056*	*.040*	*.089*	**.870**	*.039*	*-.044*	*.134*
role2	Providing user support	*.004*	*.118*	*.037*	*.034*	**.832**	*.072*	*.033*	*.051*
role3	Concern for IS security	*-.151*	*-.031*	*.204*	*.066*	**.819**	*-.043*	*-.064*	*.195*
role4	Developing IS solutions	*-.062*	*-.085*	*.200*	*.180*	*.317*	*.088*	*-.230*	**.634**
role5	Cooperating with external suppliers	*.095*	*-.022*	*.145*	*.146*	**.520**	*-.015*	*.267*	*-.230*
role6	Identifying IS needs	*-.031*	*.221*	**.608**	*.139*	*.259*	*.067*	*-.189*	*.111*
role7	Formulating IS architecture	*-.094*	*.023*	**.512**	*.134*	*.308*	*-.061*	*-.145*	*.433*
role8	On-time concluding IS projects	*.262*	*.071*	**.686**	*-.157*	*.047*	*.099*	*.288*	*.006*
role9	Proper IS organisation	*.275*	*.187*	**.654**	*-.132*	*.202*	*.100*	*.161*	*.062*
role10	Implementing projects in a cost-specified range	*.330*	*.108*	**.719**	*.037*	*.100*	*.169*	*.089*	*-.037*
role11	Improving and redesigning business processes	*.210*	*.024*	**.627**	*-.019*	*-.106*	*.233*	*.292*	*.113*
role12	Strategic IS planning	*.382*	*.223*	**.664**	*-.062*	*-.019*	*.147*	*.089*	*.010*
role13	Controlling the performance of IS projects	*.318*	*.136*	**.763**	*-.137*	*.061*	*.130*	*.103*	*.115*

As it is evident from Table 24, Factor 1 consists of several variables measuring the partnership relation, and therefore represent the business-IS partnership. Further, there are two factors measuring the role of the IS department, namely Factor 3 that represents the business role of the IS department, while Factor 5 represents the technological and supportive role of the IS department. Just two items loaded on Factor 8 and therefore this factor was not included in the structural equation modelling. The item role4 was included in Factor 5 since it also represents the technological role of the IS department.

The value of the calculated Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) is above 0.8, thus indicating a reliable factor analysis since values greater than 0.5 are acceptable (Kaiser, 1974) and values greater than 0.8 are considered as very good (Hutcheson

& Sofroniou, 1999). Further, Cronbach's alpha was calculated to determine the internal consistency reliability of the identified factors. Values above 0.7 are generally accepted (P. Kline, 1999), however in exploratory studies values below 0.7 and above 0.50 are also considered to be acceptable (Hair, et al., 1998; Nunnally, 1967).

Table 25: Scale reliability of factors in the partnership model

Factor	Description	Label	Cronbach's alpha
1	Partnership relation	PART	0.956
2	Managerial knowledge and skills	MANknl	0.897
3	Business orientation of IS personnel	BUSori	0.875
4	Technological knowledge and skills	TECknl	0.846
5	Technological orientation of IS personnel	TECori	0.737
6	Perceived value of IS	valIS	0.849
7	Business knowledge and skills	BUSknl	0.786

As Table 25 shows, Cronbach's alpha for all identified factors is above the recommended value, signifying the high reliability of the identified factors.

It is also possible to assess the convergent and discriminant validity of the measures using exploratory analysis since in general convergent and discriminant validity are achieved when measurement items load high on their respective constructs and low on other constructs (Yi, Jackson, Park, & Probst, 2006), however it has been claimed that exploratory factor models do not provide an explicit test statistic for assessing convergent and discriminant validity (Koufteros, 1999; O'Leary-Kelly & J. Vokurka, 1998; Segars & Grover, 1993) as constructs represented by a set of indicators do not correspond directly to the factors in the exploratory analysis (Gerbing & Anderson, 1988). Therefore, convergent and discriminant validity is assessed in the confirmatory analysis below.

6.5.2 Confirmatory analysis using structural equation modelling

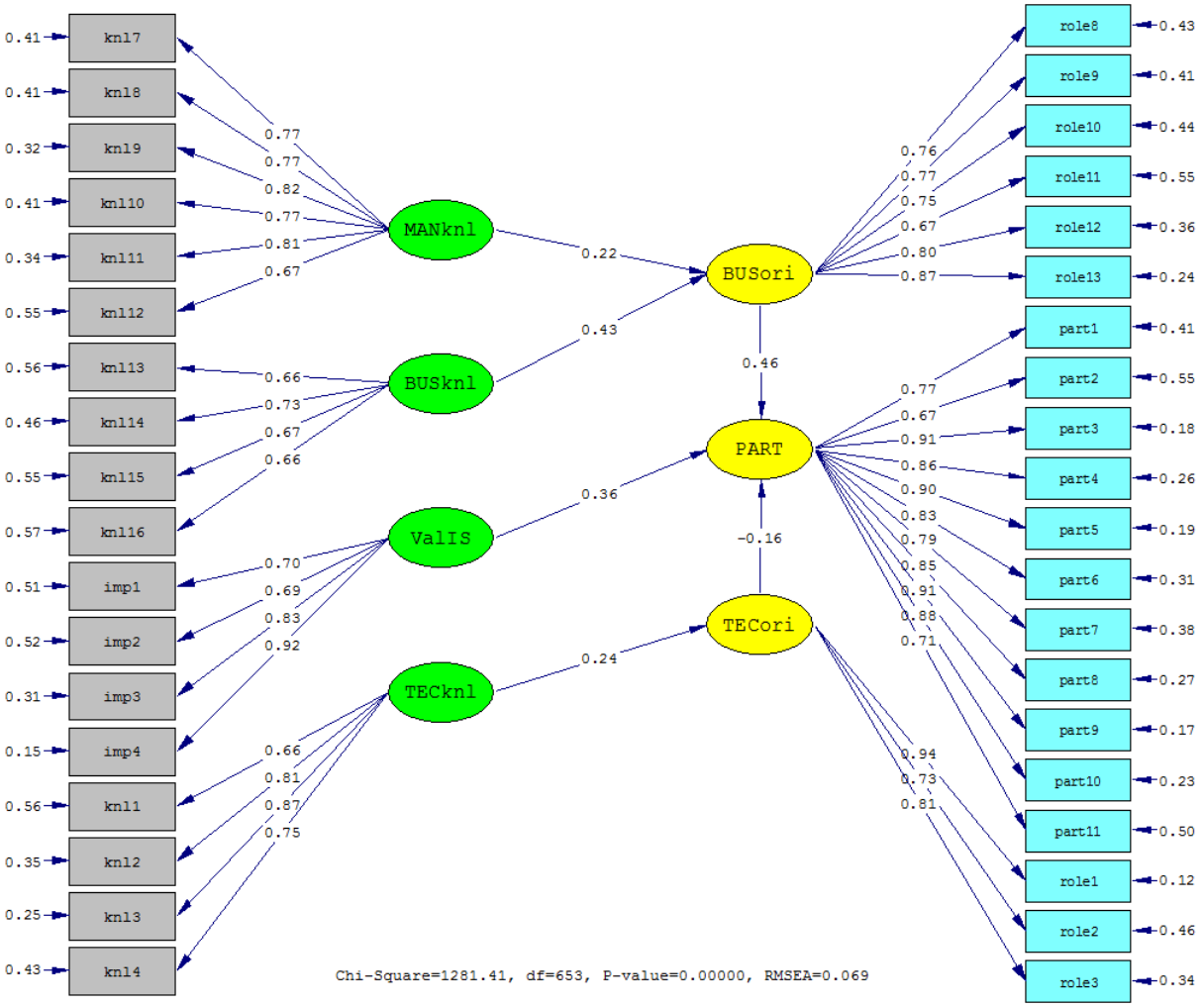
Based on the confirmatory analysis, some indicators were removed from the original model since their loadings were small and therefore do not represent reliable measures of the latent variables. Measurement items with completely standardised loadings below 0.6 were dropped from the modified model. Thus four items were dropped, namely role4, role5, role6 and role7. These modifications merely improve the model fit and not the model itself as they are only dropping some measures for latent variables. In Table 26 fit indices are presented for the original and modified models, while a detailed presentation of the indices is made in Table 27.

Table 26: Fit indices for the original and modified models

	χ2	χ2 per df	RMSEA	NNFI	std. RMR
Original model	1687.40	2.09	0.073	0.952	0.097
Modified model	1281.41	1.96	0.069	0.963	0.084

It is evident from the table that the model fit indices were slightly improved by removing the mentioned four measurement items. Therefore, the modified model was used to present the partnership relation. Figure 18 shows the path diagram for the partnership model with the completely standardised parameter estimates. Parameters were estimated using a maximum likelihood method as a default estimation method in Lisrel (Diamantopoulos & Siguaw, 2000).

Figure 18: Path diagram for the partnership model



Before interpreting the results, the model fit was examined as it represents the consistency of a hypothesised model and the data (Diamantopoulos & Siguaw, 2000). More specifically, testing the model fit presents the statistical process of comparing the covariance in the

observed data with the expected covariance in the hypothesised model (Iriondo, Albert, & Escudero, 2003).

6.5.2.1 Overall fit assessment

Several fit indices have been developed to measure the overall model fit; however, there is no agreement on the overall model fit index (Hayduk, 1996). These indices are dependent on the estimation procedure, the sample size and model complexity (Byrne, 1998) and should be used with caution (Mulaik et al., 1989). Therefore, in Table 27 fit indices that are generally used with the reference values are presented and explained below the table.

Table 27: Fit indices for the partnership model

Fit indices	Model value	Reference Value	Overall Model fit
χ^2	1281.41	not applicable	
P value for χ^2	0.000	>0.05	No
χ^2/df	1.962	<5.00 (3.00)	Yes
Standardised RMR	0.084	<0.10 (0.05)	Acceptable
RMSEA	0.069	<0.10 (0.05)	Yes
ECVI	7.109	<ECVI saturated (7.230) <ECVI independence (96.19)	Yes
AIC	1457.41	<AIC saturated (1482.00) <AIC independence (19883.89)	Yes
CAIC	1838.26	<CAIC saturated (4688.96) <CAIC independence (19883.89)	Yes
NFI	0.934	>0.90	Yes
NNFI	0.963	>0.90	Yes
CFI	0.966	>0.90	Yes
GFI	0.752	>0.90	No
IFI	0.966	>0.90	Yes

All the indices indicate a good overall model fit, except the p-value for χ^2 statistics and goodness-of-fit index (GFI). However, in the large samples the χ^2 statistic is often significant (smaller than 0.05) even though the model has a good fit (James, Mulaik, & Brett, 1982; H.W. Marsh, Balla, & McDonald, 1988), especially if the sample size exceeds 200 respondents (Hair, et al., 1998). Further, in large samples almost any model will be rejected considering just the p-value for χ^2 statistics (Long, 1983) and therefore use of the χ^2 statistic is appropriate for sample sizes between 100 and 200 (Hair, et al., 1998). Thus, χ^2 statistics in comparison with degrees of freedom is used to test the model (Diamantopoulos & Siguaw, 2000). A model fit is achieved when the ratio between the χ^2 statistics and degrees of freedom is lower than 5 (Wheaton, Muthen, Alwin, & Summers, 1977), while more restrictive rules suggest that the ratio should be lower than 3 (R. B. Kline, 2011) or even below 2 (Carmines & McIver, 1981; Hair, et al., 1998).

The next index that is below the reference value is GFI. However, it has been claimed that the GFI index also depends on the sample size (H.W. Marsh, et al., 1988), and further that GFI is particularly useless in large samples and when the number of indicators is large, so its use should be reconsidered (Sharma, Mukherjee, Kumar, & Dillon, 2005). It has also been claimed that there is no absolute cut-off level for accepting GFI, although higher values indicate a better fit (Hair, et al., 1998).

The last index that is close to the recommended value is the standardised root mean square residual (standardised RMR) where values below 0.05 are indicators of a good fit (Browne & Cudeck, 1993; Byrne, 1998) or values close to 0.08 (Hu & Bentler, 1998), however it has been claimed that values below 0.10 also indicate a good model fit (T. J. B. Kline, 2005).

The next index in the table is the root mean square error of approximation (RMSEA). The index is considered one of the most informative fit indices (Diamantopoulos & Siguaw, 2000), yet the recommended values for this index vary. It has been claimed that a reference value for a good model fit is around 0.06 (Hu & Bentler, 1999) or below 0.08 (Hair, et al., 1998) (S.L. Jarvenpaa, Tractinsky, & Vitale, 2000), while some suggest that values below 0.05 indicate a good fit, values below 0.08 a reasonable fit, values between 0.08 and 0.10 a mediocre fit and values above 0.10 are indicating a poor fit (Browne & Cudeck, 1993; Diamantopoulos & Siguaw, 2000; MacCallum, et al., 1996).

The expected cross-validation index (ECVI) focuses on overall error. There is no reference value for the ECVI; however, it is suggested to select the model with the smallest ECVI and therefore the value of the index should be smaller than the value of the saturated and independence models (Diamantopoulos & Siguaw, 2000). The same is true for Akaike's information criterion (AIC) and the consistent AIC (CAIC). Further, the normed fit index (NFI), non-normed fit index (NNFI), comparative fit index (CFI) and incremental fit index (IFI) measure the difference of fitting the model compared to the baseline model, where values close to 1 represent a good fit (Jöreskog & Sörbom, 1993).

It has been claimed that the chi-square test, standardised RMR, GFI and CFI, RMSEA and ECVI indices satisfy the criteria to assess the overall model fit (Diamantopoulos & Siguaw, 2000); however, the $\chi 2$ per degree of freedom, comparative fit index (CFI,) and non-normed fit index (NNFI) are generally used to assess the model fit (Koufteros, 1999).

Considering the presented indices and underlying limitations, it is possible to conclude that that the model has a good overall fit.

6.5.2.2 Assessing the measurement model

Assessment of the measurement model refers to the relationships between the latent variable and its indicators with the purpose of determining the validity and reliability of the measures used to represent the latent variables. Validity signifies whether an indicator measures what it

is designed to measure, while reliability refers to the consistency of measurement signifying whether a set of construct indicators is consistent in their measurements (Hair, et al., 1998).

To achieve the validity of the indicators, the relationship between each latent variable and its indicators should be significantly different from zero. In Table 28 indicators for endogenous latent variables with Lisrel estimates and t-values are presented. Since the t-values exceed 2.58, all the relations are significantly different from zero (0.01 significance level), and thus the construct validity is achieved.

Table 28: Validity and reliability assessment for the partnership model – Lambda Y

	LAMBDA-Y				
Latent Variable	Indicator	Estimate	t-value	Completely standardised loadings	R^2
BUSori	role8	0.69	11.68	0.76	0.57
	role9	0.81	11.94	0.77	0.59
	role10	0.71	11.52	0.75	0.56
	role11	0.76	10.07	0.67	0.45
	role12	0.88	12.51	0.80	0.64
	role13	0.91	13.99	0.87	0.76
PART	part1	0.77	12.43	0.77	0.59
	part2	0.49	10.53	0.67	0.46
	part3	0.85	15.65	0.91	0.82
	part4	0.72	14.57	0.86	0.74
	part5	0.87	15.44	0.90	0.81
	part6	0.79	13.82	0.83	0.69
	part7	0.74	12.88	0.79	0.62
	part8	0.77	14.34	0.85	0.73
	part9	0.87	15.79	0.91	0.83
	part10	0.86	14.94	0.88	0.77
	part11	0.91	11.22	0.71	0.50
TECori	role1	1.12	15.92	0.94	0.88
	role2	0.81	11.62	0.73	0.54
	role3	0.85	13.18	0.81	0.66

Likewise, Table 29 presents indicators for the exogenous latent variables with the estimates and t-values. Also these t-values are larger than 2.58 and therefore the construct validity is achieved.

In both tables completely standardised loadings are also presented. In the completely standardised solution, both measurable indicators and latent variables are standardised and it is therefore possible to compare the validity of different indicators (Diamantopoulos &

Siguaw, 2000). It is evident from the tables that controlling the performance of IS projects is the most valid indicator for the business-oriented role of IS personnel and commitment to a good relationship is the most valid indicator of a partnership. On the contrary, top management's reliance on IS personnel is the least valid indicator of a partnership.

Table 29: Validity and reliability assessment for the partnership model – Lambda X

	LAMBDA-X				
Latent Variable	Indicator	Estimate	t-Value	Completely standardised loadings	R^2
MANknl	knl7	0.75	12.69	0.77	0.59
	knl8	0.81	12.59	0.77	0.59
	knl9	0.91	14.02	0.82	0.68
	knl10	0.75	12.65	0.77	0.59
	knl11	0.69	13.74	0.81	0.66
	knl12	0.53	10.46	0.67	0.45
BUSknl	knl13	0.74	9.84	0.67	0.44
	knl14	0.95	11.19	0.73	0.54
	knl15	0.77	9.99	0.67	0.45
	knl16	0.77	9.69	0.66	0.43
ValIS	imp1	0.75	11.10	0.70	0.49
	imp2	0.78	10.94	0.69	0.48
	imp3	1.03	14.07	0.83	0.69
	imp4	1.16	16.57	0.92	0.85
TECknl	knl1	1.12	10.10	0.66	0.44
	knl2	1.29	13.26	0.81	0.66
	knl3	1.28	14.63	0.87	0.75
	knl4	1.02	12.00	0.75	0.57

Table 28 and Table 29 also present the squared multiple correlation (R^2) for the indicators in the partnership model representing the share of variance in the indicator explained by the latent variable (Diamantopoulos & Siguaw, 2000) where high values signify a high level of reliability.

Besides indicator reliability, the construct reliability was also calculated. In Table 30 the composite reliability (CR) measuring the reliability of the constructs is thus presented. Values for CR should exceed 0.6 (Bagozzi & Yi, 1988), although a commonly cut-off value for acceptable reliability is 0.70 (Hair, et al., 1998). In addition, average variance extracted (AVE) that refers to the amount of variance that is captured by the construct in relation to the amount of variance that is caused by the measurement error (Fornell & Larcker, 1981) was calculated. AVE values should exceed 0.50, signifying that the variance due to measurement error is smaller than the variance captured by the construct.

Table 30: Construct reliability in the partnership model

Latent variable	Number of items	CR	AVE
BUSori	6	0.898	0.595
PART	11	0.960	0.687
TECori	3	0.869	0.691
MANknl	6	0.897	0.593
BUSknl	4	0.777	0.466
ValIS	4	0.869	0.627
TECknl	4	0.857	0.603

As it is evident from Table 30, all constructs highly exceed the recommended values for CR, and therefore the indicators of each construct provide a reliable measurement. Further, with one exception AVE is larger than 0.5 for all latent variables indicating that more than half of the variance in the indicators is captured by the underlying latent variable. The only exception is BUSknl, however the value of AVE for BUSknl is close to the recommended value and thus reliability of the measures is achieved.

The last assessment of the measurement model refers to the discriminant validity. It presents a test of whether the latent variable explains the variance of its own indicators better than the variance of other latent variables. A discriminant validity test using a Fornell-Larcker criterion (Fornell & Larcker, 1981) is presented in Table 31. According to that criterion, AVE values are compared to the squared correlation between each pair of latent variables.

Table 31: Discriminant validity for the partnership model

Latent variable	BUSori	PART	TECori	MANknl	BUSknl	ValIS	TECknl
BUSori	**0.595**						
PART	0.343	**0.687**					
TECori	0.001	0.033	**0.691**				
MANknl	0.269	0.187	0.004	**0.593**			
BUSknl	0.340	0.219	0.001	0.494	**0.466**		
ValIS	0.120	0.271	0.000	0.264	0.298	**0.627**	
TECknl	0.014	0.016	0.058	0.076	0.019	0.009	**0.603**

Since the AVE values on the diagonal for each latent variable are higher than the squared correlation between that latent variable and all other latent variables, the discriminant validity is confirmed.

6.5.2.3 Assessment of the structural model

The last part of the model fit assessment is a structural model fit which refers mainly to the significance of the estimated coefficients in the structural part of the model (Hair, et al., 1998). The purpose is to examine whether the data support the theoretical relationships in the conceptualisation model (Diamantopoulos & Siguaw, 2000). Therefore, the signs of the parameters representing a relationship between latent variables, the statistical significance and magnitude of the estimated parameters, and the squared multiple correlation for the structural equations were examined.

In the partnership model the signs of all parameters are consistent with the hypothesised relationships between the latent variables. Further, all parameters are statistically significant at the 0.01 significance level, except MANknl which is significant at the 0.05 level. Considering the relative impact of the estimated parameters, it is evident from Figure 18 that BUSori has the largest impact on PART. Lastly, with the exception for TECori, where R^2 is just 0.06, the R^2 for other endogenous variables are quite high, namely 0.36 for BUSori and 0.48 for PART. The latter indicates that the independent latent variables (BUSori, TECori and valIS) explain 48% of the variance in the PART latent variable.

Considering the overall model fit, the measurement model fit and the structural model fit, the confirmatory analysis has verified all six hypotheses.

6.6 Discussion

6.6.1 Findings and Implications

There are two important findings of the research. The first is the definition of the term partnership in the context of the business-IS relationship. The partnership construct has been developed using interdisciplinary studies and transferred to the business-IS relationship. However, the most important finding of the research is that a partnership relation can be achieved through business-oriented IS personnel and the perceived value of the IS. It has been found that these two factors have the largest positive influence on the partnership relation. On the contrary, the research has shown that technology-oriented IS personnel has a negative influence on the business-IS partnership, although the impact of that influence is relatively small.

IS managers should therefore improve their managerial knowledge and particularly their business knowledge and skills since this should shift their attention more towards a business-oriented IS department. This does not mean that technology is not important, but emphasises that just having technology-oriented IS departments that neglect the importance of the business role are creating the gap between IS personnel and top management. The technology-oriented role itself namely has a negative influence on the partnership.

In particular, IS managers should primarily improve their knowledge and skills related to risk management and know the individual functional areas since these have been found to be the most influential measures of business knowledge and skills. Similarly, knowledge of project management and communication and coordination skills should be improved as the most influential measures of managerial knowledge.

In addition, in order to improve the business orientation of the IS department IS managers should emphasise strategic IS planning and focus on the importance of controlling the performance of IS projects. In contrast, simply emphasising the establishment and provision of appropriate IS infrastructure as the main indicator of a technology-oriented IS department and simultaneously neglecting the importance of the business role leads to the IS personnel being treated merely as a supporting function and not a strategic resource.

Further, IS managers should also devote particular efforts to assuring that the IS will enable successful business performance and that it will enable a competitive advantage to be obtained since this has been found to be an influential measure of the perceived value of the IS.

However, it is important to add that although a technology-oriented IS department in itself does not contribute to an improved partnership relation and it is in fact even worsening that relation, and considering that technological knowledge and skills are influencing the technology-oriented IS department, it would be wrong to conclude that merely emphasising technological knowledge and skills is a cause of the business-IS gap. The factor technology-oriented IS department has namely remained quite unexplained in the research, suggesting that there are additional items influencing it, although it has been confirmed in the research that giving a preference to technological knowledge and neglecting business and managerial knowledge does not improve the business-IS relation.

6.6.2 Limitations and further research

The research findings are constrained by the sample which is limited to a single country. Moreover, the study results do not present the situation of specific industrial sector, although the purpose of this paper was to confirm the hypotheses in general and not as applied to a specific industrial sector.

The research also shows that the further study of the business-IS partnership relation is justified and still necessary. Since the perceived value of the IS has been found to be an important factor for creating a partnership relation, future research should analyse this factor in detail and present the factors that are influencing it. Similarly, since the technology-oriented IS department was not thoroughly explained by the presented indicators, it is suggested that this factor be studied in greater detail.

Further research could also examine differences between industry sectors and the business-IS partnership relation within different industry sectors. Moreover, the study could be repeated in

a different region to cross-validate it. Further, research examining the influence of culture on the business-IS relationship could also provide an important improvement to the presented partnership model. More specifically, testing whether cultures that emphasise the importance of hierarchy and leadership differ from cultures emphasising the importance of a flat organisational structure and collaboration could provide a notable information about the creation of a business-IS partnership.

Nevertheless, future research should test the applicability of this research to the relationship in other spheres in companies, namely the relationship between top management and other non-business spheres in the company.

6.7 Conclusion

The paper has presented the term partnership in the business-IS relationship and contributed to understanding of the important factors that are important for achieving a partnership relation between top management and IS personnel. The results confirm that the business orientation of the IS department and the perceived value of the IS have a positive influence on the partnership. Further, the paper has also presented the prerequisites that lead to the business orientation of the IS department. The results are also important for IS managers and business managers in order to improve the relationships between them.

7 FINAL CONCLUSION

The business-IT gap remains an important issue since it influences the success of IT implementation and consequently the company overall performance. The purpose of this dissertation was not to eliminate the gap because differences between the business side and IT side will always exist. Instead, the purpose was to enhance understanding of the gap between business and IT personnel and to reduce the gap by creating a partnership between them. The dissertation thus presents and defines the gap by identifying the factors that are important in the business-IT relationship and by revealing significant differences between top managers and IT managers.

Defining the gap is particularly important because misunderstanding between top management and IT personnel can be removed to some extent by knowing the factors important in this relationship and knowing particular fields within these factors where significant differences exist. Although this gap will probably always exist, the findings of this dissertation allow the gap to be narrowed and both sides to be aligned.

Further, the term partnership as a form of cooperation where different actors are involved was also used in the business-IT relationship. In this context, it represented the situation where different people can work together despite the obvious differences and gap between them.

7.1 Achieving the goals

The dissertation had five main goals. Through the different articles these goals were successfully achieved, namely:

1. *to identify key factors important in the business-IT relationship*

The research revealed the existence of nine factors that are important in the business-IT relationship. Two factors in the business-IT relationship are similarly perceived, meaning that there are no significant differences between IT managers and top management, namely the business knowledge and skills of the IT manager and the managerial knowledge and skills of the IT manager.

2. *to identify the main key factors causing or increasing the gap*

On the contrary, seven of these factors are perceived differently by top management and IT management and are therefore causing the gap between them, namely top management support to the IT department, mutual trust between management and IT personnel, the perceived value of the IT department, one factor related to knowledge and skills, namely the technological knowledge and skills of the IT manager, and three factors related to the role of IT personnel, namely the business role of the IT department, the supporting role of the IT department and the technological role of the IT department.

3. *to examine and define the notion of the gap between business and IT managers*

The research also presented the main differences between top management and IT personnel by presenting measures of each factor where significant differences exist between them. The research revealed the obvious and hidden gaps in the relationship. In relation to the obvious gap, the differences regarding the top management support, mutual trust and the different roles of IT personnel were exposed. Concerning the hidden gap, the differences regarding knowledge and skills were presented.

The notion of hidden gap was used since simply comparing the differences between top management and IT managers in valuing the importance of different IT managers' knowledge and skills revealed just a few significantly different variables. More specifically, only the perception of the importance of technological knowledge and skills was significantly different between top management and IT managers. However, comparing the importance of the IT managers' skills valued by the top management with the skills IT managers actually possess revealed that 13 variables measuring different knowledge and skills out of 15 are significantly different. This indicates a gap that is not obvious from merely comparing the differences in valuing the importance of knowledge and skills.

4. *to present factors that lead to obtaining top management support*

The research also confirmed the importance of two factors in obtaining top management's support, namely the business and managerial knowledge and skills of IT personnel and the business-oriented role of the IT department. It was shown that IT managers with sufficient business and managerial skills more easily obtain top management support than IT managers without these knowledge and skills.

5. *to reveal the factors that lead to partnerships and consequently enable better cooperation between top managers and IT personnel*

The research tested the partnership model with structural equation modelling and confirmed the existence of several factors that influence the partnership relation. It was found that the business-oriented role of IT personnel has an important influence on the partnership, while only technology-oriented IT personnel has a negative influence on the business-IT partnership. Further, it was confirmed that the perceived value of IT also has a positive impact on the partnership relation.

The research also presented and confirmed the factors that influence the orientation of the IT personnel, namely business knowledge and skills, managerial knowledge and skills and technological knowledge and skills.

7.2 Confirming the hypotheses

The dissertation successfully confirmed the proposed hypotheses.

- *H1: Several factors in the business-IT relationship are increasing the gap*

The hypothesis was confirmed in the first article which presented the factors that are important in the business-IT relationship. The research in the first article confirmed the existence of nine factors.

- *H2: Top management's view regarding the role of the IT department is different from the view of IT personnel*

The hypothesis was confirmed in the second article which presented significant differences between IT managers and top managers using the factors presented in the first article with a special emphasis on the knowledge and skills factor.

- *H3: The business and managerial knowledge and skills of the IT manager and the business-oriented IT department have a positive impact on top management support*

The hypothesis was confirmed in the third article which presented the factors important for obtaining top management support. More specifically, it showed that business and managerial knowledge and skills and a business-oriented IT department have a direct positive influence on top management support.

- *H4: The business knowledge and skills of the IT manager have a positive impact on business-oriented IT department*

The hypothesis was confirmed in the fourth article which presented the partnership model and the factors that are important for creating a partnership relation. It was found that business knowledge and skills have the largest standardised positive effect on the business-oriented role of IS personnel.

- *H5: The managerial knowledge and skills of the IT manager have a positive impact on business-oriented IT department*

The hypothesis was confirmed in the fourth article. It was found that managerial knowledge and skills have a positive effect on the business-oriented role of IS personnel; however, the standardised estimate of that effect is considerably smaller than the effect of business knowledge and skills.

- *H6: A high assessment of technological knowledge and skills has a positive impact on technology-oriented IT department*

The hypothesis was confirmed in the fourth article. It was found that technological knowledge and skills have a positive influence on a technology-oriented IT department; although the explained variance of the technology-oriented IT department was low, signifying that technological knowledge and skills are not the only factors influencing a technology-oriented IT department.

- *H7: A business-oriented IT department has a positive impact on the partnership between top management and IT personnel*

The hypothesis was confirmed in the fourth article. It was found that a business-oriented IT department has the largest standardised positive effect on the partnership relation. The finding confirmed that the business orientation of the IT personnel is the most important factor for creating a business-IT partnership relation.

- *H8: A technology-oriented IT department has a negative impact on the partnership between top management and IT personnel*

The hypothesis was confirmed in the fourth article. It was found that a technology-oriented IT department has a negative effect on the partnership relation. The standardised effect is not particularly large, although it is still significant.

- *H9: The perceived value of IT positively influences the partnership between top management and IT personnel*

The hypothesis was confirmed in the fourth article. It was found that the perceived value of IT has a large positive effect on the partnership relation.

7.3 Limitations and further research

The limitations of the dissertation theses are stated in the individual articles, but they can be summarised as follows:

- Confirmation of the hypotheses related to obtaining top management's support is constrained by the sample which was limited to a single country and a sample of 600 companies with 152 respondents. Thus, it may not represent the general situation.
- Confirmation of all the other hypotheses is also limited to a single country; however, they are not constrained by the sample size. The whole population was namely invited to participate in the research, leading to 312 valid cases.
- The study results are limited since they do not present the situation related to a specific industry sector. This limitation is not so important since the goal of the thesis

was to confirm the hypotheses in general and not in relation to any specific industry sector.

The abovementioned limitations do not take away from the findings of the dissertation as they do not represent major limitations. In all the articles the sample was large enough to enable the research findings to be generalised.

The dissertation presented the factors that influence the business-IT relationship. Several factors were researched in detail, while also showing how to achieve these factors. More specifically, top management support has been claimed in the literature to be particularly important for successful IT implementation, yet the research on how to achieve such support was missing. The same is true for the partnership relation. On the other hand, the perceived value of IT was found to be quite an important factor for creating a partnership relation and therefore future research should analyse this factor in detail by presenting how to increase the perceived value of IT.

Further research could also analyse possible differences between industry sectors and the business-IT relationship within different types of industry. In addition, the study could be repeated in a different region to cross-validate it.

Moreover, the presented results enable further research in order to study the impact of top management's support to the initiatives of IT personnel regarding improved business processes and business performance. Further, subsequent research could also test whether the findings are also appropriate for other spheres in companies, namely it could research the relationship between top management and other non-business spheres in the company.

Future research could also explore the influence of culture on the business-IT relationship. More specifically, cultures that emphasise the importance of hierarchy and leadership may differ from cultures emphasising the importance of a flat organisational structure regarding the relationship between top management and IT personnel.

Additional research could also examine the impact of the education system and faculty courses on the individual characteristics in order to further narrow the gap between top management and IT personnel.

REFERENCES

1. Agarwal, R., & Lucas Jr, H. C. (2005). The information systems identity crisis: Focusing on high-visibility and high-impact research. MIS Quarterly, 29(3), 381-398.
2. Al Majali, D., & Dahlin, Z. (2010). Diagnosing the gap in IT - business strategic alignment: a qualitative analysis among public shareholding firms in Jordan. International Journal of Electronic Business Management, 8(4), 263-271.
3. Allen, M. W., Armstrong, D. J., Reid, M. F., & Riemenschneider, C. K. (2008). Factors impacting the perceived organizational support of IT employees. Information & Management, 45(8), 556-563.
4. Anderson, T., & Rubin, H. (1956). Statistical inference in factor analysis. Paper presented at the Third Berkeley Symposium on Mathematical Statistics and Probability.
5. Armstrong, C. P., & Sambamurthy, V. (1999). Information technology assimilation in firms: The influence of senior leadership and IT infrastructures. Information Systems Research, 10(4), 304-327.
6. Atafar, A., Akbari, N., & Bidmeshk, O. (2011). Determining the Strategic Alignment Between IT Strategies and Business Strategies In Esfahan Municipality. Interdisciplinary Journal of Contemporary Research In Business, 3(6), 302-310.
7. Avison, D., Jones, J., Powell, P., & Wilson, D. (2004). Using and validating the strategic alignment model. The Journal of Strategic Information Systems, 13(3), 223-246.
8. Avison, D. E., Cuthbertson, C. H., & Powell, P. (1999). The paradox of information systems: strategic value and low status. The Journal of Strategic Information Systems, 8(4), 419-445.
9. Bagozzi, R. P., & Yi, Y. (1988). On the Evaluation of Structural Equation Models. Journal of the Academy of Marketing Science, 16(1), 74-94.
10. Baihareth, H., & Liu, K. (2011). Business-IT Strategic Alignment: Linking Organisational Learning with Strategic Perspectives. GSTF Business Review (GBR), 1(1), 116-121.
11. Bassellier, G., Reich, B. H., & Benbasat, I. (2001). Information technology competence of business managers: A definition and research model. Journal of Management Information Systems, 17(4), 159-182.
12. Bergeron, F., Raymond, L., & Rivard, S. (2004). Ideal patterns of strategic alignment and business performance. Information & Management, 41(8), 1003-1020.
13. Bharadwaj, A. S. (2000). A resource-based perspective on information technology capability and firm performance: an empirical investigation. MIS Quarterly, 24(1), 169-196.
14. Boynton, A. C., Victor, B., & Pine, B. J. (1993). New competitive strategies: Challenges to organizations and information technology. IBM Systems Journal, 32(1), 40-64.
15. Brinkerhoff, J. M. (2002). Government–nonprofit partnership: a defining framework. Public Administration and Development, 22(1), 19-30.

16. Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), Testing Structural Equation Models (pp. 136-162). Newbury Park, CA: Sage Publications.
17. Burn, J. M., & Szeto, C. (2000). A comparison of the views of business and IT management on success factors for strategic alignment. Information & Management, 37(4), 197-216.
18. Byrd, T. A., & Davidson, N. W. (2003). Examining possible antecedents of IT impact on the supply chain and its effect on firm performance. Information & Management, 41(2), 243-255.
19. Byrd, T. A., & Turner, D. B. (2001). An Exploratory Analysis of the Value of the Skills of IT Personnel: Their Relationship to IS Infrastructure and Competitive Advantage. Decision Sciences, 32(1), 21-54.
20. Byrne, B. M. (1998). Structural Equation Modeling with LISREL, PRELIS, and SIMPLIS: Basic Concepts, Applications, and Programming. Mahwah: Lawrence Erlbaum Associates.
21. Caldeira, M. M., & Ward, J. M. (2002). Understanding the successful adoption and use of IS/IT in SMEs: an explanation from Portuguese manufacturing industries. Information Systems Journal, 12(2), 121-152.
22. Caldeira, M. M., & 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(2), 127-141.
23. Campbell, B., Kay, R., & Avison, D. (2005). Strategic alignment: a practitioner's perspective. Journal of Enterprise Information Management, 18(5/6), 653-664.
24. Cardinali, R. (1992). Information systems - A key igredient to achieving organizational competitive strategy. Computers in industry, 18(3), 241-245.
25. Carmines, E. G., & McIver, J. P. (1981). Analyzing models with unobserved variables: Analysis of covariance structures. In G. W. Bohrnstedt & E. F. Borgatta (Eds.), Social measurement: Current issues (pp. 65-115). Beverly Hills, CA: Sage Publications.
26. Carr, N. G. (2003). IT doesn't matter. Harvard Business Review, 81(5), 41-49.
27. Chan, Y. E., & Huff, S. L. (1993). Strategic information systems alignment. Business quarterly, 58(1), 51-56.
28. Chan, Y. E., Huff, S. L., Barclay, D. W., & Copeland, D. G. (1997). Business strategic orientation, information systems strategic orientation, and strategic alignment. Information Systems Research, 8(2), 125-150.
29. Chan, Y. E., & Reich, B. H. (2007). IT alignment: what have we learned? Journal of Information Technology, 22(4), 297-315.
30. Chang, H.-L., Wang, K., & Chiu, I. (2008). Business-IT fit in e-procurement systems: evidence from high-technology firms in China. Information Systems Journal, 18(4), 381-404.
31. Chatham, R., & Patching, K. (2000). Corporate Politics for IT Managers: How to Get Streetwise. Boston: Butterworth-Heinemann.

32. Chen, D. Q., Mocker, M., Preston, D. S., & Teubner, A. (2010). Information systems strategy: reconceptualisation, measurement, and implications. MIS Quarterly, 34(2), 233-259.
33. Chen, H. H. G., Miller, R., Jiang, J. J., & Klein, G. (2005). Communication skills importance and proficiency: perception differences between IS staff and IS users. International Journal of Information Management, 25(3), 215-227.
34. Chen, L. (2010). Business–IT alignment maturity of companies in China. Information & Management, 47(1), 9-16.
35. Chen, R.-S., Sun, C.-M., Helms, M. M., & Jih, W.-J. (2008). Aligning information technology and business strategy with a dynamic capabilities perspective: A longitudinal study of a Taiwanese Semiconductor Company. International Journal of Information Management, 28(5), 366-378.
36. Chen, Y.-C., & Wu, J.-H. (2011). IT management capability and its impact on the performance of a CIO. Information & Management, 48(4–5), 145-156.
37. Chris, G. (2005). IT governance - are boards and business executives interested onlookers or committed participants? Australian Accounting Review, 15(3), 5-10.
38. Chun, M., & Mooney, J. (2009). CIO roles and responsibilities: Twenty-five years of evolution and change. Information & Management, 46(6), 323-334.
39. Clark, C. E., Cavanaugh, N. C., Brown, C. V., & Sambamurthy, V. (1997). Building Change-Readiness Capabilities in the IS Organization: Insights From the Bell Atlantic Experience. MIS Quarterly, 21(4), 425-455.
40. Coleman, P., & Papp, R. (2006). Strategic alignment: analysis of perspectives. Paper presented at the Southern Association for Information Systems Conference.
41. Conover, W. J. (1980). Practical nonparametric statistics (2nd ed.). New York: John Wiley & Sons.
42. Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Practical Assessment, Research & Evaluation, 10(7), 1-9.
43. Coughlan, J., Lycett, M., & Macredie, R. D. (2005). Understanding the business-IT relationship. International Journal of Information Management, 25(4), 303-319.
44. Crichton, N. (2000). Mann–Whitney test. Journal of clinical nursing, 9(4), 574-584.
45. De Haes, S., & Van Grembergen, W. (2004). IT Governance and its Mechanisms. Information Systems Control Journal, 1, 27-33.
46. De Haes, S., & Van Grembergen, W. (2009). Exploring the relationship between IT governance practices and business/IT alignment through extreme case analysis in Belgian mid-to-large size financial enterprises. Journal of Enterprise Information Management, 22(5), 615-637.
47. Dhillon, G. (2008). Organizational competence for harnessing IT: A case study. Information & Management, 45(5), 297-303.
48. Diamantopoulos, A., & Siguaw, J. A. (2000). Introducing LISREL. London: SAGE Publications.

49. Diaz, R. A. (2011). Planning for sustainable development: Strategic alignment in Peruvian regions and cities. Futures, 43(8), 908-918.
50. DiStefano, C., Zhu, M., & Mîndrilă, D. (2009). Understanding and using factor scores: Considerations for the applied researcher. Practical Assessment, Research & Evaluation, 14(20), 1-11.
51. Doll, W. J., & Ahmed, M. U. (1983). Diagnosing and Treating the Credibility Syndrome. MIS Quarterly, 7(3), 21-32.
52. Dong, X., Liu, Q., & Yin, D. (2008). Business Performance, Business Strategy, and Information System Strategic Alignment: An Empirical Study on Chinese Firms. Tsinghua Science & Technology, 13(3), 348-354.
53. Dos Santos, B., & Sussman, L. (2000). Improving the return on IT investment: the productivity paradox. International Journal of Information Management, 20(6), 429-440.
54. Earl, M. J. (1992). Putting IT in its place: a polemic for the nineties. Journal of Information Technology, 7(2), 100-108.
55. Earl, M. J. (1996). Information management: The organizational dimension. New York: Oxford University Press.
56. Earl, M. J., & Feeney, D. F. (1994). Is Your CIO Adding Value? Sloan Management Review, 35(3), 11-20.
57. Earls, M. J., & Skyrme, D. J. (1992). Hybrid managers—what do we know about them? Information Systems Journal, 2(3), 169-187.
58. Enns, H. G., Huff, S. L., & Golden, B. R. (2003). CIO influence behaviors: the impact of technical background. Information & Management, 40(5), 467-485.
59. Ensley, M. D., & Pearce, C. L. (2001). Shared cognition in top management teams: Implications for new venture performance. Journal of Organizational Behavior, 22(2), 145-160.
60. Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. Psychological Methods, 4(3), 272-299.
61. Farwell, D. W., Kuramoto, L., Lee, D., Trauth, E. M., & Winslow, C. (1992). A new paradigm for IS. Information Systems Management, 9(2), 7-14.
62. Feeny, D. F., Edwards, B. R., & Simpson, K. M. (1992). Understanding the CEO/CIO relationship. MIS Quarterly, 435-448.
63. Field, A. (2009). Discovering statistics using SPSS (3rd ed.). London: SAGE publications Ltd.
64. Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of marketing research, 18, 39-50.
65. Gantz, J. (1997). E-commerce puts IS in the fast lane. Computerworld, 31(5), 33.
66. Gerbing, D. W., & Anderson, J. C. (1988). An updated paradigm for scale development incorporating unidimensionality and its assessment. Journal of marketing research, 25, 186-192.

67. Gordon, S. R., & Tarafdar, M. (2007). How do a company's information technology competences influence its ability to innovate? Journal of Enterprise Information Management, 20(3), 271-290.
68. Green, G. I. (1989). Perceived Importance Of Systems Analysts' Job Skills, Roles. MIS Quarterly, 13(2), 115-133.
69. Grindley, K. (1992). Information systems issues facing senior executives: the culture gap. The Journal of Strategic Information Systems, 1(2), 57-62.
70. Groznik, A., Kovačič, A., Jaklič, J., & Indihar Štemberger, M. (2001). A comparison of the strategic IS planning practices in the developed and transition countries. Journal of information technology management, 11(1-2), 25-44.
71. Gutierrez, A., Orozco, J., & Serrano, A. (2009). Factors affecting IT and business alignment: a comparative study in SMEs and large organisations. Journal of Enterprise Information Management, 22(1/2), 197-211.
72. Hackathorn, R. (2003). IT Doesn't Matter? DM Review, 13(11), 53-53.
73. Hackney, R., & Little, S. (1999). Opportunistic strategy formulation for IS/IT planning. European Journal of Information Systems, 8(2), 119-126.
74. Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). Multivariate Data Analysis (5th ed.). New Jersey: Prentice-Hall.
75. Hayduk, L. (1996). LISREL issues, debates, and strategies. Baltimore: Johns Hopkins University Press.
76. Henderson, J. C., & Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. IBM Systems Journal, 32(1), 4-17.
77. Henriksen, H. Z., & Rukanova, B. (2011). To mind IT or not to mind IT. Transforming Government: People, Process and Policy, 5(2), 155-166.
78. Hewitt, F. (1995). Business process innovation in the mid-1990s. Integrated Manufacturing Systems, 6(2), 18-26.
79. Hind, B., & Bill, M. (2006). Using coevolutionary and complexity theories to improve IS alignment: a multi-level approach. Journal of Information Technology, 21(4), 284-298.
80. Holtsnider, B., & Jaffe, B. D. (2007). IT manager's handbook: Getting your new job done (2nd ed.). San Francisco: Morgan Kaufmann Publishers.
81. Howell, D. C. (2007). The analysis of missing data. In W. Outhwaite & S. P. Turner (Eds.), Handbook of social science methodology. London: SAGE.
82. Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. Psychological Methods, 3(4), 424-453.
83. Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal, 6(1), 1-55.
84. Huang, C. D., & Hu, Q. (2007). Achieving IT-Business Strategic Alignment via Enterprise-Wide Implementation of Balanced Scorecards. Information Systems Management, 24(2), 173-184.

85. Hutcheson, G., & Sofroniou, N. (1999). The multivariate scientist. London: Sage Publications.
86. Indihar Štemberger, M., Manfreda, A., & Kovačič, A. (2011). Achieving top management support with business knowledge and role of IT/IS personnel. International Journal of Information Management, 31(5), 428-436.
87. Irani, Z. (2002). Information systems evaluation: navigating through the problem domain. Information & Management, 40(1), 11-24.
88. Iriondo, J. M., Albert, M. a. J., & Escudero, A. (2003). Structural equation modelling: an alternative for assessing causal relationships in threatened plant populations. Biological Conservation, 113(3), 367-377.
89. Ives, B., Jarvenpaa, S. L., & Mason, R. O. (1993). Global business drivers: Aligning information technology to. IBM Systems Journal, 32(1), 143-161.
90. James, L. R., Mulaik, S. A., & Brett, J. M. (1982). Causal analysis: Assumptions, models, and data. Beverly Hills, CA: Sage publications.
91. Jarvenpaa, S. L., & Ives, B. (1990). Information Technology and Corporate Strategy: A View from the Top. Information Systems Research, 1(4), 351-376.
92. Jarvenpaa, S. L., Tractinsky, N., & Vitale, M. (2000). Consumer Trust in an Internet Store: A Cross Cultural Validation. Information Technology and Management, 1(1-2), 45-71.
93. Jenkins, G. H. (1986). Education Requirements for the Entry Level Business Systems Analyst. Journal of Systems Management, 37(8), 30-33.
94. Johnson, A. M., & Lederer, A. L. (2010). CEO/CIO mutual understanding, strategic alignment, and the contribution of IS to the organization. Information & Management, 47(3), 138-149.
95. Jöreskog, K. G., & Sörbom, D. (1993). LISREL 8: Structural equation modeling with the SIMPLIS command language. Chicago: Scientific Software International.
96. Jorfi, S., Md Nor, K., & Najjar, L. (2011). Assessing the Impact of IT Connectivity and IT Capability on IT-Business Strategic Alignment: An Empirical Study. Computer and Information Science, 4(3), 76-87.
97. Kaiser, H. (1974). An index of factorial simplicity. Psychometrika, 39(1), 31-36.
98. Kakabadse, A., & Korac-Kakabadse, N. (2000). Leading the pack: future role of IS/IT professionals. Journal of Management Development, 19(2), 97-155.
99. Kanter, R. M. (1994). Collaborative advantage: the art of alliances. Harvard business review, 72(4), 96-108.
100. Kappelman, L. A., McKeeman, R., & Zhang, L. (2006). Early warning signs of IT project failure: The dominant dozen. Information Systems Management, 23(4), 31-36.
101. Kearns, G. S. (2006). The effect of top management support of SISP on strategic IS management: insights from the US electric power industry. Omega, 34(3), 236-253.
102. Kearns, G. S., & Lederer, A. L. (2003). A Resource- Based View of Strategic IT Alignment: How Knowledge Sharing Creates Competitive Advantage. Decision Sciences, 34(1), 1-29.

103. Keen, P. G. W. (1991). Shaping the Future: Business Design through IT. Boston: Harvard Business School Press.
104. Keen, P. G. W. (1993). Information technology and the management difference: A fusion map. IBM Systems Journal, 32(1), 17-39.
105. Kettinger, W. J., Grover, V., Guha, S., & Segars, A. H. (1994). Strategic information systems revisited: a study in sustainability and performance. MIS Quarterly, 18(1), 31-58.
106. Kline, P. (1999). The handbook of psychological testing (2nd ed.). London: Routledge.
107. Kline, R. B. (2011). Principles and practice of structural equation modeling. New York: Guilford Press.
108. Kline, T. J. B. (2005). Psychological testing: A practical approach to design and evaluation. Thousand Oaks, CA: Sage Publications.
109. Koufteros, X. A. (1999). Testing a model of pull production: a paradigm for manufacturing research using structural equation modeling. Journal of Operations Management, 17(4), 467-488.
110. Kovačič, A. (2001). Business renovation projects in Slovenia. Business Process Management Journal, 7(5), 409-419.
111. Kovačič, A. (2004a). Business renovation: business rules (still) the missing link. Business Process Management Journal, 10(2), 158-170.
112. Kovačič, A. (2004b). Management in informatika - kako odpraviti prepad? (pp. 3-15). Portorož: Slovenian society Informatika.
113. Kovačič, A., Jaklič, J., Indihar Štemberger, M., & Groznik, A. (2004). Prenova in informatizacija poslovanja (1st ed.). Ljubljana: Ekonomska fakulteta.
114. Lee, C. K. (2005). Analysis of skill requirements for systems analysts in Fortune 500 organizations. Journal of Computer Information Systems, 45(4), 84-92.
115. Lee, D. M. S., Trauth, E. M., & Farwell, D. (1995). Critical skills and knowledge requirements of IS professionals: A joint academic/industry investigation. MIS Quarterly, 19(3), 313-340.
116. Lee, S., & Fang, X. (2008). Perception Gaps about Skills Requirement for Entry-Level IS Professionals between Recruiters and Students: An Exploratory Study. Information Resources Management Journal, 21(3), 39-63.
117. Leida, C. (2010). Business–IT alignment maturity of companies in China. Information & Management, 47(1), 9-16.
118. Lerouge, C., Newton, S., & Blanton, J. E. (2005). Exploring the systems analyst skill set: perceptions, preferences, age, and gender. Journal of Computer Information Systems, 45(3), 12-23.
119. Litecky, C. R., Arnett, K. P., & Prabhakar, B. (2004). The paradox of soft skills versus technical skills in is hiring. Journal of Computer Information Systems, 45(1), 69-76.
120. Long, J. S. (1983). Covariance structure models: An introduction to LISREL. Beverly Hills, CA: Sage Publications.
121. Luftman, J. N. (2000). Assessing Business-IT Alignment Maturity. Communications of the Association for Information Systems, 4(14), 1-50.

122. Luftman, J. N. (2003). Assessing IT/Business Alignmemt. Information Systems Management, 20(4), 9-15.
123. Luftman, J. N. (2004). Assessing business-IT alignment maturity. In W. Van Grembergen (Ed.), Strategies for information technology governance (pp. 99-128). London: Idea Group Publishing.
124. Luftman, J. N. (2005). Key issues for IT executives 2004. MIS Quarterly, 4(2), 269-285.
125. Luftman, J. N., & Kempaiah, R. (2007). An update on business-IT alignment: a line has been drawn. MIS Quarterly Executive, 6(3), 165-177.
126. Luftman, J. N., Lewis, P. R., & Oldach, S. H. (1993). Transforming the enterprise: The alignment of business and information technology strategies. IBM Systems Journal, 32(1), 198-221.
127. Luo, J., Fan, M., & Zhang, H. (2012). Information technology and organizational capabilities: A longitudinal study of the apparel industry. Decision Support Systems, 53(1), 186-194.
128. MacCallum, R., Browne, M., & Sugawara, H. (1996). Power analysis and determination of sample size for covariance structure modeling. Psychological Methods, 1(2), 130-149.
129. Maes, R., Rijsenbrij, D., Truijens, O., & Goedvolk, H. (2000). Redefining business-IT alignment through a unified framework. Paper presented at the Landelijk Architectuur Congres, Amsterdam.
130. Malena, C. (1995). Relations between northern and southern non-governmental development organizations. Canadian Journal of Development Studies, 16(1), 7-30.
131. Manfreda, A., & Indihar Štemberger, M. (2012). Identifying factors in the relationship between top management and IS personnel. Paper presented at the UKAIS 2012 Conference, Oxford.
132. Mann, H. B., & Whitney, D. R. (1947). On a test of whether one of two random variables is stochastically larger than the other. The annals of mathematical statistics, 18(1), 50-60.
133. Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. Psychological Bulletin, 103(3), 391-410.
134. Marsh, H. W., & Hocevar, D. (1985). Application of confirmatory factor analysis to the study of self-concept: First- and higher order factor models and their invariance across groups. Psychological Bulletin, 97(3), 562-582.
135. Martin, V. A., Hatzakis, T., Lycett, M., & Macredie, R. (2004). Building the Business/IT Relationship through Knowledge Management. Journal of Information Technology Cases and Applications, 6(2), 27-47.
136. Mata, F. J., Fuerst, W. L., & Barney, J. B. (1995). Information technology and sustained competitive advantage: A resource-based analysis. MIS Quarterly, 19(4), 487-505.
137. McKeen, J. D., & Smith, H. A. (1996). Management challenges in IS: successful strategies and appropriate action. Chichester: Wiley.

138. Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Information technology and organizational performance: An integrative model of it business value. MIS Quarterly, 28(2), 283-322.
139. Milis, K., Fairchild, A., Smits, M., & Ribbers, P. (2008, May 25-26 2008). The I-fit model: Developing a tool to detect potential alignment problems. Paper presented at the European and Mediterranean Conference on Information Systems (EMCIS), Al Bostan Rotana, Dubai, UAE.
140. Mohr, J., & Spekman, R. (1994). Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques. Strategic management journal, 15(2), 135-152.
141. Mulaik, S. A., James, L. R., Van Alstine, J., Bennett, N., Lind, S., & Stilwell, C. D. (1989). Evaluation of Goodness-of-Fit Indices for Structural Equation Models. Psychological Bulletin, 105(3), 430-445.
142. Nelson, R. R. (1991). Educational Needs as Perceived by IS and End-User Personnel: A Survey of Knowledge and Skill Requirements. MIS Quarterly, 15(4), 502-525.
143. Newman, M., & Zhao, Y. (2008). The process of enterprise resource planning implementation and business process re-engineering: tales from two Chinese small and medium-sized enterprises. Information Systems Journal, 18(4), 405-426.
144. Niederman, F., Brancheau, J. C., & Wetherbe, J. C. (1991). Information Systems Management Issues for the 1990s. MIS Quarterly, 15(4), 474-500.
145. Nord, J. H., Nord, D. G., Cormack, S., & 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(3), 265-292.
146. Nunnally, J. C. (1967). Psychometric theory. New York: McGraw-Hill Education.
147. O'Leary-Kelly, S. W., & J. Vokurka, R. (1998). The empirical assessment of construct validity. Journal of Operations Management, 16(4), 387-405.
148. Onita, C., & Dhaliwal, J. (2011). Alignment within the corporate IT unit: an analysis of software testing and development. European Journal of Information Systems, 20(1), 48-68.
149. Papp, R. (1999). Business-IT alignment: productivity paradox payoff? Industrial Management & Data Systems, 99(8), 367-373.
150. Papp, R. (2004). Assessing Strategic Alignment in Real Time. Journal of Informatics Education Research, 6(1), 11-28.
151. Parolia, N., Goodman, S., Li, Y., & Jiang, J. J. (2007). Mediators between coordination and IS project performance. Information & Management, 44(7), 635-645.
152. Peppard, J. (2001). Bridging the gap between the IS organization and the rest of the business: plotting a route. Information Systems Journal, 11(3), 249-270.
153. Peppard, J., & 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(1), 29-60.

154. Philip, G. (2007). IS Strategic Planning for Operational Efficiency. Information Systems Management, 24(3), 247-264.
155. Piccoli, G., & Ives, B. (2005). Review: IT-dependent strategic initiatives and sustained competitive advantage: A review and synthesis of the literature. MIS Quarterly, 29(4), 747-776.
156. Ploetner, O., & Ehret, M. (2006). From relationships to partnerships-new forms of cooperation between buyer and seller. Industrial Marketing Management, 35(1), 4-9.
157. Preacher, K. J., & Coffman, D. L. (2006). Computing power and minimum sample size for RMSEA, from http://quantpsy.org/
158. Preston, D. S., & Karahanna, E. (2009). Antecedents of IS strategic alignment: A nomological network. Information Systems Research, 20(2), 159-179.
159. Pyburn, P. J., Ernst, & Young. (1991). Redefining the Role of Information Technology. Business Quarterly, 55(3), 89-94.
160. Raghunathan, B., Raghunathan, T., & Tu, Q. (1999). Dimensionality of the strategic grid framework: the construct and its measurement. Information Systems Research, 10(4), 343-355.
161. Ragu-Nathan, B. S., Apigian, C. H., Ragu-Nathan, T. S., & Tu, Q. (2004). A path analytic study of the effect of top management support for information systems performance. Omega, 32(6), 459-471.
162. Ranganathan, C., & Kannabiran, G. (2004). Effective management of information systems function: an exploratory study of Indian organizations. International Journal of Information Management, 24(3), 247-266.
163. Ravichandran, T., & Lertwongsatien, C. (2005). Effect of Information System Resources and Capabilities on Firm Performance: A Resource-Based Perspective. Journal of Management Information Systems, 21(4), 237-276.
164. Rosenthal, R. (1991). Meta-analytic procedures for social research (2nd ed.). Newbury Park: Sage Publications.
165. Rubin, D. B. (1976). Inference and missing data. Biometrika, 63(3), 581-592.
166. Rummel, R. J. (1967). Understanding factor analysis. The Journal of Conflict Resolution, 11(4), 444-480.
167. Sambamurthy, V., Bharadwaj, A., & Grover, V. (2003). Shaping Agility through Digital Options: Reconceptualizing the Role of Information Technology in Contemporary Firms. MIS Quarterly, 27(2), 237-263.
168. Schreiber, J. B. (2008). Core reporting practices in structural equation modeling. Research in Social and Administrative Pharmacy, 4(2), 83-97.
169. Scott, J. E. (2007). Mobility, Business Process Management, Software Sourcing, and Maturity Model Trends: Propositions for the IS Organization of the Future. Information Systems Management, 24(2), 139-145.
170. Segars, A. H., & Grover, V. (1993). Re-examining perceived ease of use and usefulness: A confirmatory factor analysis. MIS Quarterly, 17(4), 517-525.

171. Sharma, S., Mukherjee, S., Kumar, A., & Dillon, W. R. (2005). A simulation study to investigate the use of cutoff values for assessing model fit in covariance structure models. Journal of Business Research, 58(7), 935-943.
172. Skyrme, D. J., & Earl, M. J. (1990). 'Hybrid managers': what should you do? A Guide to Support the British Computer Society Task Group on Hybrids. London: British Computer Society.
173. Sledgianowski, D., Luftman, J. N., & Reilly, R. R. (2006). Development and validation of an instrument to measure maturity of IT business strategic alignment mechanisms. Innovative Technologies for Information Resources Management, 19(3), 18-33.
174. Smaltz, D. H., Sambamurthy, V., & Agarwal, R. (2006). The antecedents of CIO role effectiveness in organizations: An empirical study in the healthcare sector. Engineering Management, IEEE Transactions on, 53(2), 207-222.
175. Smith, H. A., & McKeen, J. D. (1992). Computerization and management: A study of conflict and change. Information & Management, 22(1), 53-64.
176. Sobol, M. G., & Klein, G. (2009). Relation of CIO background, IT infrastructure, and economic performance. Information & Management, 46(5), 271-278.
177. Stevens, J. (2002). Applied multivariate statistics for the social sciences. New Jersey: Lawrence Erlbaum.
178. Tabachnick, B., & Fidell, L. (2007). Using multivariate statistics (5th ed.). Boston: Allyn & Bacon.
179. Tabachnick, B. G., & Fidell, L. S. (2007). Using multivariate statistics. Boston: Pearson.
180. Tallon, P. P., Kraemer, K. L., & Gurbaxani, V. (2000). Executives' Perceptions of the Business Value of Information Technology: A Process-Oriented Approach. Journal of Management Information Systems, 16(4), 145-173.
181. Teng, B. S. (2003). Collaborative advantage of strategic alliances: value creation in the value net. Journal of General Management, 29(2), 1-22.
182. Teo, T. S. H., & Ang, J. S. K. (2001). An examination of major IS planning problems. International Journal of Information Management, 21(6), 457-470.
183. Thong, J. Y. L., Yap, C.-S., & Raman, K. S. (1996). Top management support, external expertise and information systems implementation in small businesses. Information Systems Research, 7(2), 248-267.
184. Tian, J., Wang, K., Chen, Y., & Johansson, B. (2010). From IT deployment capabilities to competitive advantage: An exploratory study in China. Information Systems Frontiers, 12(3), 239-255.
185. Todd, P. A., McKeen, J. D., & Gallupe, R. B. (1995). The evolution of IS job skills: A content analysis of IS job. MIS Quarterly, 19(1), 1-28.
186. Travica, B. (2005). Information view of organization. Journal of International Technology and Information Management, 14(3), 1-20.
187. Tuten, T. L., & Urban, D. J. (2001). An expanded model of business-to-business partnership formation and success. Industrial Marketing Management, 30(2), 149-164.
188. Velcu, O. (2010). Strategic alignment of ERP implementation stages: An empirical investigation. Information & Management, 47(3), 158-166.

189. Venkatraman, N., & Loh, L. (1994). The shifting logic of the IS organization: From technical portfolio to relationship portfolio. Information Strategy, 10(2), 5-11.
190. Vitalari, N. P. (1985). Knowledge as a Basis for Expertise in Systems Analysis: An Empirical Study. MIS Quarterly, 9(3), 221-241.
191. Wade, M., R. , & Parent, M. (2001). Relationships between job skills and performance: A study of webmasters. Journal of Management Information Systems, 18(3), 71-96.
192. Wagner, H. T., & Weitzel, T. (2007). Towards an IT production function: Understanding routines as fundamental for IT value creation. Journal of Enterprise Information Management, 20(4), 380-395.
193. Ward, J. (2012). Information systems strategy: Quo vadis? The Journal of Strategic Information Systems, In Press.
194. Ward, J., & Griffiths, P. (1996). Strategic planning for information systems (2nd ed.). Chicester: John Wiley and Sons.
195. Ward, J., & Peppard, J. (1996). Reconciling the IT/business relationship: a troubled marriage in need of guidance. The Journal of Strategic Information Systems, 5(1), 37-65.
196. Ward, M. A., & Mitchell, S. (2004). A comparison of the strategic priorities of public and private sector information resource management executives. Government Information Quarterly, 21(3), 284-304.
197. Wateridge, J. (1998). How can IS/IT projects be measured for success? International Journal of Project Management, 16(1), 59-63.
198. Watson, H. J., Young, D., Miranda, S., Robichaux, B., & Seerley, R. (1990). Requisite skills for new MIS hires. SIGMIS Database, 21(1), 20-29.
199. Watts, S., & Henderson, J. C. (2006). Innovative IT climates: CIO perspectives. The Journal of Strategic Information Systems, 15(2), 125-151.
200. Wayment, H. A., & Cordova, A. (2003). Mental Models of Attachment, Social Strain, and Distress Following a Collective Loss: A Structural Modeling Analysis. Current Research in Social Psychology, 9(2), 18-32.
201. Thomson Reuters. Web of Knowledge. 2012, from http://apps.webofknowledge.com/
202. Weill, P., & Ross, J. (2005). A Matrixed Approach to Designing IT Governance. MIT Sloan Management Review, 46(2), 26-34.
203. Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. F. (1977). Assessing reliability and stability in panel models. Sociological methodology, 8(1), 84-136.
204. Wilcoxon, F. (1945). Individual comparisons by ranking methods. Biometrics Bulletin, 1(6), 80-83.
205. Willcoxson, L., & Chatham, R. (2006). Testing the accuracy of the IT stereotype: Profiling IT managers' personality and behavioural characteristics. Information & Management, 43(6), 697-705.
206. Wu, J.-H., Chen, Y.-C., & Chang, J. (2007). Critical IS professional activities and skills/knowledge: A perspective of IS managers. Computers in Human Behavior, 23(6), 2945-2965.

207. Yen, D. C., Chen, H.-G., Lee, S., & Koh, S. (2003). Differences in perception of IS knowledge and skills between academia and industry: findings from Taiwan. International Journal of Information Management, 23(6), 507-522.
208. Yi, M. Y., Jackson, J. D., Park, J. S., & Probst, J. C. (2006). Understanding information technology acceptance by individual professionals: Toward an integrative view. Information & Management, 43(3), 350-363.
209. Young, R., & Jordan, E. (2008). Top management support: Mantra or necessity? International Journal of Project Management, 26(7), 713-725.
210. Zakon o gospodarskih družbah. U. l. RS št. 42/2006, 60/2006 popr., št. 26/2007-ZSDU-B, 33/2007-ZSReg-B, 67/2007-ZTFI (100/2007 popr.), 10/2008, 68/2008, 23/2009 Odl.US: U-I-268/06-35, 42/2009, 65/2009-UPB3, 83/2009 Odl.US: U-I-165/08-10, Up-1772/08-14, Up-379/09-8, 33/2011, 91/2011, 100/2011 Skl.US: U-I-311/11-5, 32/2012

APPENDICES

LIST OF APPENDICES

Appendix A: Questionnaire for IT managers (in Slovenian) 1
Appendix B: Questionnaire for top management (in Slovenian) 5
Appendix C: Simplis input for the top management support model 9
Appendix D: Parameter specification for the top management support model 10
Appendix E: LISREL output for the top management support model 11
Appendix F: Goodness of Fit Statistics for the top management support model 13
Appendix G: Missing data - the dataset for the partnership model 14
Appendix H: Exploratory factor analysis for the partnership model 16
Appendix I: Simplis input for the original partnership model 18
Appendix J: Covariance matrix for the partnership analysis 19
Appendix K: Parameter specification for the partnership model – the original model 20
Appendix L: Measurement part of the original partnership model 22
Appendix M: LISREL output for the partnership model – the original model 23
Appendix N: Goodness of Fit Statistics for the partnership model – the original model 27
Appendix O: Simplis input for the modified partnership model 28
Appendix P: LISREL output for the modified partnership model 29
Appendix Q: Goodness of Fit Statistics for the modified partnership model 33

Appendix A: Questionnaire for IT managers (in Slovenian)

RAZISKAVA MED INFORMATIKI

ODNOS INFORMATIKI – MANAGEMENT

OSNOVNE INFORMACIJE

NAZIV PODJETJA:	_____	**MATIČNA ŠT.:**	_____
ALI STE JAVNA ORGANIZACIJA:	○ da ○ ne	**LASTNIŠTVO:**	○ v večinski državni lasti (več kot 50%) ○ v manjšinski državni lasti ○ država neposredno ni lastnik ○ tuje lastništvo
ANKETIRANEC:	_____	**DELOVNO MESTO:**	_____
E-POŠTA:	_____	**TELEFON:**	_____

METODOLOŠKA POJASNILA (SPLOŠNO)
○ = možen 1 odgovor ☐ = možnih več odgovorov

A	POLOŽAJ INFORMATIKOV V PODJETJU (ORGANIZACIJI)	
1.	Kakšen je položaj najvišje rangiranega zaposlenega odgovornega za informatiko?	○ član najvišjega vodstva podjetja (uprave) ○ neposredno podrejen najvišjemu vodstvu ○ posredno podrejen najvišjemu vodstvu
2.	Kako so organizirani informatiki v vašem (organizaciji)?	○ imamo posebno organizacijsko enoto ○ informatika je del organizacijske enote (npr. službe za informatiko in organizacijo) ○ za področje informatike so zadolženi posamezniki ○ za področje informatike ni nihče formalno zadolžen

Pri vsaki trditvi obkrožite oceno, ki najbolj ustreza stanju v vašem podjetju (organizaciji).		1 = sploh se ne strinjam 7 = popolnoma se strinjam X = ne vem
1.	Informatiki omogočajo izvajanje boljših in kvalitetnejših storitev	1 2 3 4 5 6 7 X
2.	Informatiki omogočajo poslovanje z nižjimi stroški	1 2 3 4 5 6 7 X
3.	Informatiki omogočajo uspešno poslovanje (večji tržni delež, prodajo in dobičkonosnost)	1 2 3 4 5 6 7 X
4.	Informatiki omogočajo konkurenčne prednosti	1 2 3 4 5 6 7 X
5.	Vodstvo se zaveda pomembnosti informatike.	1 2 3 4 5 6 7 X
6.	Vodstvo se aktivno vključuje v načrtovanje informatike.	1 2 3 4 5 6 7 X
7.	Vodstvo ima dovolj znanja s področja informatike.	1 2 3 4 5 6 7 X
8.	Vodstvo zagotavlja zadostna sredstva za izvajanje informacijskih projektov.	1 2 3 4 5 6 7 X
9.	Vodstvo podpira pobude informatikov v podjetju.	1 2 3 4 5 6 7 X
10.	Vodstvo priznava zasluge informatikom za razvoj podjetja.	1 2 3 4 5 6 7 X
11.	Informatiki smo samostojni pri sprejemanju svojih odločitev.	1 2 3 4 5 6 7 X
12.	Vodstvo podjetja se na informatike lahko zanese.	1 2 3 4 5 6 7 X
13.	Vodstvo podjetja spoštuje delo informatikov.	1 2 3 4 5 6 7 X
14.	Vodstvo podjetja zaupa informatikom, da bodo svoje obveznosti kvalitetno opravili.	1 2 3 4 5 6 7 X
15.	Med vodstvom podjetja in informatiki obstaja medsebojno zaupanje.	1 2 3 4 5 6 7 X
16.	Informatiki sodelujejo pri razvoju podjetja.	1 2 3 4 5 6 7 X
17.	Cilji informatike so usklajeni s cilji podjetja	1 2 3 4 5 6 7 X
18.	Vodstvo podjetja je pripravljeno dolgoročno sodelovati z obstoječimi informatiki (vodjo informatike).	1 2 3 4 5 6 7 X
19.	Vodstvo podjetja si prizadeva za dober medsebojni odnos z informatiki (vodjo informatikov).	1 2 3 4 5 6 7 X
20.	Komunikacija vodstva z informatiki (vodjo informatikov) je odkrita in poštena.	1 2 3 4 5 6 7 X
21.	Vodja informatike sodeluje pri oblikovanju poslovne strategije.	1 2 3 4 5 6 7 X

B	ZNANJA INFORMATIKOV		
Ocenite pomembnost in kakovost znanj oziroma veščin direktorja informatike (oziroma osebe zadolžene za področje informatike) v vašem podjetju (organizaciji) z naslednjih področij. POMEMBNOST – KAKO POMEMBNO JE, DA IMA DIREKTOR INFORMATIKE TA ZNANJA OZ. VEŠČINE KAKOVOST – KAKŠEN JE NIVO TEH ZNANJ OZ. VEŠČIN		Pomembnost 1 = popolnoma nepomembno 7 = najbolj pomembno X = ne vem	Kakovost 1 = nezadostna 7 = odlična X = ne vem
1.	Programiranje	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
2.	Operacijski sistemi	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
3.	Baze podatkov	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
4.	Telekomunikacije in omrežja	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
5.	Informacijske rešitve (npr. ERP) na trgu	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
6.	Modeli za kakovost in revidiranje informacijskih sistemov (npr. ITIL, COBIT)	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
7.	Planiranje in organiziranje	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
8.	Motiviranja	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
9.	Projektni management	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
10.	Timsko delo	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
11.	Komuniciranje in koordiniranje	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
12.	Poznavanje poslovnih procesov organizacije	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
13.	Poznavanje relevantne zakonodaje	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
14.	Obvladovanje tveganja	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
15.	Poznavanje posameznih funkcijskih področij (finance, trženje, proizvodnja…)	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
16.	Poznavanje poslovanja konkurenčnih podjetij	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X
17.	Drugo: _____	1 2 3 4 5 6 7 X	1 2 3 4 5 6 7 X

C	VLOGA INFORMATIKOV	
Pri vsaki trditvi obkrožite oceno, ki najbolj ustreza stanju v vašem podjetju. Vloga informatikov je…		1 = sploh se ne strinjam 7 = popolnoma se strinjam X = ne vem
1.	vzpostavljanje in/ali zagotavljanje delovanja ustrezne infrastrukture (strojne in programske opreme).	1 2 3 4 5 6 7 X
2.	nudenje podpore uporabnikom (izobraževanje, pomoč in svetovanje pri uporabi orodij in informacijskih rešitev, pridobivanju podatkov, odpravljanje napak v delovanju…).	1 2 3 4 5 6 7 X
3.	skrb za varnost informacijskega sistema.	1 2 3 4 5 6 7 X
4.	razvijanje in/ali integriranje informacijskih rešitev (lasten razvoj).	1 2 3 4 5 6 7 X
5.	sodelovanje z zunanjimi izvajalci.	1 2 3 4 5 6 7 X
6.	ugotavljanje informacijskih potreb podjetja	1 2 3 4 5 6 7 X
7.	formuliranje informacijske arhitekture.	1 2 3 4 5 6 7 X
8.	skrb za pravočasno zaključevanje informacijskih projektov (v predvidenih časovnih okvirih)	1 2 3 4 5 6 7 X
9.	skrb za ustrezno organiziranost in/ali kakovost (zagotavljanje ustreznih znanj, standardov, meril za kakovost…) na področju informatike.	1 2 3 4 5 6 7 X
10.	zagotavljanje izvajanja informacijskih projektov v stroškovno določenih okvirih.	1 2 3 4 5 6 7 X
11.	izboljševanje in prenavljanje poslovnih procesov.	1 2 3 4 5 6 7 X
12.	strateško načrtovanje informatike.	1 2 3 4 5 6 7 X
13.	izvajanje kontrol nadzora uspešnosti poteka informacijskih projektov (omogočanje pravočasnega odkrivanja napak)	1 2 3 4 5 6 7 X
14.	Drugo: _____	1 2 3 4 5 6 7 X

Appendix B: Questionnaire for top management (in Slovenian)

RAZISKAVA MED VODILNIM MANAGEMENTOM

ODNOS MANAGEMENT – INFORMATIKI

OSNOVNE INFORMACIJE

NAZIV PODJETJA: _____ **MATIČNA ŠT.:** _____	
ALI STE JAVNA ORGANIZACIJA:	○ da ○ ne

ALI STE USTANOVITELJ PODJETJA:	○ da ○ ne
ALI STE TRENUTNO DELNIČAR PODJETJA (ne glede na višino deleža)	○ da ○ ne

ANKETIRANEC:	_____
E-POŠTA (neobvezno):	_____

METODOLOŠKA POJASNILA (SPLOŠNO)
○ = možen 1 odgovor ☐ = možnih več odgovorov

A	POLOŽAJ INFORMATIKOV V PODJETJU (ORGANIZACIJI)	
Pri vsaki trditvi obkrožite oceno, ki najbolj ustreza stanju v vašem podjetju (organizaciji).Večina vprašanj se nanaša na informatike v splošnem, določena vprašanja pa se nanašajo bolj na vodjo informatike.		1 = sploh se ne strinjam 7 = popolnoma se strinjam X = ne vem
1.	Zavedam se pomembnosti informatike.	1 2 3 4 5 6 7 X
2.	Aktivno se vključujem v načrtovanje informatike.	1 2 3 4 5 6 7 X
3.	Imam dovolj znanja s področja informatike.	1 2 3 4 5 6 7 X
4.	Zagotavljam (kot podjetje) zadostna sredstva za izvajanje informacijskih projektov.	1 2 3 4 5 6 7 X
5.	Podpiram pobude informatikov v podjetju.	1 2 3 4 5 6 7 X
6.	Priznavam zasluge informatikom za razvoj podjetja.	1 2 3 4 5 6 7 X
7.	Informatiki nam omogočajo izvajanje boljših in kvalitetnejših storitev	1 2 3 4 5 6 7 X
8.	Informatiki nam omogočajo poslovanje z nižjimi stroški	1 2 3 4 5 6 7 X
9.	Informatiki nam omogočajo uspešno poslovanje (večji tržni delež, prodajo in dobičkonosnost)	1 2 3 4 5 6 7 X
10.	Informatiki nam omogočajo konkurenčne prednosti	1 2 3 4 5 6 7 X
11.	Informatiki so samostojni pri sprejemanju svojih odločitev.	1 2 3 4 5 6 7 X
12.	Na informatike se lahko zanesem.	1 2 3 4 5 6 7 X
13.	Delo informatikov spoštujem.	1 2 3 4 5 6 7 X
14.	Zaupam informatikom, da bodo svoje obveznosti kvalitetno opravili.	1 2 3 4 5 6 7 X
15.	Med vodstvom podjetja in informatiki obstaja medsebojno zaupanje.	1 2 3 4 5 6 7 X
16.	Informatiki sodelujejo pri razvoju podjetja.	1 2 3 4 5 6 7 X
17.	Cilji informatike so usklajeni s cilji podjetja	1 2 3 4 5 6 7 X
18.	Z obstoječimi informatiki (vodjo informatike) bi dolgoročno sodeloval.	1 2 3 4 5 6 7 X
19.	Prizadevam si za dober medsebojni odnos z informatiki (vodjo informatike).	1 2 3 4 5 6 7 X
20.	Komunikacija z informatiki (vodjo informatike) je odkrita in poštena.	1 2 3 4 5 6 7 X
21.	Vodja informatike sodeluje pri oblikovanju poslovne strategije.	1 2 3 4 5 6 7 X

B	ZNANJA DIREKTORJA INFORMATIKE	
Ocenite, kako pomembno je po vašem mnenju, da ima direktor informatike (oziroma najvišje rangirani informatik) v vašem podjetju (organizaciji) znanja in veščine z naslednjih področij:V kolikor te osebe nimate, ocenite katera znanja bi od te osebe pričakovali, če bi jo imeli.		**Pomembnost** 1 = popolnoma nepomembno 7 = najbolj pomembno X = ne vem **POMEMBNOST** – KAKO POMEMBNO JE PO VAŠEM MNENJU, DA IMA DIREKTOR INFORMATIKE NAVEDENA ZNANJA OZ. VEŠČINE
1.	Programiranje	1 2 3 4 5 6 7 X
2.	Operacijski sistemi	1 2 3 4 5 6 7 X
3.	Baze podatkov	1 2 3 4 5 6 7 X
4.	Telekomunikacije in omrežja	1 2 3 4 5 6 7 X
5.	Informacijske rešitve (npr. ERP) na trgu	1 2 3 4 5 6 7 X
6.	Modeli za kakovost in revidiranje informacijskih sistemov (npr. ITIL, COBIT)	1 2 3 4 5 6 7 X
7.	Planiranje in organiziranje	1 2 3 4 5 6 7 X
8.	Motiviranja	1 2 3 4 5 6 7 X
9.	Projektni management	1 2 3 4 5 6 7 X
10.	Timsko delo	1 2 3 4 5 6 7 X
11.	Komuniciranje in koordiniranje	1 2 3 4 5 6 7 X
12.	Poznavanje poslovnih procesov organizacije	1 2 3 4 5 6 7 X
13.	Poznavanje relevantne zakonodaje	1 2 3 4 5 6 7 X
14.	Obvladovanje tveganja	1 2 3 4 5 6 7 X
15.	Poznavanje posameznih funkcijskih področij (finance, trženje, proizvodnja…)	1 2 3 4 5 6 7 X
16.	Poznavanje poslovanja konkurenčnih podjetij	1 2 3 4 5 6 7 X

C	VLOGA INFORMATIKOV	
Vloga informatikov bi po vašem mnenju morala biti predvsem…		1 = sploh se ne strinjam 7 = popolnoma se strinjam X = ne vem
1.	vzpostavljanje in/ali zagotavljanje delovanja ustrezne infrastrukture (strojne in programske opreme).	1 2 3 4 5 6 7 X
2.	nudenje podpore uporabnikom (izobraževanje, pomoč in svetovanje pri uporabi orodij in informacijskih rešitev, pridobivanju podatkov, odpravljanje napak v delovanju…).	1 2 3 4 5 6 7 X
3.	skrb za varnost informacijskega sistema.	1 2 3 4 5 6 7 X
4.	razvijanje in/ali integriranje informacijskih rešitev (lasten razvoj).	1 2 3 4 5 6 7 X
5.	sodelovanje z zunanjimi izvajalci.	1 2 3 4 5 6 7 X
6.	ugotavljanje informacijskih potreb podjetja	1 2 3 4 5 6 7 X
7.	formuliranje informacijske arhitekture.	1 2 3 4 5 6 7 X
8.	skrb za pravočasno zaključevanje informacijskih projektov (v predvidenih časovnih okvirih)	1 2 3 4 5 6 7 X
9.	skrb za ustrezno organiziranost in/ali kakovost (zagotavljanje ustreznih znanj, standardov, meril za kakovost…) na področju informatike.	1 2 3 4 5 6 7 X
10.	zagotavljanje izvajanja informacijskih projektov v stroškovno določenih okvirih.	1 2 3 4 5 6 7 X
11.	izboljševanje in prenavljanje poslovnih procesov.	1 2 3 4 5 6 7 X
12.	strateško načrtovanje informatike.	1 2 3 4 5 6 7 X
13.	izvajanje kontrol nadzora uspešnosti poteka informacijskih projektov (omogočanje pravočasnega odkrivanja napak)	1 2 3 4 5 6 7 X

Appendix C: Simplis input for the top management support model

```
Sample Size = 129
Latent Variables supMAN bmKNL busRO
Relationships
manIMP = 1.00*supMAN
manPART = supMAN
manSUP = supMAN
manKNL = supMAN
impMAN = bmKNL
impBUS = bmKNL
qMAN = bmKNL
qBUS = bmKNL
roNDS = busRO
roQ = busRO
roPROC = busRO
roSTR = busRO
supMAN = bmKNL busRO
Lisrel output: SS SC
Options: ND=3
Path Diagram
End of Problem
```

Appendix D: Parameter specification for the top management support model

LAMBDA-Y

	supMAN
manIMP	0
manPART	1
manSUP	2
manKNL	3

LAMBDA-X

	bmKNL	busRO
impMAN	4	0
impBUS	5	0
qMAN	6	0
qBUS	7	0
roNDS	0	8
roQ	0	9
roPROC	0	10
roSTR	0	11

GAMMA

	bmKNL	busRO
supMAN	12	13

PHI

	bmKNL	busRO
bmKNL	0	
busRO	14	0

PSI

supMAN
15

THETA-EPS

manIMP	manPART	manSUP	manKNL
16	17	18	19

THETA-DELTA

impMAN	impBUS	qMAN	qBUS	roNDS	roQ	roPROC	roSTR
20	21	22	23	24	25	26	27

Appendix E: LISREL output for the top management support model

Standardised Solution

LAMBDA-Y

	supMAN
manIMP	0.622
manPART	0.719
manSUP	0.668
manKNL	0.725

LAMBDA-X

	bmKNL	busRO
impMAN	0.526	- -
impBUS	0.609	- -
qMAN	0.433	- -
qBUS	0.506	- -
roNDS	- -	0.679
roQ	- -	0.758
roPROC	- -	0.764
roSTR	- -	0.851

GAMMA

	bmKNL	busRO
supMAN	0.480	0.213

Correlation Matrix of ETA and KSI

	supMAN	bmKNL	busRO
supMAN	1.000		
bmKNL	0.561	1.000	
busRO	0.396	0.381	1.000

PSI

supMAN
0.646

Regression Matrix ETA on KSI (Standardised)

	bmKNL	busRO
supMAN	0.480	0.213

Completely Standardised Solution

LAMBDA-Y

	supMAN
manIMP	0.768
manPART	0.726
manSUP	0.788
manKNL	0.682

LAMBDA-X

	bmKNL	busRO
impMAN	0.685	- -
impBUS	0.693	- -
qMAN	0.580	- -
qBUS	0.661	- -
roNDS	- -	0.784
roQ	- -	0.777
roPROC	- -	0.793
roSTR	- -	0.815

GAMMA

	bmKNL	busRO
supMAN	0.480	0.213

Correlation Matrix of ETA and KSI

	supMAN	bmKNL	busRO
supMAN	1.000		
bmKNL	0.561	1.000	
busRO	0.396	0.381	1.000

PSI

supMAN
0.646

THETA-EPS

manIMP	manPART	manSUP	manKNL
0.410	0.473	0.379	0.535

THETA-DELTA

impMAN	impBUS	qMAN	qBUS	roNDS	roQ	roPROC	roSTR
0.531	0.520	0.664	0.564	0.386	0.396	0.372	0.336

Regression Matrix ETA on KSI (Standardised)

	bmKNL	busRO
supMAN	0.480	0.213

Appendix F: Goodness of Fit Statistics for the top management support model

Degrees of Freedom = 51
Minimum Fit Function Chi-Square = 112.664 (P = 0.000)
Normal Theory Weighted Least Squares Chi-Square = 97.047 (P = 0.000108)
Estimated Non-centrality Parameter (NCP) = 46.047
90 Percent Confidence Interval for NCP = (22.046 ; 77.854)

Minimum Fit Function Value = 0.880
Population Discrepancy Function Value (F0) = 0.360
90 Percent Confidence Interval for F0 = (0.172 ; 0.608)
Root Mean Square Error of Approximation (RMSEA) = 0.0840
90 Percent Confidence Interval for RMSEA = (0.0581 ; 0.109)
P-Value for Test of Close Fit (RMSEA S 0.05) = 0.0181

Expected Cross-Validation Index (ECVI) = 1.180
90 Percent Confidence Interval for ECVI = (0.993 ; 1.429)
ECVI for Saturated Model = 1.219
ECVI for Independence Model = 8.453

Chi-Square for Independence Model with 66 Degrees of Freedom = 1057.940
Independence AIC = 1081.940
Model AIC = 151.047
Saturated AIC = 156.000
Independence CAIC = 1128.257
Model CAIC = 255.262
Saturated CAIC = 457.065
Normed Fit Index (NFI) = 0.894
Non-Normed Fit Index (NNFI) = 0.920
Parsimony Normed Fit Index (PNFI) = 0.690
Comparative Fit Index (CFI) = 0.938
Incremental Fit Index (IFI) = 0.939
Relative Fit Index (RFI) = 0.862

Critical N (CN) = 88.926

Root Mean Square Residual (RMR) = 0.0486
Standardised RMR = 0.0606
Goodness of Fit Index (GFI) = 0.888
Adjusted Goodness of Fit Index (AGFI) = 0.828
Parsimony Goodness of Fit Index (PGFI) = 0.58

Appendix G: Missing data - the dataset for the partnership model

	N	Missing		No. of Extremes	
		Count	Percent	Low	High
imp1	215	6	2.7	2	0
imp2	218	3	1.4	11	0
imp3	216	5	2.3	2	0
imp4	216	5	2.3	22	0
part1	214	7	3.2	3	0
part2	216	5	2.3	4	0
part3	216	5	2.3	1	0
part4	216	5	2.3	13	0
part5	215	6	2.7	1	0
part6	214	7	3.2	2	0
part7	214	7	3.2	0	0
part8	216	5	2.3	5	0
part9	219	2	.9	21	0
part10	219	2	.9	8	0
part11	219	2	.9	0	0
knl1	218	3	1.4	0	0
knl2	218	3	1.4	0	0
knl3	217	4	1.8	6	0
knl4	218	3	1.4	3	0
knl5	217	4	1.8	4	0
knl6	215	6	2.7	21	15
knl7	217	4	1.8	18	0
knl8	217	4	1.8	1	0
knl9	217	4	1.8	3	0
knl10	218	3	1.4	14	0
knl11	218	3	1.4	5	0
knl12	217	4	1.8	5	0
knl13	218	3	1.4	11	0
knl14	218	3	1.4	17	0
knl15	217	4	1.8	18	0
knl16	217	4	1.8	3	0
role1	219	2	.9	19	0
role2	220	1	.5	20	0
role3	221	0	.0	17	0
role4	218	3	1.4	0	0
role5	221	0	.0	20	0

	N	Missing		No. of Extremes	
		Count	Percent	Low	High
role6	220	1	.5	2	0
role7	219	2	.9	8	0
role8	219	2	.9	3	0
role9	220	1	.5	20	0
role10	218	3	1.4	5	0
role11	220	1	.5	9	0
role12	220	1	.5	6	0
role13	220	1	.5	8	0

Appendix H: Exploratory factor analysis for the partnership model

Rotated component matrix:

Label	Short description (in Slovenian)	Component							
		1	2	3	4	5	6	7	8
imp1	Informatiki omogočajo izvajanje boljših in kvalitetnejših storitev	.367	.112	.179	-.020	.186	.665	.033	-.014
imp2	Informatiki omogočajo poslovanje z nižjimi stroški	.212	.178	.160	.037	.030	.709	.233	.057
imp3	Informatiki omogočajo uspešno poslovanje (večji tržni delež, prodajo in dobičkonosnost)	.289	.164	.147	-.033	-.074	.784	.073	.016
imp4	Informatiki omogočajo konkurenčne prednosti	.328	.224	.207	.035	.008	.780	.102	.021
part1	Informatiki smo samostojni pri sprejemanju svojih odločitev.	.718	.296	.252	.016	-.131	.147	-.031	-.101
part2	Vodstvo podjetja se na informatike lahko zanese.	.573	.280	.319	-.037	-.027	.181	.081	-.079
part3	Vodstvo podjetja spoštuje delo informatikov.	.894	.125	.150	-.022	.055	.065	.144	-.056
part4	Vodstvo podjetja zaupa informatikom, da bodo svoje obveznosti kvalitetno opravili.	.839	.130	.164	-.022	.019	.076	.144	-.057
part5	Med vodstvom podjetja in informatiki obstaja medsebojno zaupanje.	.831	.198	.189	-.083	.033	.085	.208	-.098
part6	Informatiki sodelujejo pri razvoju podjetja.	.780	.111	.240	-.099	-.067	.272	.055	.057
part7	Cilji informatike so usklajeni s cilji podjetja	.725	.114	.171	-.135	-.037	.265	.207	.097
part8	Vodstvo podjetja je pripravljeno dolgoročno sodelovati z obstoječimi informatiki (vodjo informatike).	.843	.125	.052	-.101	-.025	.153	.124	.025
part9	Vodstvo podjetja si prizadeva za dober medsebojni odnos z informatiki (vodjo informatikov).	.890	.141	.082	-.108	.003	.101	.096	.033
part10	Komunikacija vodstva z informatiki (vodjo informatikov) je odkrita in poštena.	.844	.177	.072	-.151	-.007	.119	.114	-.017
part11	Vodja informatike sodeluje pri oblikovanju poslovne strategije.	.711	.045	.180	-.090	-.153	.206	.013	.125
knl1	Programiranje	-.239	-.241	.050	.633	-.002	-.081	-.085	.341
knl2	Operacijski sistemi	-.121	-.116	-.029	.826	.236	-.060	-.039	-.085
knl3	Baze podatkov	-.123	-.122	-.048	.867	.026	.031	.044	.133
knl4	Telekomunikacije in omrežja	-.096	.019	-.107	.841	.057	.059	.063	-.033
knl5	Informacijske rešitve (npr. ERP) na trgu	.076	.248	.018	.320	.231	.100	.369	.417
knl6	Modeli za kakovost in revidiranje informacijskih sistemov (npr. ITIL, COBIT)	.064	.374	.132	-.030	-.026	.005	.301	.662
knl7	Planiranje in organiziranje	.223	.719	.129	-.068	.039	.089	.199	.166
knl8	Motiviranja	.190	.724	.090	-.091	.028	.255	.160	.032
knl9	Projektni management	.214	.791	.083	-.120	-.003	.128	.167	.079
knl10	Timsko delo	.144	.784	.181	.044	-.072	.183	.064	.097
knl11	Komuniciranje in koordiniranje	.197	.791	.178	-.143	.055	.024	.166	-.072
knl12	Poznavanje poslovnih procesov organizacije	.284	.530	.090	-.072	.003	.032	.370	-.092
knl13	Poznavanje relevantne zakonodaje	.204	.217	.002	.045	.081	.084	.723	-.046
knl14	Obvladovanje tveganja	.170	.373	.229	-.147	.037	.106	.577	-.024
knl15	Poznavanje posameznih funkcijskih področij (finance, trženje, proizvodnja…)	.106	.231	.263	.074	.056	.131	.673	-.043
knl16	Poznavanje poslovanja konkurenčnih podjetij	.259	.216	.098	.006	-.210	.154	.615	.235

Label	Short description (in Slovenian)	Component							
		1	2	3	4	5	6	7	8
role1	vzpostavljanje in/ali zagotavljanje delovanja ustrezne infrastrukture (strojne in programske opreme).	-.085	-.056	.040	.089	.870	.039	-.044	.134
role2	nudenje podpore uporabnikom (izobraževanje, pomoč in svetovanje pri uporabi orodij in informacijskih rešitev, pridobivanju podatkov, odpravljanje napak v delovanju…).	.004	.118	.037	.034	.832	.072	.033	.051
role3	skrb za varnost informacijskega sistema.	-.151	-.031	.204	.066	.819	-.043	-.064	.195
role4	razvijanje in/ali integriranje informacijskih rešitev (lasten razvoj).	-.062	-.085	.200	.180	.317	.088	-.230	.634
role5	sodelovanje z zunanjimi izvajalci.	.095	-.022	.145	.146	.520	-.015	.267	-.230
role6	ugotavljanje informacijskih potreb podjetja	-.031	.221	.608	.139	.259	.067	-.189	.111
role7	formuliranje informacijske arhitekture.	-.094	.023	.512	.134	.308	-.061	-.145	.433
role8	skrb za pravočasno zaključevanje informacijskih projektov (v predvidenih časovnih okvirih)	.262	.071	.686	-.157	.047	.099	.288	.006
role9	skrb za ustrezno organiziranost in/ali kakovost (zagotavljanje ustreznih znanj, standardov, meril za kakovost…) na področju informatike.	.275	.187	.654	-.132	.202	.100	.161	.062
role10	zagotavljanje izvajanja informacijskih projektov v stroškovno določenih okvirih.	.330	.108	.719	.037	.100	.169	.089	-.037
role11	izboljševanje in prenavljanje poslovnih procesov.	.210	.024	.627	-.019	-.106	.233	.292	.113
role12	strateško načrtovanje informatike.	.382	.223	.664	-.062	-.019	.147	.089	.010
role13	izvajanje kontrol nadzora uspešnosti poteka informacijskih projektov (omogočanje pravočasnega odkrivanja napak)	.318	.136	.763	-.137	.061	.130	.103	.115

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalisation.
Rotation converged in 8 iterations.

Appendix I: Simplis input for the original partnership model

```
!SEM original model
Observed Variables: knl7 knl8 knl9 knl10 knl11 knl12 knl13 knl14 knl15 knl16
role6 role7 role8 role9 role10 role11 role12 role13
imp1 imp2 imp3 imp4 part1 part2 part3 part4 part5 part6 part7 part8 part9 part10 part11
knl1 knl2 knl3 knl4 knl5 knl6 role1 role2 role3 role4 role5

Covariance Matrix from File 'C:\Users\anton.manfreda\Desktop\Doktorska
disertacija\Analiza\SEM_original\Partnership.cov'
Sample Size: 206

Latent Variables:  MANknl BUSknl BUSori ValIS PART TECknl TECori

Relationships:
BUSori = BUSknl MANknl
TECori = TECknl
PART =  ValIS BUSori TECori

part1 = PART
part2 = PART
part3 = 1*PART
part4-part11 = PART

imp1-imp3 = ValIS
imp4 = 1*ValIS

knl1 = TECknl
knl2 = TECknl
knl3 = 1*TECknl
knl4 = TECknl

knl7 = MANknl
knl8 = MANknl
knl9 = 1*MANknl
knl10-knl12 = MANknl

knl13 = BUSknl
knl14 = 1*BUSknl
knl15 = BUSknl
knl16 = BUSknl

role1 = 1*TECori
role2-role5 = TECori

role6-role12 = BUSori
role13 = 1*BUSori

Lisrel output: SS SC
Options: ND=3
Path Diagram
End of Problem
```

Appendix J: Covariance matrix for the partnership analysis

	knl7	knl8	knl9	knl10	knl11	knl12	knl13	knl14	knl15	knl16	role6	role7	role8	role9	role10	role11	role12	role13	imp1	imp2	imp3	imp4	part1	part2	part3	part4	part5	part6	part7	part8	part9	part10	part11	knl1	knl2	knl3	knl4	knl5	knl6	role1	role2	role3	role4	role5
knl7	.937																																										
knl8	.693	1.107																																										
knl9	.678	.710	1.209																																									
knl10	.527	.626	.685	.947																																								
knl11	.488	.521	.644	.543	.728																																							
knl12	.395	.350	.478	.386	.405	.634																																						
knl13	.341	.386	.376	.330	.336	.417	1.229																																						
knl14	.459	.601	.618	.534	.563	.365	.786	1.671																																				
knl15	.424	.442	.453	.327	.328	.402	.549	.697	1.308																																			
knl16	.434	.445	.527	.353	.339	.361	.613	.635	.658	1.380																																		
role6	.215	.187	.207	.212	.242	.050	-.019	.176	.146	.078	1.189																																		
role7	.083	.010	.072	.112	.036	-.071	-.133	.154	.102	-.064	.755	1.884																																	
role8	.312	.297	.359	.282	.309	.316	.340	.597	.402	.391	.377	.366	1.288																																
role9	.463	.473	.459	.383	.413	.217	.354	.647	.496	.406	.520	.463	.874	1.748																															
role10	.302	.289	.353	.357	.286	.208	.202	.527	.463	.296	.542	.551	.833	.930	1.401																														
role11	.405	.322	.288	.384	.287	.339	.390	.572	.676	.569	.468	.370	.848	.842	.851	2.019																													
role12	.512	.535	.540	.474	.407	.312	.245	.712	.542	.517	.481	.467	.853	1.179	.925	1.001	1.908																												
role13	.439	.462	.403	.431	.356	.328	.316	.497	.480	.402	.586	.552	.986	1.142	.981	1.160	1.294	1.705																											
imp1	.298	.387	.278	.282	.248	.232	.208	.359	.262	.306	.240	.085	.435	.436	.465	.515	.588	.551	1.161																										
imp2	.390	.485	.374	.374	.236	.216	.355	.495	.458	.392	.150	.041	.380	.496	.483	.565	.580	.477	.627	1.256																									
imp3	.322	.459	.482	.420	.267	.258	.292	.345	.394	.490	.219	-.028	.388	.494	.535	.634	.584	.550	.748	.784	1.549																								
imp4	.351	.572	.559	.477	.328	.282	.403	.604	.403	.484	.319	.159	.495	.600	.628	.661	.743	.621	.865	.880	1.215	1.568																							
part1	.507	.650	.591	.525	.469	.403	.369	.532	.361	.528	.187	-.062	.534	.747	.754	.696	1.014	.874	.627	.554	.706	.787	1.994																					
part2	.346	.367	.470	.367	.351	.247	.264	.518	.335	.374	.202	.031	.472	.598	.542	.546	.780	.572	.441	.407	.520	.620	.896	1.036																				
part3	.429	.407	.488	.365	.356	.427	.447	.544	.443	.535	.098	-.056	.571	.714	.709	.647	.881	.732	.609	.427	.651	.690	1.349	.836	1.736																		
part4	.415	.369	.362	.330	.342	.359	.427	.441	.377	.445	.119	-.093	.541	.546	.563	.602	.777	.656	.565	.416	.557	.586	1.115	.727	1.296	1.360																	
part5	.483	.546	.578	.454	.451	.479	.555	.737	.516	.592	.148	-.107	.675	.774	.782	.726	.964	.816	.612	.556	.671	.780	1.341	.892	1.476	1.319	1.866																
part6	.444	.471	.509	.423	.364	.406	.387	.499	.305	.561	.162	.053	.695	.794	.759	.797	.941	.875	.678	.687	.772	.883	1.271	.744	1.341	1.035	1.347	1.799															
part7	.527	.459	.504	.388	.364	.396	.491	.595	.489	.629	.166	.040	.630	.688	.653	.783	.788	.728	.632	.689	.716	.835	1.121	.732	1.223	1.014	1.183	1.319	1.718														
part8	.405	.427	.523	.274	.336	.388	.389	.535	.350	.520	.061	-.059	.474	.524	.498	.536	.733	.665	.622	.425	.649	.747	1.139	.682	1.301	1.060	1.290	1.205	1.201	1.598													
part9	.429	.509	.495	.375	.377	.345	.407	.579	.383	.508	.090	-.080	.500	.639	.662	.554	.855	.708	.602	.539	.644	.704	1.241	.786	1.456	1.235	1.531	1.302	1.210	1.356	1.792												
part10	.449	.530	.587	.392	.435	.379	.440	.625	.384	.586	.083	-.142	.492	.666	.692	.581	.790	.698	.610	.548	.663	.740	1.279	.810	1.376	1.156	1.515	1.324	1.242	1.341	1.627	1.890											
part11	.415	.527	.529	.378	.413	.430	.310	.531	.274	.658	.132	-.058	.849	.874	.711	.744	1.178	.958	.769	.591	.911	1.020	1.409	.747	1.535	1.175	1.368	1.826	1.562	1.484	1.552	1.525	3.260										
knl1	-.390	-.449	-.592	-.258	-.448	-.298	-.232	-.699	-.139	-.197	.167	.486	-.324	-.326	-.280	-.095	-.458	-.235	-.251	-.203	-.398	-.378	-.615	-.376	-.651	-.503	-.819	-.634	-.619	-.659	-.758	-.838	-.599	2.881									
knl2	-.215	-.351	-.374	-.254	-.328	-.219	-.090	-.423	-.031	-.286	.160	.217	-.257	-.216	-.052	-.281	-.283	-.438	-.153	-.168	-.290	-.125	-.419	-.278	-.314	-.297	-.459	-.547	-.513	-.424	-.500	-.566	-.513	1.455	2.560								
knl3	-.229	-.266	-.345	-.093	-.281	-.163	.059	-.310	.063	-.016	.111	.333	-.331	-.335	-.125	-.068	-.325	-.308	-.059	-.006	-.109	-.039	-.262	-.248	-.298	-.258	-.424	-.409	-.394	-.391	-.405	-.470	-.389	1.543	1.584	2.172						
knl4	-.102	-.095	-.167	.050	-.172	-.142	.111	-.102	.043	-.012	.063	.180	-.312	-.259	-.065	-.162	-.213	-.367	-.084	.148	-.092	.019	-.168	-.195	-.202	-.212	-.267	-.201	-.283	-.220	-.298	-.377	-.420	.895	1.413	1.348	1.849					
knl5	.444	.298	.419	.326	.217	.185	.330	.464	.457	.425	.226	.367	.312	.278	.292	.320	.240	.254	.317	.330	.248	.378	.059	.211	.264	.208	.295	.189	.202	.209	.237	.152	.168	.221	.531	.496	.528	1.733					
knl6	.585	.558	.639	.514	.387	.205	.342	.668	.396	.632	.242	.486	.351	.638	.335	.440	.541	.511	.106	.389	.294	.383	.280	.301	.276	.224	.331	.239	.388	.274	.348	.334	.408	.143	-.299	.023	-.011	.883	2.048				
role1	.020	-.048	-.119	-.104	-.009	-.043	.019	-.104	.051	-.254	.315	.511	.024	.283	.067	-.039	.031	.123	.198	.047	-.103	-.041	-.304	-.084	-.070	-.086	-.136	-.163	-.152	-.178	-.187	-.188	-.357	.341	.581	.266	.227	.302	.052	1.526			
role2	.122	.126	.166	.095	.136	.044	.109	.187	.139	-.120	.255	.400	.109	.378	.188	.089	.113	.190	.204	.112	.038	.165	-.054	.052	.141	.012	.073	.019	.050	-.004	.023	.034	-.174	.024	.425	.106	.124	.366	.162	.977	1.306		
role3	.015	-.023	-.086	-.030	-.020	-.048	-.020	-.037	.064	-.242	.427	.615	.105	.372	.169	.029	.049	.244	.102	-.003	-.153	-.055	-.261	-.081	-.141	-.129	-.128	-.235	-.177	-.212	-.177	-.204	-.377	.368	.437	.201	.101	.331	.097	1.014	.732	1.173	
role4	-.024	-.117	-.114	.126	-.181	-.147	-.131	-.345	-.178	-.048	.638	1.296	.117	.196	.355	.289	.095	.405	.176	.128	.057	.093	-.154	-.119	-.239	-.116	-.327	.047	-.099	-.281	-.161	-.363	-.031	1.212	.447	.690	.306	.442	.429	.907	.591	.901	3.616	
role5	.034	.143	.077	-.029	.065	.073	.241	.149	.239	.127	.256	.293	.226	.219	.297	-.008	.145	.171	.153	.138	.050	.099	.063	.091	.231	.170	.210	.104	.119	.095	.124	.113	.080	.006	.214	.124	.206	.248	.007	.369	.403	.336	.062	1.077

Appendix K: Parameter specification for the partnership model – the original model

LAMBDA-Y

	BUSori	PART	TECori
role6	1	0	0
role7	2	0	0
role8	3	0	0
role9	4	0	0
role10	5	0	0
role11	6	0	0
role12	7	0	0
role13	0	0	0
part1	0	8	0
part2	0	9	0
part3	0	0	0
part4	0	10	0
part5	0	11	0
part6	0	12	0
part7	0	13	0
part8	0	14	0
part9	0	15	0
part10	0	16	0
part11	0	17	0
role1	0	0	0
role2	0	0	18
role3	0	0	19
role4	0	0	20
role5	0	0	21

LAMBDA-X

	MANknl	BUSknl	ValIS	TECknl
knl7	22	0	0	0
knl8	23	0	0	0
knl9	0	0	0	0
knl10	24	0	0	0
knl11	25	0	0	0
knl12	26	0	0	0
knl13	0	27	0	0
knl14	0	0	0	0
knl15	0	28	0	0
knl16	0	29	0	0
imp1	0	0	30	0
imp2	0	0	31	0
imp3	0	0	32	0
imp4	0	0	0	0
knl1	0	0	0	33
knl2	0	0	0	34
knl3	0	0	0	0
knl4	0	0	0	35

BETA

	BUSori	PART	TECori
BUSori	0	0	0
PART	36	0	37
TECori	0	0	0

GAMMA

	MANknl	BUSknl	ValIS	TECknl
BUSori	38	39	0	0
PART	0	0	40	0
TECori	0	0	0	41

PHI

	MANknl	BUSknl	ValIS	TECknl
MANknl	42			
BUSknl	43	44		
ValIS	45	46	47	
TECknl	48	49	50	51

PSI

BUSori	PART	TECori
52	53	54

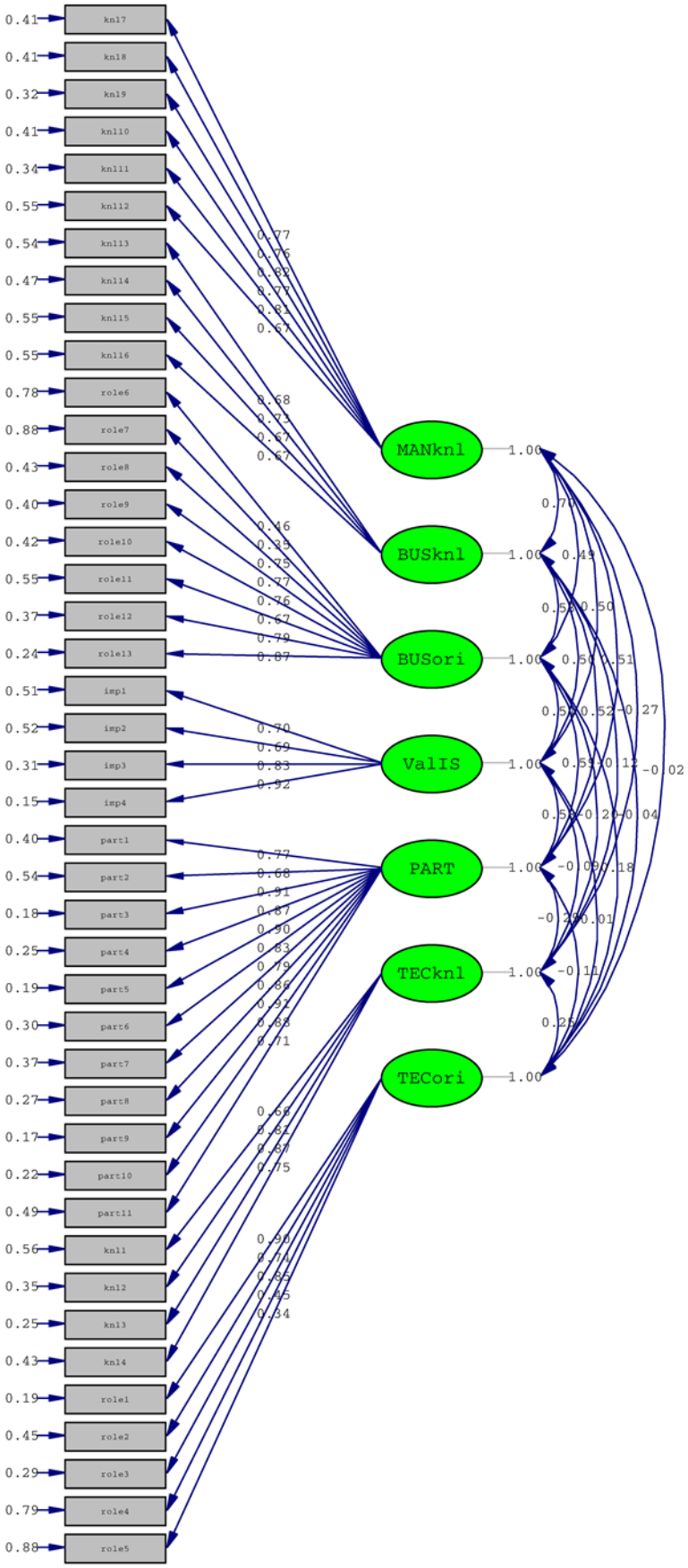
THETA-EPS

role6	role7	role8	role9	role10	role11
55	56	57	58	59	60
role12	role13	part1	part2	part3	part4
61	62	63	64	65	66
part5	part6	part7	part8	part9	part10
67	68	69	70	71	72
part11	role1	role2	role3	role4	role5
73	74	75	76	77	78

THETA-DELTA

knl7	knl8	knl9	knl10	knl11	knl12
79	80	81	82	83	84
knl13	knl14	knl15	knl16	imp1	imp2
85	86	87	88	89	90
imp3	imp4	knl1	knl2	knl3	knl4
91	92	93	94	95	96

Appendix L: Measurement part of the original partnership model



Appendix M: LISREL output for the partnership model – the original model

Standardised Solution

LAMBDA-Y

	BUSori	PART	TECori
role6	0.499	- -	- -
role7	0.467	- -	- -
role8	0.856	- -	- -
role9	1.019	- -	- -
role10	0.897	- -	- -
role11	0.951	- -	- -
role12	1.097	- -	- -
role13	1.141	- -	- -
part1	- -	1.080	- -
part2	- -	0.685	- -
part3	- -	1.184	- -
part4	- -	0.999	- -
part5	- -	1.217	- -
part6	- -	1.108	- -
part7	- -	1.029	- -
part8	- -	1.072	- -
part9	- -	1.210	- -
part10	- -	1.198	- -
part11	- -	1.277	- -
role1	- -	- -	1.124
role2	- -	- -	0.845
role3	- -	- -	0.905
role4	- -	- -	0.848
role5	- -	- -	0.352

LAMBDA-X

	MANknl	BUSknl	ValIS	TECknl
knl7	0.745	- -	- -	- -
knl8	0.806	- -	- -	- -
knl9	0.905	- -	- -	- -
knl10	0.748	- -	- -	- -
knl11	0.694	- -	- -	- -
knl12	0.532	- -	- -	- -
knl13	- -	0.738	- -	- -
knl14	- -	0.949	- -	- -
knl15	- -	0.770	- -	- -
knl16	- -	0.771	- -	- -
imp1	- -	- -	0.755	- -
imp2	- -	- -	0.777	- -
imp3	- -	- -	1.032	- -
imp4	- -	- -	1.154	- -
knl1	- -	- -	- -	1.124
knl2	- -	- -	- -	1.294
knl3	- -	- -	- -	1.278
knl4	- -	- -	- -	1.023

BETA

	BUSori	PART	TECori
BUSori	- -	- -	- -
PART	0.441	- -	-0.180
TECori	- -	- -	- -

GAMMA

	MANknl	BUSknl	ValIS	TECknl
BUSori	0.226	0.408	- -	- -
PART	- -	- -	0.369	- -
TECori	- -	- -	- -	0.253

Correlation Matrix of ETA and KSI

	BUSori	PART	TECori	MANknl	BUSknl	ValIS	TECknl
BUSori	1.000						
PART	0.571	1.000					
TECori	-0.029	-0.202	1.000				
MANknl	0.513	0.429	-0.069	1.000			
BUSknl	0.567	0.457	-0.034	0.703	1.000		
ValIS	0.338	0.523	-0.024	0.515	0.545	1.000	
TECknl	-0.116	-0.131	0.253	-0.275	-0.133	-0.094	1.000

PSI

BUSori	PART	TECori
0.653	0.519	0.936

Regression Matrix ETA on KSI (Standardised)

	MANknl	BUSknl	ValIS	TECknl
BUSori	0.226	0.408	- -	- -
PART	0.099	0.180	0.369	-0.046
TECori	- -	- -	- -	0.253

Completely Standardised Solution

LAMBDA-Y

	BUSori	PART	TECori
role6	0.457	- -	- -
role7	0.340	- -	- -
role8	0.754	- -	- -
role9	0.771	- -	- -
role10	0.758	- -	- -
role11	0.669	- -	- -
role12	0.794	- -	- -
role13	0.874	- -	- -
part1	- -	0.770	- -
part2	- -	0.676	- -
part3	- -	0.906	- -
part4	- -	0.863	- -
part5	- -	0.898	- -
part6	- -	0.832	- -
part7	- -	0.790	- -
part8	- -	0.854	- -
part9	- -	0.912	- -
part10	- -	0.879	- -
part11	- -	0.711	- -
role1	- -	- -	0.910
role2	- -	- -	0.740
role3	- -	- -	0.835
role4	- -	- -	0.446
role5	- -	- -	0.339

LAMBDA-X

	MANknl	BUSknl	ValIS	TECknl
knl7	0.770	- -	- -	- -
knl8	0.766	- -	- -	- -
knl9	0.823	- -	- -	- -
knl10	0.768	- -	- -	- -
knl11	0.813	- -	- -	- -
knl12	0.668	- -	- -	- -
knl13	- -	0.666	- -	- -
knl14	- -	0.734	- -	- -
knl15	- -	0.673	- -	- -
knl16	- -	0.656	- -	- -
imp1	- -	- -	0.701	- -
imp2	- -	- -	0.693	- -
imp3	- -	- -	0.829	- -
imp4	- -	- -	0.922	- -
knl1	- -	- -	- -	0.662
knl2	- -	- -	- -	0.809
knl3	- -	- -	- -	0.867
knl4	- -	- -	- -	0.752

BETA

	BUSori	PART	TECori
BUSori	- -	- -	- -
PART	0.441	- -	-0.180
TECori	- -	- -	- -

GAMMA

	MANknl	BUSknl	ValIS	TECknl
BUSori	0.226	0.408	- -	- -
PART	- -	- -	0.369	- -
TECori	- -	- -	- -	0.253

Correlation Matrix of ETA and KSI

	BUSori	PART	TECori	MANknl	BUSknl	ValIS	TECknl
BUSori	1.000						
PART	0.571	1.000					
TECori	-0.029	-0.202	1.000				
MANknl	0.513	0.429	-0.069	1.000			
BUSknl	0.567	0.457	-0.034	0.703	1.000		
ValIS	0.338	0.523	-0.024	0.515	0.545	1.000	
TECknl	-0.116	-0.131	0.253	-0.275	-0.133	-0.094	1.000

PSI

BUSori	PART	TECori
0.653	0.519	0.936

THETA-EPS

role6	role7	role8	role9	role10	role11
0.791	0.884	0.431	0.406	0.426	0.552
role12	role13	part1	part2	part3	part4
0.369	0.237	0.407	0.543	0.178	0.255
part5	part6	part7	part8	part9	part10
0.193	0.308	0.375	0.270	0.168	0.228
part11	role1	role2	role3	role4	role5
0.494	0.172	0.453	0.302	0.801	0.885

THETA-DELTA

knl7	knl8	knl9	knl10	knl11	knl12
0.407	0.413	0.322	0.410	0.339	0.553
knl13	knl14	knl15	knl16	imp1	imp2
0.557	0.461	0.547	0.570	0.509	0.520
imp3	imp4	knl1	knl2	knl3	knl4
0.312	0.151	0.562	0.346	0.248	0.434

Regression Matrix ETA on KSI (Standardised)

	MANknl	BUSknl	ValIS	TECknl
BUSori	0.226	0.408	- -	- -
PART	0.099	0.180	0.369	-0.046
TECori	- -	- -	- -	0.253

Appendix N: Goodness of Fit Statistics for the partnership model – the original model

Degrees of Freedom = 807
Minimum Fit Function Chi-Square = 1687.400 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 1686.875 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 879.875
90 Percent Confidence Interval for NCP = (765.858 ; 1001.627)

Minimum Fit Function Value = 8.231
Population Discrepancy Function Value (F0) = 4.292
90 Percent Confidence Interval for F0 = (3.736 ; 4.886)
Root Mean Square Error of Approximation (RMSEA) = 0.0729
90 Percent Confidence Interval for RMSEA = (0.0680 ; 0.0778)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.000

Expected Cross-Validation Index (ECVI) = 9.165
90 Percent Confidence Interval for ECVI = (8.609 ; 9.759)
ECVI for Saturated Model = 8.810
ECVI for Independence Model = 100.992

Chi-Square for Independence Model with 861 Degrees of Freedom = 20619.392
Independence AIC = 20703.392
Model AIC = 1878.875
Saturated AIC = 1806.000
Independence CAIC = 20885.163
Model CAIC = 2294.351
Saturated CAIC = 5714.072

Normed Fit Index (NFI) = 0.918
Non-Normed Fit Index (NNFI) = 0.952
Parsimony Normed Fit Index (PNFI) = 0.861
Comparative Fit Index (CFI) = 0.955
Incremental Fit Index (IFI) = 0.956
Relative Fit Index (RFI) = 0.913

Critical N (CN) = 110.753

Root Mean Square Residual (RMR) = 0.165
Standardised RMR = 0.0973
Goodness of Fit Index (GFI) = 0.718
Adjusted Goodness of Fit Index (AGFI) = 0.685
Parsimony Goodness of Fit Index (PGFI) = 0.642

Appendix O: Simplis input for the modified partnership model

```
!SEM modified model
Observed Variables: knl7 knl8 knl9 knl10 knl11 knl12 knl13 knl14 knl15 knl16
role6 role7 role8 role9 role10 role11 role12 role13
imp1 imp2 imp3 imp4 part1 part2 part3 part4 part5 part6 part7 part8 part9 part10 part11
knl1 knl2 knl3 knl4 knl5 knl6 role1 role2 role3 role4 role5

Covariance Matrix from File 'C:\Users\anton.manfreda\Desktop\Doktorska
disertacija\Analiza\SEM_modified\Partnership.cov'
Sample Size: 206

Latent Variables:  MANknl BUSknl BUSori ValIS PART TECknl TECori

Relationships:
BUSori = BUSknl MANknl
TECori = TECknl
PART =  ValIS BUSori TECori

part1-part11 = PART
imp1-imp4 = ValIS
knl1-knl4 = TECknl
knl7-knl12 = MANknl
knl13-knl16 = BUSknl

role1-role3 = TECori
/*role4 = TECori
/*role5 = TECori

/*role6 = BUSori
/*role7 = BUSori
role8-role13 = BUSori

Set the Variance of BUSknl to 1.00
Set the Variance of MANknl to 1.00
Set the Variance of BUSori to 1.00
Set the Variance of TECknl to 1.00
Set the Variance of TECori to 1.00
Set the Variance of PART to 1.00
Set the Variance of ValIS to 1.00

Options: ND=3
Lisrel output: SS SC
Path Diagram

End of Problem
```

Appendix P: LISREL output for the modified partnership model

Standardised Solution

LAMBDA-Y

	BUSori	PART	TECori
role8	0.859	- -	- -
role9	1.018	- -	- -
role10	0.886	- -	- -
role11	0.953	- -	- -
role12	1.103	- -	- -
role13	1.136	- -	- -
part1	- -	1.076	- -
part2	- -	0.682	- -
part3	- -	1.179	- -
part4	- -	0.995	- -
part5	- -	1.212	- -
part6	- -	1.103	- -
part7	- -	1.025	- -
part8	- -	1.067	- -
part9	- -	1.205	- -
part10	- -	1.193	- -
part11	- -	1.272	- -
role1	- -	- -	1.157
role2	- -	- -	0.839
role3	- -	- -	0.878

LAMBDA-X

	MANknl	BUSknl	ValIS	TECknl
knl7	0.745	- -	- -	- -
knl8	0.806	- -	- -	- -
knl9	0.905	- -	- -	- -
knl10	0.748	- -	- -	- -
knl11	0.693	- -	- -	- -
knl12	0.533	- -	- -	- -
knl13	- -	0.737	- -	- -
knl14	- -	0.949	- -	- -
knl15	- -	0.769	- -	- -
knl16	- -	0.771	- -	- -
imp1	- -	- -	0.754	- -
imp2	- -	- -	0.776	- -
imp3	- -	- -	1.032	- -
imp4	- -	- -	1.155	- -
knl1	- -	- -	- -	1.123
knl2	- -	- -	- -	1.294
knl3	- -	- -	- -	1.278
knl4	- -	- -	- -	1.024

BETA

	BUSori	PART	TECori
BUSori	- -	- -	- -
PART	0.457	- -	-0.160
TECori	- -	- -	- -

GAMMA

	MANknl	BUSknl	ValIS	TECknl
BUSori	0.216	0.431	- -	- -
PART	- -	- -	0.359	- -
TECori	- -	- -	- -	0.241

Correlation Matrix of ETA and KSI

	BUSori	PART	TECori	MANknl	BUSknl	ValIS	TECknl
BUSori	1.000						
PART	0.586	1.000					
TECori	-0.029	-0.181	1.000				
MANknl	0.519	0.433	-0.066	1.000			
BUSknl	0.583	0.468	-0.033	0.703	1.000		
ValIS	0.346	0.521	-0.022	0.514	0.546	1.000	
TECknl	-0.119	-0.127	0.241	-0.276	-0.138	-0.093	1.000

PSI

BUSori	PART	TECori
0.637	0.516	0.942

Regression Matrix ETA on KSI (Standardised)

	MANknl	BUSknl	ValIS	TECknl
BUSori	0.216	0.431	- -	- -
PART	0.099	0.197	0.359	-0.039
TECori	- -	- -	- -	0.241

Completely Standardised Solution

LAMBDA-Y

	BUSori	PART	TECori
role8	0.757	- -	- -
role9	0.770	- -	- -
role10	0.748	- -	- -
role11	0.671	- -	- -
role12	0.799	- -	- -
role13	0.870	- -	- -
part1	- -	0.768	- -
part2	- -	0.674	- -
part3	- -	0.906	- -
part4	- -	0.863	- -
part5	- -	0.898	- -
part6	- -	0.831	- -
part7	- -	0.789	- -
part8	- -	0.853	- -
part9	- -	0.911	- -
part10	- -	0.878	- -
part11	- -	0.709	- -
role1	- -	- -	0.937
role2	- -	- -	0.734
role3	- -	- -	0.811

LAMBDA-X

	MANknl	BUSknl	ValIS	TECknl
knl7	0.770	- -	- -	- -
knl8	0.766	- -	- -	- -
knl9	0.823	- -	- -	- -
knl10	0.768	- -	- -	- -
knl11	0.813	- -	- -	- -
knl12	0.669	- -	- -	- -
knl13	- -	0.665	- -	- -
knl14	- -	0.734	- -	- -
knl15	- -	0.673	- -	- -
knl16	- -	0.656	- -	- -
imp1	- -	- -	0.700	- -
imp2	- -	- -	0.693	- -
imp3	- -	- -	0.829	- -
imp4	- -	- -	0.922	- -
knl1	- -	- -	- -	0.661
knl2	- -	- -	- -	0.809
knl3	- -	- -	- -	0.867
knl4	- -	- -	- -	0.753

BETA

	BUSori	PART	TECori
BUSori	- -	- -	- -
PART	0.457	- -	-0.160
TECori	- -	- -	- -

GAMMA

	MANknl	BUSknl	ValIS	TECknl
BUSori	0.216	0.431	- -	- -
PART	- -	- -	0.359	- -
TECori	- -	- -	- -	0.241

Correlation Matrix of ETA and KSI

	BUSori	PART	TECori	MANknl	BUSknl	ValIS	TECknl
BUSori	1.000						
PART	0.586	1.000					
TECori	-0.029	-0.181	1.000				
MANknl	0.519	0.433	-0.066	1.000			
BUSknl	0.583	0.468	-0.033	0.703	1.000		
ValIS	0.346	0.521	-0.022	0.514	0.546	1.000	
TECknl	-0.119	-0.127	0.241	-0.276	-0.138	-0.093	1.000

PSI

BUSori	PART	TECori
0.637	0.516	0.942

THETA-EPS

role8	role9	role10	role11	role12	role13
0.427	0.407	0.440	0.550	0.362	0.243
part1	part2	part3	part4	part5	part6
0.409	0.545	0.180	0.256	0.194	0.309
part7	part8	part9	part10	part11	role1
0.377	0.272	0.170	0.230	0.497	0.122
role2	role3				
0.461	0.343				

THETA-DELTA

knl7	knl8	knl9	knl10	knl11	knl12
0.407	0.413	0.322	0.410	0.340	0.553
knl13	knl14	knl15	knl16	imp1	imp2
0.558	0.461	0.548	0.569	0.510	0.520
imp3	imp4	knl1	knl2	knl3	knl4
0.312	0.150	0.563	0.345	0.248	0.433

Regression Matrix ETA on KSI (Standardised)

	MANknl	BUSknl	ValIS	TECknl
BUSori	0.216	0.431	- -	- -
PART	0.099	0.197	0.359	-0.039
TECori	- -	- -	- -	0.241

Appendix Q: Goodness of Fit Statistics for the modified partnership model

Degrees of Freedom = 653
Minimum Fit Function Chi-Square = 1300.476 (P = 0.0)
Normal Theory Weighted Least Squares Chi-Square = 1281.408 (P = 0.0)
Estimated Non-centrality Parameter (NCP) = 628.408
90 Percent Confidence Interval for NCP = (530.607 ; 733.985)

Minimum Fit Function Value = 6.344
Population Discrepancy Function Value (F0) = 3.065
90 Percent Confidence Interval for F0 = (2.588 ; 3.580)
Root Mean Square Error of Approximation (RMSEA) = 0.0685
90 Percent Confidence Interval for RMSEA = (0.0630 ; 0.0740)
P-Value for Test of Close Fit (RMSEA < 0.05) = 0.000

Expected Cross-Validation Index (ECVI) = 7.109
90 Percent Confidence Interval for ECVI = (6.632 ; 7.624)
ECVI for Saturated Model = 7.229
ECVI for Independence Model = 96.192

Chi-Square for Independence Model with 703 Degrees of Freedom = 19643.433
Independence AIC = 19719.433
Model AIC = 1457.408
Saturated AIC = 1482.000
Independence CAIC = 19883.893
Model CAIC = 1838.261
Saturated CAIC = 4688.956

Normed Fit Index (NFI) = 0.934
Non-Normed Fit Index (NNFI) = 0.963
Parsimony Normed Fit Index (PNFI) = 0.867
Comparative Fit Index (CFI) = 0.966
Incremental Fit Index (IFI) = 0.966
Relative Fit Index (RFI) = 0.929

Critical N (CN) = 117.651

Root Mean Square Residual (RMR) = 0.139
Standardised RMR = 0.0843
Goodness of Fit Index (GFI) = 0.752
Adjusted Goodness of Fit Index (AGFI) = 0.719
Parsimony Goodness of Fit Index (PGFI) = 0.663

POVZETEK V SLOVENSKEM JEZIKU

KAZALO

1 OPIS ZNANSTVENEGA PODROČJA 1

1.1 RAZKORAK MED INFORMATIKI IN VODILNIM MANAGEMENTOM 1
1.2 PARTNERSKI ODNOS MED INFORMATIKI IN VODILNIM MANAGEMENTOM 3
1.3 VLOGA VODILNEGA MANAGEMENTA 5
1.4 ZNANJA INFORMATIKOV 6
1.5 VLOGA INFORMATIKOV 8
1.6 ZAZNANA VREDNOST INFORMATIKE 9

2 PROBLEMATIKA PREDLAGANE TEME 11

3 NAMEN IN CILJI DISERTACIJE 11

4 HIPOTEZE DISERTACIJE 12

5 OCENA PRISPEVKA DISERTACIJE K ZNANOSTI 13

6 OPIS ZNANSTVENE METODE 14

7 STRUKTURA DISERTACIJE 15

8 REZULTATI DISERTACIJE 16

9 SKLEP 17

LITERATURA 19

POVZETEK V SLOVENSKEM JEZIKU

1 OPIS ZNANSTVENEGA PODROČJA

Odnos med informatiki in vodilnim managementom je predmet raziskav že več kot 50 let. V strokovni literaturi se omenja, da odnos med poslovno in informacijsko sfero povzroča težave vse od pojava računalniških aplikacij, namenjenih širši poslovni uporabi v 60. letih prejšnjega stoletja (Doll & Ahmed, 1983; Ward & Peppard, 1996) in naj bi bil večinoma posledica kulturnega razkoraka med poslovno in informacijsko sfero. Nerazumevajoč odnos med managerji in informatiki se v strokovni literaturi pogosto označuje kot prepad oziroma razkorak med omenjenima stranema (Coughlan, Lycett, & Macredie, 2005; Grindley, 1992; Peppard & Ward, 1999). Kulturni razkorak povzroča različne poglede in pričakovanja tako s strani informatikov kot vodilnih managerjev ter posledično preprečuje, da bi podjetje razvilo konkurenčne prednosti na podlagi informatike (Grindley, 1992). Čeprav je do sedaj le redkim podjetjem uspelo ta prepad uspešno premostiti (Peppard & Ward, 1999), se podjetja še vedno premalo zavedajo posledic neustreznega odnosa.

Razkorak izhaja tudi iz različnih pogledov glede vloge službe za informatiko, saj managerji službo za informatiko pogosto jemljejo le kot podporno funkcijo, katere edini cilj je le avtomatizacija izvajanja poslovnih procesov (Dos Santos & Sussman, 2000). Prav zaradi slednjega se v podjetjih pogosto le informatizira obstoječe procese, namesto da bi se službo za informatiko izkoristilo za prenovo procesov (Kovačič, 2004). Tako služba za informatiko v podjetjih večinoma predstavlja le strošek in ne poslovne vrednosti, kar dodatno poslabšuje odnos med direktorjem službe za informatiko in vodilnim managementom.

Prav zaradi razsežnosti, ki jih ima odnos med managementom in informatiki, se v strokovni in znanstveni literaturi avtorji precej posvečajo tej problematiki in z raznimi raziskavami skušajo zajeti dejavnike, ki najbolj vplivajo na odnos. V nadaljevanju so na kratko predstavljeni dejavniki, ki se v literaturi najpogosteje omenjajo in tako tvorijo opis ožjega znanstvenega področja, na katerega se nanaša tema doktorske disertacije.

1.1 Razkorak med informatiki in vodilnim managementom

Z razvojem aplikacij, ki so namenjene širši poslovni uporabi, so podjetja postala bolj odvisna od informatike (Peppard, 2001), zato se je povečal tudi pomen odnosa med informatiki in preostalimi zaposlenimi v poslovnih oddelkih. Ker je ta odnos pogosto problematičen, se ga v literaturi označuje kot razkorak med obema stranema (Coughlan, et al., 2005; Grindley, 1992; Peppard & Ward, 1999). V nekaterih raziskavah je ta problematičen odnos označen tudi kot kulturni razkorak med informatiki in vodilnim managementom (Ward & Peppard, 1996).

Razkorak je opredeljen kot pomanjkanje razumevanja med managementom in informatiki (Coughlan, et al., 2005; Peppard & Ward, 1999). Poleg tega razkorak navadno predstavlja

problematičen odnos med informatiki in zaposlenimi v poslovnih oddelkih kot posledica razlik med njimi (Ward & Peppard, 1996).

Te razlike vključujejo predvsem različne poglede glede vloge službe za informatiko. Vodilni management namreč pogosto meni, da ima služba za informatiko zgolj podporno vlogo, pri čemer je avtomatizacija poslovnih procesov njen edini namen (Dos Santos & Sussman, 2000). Podjetja se zato pogosto osredotočajo zgolj na obstoječe poslovne procese in njihovo avtomatizacijo ter posledično ne izkoristijo informatike za celovito preoblikovanje poslovnih procesov (Kovačič, 2004). Tako je informatika v podjetjih razumljena predvsem kot strošek in ne sredstvo za omogočanje poslovne vrednosti, kar posledično dodatno poslabšuje odnos med vodilnim managementom in informatiki.

Nerazumevanje znotraj podjetja je posledica tudi pomanjkljivih znanj informatikov in pomanjkljivih znanj managerjev. Pomanjkanje znanja o obojestranskih področjih privede do neučinkovite komunikacije, zaradi česar je omejen pravi pretok informacij, kar privede do neusklajenosti informacijskih rešitev s poslovnimi cilji podjetja (Martin, Hatzakis, Lycett, & Macredie, 2004), kot prikazuje tudi Slika 1. Prepad, ki nastane kot posledica navedenega, pa podjetjem onemogoča, da bi se ustrezno prilagodila novim razmeram (Kovačič & Bosilj-Vukšić, 2005). Tako sta ključna izziva, s katerima se mora soočiti organizacija, premostitev pomanjkanja skupne vizije in razumevanja med managerji in informatiki ter izboljšanje pretoka znanja med omenjenima skupinama (Martin, et al., 2004).

Slika 1: Prepad v načrtovanju

Vir: Kovačič & Bosilj-Vukšić, 2005

Razkorak torej povzroča različne poglede in pričakovanja tako s strani informatikov kot s strani vodilnega managementa in s tem preprečuje podjetjem razviti konkurenčne prednosti, ki jih informatika omogoča (Grindley, 1992; Ward & Peppard, 1996). Ta razkorak naj bi bil odpravljen s prihodom novih managerjev, ki bi bili sposobni povezovati obe strani (Grindley, 1992), vendar je razkorak še vedno prisoten, saj mnoga podjetja poročajo o nezadostnem

usklajevanju dela in deljenju znanj, ki izvira iz nesporazumov med poslovnimi oddelki in službo za informatiko (Martin, et al., 2004). Kljub številnim prizadevanjem za zmanjšanje razlik poslovni oddelki in služba za informatiko v mnogih podjetjih še vedno ne delijo enakih stališč glede vloge informatikov (Nord, Nord, Cormack, & Cater-Steel, 2007). Čeprav veliko študij potrjuje, da je odnos med informatiki in vodilnim managementom v mnogih podjetjih neustrezen, primanjkuje raziskav in smernic, kako premostiti ta razkorak (Peppard, 2001).

1.2 Partnerski odnos med informatiki in vodilnim managementom

Na področju poslovnih ved se izraz partnerstvo uporablja predvsem za opisovanje odnosov med podjetji oziroma organizacijami. Z namenom ustvarjanja vrhunskih izdelkov, pridobivanja pomembnih strank in povečevanja dobička se priporoča, da podjetja oblikujejo partnerstva (Teng, 2003). Poleg tega organizacije, ki učinkovito upravljajo partnerske zveze, pridobijo pomembno poslovno sredstvo, in sicer primerjalno prednost (Kanter, 1994).

Vendar pa že obstajajo poskusi, da se izraz partnerstvo opredeli tudi v povezavi z odnosom med službo za informatiko in poslovnimi oddelki oziroma informatiki in zaposlenimi v poslovnih oddelkih. Na tako imenovanem poslovno-informacijskem področju se izraz partnerstvo nanaša na organizacijske sposobnosti po združevanju med-oddelčnih prizadevanj pri uvajanju informacijskih sistemov z namenom podpirati in oblikovati poslovne priložnosti (Tian, Wang, Chen, & Johansson, 2010). Navsezadnje je učinkovita uporaba informacijskih virov odvisna predvsem od razmerja med informatiki in poslovnimi oddelki znotraj podjetja (Bassellier, Reich, & Benbasat, 2001). Tako je partnerski odnos med njimi eden izmed najpomembnejših dejavnikov uspešne informatizacije, saj olajšuje proces sprejemanja informatike v podjetju (Tian, et al., 2010).

Izraz partnerstvo v povezavi s poslovno-informacijskim področjem je bil uporabljen tudi v raziskavi, ki je poudarila, da se z razumevanjem partnerskega odnosa organizacije lažje osredotočajo na informatizacijo in uresničevanje poslovne strategije (Papp, 1999), vendar iz raziskave ni razvidno, kako doseči partnerski odnos.

Razmerje med usklajenostjo in partnerstvom je bilo potrjeno v raziskavi, ki je izpostavila, da usklajenost med informatiki in vodilnim managementom vodi v partnerski odnos (Chen, 2010). V tej raziskavi se je partnerstvo nanašalo na vzajemno zaznan prispevek informatike tako s strani informatikov kot poslovnih oddelkov, vključujoč vlogo informatike pri strateškem poslovnem planiranju ter deljenje tveganj in nagrad med službo za informatiko in poslovnimi oddelki. Raziskava se je bolj osredotočala na zrelost partnerskega odnosa, kot pa na sam odnos med informatiki in managementom. Spremenljivke za merjenje partnerske zrelosti v tej raziskavi so bile osnovane na podlagi modela strateške usklajenosti (Luftman, 2000; Sledgianowski, Luftman, & Reilly, 2006). Tudi ta raziskava ni prikazala načina za doseganje partnerskega odnosa.

Glede na to, da se pojem partnerstvo na splošno ne uporablja v poslovno-informacijskih vedah, so v disertaciji za merjenje odnosa med vodilnim managementom in informatiki uporabljeni indikatorji za merjenje partnerskega odnosa na ravni podjetij, torej partnerstev med podjetji.

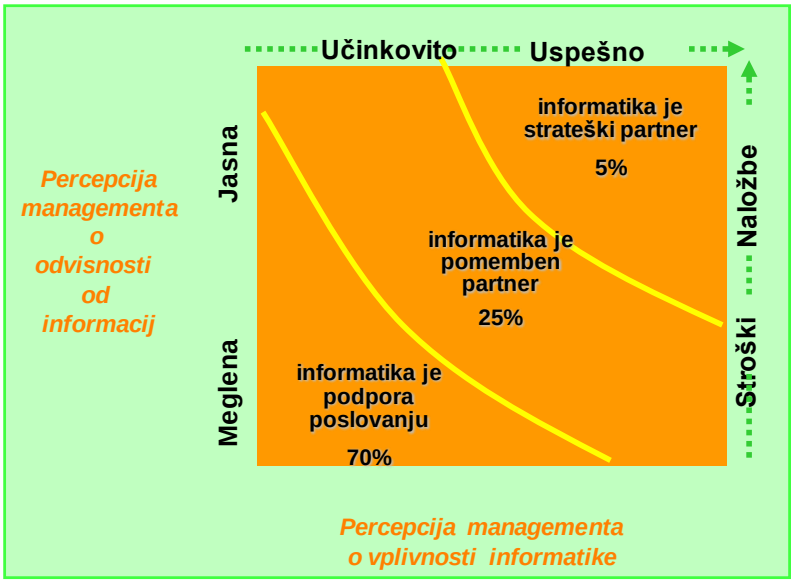
V disertaciji je bil tako deloma uporabljen model partnerskega uspeha (Mohr & Spekman, 1994). V tem modelu so lastnosti, ki so pomembne za uspešno partnerstvo, sestavljene iz obveze in predanosti, usklajevanja, medsebojne povezanosti in zaupanja. Prikazano je bilo tudi, da obstoj teh lastnosti v partnerskem odnosu povzroča, da se partnerska podjetja zavedajo svoje soodvisnosti in so pripravljena delovati v smeri dragocenega odnosa (Tuten & Urban, 2001).

Za merjenje partnerskega odnosa so bili v disertacijo vključeni dodatni indikatorji, temelječi na raziskavi, ki je proučevala odnose med nevladnimi razvojnimi organizacijami (Malena, 1995). Partnerstvo v tej raziskavi je bilo opredeljeno kot vrsta vrednostnih načel, in sicer (1) skupno dogovorjeni nameni in vrednote, (2) vzajemno zaupanje in spoštovanje, (3) vzajemna odgovornost, (4) preglednost, (5) razumevanje političnih, gospodarskih in kulturnih vsebin med partnerji ter (6) dolgoročna zavezanost k sodelovanju.

Za vzpostavitev partnerstva med informatiki in managementom kot optimalno doseženega odnosa so v veliki meri odgovorni informatiki. Podpora vodilnega managementa se namreč ne pojavi samodejno. Vodilni management, ki v informatiki ne prepozna strateškega orodja, ni naklonjen sodelovanju pri strateškem planiranju informacijskih sistemov in s tem zmanjšuje učinkovitost investicij v informatiko (Kearns, 2006), zato sta ravno učinkovita komunikacija informatikov z vodstvom in predstavljanje rešitev na razumljiv način ključnega pomena.

V splošnem velja prepričanje, da bolj kot je vodilni management zadovoljen z direktorjem informatike, večji vpliv imajo informacijski sistemi pri odločitvah na višjih nivojih (Jones, Taylor, & Spencer, 1995). Tako informatika nima več samo podporne vloge, ampak postane del poslovne strategije podjetja. Položaj oziroma prehod informatike od podporne do strateške funkcije prikazuje Slika 2.

Slika 2: Položaj informatike



Vir: Kovačič & Bosilj-Vukšić, 2005

Raziskave med drugim tudi potrjujejo, da je za izboljšanje odnosa z vodilnim managementom pomembno, da direktor informatike skrbi predvsem za časovno točnost izvajanja projektov, ohranjanje komunikacije glede tehnologij in poslovnih priložnosti, ki jih informatika omogoča ter navsezadnje prikazuje svoj uspeh tudi preko javnih nastopov, ki izboljšujejo ugled podjetja (Hayden, 2002).

1.3 Vloga vodilnega managementa

Pogosto se odgovornost za neustrezen odnos pripisuje bodisi informatikom bodisi managerjem. Dejansko pa sta oba odgovorna za neustrezen odnos, zato je tudi vloga vodilnega managementa ključnega pomena pri oblikovanju odnosa do informatikov. Vloga vodilnega managementa ima namreč odločilni pomen glede položaja informatikov v podjetju in odnosa do njih ter posledično uspešnosti informatizacije poslovanja (Byrd & Davidson, 2003; Caldeira & Ward, 2002; Ragu-Nathan, Apigian, Ragu-Nathan, & Tu, 2004).

Izkazalo se je, da je eden izmed najpomembnejših dejavnikov uspešne informatizacije ravno podpora vodstva oziroma naklonjenost vodstva informatiki (Young & Jordan, 2008). Podpora vodstva informatiki pomeni predvsem podpiranje pobud s strani informatikov in vključevanje v projekte informatizacije (Ragu-Nathan, et al., 2004). Za uspešno informatizacijo je tako pomembno, da vodilni management razume strateško vlogo informatike, ima ustrezna znanja tudi s področja informatike ter zagotavlja zadostna sredstva za izvajanje informatizacije (Ranganathan & Kannabiran, 2004).

Naklonjenost vodstva informatiki je razvidna tudi iz zavedanja vodilnega managementa glede pomembnosti informatike pri doseganju konkurenčnih prednosti (Ragu-Nathan, et al., 2004)

in je izjemnega pomena za učinkovito uporabo informatike (Kearns, 2006). Ravno nasprotno pa pomanjkanje naklonjenosti vodstva informatiki vodi v prerazporejanje sredstev k drugim projektom, ki so bolj pomembni za vodilni management, kar vodi v neučinkovite projekte informatizacije ter posledično k odporu do informatike (Newman & Zhao, 2008; Teo & Ang, 2001).

Vodilni management ima tako zelo pomembno vlogo, saj le sprejemanje strateške vloge informatike in njeno vključevanje v poslovne procese vodi do primerjalnih prednosti, medtem ko tehnologija sama po sebi še ni zagotovilo za uspešno informatizacijo (Dhillon, 2008).

1.4 Znanja informatikov

Znanja informatikov in njihovega vodje so precej pomemben dejavnik medsebojnega odnosa in odnosa do vodilnega managementa ter obratno. Večina strokovne literature kot pomembnejši vzrok za nerazumevanje med vodilnim managementom in direktorjem informatike navaja ravno različna znanja in veščine, ki jih pridobijo posamezniki na obeh straneh, te pa vodijo v tako imenovani kulturni razkorak. Ravno zato je razvoj poslovnih znanj med informatiki pomemben dejavnik pri zmanjševanju kulturnega razkoraka (Grindley, 1992).

Odnos do znanj, ki so potrebna za učinkovit odnos, se je spreminjal skozi obdobja, predvsem pa je sledil tehnološkemu napredku. V 60. in 70. letih prejšnjega stoletja, ko se je tehnološka oprema, ki je omogočala informatizacijo poslovanja, šele začela pojavljati, je prevladovalo prepričanje, da so tehnološka znanja najpomembnejša (Byrd & Turner, 2001). Tudi informatiki so bili večinoma le programerji in sistemski analitiki. V tem obdobju razkorak v odnosu ni bil tako izrazit, saj so bile prioritetne naloge predvsem vzpostavitev informacijske infrastrukture, medtem ko je bil čas razvoja informacijskih rešitev zelo dolg in brez pravih strateških usmeritev (Clark, Cavanaugh, Brown, & Sambamurthy, 1997).

Pomembnost strateškega načrtovanja informatike se je pojavila v 80. letih prejšnjega stoletja, s čimer so se posledično spremenila tudi pričakovana znanja informatikov. Od informatikov se je tako pričakovalo, da bodo delovali usklajeno s poslovno strategijo podjetja in jo podpirali (Cross, Earl, & Sampler, 1997; Henderson & Venkatraman, 1993). Izkazalo se je, da so poslovna in managerska znanja pomembna za pridobitev prve zaposlitve na področju informatike (Jenkins, 1986), medtem ko je druga raziskava pokazala celo, da so sistemski analitiki vrednotili komunikacijske sposobnosti in poslovna znanja višje kot tehnološka znanja (Green, 1989). Višje vrednotenje komunikacijskih sposobnosti je predvsem posledica dejstva, da so jih sistemski analitiki zaznavali kot dejavnik uspešne interakcije z uporabniki pri osnovanju informacijskih rešitev, medtem ko so tehnološka znanja (npr. programiranje) zaznavali kot predpogoj (Green, 1989). Čeprav se je vedno bolj poudarjalo pomen raznovrstnih znanj, enotnega mnenja v tem obdobju ni bilo, saj je precej preostalih raziskav in avtorjev na prvo mesto še vedno postavljalo tehnološka znanja (Todd, McKeen, & Gallupe, 1995; Vitalari, 1985; Watson, Young, Miranda, Robichaux, & Seerley, 1990).

Precej bolj poenoteno mnenje je prevladovalo v 90. letih, saj je večina raziskav potrjevala stališče, da informatiki za uspešno opravljanje svojih nalog potrebujejo kombinacijo managerskih, poslovnih, komunikacijskih in tehničnih znanj (D. M. S. Lee, Trauth, & Farwell, 1995; Mata, Fuerst, & Barney, 1995; Rockart, Earl, & Ross, 1996). To mnenje prevladuje tudi danes, saj tudi sodobnejše raziskave potrjujejo, da so kombinacije znanj ključni dejavniki uspešne informatizacije poslovanja (Caldeira & Ward, 2002) oziroma pogoj za uspešno opravljanje nalog (Misic & Graf, 2004).

Vsekakor pa so znanja odvisna od poklica, ki ga posameznik v službi za informatiko opravlja. Odnos med informatiki in vodilnim managementom se najpogosteje odraža v odnosu med direktorjem službe za informatiko in vodilnim managementom, zato je potrebno opredeliti predvsem znanja in veščine direktorjev informatike. Iz pregleda literature na področju znanj direktorjev informatike je razvidno, da se pogled zadnjih 40 let ni bistveno spreminjal. Do sredine 70. let prejšnjega stoletja na tem področju ni bil objavljen noben prispevek (Todd, et al., 1995). Raziskava sredi 70. let pa je pokazala, da so za direktorja informatike najpomembnejša managerska znanja in komunikacijske sposobnosti, medtem ko lahko probleme, ki zahtevajo tehnične veščine, prenese na podrejene (Joslin & Bassler, 1976). Tudi kasnejše raziskave so potrjevale, da so splošna managerska znanja za direktorje informatike pomembnejša kot tehnološka (Ives & Olson, 1981; Todd, et al., 1995).

Širok spekter znanj je za ohranjanje učinkovitega odnosa med informatiki in managementom ključnega pomena. Informatiki v podjetju so razpeti med uporabnike storitev in vodilni management. Uporabniki od informatikov pričakujejo tehnično usposobljenost, ki mora presegati znanje uporabnikov. Vodstvo podjetja pa od informatikov pričakuje ustrezne komunikacijske sposobnosti ter sledenje poslovni strategiji. Tako lahko informatiki le z ustrezno kombinacijo znanj uspešno izvajajo proces informatizacije v podjetju. Dejstvo, da znanje informatikov nedvomno vpliva na uspešnost informatizacije, je potrdila tudi raziskava med direktorji informatike najuspešnejših ameriških podjetij (Byrd & Turner, 2001).

Znanja informatikov in managementa pa ne izvirajo le iz potreb organizacije, ampak so v veliki meri posledica izobraževalnega sistema, ki v veliko primerih ne sledi zahtevam oziroma potrebam iz prakse. Tako določeni študijski programi študentom ne zagotavljajo potrebnih veščin, ki jih zahteva delovno okolje. Ravno področje informatike pa je bilo v zadnjih desetletjih eno izmed najhitreje razvijajočih. Prav zaradi hitrih sprememb so se vodilni managerji in tudi profesorji precej ukvarjali z znanji in veščinami, potrebnimi za učinkovito delovanje v tehnološkem in poslovnem okolju ter preoblikovanjem univerzitetnih učnih načrtov (Nelson, 1991; Niederman, Brancheau, & Wetherbe, 1991). Izkazalo se je, da veliko univerz ni usklajenih s poslovnimi potrebami. Raziskava (D. M. S. Lee, et al., 1995) je pokazala, da veliko tehničnih predmetov v učnem načrtu dejansko ni imelo prave vrednosti na trgu, poleg tega pa je razkrila tudi pomanjkljivo znanje s področja komuniciranja in poslovanja glede na pričakovanja v podjetjih. Ravno razlike med pričakovanim in dejanskim stanjem pa lahko bistveno poslabšujejo odnos med managementom in informatiki. Tudi novejše raziskave (S. Lee & Fang, 2008; Yen, Chen, Lee, & Koh, 2003) potrjujejo, da učni

programi še vedno zaostajajo za dejanskimi potrebami na trgu, čeprav naj bi ravno priznanje razkoraka motiviralo študente in fakultete k prilagajanju veščin in preoblikovanju študijskih programov (S. Lee & Fang, 2008).

Zaradi vse bolj specifičnih potreb na trgu in časovno omejenega študijskega izobraževanja avtorji omenjenih raziskav predlagajo oblikovanje raznolikih študijskih programov, ki bodo sovpadali z različnimi poklici na informacijskem področju. Že v preteklosti je bilo pokazano, da koncept enovitega študija, ki bi zagotovil vse prihodnje potrebe informatikov, v poslovnem svetu nima več prave vrednosti (D. M. S. Lee, et al., 1995).

Prav zaradi tega dejstva je za oblikovanje uspešnega odnosa potrebno, da se vodilni managerji in direktorji službe za informatiko tesneje povezujejo z univerzami in predstavljajo svoje potrebe. Poleg tega pa s sodelovanjem v raziskavah omogočajo odkrivati ključne dejavnike, ki vodijo v uspešno informatizacijo podjetij.

Vsekakor pa samo znanja niso edini razlog za neustrezen odnos. V novejši raziskavi (Litecky, Arnett, & Prabhakar, 2004) je bilo ugotovljeno, da delodajalci v zaposlitvenih oglasih zahtevajo predvsem tehnična znanja, pri izbiri kandidatov pa se osredotočajo predvsem na komunikacijske sposobnosti, kar so avtorji poimenovali zaposlitveni paradoks. Ena izmed razlag za povečevanje potreb po tehničnem znanju med sistemskimi analitiki izhaja iz dejstva, da so uporabniki informacijskih sistemov tehnično bistveno bolj usposobljeni, kot so bili v preteklosti. Prav zaradi tega sistemski analitiki potrebujejo več tehnične usmerjenosti za ohranjanje kredibilnosti (Davis, 1993). Poleg tega pa lahko zaposlitveni oglasi odražajo želje nižjih managerjev, ki tehnična znanja vrednotijo višje, kar pa se ponovno lahko razlikuje od potreb in želja vodilnega managementa. Zato tudi prihaja do razkoraka med znanji, ki jih vodilni management vidi kot dobra za podjetje, ter med kadri, ki jih dejansko pridobi (Todd, et al., 1995).

1.5 Vloga informatikov

Odnos med informatiki in vodilnim managementom je razviden predvsem iz vloge in položaja informatikov ter podpore, ki jo vodstvo namenja njim oziroma direktorju službe za informatiko.

Naloge informatikov so se v zadnjih desetletjih bistveno spreminjale, predvsem pa vloga direktorja informatike. V 70. letih prejšnjega stoletja je bila služba za informatiko razumljena kot zaprta celica, ki jo je management lahko povsem prezrl. Posledično je bilo to obdobje znano predvsem po ponavljajočih se neuspelih projektih (Doll & Ahmed, 1983), kar je vplivalo na kredibilnost informatikov v podjetjih. Kasneje pa je pomembnost službe za informatiko vse bolj prihajala v ospredje, s tem pa tudi problematika odnosa z vodilnim managementom ter nejasnost glede vloge informatikov, saj se je izkazalo, da v večini podjetij poslovni oddelki in služba za informatiko ne delijo enakih pogledov glede položaja informatikov (Bashein & Markus, 1997).

Nejasnost pri vlogi informatikov v podjetju pa nedvoumno vpliva na odnos med managementom in informatiki in povzroča dodatne dvome. Tako je veliko direktorjev informatike negotovih, ali je primarna naloga službe za informatiko sodelovanje v procesih poslovne prenove ali zgolj kot podporna vloga preostalim oddelkom (Ward & Peppard, 1996). Tudi vodilni management je pogosto razdvojen, ali služba za informatiko predstavlja strateški vir ali pa le strošek (Earl & Feeney, 1994; Kovačič, 2004). Ravno zato je ključna naloga direktorja informatike, da predstavi informatizacijo kot strateško prednost, ki prinaša vrednost podjetju (Earl & Feeney, 1994).

Za odpravo nejasnosti in izboljšanje odnosov je ključnega pomena, da je vloga informatikov jasno določena, kar vključuje opredelitev prispevka informatikov, zagotovitev usklajenosti ciljev informatikov s cilji podjetja, kar povečuje pripadnost podjetju ter komuniciranje z vodilnim managementom (Nord, et al., 2007). Bistvenega pomena pri komunikaciji je, da omogoča izmenjavo informacij med vodilnim managementom in direktorjem informatike glede poslovnih aktivnostih in omogoča izobraževanje vodilnega managementa s področja informatike ter posledično poveča zavedanje o njeni pomembnosti.

Neustrezna komunikacija pa poleg navedenega izvira tudi iz neustreznega pozicioniranja direktorja informatike v podjetju, s čimer je tudi položaj preostalih informatikov nekoliko zapostavljen. Tako v podjetjih pogosto nimajo ustrezne podpore, hkrati pa tudi njihove rešitve niso usklajene s poslovno strategijo podjetja, saj direktor informatike ni udeležen pri njenem oblikovanju. Posledično prihaja do neustreznih projektov informatizacije, preseženih stroškovnih okvirov in zamud, ki zmanjšujejo kredibilnost informatikom v podjetju. Vodilni management je zaradi omenjenih težav nato še manj pripravljen sodelovati z informatiki, kar odnos le dodatno poslabšuje (Bashein & Markus, 1997; Nord, et al., 2007).

Prav zaradi navedenega je zelo pomembno, da imajo informatiki v podjetju ustrezno mesto, kar velja predvsem za direktorja službe za informatiko. Raziskave potrjujejo, da so pri informatizaciji uspešnejša tista podjetja, kjer ima direktor službe za informatiko pomembno vlogo v podjetju kot član najvišjega vodstva, ali pa kjer je neposredno podrejen vodilnemu managerju (Ranganathan & Kannabiran, 2004).

1.6 Zaznana vrednost informatike

Proučevanje vpliva informatike na poslovno vrednost predstavlja velik izziv raziskovalcem v zadnjih desetletjih (Luo, Fan, & Zhang, 2012; Piccoli & Ives, 2005; Wagner & Weitzel, 2007). Glede na pomembno vlogo informatike predstavlja prikazovanje pomena investiranja vanjo bistven znanstveni prispevek na tem področju (Agarwal & Lucas Jr, 2005). Zato je precej raziskovalcev motiviranih k proučevanju razumevanja vpliva informatike na izboljšanje organizacijske uspešnosti (Melville, Kraemer, & Gurbaxani, 2004).

Z namenom, da je strategija informatike osredotočena na ustvarjanje poslovne vrednosti, je smiselno, da sta strateški plan informatike in strateški poslovni plan združena v enoten

dokument, kar omogoča, da temeljna strategija ostaja nespremenjena, medtem ko se izvedba plana lahko spreminja (Philip, 2007). Informatika mora biti pomemben del strategije, saj zgolj tehnologija sama po sebi ne prispeva k dvigu poslovne uspešnosti, ampak prispeva kot del celotnega sistema, ki izboljšuje ustvarjanje ekonomske vrednosti (Piccoli & Ives, 2005).

Informatika omogoča prenavljanje poslovnih procesov, strateška povezovanja in pridobivanje konkurenčnih prednosti (Avison, Cuthbertson, & Powell, 1999), zato lahko predstavlja vrednost za organizacijo (McKeen & Smith, 1996). Navsezadnje, informatika ustvarja poslovno vrednost z omogočanjem učinkovitega izvajanja poslovnih procesov in omogoča organizacijam, da opravljajo svoje aktivnosti bolje v primerjavi s konkurenti (Luo, et al., 2012). Kljub svojim možnostim pa je služba za informatiko pogosto upoštevana zgolj kot podporna dejavnost (Avison, et al., 1999).

Dejavniki, ki spodbujajo managerje k oblikovanju poslovnih partnerstev med podjetji in predstavljajo vrednost v partnerskem odnosu, so bili proučevani v raziskavi (Tuten & Urban, 2001), kjer so bili razdeljeni v več kategorij, razvrščenih po pomembnosti, in sicer: (1) želja po nižanju stroškov, vključno z zmanjšanjem nepotrebnega podvajanja dela, (2) zagotavljanje večjega števila storitev, (3) krepitev konkurenčnih prednosti, (4) izboljšanje poslovne učinkovitosti, vključno s povečevanjem tržnega deleža in dobičkonosnosti, (5) povečanje kvalitete izdelkov in storitev ter (6) pridobivanje različnih ugodnosti s strani partnerjev, vključno z zanesljivimi dobavnimi viri.

Mohr in Spekmanov model (Mohr & Spekman, 1994) je bil tako nadgrajen z osnovnimi pogoji, ki so pomembni pri ustvarjanju vrednosti partnerstva med podjetji, in sicer s pričakovanji po nižjih stroških, izboljšanih storitvah, povečevanju konkurenčnih prednosti, izboljšani kakovosti, večji prodaji, dobičkonosnosti in tržnem deležu. Ti dejavniki predstavljajo pričakovanja potencialnega partnerja v zvezi z vsakim posameznim partnerskim razmerjem in vrednost sklenjenega partnerstva (Tuten & Urban, 2001).

Vendar pa je bilo v raziskavi (Tuten & Urban, 2001) tudi prikazano, da se dejanske koristi vstopa v partnerski odnos razlikujejo od dejavnikov, ki povzročijo oblikovanje partnerskega odnosa. Dejanske koristi so bile razvrščene kot (1) izboljšanje uspešnosti poslovanja, (2) želja po nižjih stroških, (3) pridobivanje različnih koristi iz odnosa, (4) zagotavljanje večjega števila storitev, (5) širjenje oglaševanja, (6) večja kvaliteta proizvodov in storitev ter (7) izboljšanje konkurenčnih prednosti.

Navsezadnje, če potencialni partner ne pričakuje oziroma ne zaznava ugodnosti iz partnerskega odnosa, tudi interes za oblikovanje takega partnerstva ne obstaja. Zato so bili predpogoji partnerskega odnosa iz razširjenega Mohr in Spekmanovega modela uporabljeni v disertaciji za oblikovanje konstrukta zaznane vrednosti informatike kot pomembnega dejavnika partnerskega odnosa.

2 PROBLEMATIKA PREDLAGANE TEME

Kljub prizadevanjem po premostitvi prepada med informatiki in managementom je ta v veliko podjetjih še vedno prisoten. Posledice neustreznega odnosa so škodljive za podjetje, saj ne samo onemogočajo učinkovito investiranje v informatiko, zaradi česar je veliko projektov informatizacije neuspešnih, ampak tudi onemogočajo izrabo informacijskih sistemov kot konkurenčne prednosti.

Strokovna literatura je na področju odnosa med managementom in informatiki zelo obširna. Čeprav so se v preteklosti pojavljala precej različna mnenja o ukrepih za vzpostavljanje učinkovitih odnosov, so slednja v zadnjem času bistveno bolj enotna mnenja. Večina avtorjev se osredotoča predvsem na obojestranska znanja tako informatikov kot managerjev (Byrd & Turner, 2001; Green, 1989; Jenkins, 1986; Ranganathan & Kannabiran, 2004; Wade & Parent, 2001). Za uspešen odnos med informatiki in vodilnim managementom je namreč pomembno, da informatiki razpolagajo z ustreznimi poslovnimi znanji, saj ta omogočajo ustrezno komunikacijo z vodstvom. To pa je tudi pogoj, da informatiki pridobijo podporo vodstva, ki je ključnega pomena za uspešno informatizacijo v podjetjih (Ragu-Nathan, et al., 2004). Le uspešna informatizacija v podjetju vodi k večjemu zaupanju in povečanju kredibilnosti informatikov ter ne nazadnje k doseženemu partnerstvu med informatiki in managementom.

Ravno nasprotno pa se v podjetjih, kjer služba za informatiko predstavlja le podporno funkcijo, pogosto informatizira le obstoječe procese, ki so lahko neučinkoviti in neprimerni za informatizacijo (Kovačič, Jaklič, Indihar Štemberger, & Groznik, 2004).

Prav zaradi posledic neuspešne informatizacije, ki so v današnjem poslovnem okolju lahko usodne za podjetje, je problematika predlagane teme vedno večja in želja po premostitvi razkoraka oziroma večjem sodelovanju med vodilnim managementom in informatiki vedno bolj prisotna.

3 NAMEN IN CILJI DISERTACIJE

Preučevanje odnosa med informatiki in managementom ni novo raziskovalno področje. Iz opisa ožjega znanstvenega področja je razvidno, da je razkorak med vodilnim managementom in informatiki tema, ki se v strokovni in znanstveni literaturi pogosto pojavlja. Tema je precej aktualna, saj je kljub številnim prispevkom in prizadevanjem za premostitev tega razkoraka slednji še vedno prisoten in močno vpliva na potek informatizacije v podjetju, kar ima lahko v današnjem poslovnem okolju razsežne negativne posledice. Zato je potrebno v podjetjih razviti primernejši odnos med managementom in informatiki. Razmere na dinamičnem trgu namreč zahtevajo posebno obliko partnerstva med managementom in informatiki, saj je le tako informatika v podjetju razumljena kot sredstvo za uspešnejše poslovanje in ne zgolj kot strošek podjetja.

Namen disertacije je prispevati k razumevanju razkoraka med vodilnim managementom in informatiki ter k boljšemu sodelovanju med njimi. Cilji disertacije tako zajemajo:

1. prikaz ključnih dejavnikov, ki so pomembni v odnosu med managementom in informatiki;
2. prikaz ključnih dejavnikov, ki povzročajo razkorak med njimi;
3. proučiti in definirati pojem razkoraka med vodilnim managementom in informatiki;
4. prikazati dejavnike, ki omogočajo pridobitev podpore vodstva;
5. prikazati dejavnike, ki ustvarjajo partnerski odnos in tako omogočajo boljše sodelovanje med vodilnim managementom in informatiki.

Osrednje raziskovalno vprašanje je tako povezano s premostitvijo razkoraka med managementom in informatiki. Pri tem ni mišljena odprava razlik med managementom in informatiki, temveč iskanje dejavnikov, ki povečujejo sodelovanje med omenjenima stranema in vodijo do večjega prispevka k uspešnosti poslovanja. Raziskovalno vprašanje se torej nanaša na iskanje dejavnikov, ki ta razkorak zmanjšujejo oziroma zbližujejo tako informatike kot tudi managerje pri zasledovanju skupnih ciljev, ter preverjanje, v kolikšni meri lahko posamezniki, tako managerji kot informatiki, prispevajo k partnerskemu odnosu.

4 HIPOTEZE DISERTACIJE

Na podlagi strokovne in znanstvene literature ter predavanj tako vodilnega managementa kot direktorjev službe za informatiko na različnih konferencah in poglobljenih intervjujev z njimi je bila oblikovana naslednja temeljna teza:

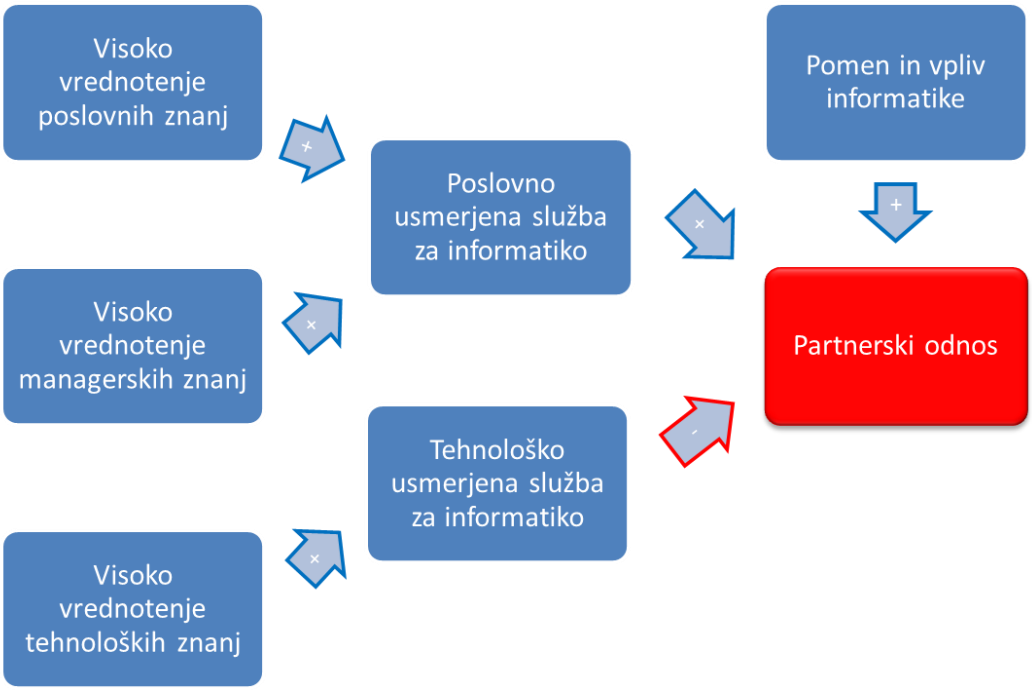
»Pomanjkanje sodelovanja med informatiki in vodilnim managementom izvira iz različnega pogleda informatikov in vodilnega managementa glede vloge informatikov, kar vodi v razkorak med njimi. Za zmanjšanje razkoraka je pomembno ustvariti partnerski odnos med vodilnim managementom in informatiki. Eden izmed najpomembnejših dejavnikov partnerskega odnosa je poslovna vloga informatikov, ki je odvisna od poslovnih znanj in veščin direktorja službe za informatiko. Pomemben predpogoj za ustvarjanje partnerskega odnosa pa je tudi podpora vodstva informatiki.«

Iz temeljne teze izhajajo spodaj navedene hipoteze doktorske disertacije. Konceptualni model, ki združuje navedene hipoteze in njihove povezave, prikazuje Slika 3.

- H1: V odnosu med informatiki in managerji obstajajo različni dejavniki, ki povzročajo razkorak med njimi.
- H2: Pogled vodilnega managementa glede vloge informatikov se razlikuje od pogleda informatikov.
- H3: Poslovna in managerska znanja direktorja službe za informatiko pozitivno vplivajo na pridobitev podpore vodstva.

- H4: Poslovna znanja direktorja službe za informatiko imajo pozitiven vpliv na poslovno usmerjenost informatikov.
- H5: Managerska znanja direktorja službe za informatiko imajo pozitiven vpliv na poslovno usmerjenost informatikov.
- H6: Visoko vrednotenje tehnoloških znanj direktorja službe za informatiko ima pozitiven vpliv na tehnološko usmerjenost informatikov.
- H7: Poslovna usmerjenost informatikov pozitivno vpliva na partnerski odnos med vodilnim managementom in informatiki.
- H8: Tehnološka usmerjenost informatikov negativno vpliva na partnerski odnos med vodilnim managementom in informatiki.
- H9: Zaznana vrednost oziroma pomen informatike ima pozitiven vpliv na partnerski odnos vodstva z informatiki.

Slika 3: Konceptualni model



Zgornja slika prikazuje konceptualni model z opredeljenimi vplivi na partnerski odnos, in sicer da ima poslovno usmerjena služba za informatiko pozitiven vpliv na partnerski odnos, medtem ko ima tehnološko usmerjena služba negativen vpliv. Poleg tega podpora vodstva informatizaciji ravno tako pozitivno vpliva na partnerski odnos kot tudi znanja vodilnega managementa s področja informatike.

5 OCENA PRISPEVKA DISERTACIJE K ZNANOSTI

Disertacija ima tako znanstveni kot tudi strokovni prispevek, saj nadgrajuje zbrano literaturo z omenjenega področja, predvsem z vidika izvedenih empiričnih raziskav. Hipoteze doktorske disertacije so lahko prenesljive v katero koli ozemeljsko okolje in tako lahko

različnim avtorjem predstavljajo izziv za nadgradnjo svojih prispevkov z omenjenega področja. Znanstveni prispevek doktorske disertacije zajema predvsem:

- Definiranje razkoraka – večina avtorjev razkorak le omenja in opredeljuje njegove posledice. V znanstveni literaturi pa pravzaprav ni zaslediti definicije razkoraka oziroma prikaza dejavnikov, ki tvorijo ta razkorak. Ravno vzporedna raziskava med vodilnim managementom in informatiki pa omogoča definiranje razkoraka in prikaz tvornikov razkoraka.
- Nadgradnja obstoječih modelov – večina avtorjev se v svojih raziskavah osredotoča le na posamezne dejavnike zmanjševanja razkoraka. Veliko je raziskav, da je podpora vodstva ključna, redko pa se preučuje, kako pridobiti podporo vodstva. Dejavniki na tem področju pa so pogosto le splošno opredeljeni.
- Opredelitev in definiranje partnerskega odnosa ter prikaz dejavnikov, ki vplivajo na partnerski odnos med vodilnim managementom in informatiki.
- Omogočanje nadaljnjih raziskav – predstavljeni rezultati in izdelan model omogočajo izvajanje nadaljnjih raziskav in nadgradnjo modela v smislu:
    - preučevanja vpliva naklonjenosti vodstva na izboljšane poslovne procese, uspešnost poslovanja …;
    - apliciranja modela tudi na odnos vodstva (poslovne skupine) do drugih neposlovnih skupin v podjetjih;
    - preučevanja vpliva izobraževalnega sistema na osebnostne lastnosti in posledično odnos med managerji in informatiki.

Strokovni prispevek je razviden predvsem iz prikaza dejavnikov, ki omogočajo zmanjševanje razkoraka med managerji in informatiki oziroma omogočajo večje sodelovanje med njimi ter posledično povečujejo možnost za uspešno izvedbo projektov informatizacije podjetij. To podjetjem omogoča hitrejše ukrepanje predvsem v primeru, ko odnosi med opazovanimi subjekti ne omogočajo optimalnega izkoriščanja informatike za namene povečevanja učinkovitosti poslovanja.

6 OPIS ZNANSTVENE METODE

V empiričnem delu, ki temelji na treh raziskavah, prevladujejo kvantitativne metode. Za preverjanje hipotez sta bila uporabljena anketna vprašalnika iz raziskav »Poslovna informatika v Sloveniji 2006« in »Poslovna informatika v Sloveniji 2009«. Za potrebe doktorske disertacije je bil predhodno prilagojen poseben sklop anketnega vprašalnika »Poslovna informatika v Sloveniji 2009«. Dodatna raziskava se je izvajala v obliki intervjujev z direktorji informatike v srednjih in velikih podjetjih v Sloveniji v letu 2011.

Druga raziskava pa je temeljila na lastnem anketnem vprašalniku, ki se je izvajal med vodilnim managementom. Namen tega vprašalnika, ki je delno temeljil na raziskavi »Poslovna informatika v Sloveniji 2009«, je prikazati razlike v pogledih med vodilnim managementom in informatiki, saj omogočajo primerjavo med odgovori vodilnega

managementa z odgovori direktorja informatike oziroma osebo, zadolženo za področje informatike. S tem je bilo omogočeno pridobiti dejavnike, ki povzročajo razkorak med vodilnim managementom in informatiki ter dejavnike, ki omogočajo večje sodelovanje med njimi.

Pri analizi podatkov so bile uporabljene statistične metode, kot so opisne statistike za iskanje splošnih značilnosti vzorca, raziskovalna faktorska analiza, t-testi in Mann-Whitney U test za primerjavo razlik med informatiki in managementom ter sistemi strukturnih linearnih enačb za proučevanje odnosov med latentnimi spremenljivkami in potrditev predlaganega modela.

7 STRUKTURA DISERTACIJE

V uvodu disertacije je opisana problematika obravnavane teme, predstavljeni so cilji in namen disertacije ter krajši pregled znanstvenega področja, ki se nanaša na obravnavano temo. V uvodnem delu so predstavljene tudi hipoteze, povzetek uporabljenih znanstvenih metod ter prispevek disertacije k znanosti.

V drugem delu so predstavljeni članki, ki tvorijo osrednji del disertacije ter natančnejši opis znanstvenih metod, ki so uporabljene v disertaciji. Tako ta del uvodoma pojasnjuje povezljivost med članki ter prikazuje, kako posamezni članek prispeva k potrjevanju hipotez. Poleg tega so predstavljene znanstvene metode, ki so uporabljene v vsakem posameznem članku. V tem delu so predstavljene tudi raziskave, ki tvorijo jedro disertacije ter osnovne opisne statistike, povezane s profili anketirancev.

Osrednji del disertacije je vsebinsko razdeljen na štiri članke, ki razvijajo temeljno tezo disertacije, in sicer:

- *Prvi članek* identificira dejavnike, ki so pomembni v odnosu med informatiki in vodilnim managementom ter prikaže dejavnike, ki povečujejo razkorak med njimi.
- *Drugi članek* opredeli pojem razkoraka s prikazom razlik v pogledih vodilnega managementa in direktorjev službe za informatiko oziroma oseb, zadolženih za informatiko. Poleg tega podrobneje predstavi razlike v pričakovanih znanjih in veščinah informatikov s strani vodilnega managementa.
- *Tretji članek* predstavi dejavnike, ki omogočajo pridobitev podpore vodstva kot enega izmed ključnih dejavnikov partnerskega odnosa.
- *Četrti* članek prikazuje model partnerskega odnosa s prikazom najpomembnejših dejavnikov in vpliv posameznih dejavnikov na partnerski odnos.

Zadnji del disertacije pa predstavlja zaključek, ki povzema potrjene hipoteze, opredeljuje omejitve disertacije ter navaja področja za prihodnje raziskave.

8 REZULTATI DISERTACIJE

Rezultati disertacije potrjujejo predlagane hipoteze, in sicer:

H1: V odnosu med informatiki in managerji obstajajo različni dejavniki, ki povzročajo razkorak med njimi.

Hipoteza je potrjena v prvem članku, ki predstavlja dejavnike, pomembne v odnosu med vodilnim managementom in informatiki. Raziskava potrjuje, da obstaja devet dejavnikov v tem odnosu, od katerih je sedem dejavnikov različno zaznanih s strani vodilnega managementa in direktorjev službe za informatiko. Teh sedem dejavnikov tudi povečuje oziroma povzroča razkorak med informatiki in vodilnim managementom.

H2: Pogled vodilnega managementa glede vloge informatikov se razlikuje od pogleda informatikov.

Hipoteza je potrjena v drugem članku, ki predstavlja pomembne razlike med direktorji službe za informatiko in vodilnim managementom. V raziskavi so uporabljeni dejavniki, ki so predstavljeni v prvem članku, s posebnim poudarkom na znanjih in veščinah.

H3: Poslovna in managerska znanja direktorja službe za informatiko pozitivno vplivajo na pridobitev podpore vodstva.

Hipoteza je potrjena v tretjem članku, ki predstavlja dejavnike, pomembne za pridobitev podpore vodstva. Raziskava je potrdila, da imajo poslovna in managerska znanja ter poslovna usmerjenost informatikov neposreden pozitiven vpliv na podporo vodstva.

H4: Poslovna znanja direktorja službe za informatiko imajo pozitiven vpliv na poslovno usmerjenost informatikov.

Hipoteza je potrjena v četrtem članku, ki predstavlja partnerski model in dejavnike, pomembne za ustvarjanje partnerskega odnosa. Raziskava je potrdila, da imajo poslovna znanja in veščine največji standardizirani vpliv na poslovno usmerjenost informatikov.

H5: Managerska znanja direktorja službe za informatiko imajo pozitiven vpliv na poslovno usmerjenost informatikov.

Hipoteza je potrjena v četrtem članku. Ugotovljeno je bilo, da managerska znanja in veščine pozitivno vplivajo na poslovno usmerjenost informatikov, vendar je standardizirani vpliv bistveno nižji od učinka poslovnih znanj in veščin.

H6: Visoko vrednotenje tehnoloških znanj direktorja službe za informatiko ima pozitiven vpliv na tehnološko usmerjenost informatikov.

Hipoteza je potrjena v četrtem članku. Ugotovljeno je bilo, da imajo tehnološko znanje in veščine pozitiven vpliv na tehnološko usmerjenost informatikov. Delež pojasnjene variance tehnološke usmerjenosti pa je precej nizek, kar pomeni, da zgolj tehnološko znanje in veščine niso edini dejavnik, ki vplivajo na tehnološko usmerjenost informatikov.

H7: Poslovna usmerjenost informatikov pozitivno vpliva na partnerski odnos med vodilnim managementom in informatiki.

Hipoteza je potrjena v četrtem članku. Ugotovljeno je bilo, da ima poslovna usmerjenost informatikov največji pozitivni standardizirani vpliv na partnerski odnos. Ugotovitev tako potrjuje, da je poslovna usmerjenost informatikov najpomembnejši dejavnik za ustvarjanje partnerskega odnosa med informatiki in vodilnim managementom.

H8: Tehnološka usmerjenost informatikov negativno vpliva na partnerski odnos med vodilnim managementom in informatiki.

Hipoteza je potrjena v četrtem članku. Ugotovljeno je bilo, da ima tehnološka usmerjenost informatikov negativen vpliv na partnerski odnos. Standardizirani vpliv usmerjenosti na partnerski odnos je bistveno nižji od preostalih dejavnikov, ki vplivajo na odnos, vendar je še vedno statistično značilen.

H9: Zaznana vrednost informacijske tehnologije pozitivno vpliva na partnerstvo med najvišjim vodstvom in informatiki.

Hipoteza je potrjena v četrtem članku. Ugotovljeno je bilo, da je ima zaznana vrednost informatike oziroma pomen informatike velik pozitiven vpliv na partnerski odnos.

9 SKLEP

Razkorak med informatiki in vodilnim managementom ostaja pomembno vprašanje, saj vpliva na uspešnost izvajanja informatike in s tem tudi na uspešnost podjetja. Namen te disertacije ni bila odprava razlik, saj bodo razlike med poslovno stranjo in informatiki vedno prisotne. Namen disertacije je prispevati k razumevanju teh razlik med poslovnim osebjem in informatiki ter k zmanjšanju razkoraka med njimi z ustvarjanjem partnerskega odnosa. Disertacija tako prikazuje in opredeljuje razkorak z opredelitvijo dejavnikov, ki so pomembni v odnosu med managementom in informatiki ter z izpostavljanjem pomembnih razlik med vodilnimi managerji in vodilnimi informatiki.

Opredelitev razkoraka je še posebej pomembna, saj je nerazumevanje med vodilnim managementom in informatiki v določeni meri lahko odpraviti že zgolj s poznavanjem dejavnikov, ki so pomembni v tem odnosu, in s poznavanjem najbolj problematičnih področij

znotraj teh dejavnikov. Čeprav bo razkorak najverjetneje vedno obstajal, ugotovitve te disertacije omogočajo premostiti ta razkorak in preko partnerskega odnosa omogočiti ustrezno sodelovanje med informatiki in vodilnim managementom.

Partnerstvo, ki načeloma označuje obliko sodelovanja med različnimi akterji, je bilo v disertaciji aplicirano tudi na odnos med informatiki in vodilnim managementom. V tem smislu partnerski odnos predstavlja stanje, kjer lahko različne osebe učinkovito sodelujejo skupaj, kljub očitnim razlikam med njimi oziroma kljub razkoraku med njimi.

LITERATURA

1. Agarwal, R., & Lucas Jr, H. C. (2005). The information systems identity crisis: Focusing on high-visibility and high-impact research. MIS Quarterly, 29(3), 381-398.
2. Avison, D. E., Cuthbertson, C. H., & Powell, P. (1999). The paradox of information systems: strategic value and low status. The Journal of Strategic Information Systems, 8(4), 419-445.
3. Bashein, B., & Markus, M. (1997). A credibility equation for IT specialists. Sloan Management Review, 38(4), 35-44.
4. Bassellier, G., Reich, B. H., & Benbasat, I. (2001). Information technology competence of business managers: A definition and research model. Journal of Management Information Systems, 17(4), 159-182.
5. Byrd, T. A., & Davidson, N. W. (2003). Examining possible antecedents of IT impact on the supply chain and its effect on firm performance. Information & Management, 41(2), 243-255.
6. Byrd, T. A., & Turner, D. B. (2001). An Exploratory Analysis of the Value of the Skills of IT Personnel: Their Relationship to IS Infrastructure and Competitive Advantage. Decision Sciences, 32(1), 21-54.
7. Caldeira, M. M., & Ward, J. M. (2002). Understanding the successful adoption and use of IS/IT in SMEs: an explanation from Portuguese manufacturing industries. Information Systems Journal, 12(2), 121-152.
8. Chen, L. (2010). Business–IT alignment maturity of companies in China. Information & Management, 47(1), 9-16.
9. Clark, C. E., Cavanaugh, N. C., Brown, C. V., & Sambamurthy, V. (1997). Building Change-Readiness Capabilities in the IS Organization: Insights From the Bell Atlantic Experience. MIS Quarterly, 21(4), 425-455.
10. Coughlan, J., Lycett, M., & Macredie, R. D. (2005). Understanding the business-IT relationship. International Journal of Information Management, 25(4), 303-319.
11. Cross, J., Earl, M. J., & Sampler, J. L. (1997). Transformation of the IT function at British Petroleum. MIS Quarterly, 21(4), 401-424.
12. Davis, D. B. (1993). Hard demand for soft skills. Datamation, 39(2), 28-32.
13. Dhillon, G. (2008). Organizational competence for harnessing IT: A case study. Information & Management, 45(5), 297-303.
14. Doll, W. J., & Ahmed, M. U. (1983). Diagnosing and Treating the Credibility Syndrome. MIS Quarterly, 7(3), 21-32.
15. Dos Santos, B., & Sussman, L. (2000). Improving the return on IT investment: the productivity paradox. International Journal of Information Management, 20(6), 429-440.
16. Earl, M. J., & Feeney, D. F. (1994). Is Your CIO Adding Value? Sloan Management Review, 35(3), 11-20.
17. Green, G. I. (1989). Perceived Importance Of Systems Analysts' Job Skills, Roles. MIS Quarterly, 13(2), 115-133.

18. Grindley, K. (1992). Information systems issues facing senior executives: the culture gap. The Journal of Strategic Information Systems, 1(2), 57-62.
19. Hayden, F. (2002). A Mars/Pluto Relationship. Optimize Magazine.
20. Henderson, J. C., & Venkatraman, N. (1993). Strategic alignment: Leveraging information technology for transforming organizations. IBM Systems Journal, 32(1), 4-17.
21. Ives, B., & Olson, M. H. (1981). Manager or Technician? The Nature of the Information Systems Manager's Job. [Article]. MIS Quarterly, 5(4), 49-63.
22. Jenkins, G. H. (1986). Education Requirements for the Entry Level Business Systems Analyst. Journal of Systems Management, 37(8), 30-33.
23. Jones, M. C., Taylor, G. S., & Spencer, B. A. (1995). The CEO/CIO relationship revisited: An empirical assessment of satisfaction with IS. Information & Management, 29(3), 123-130.
24. Joslin, E. O., & Bassler, R. A. (1976). Systems Managers Speak Out On Profession's Directions. Journal of Systems Management, 27(2), 18-21.
25. Kanter, R. M. (1994). Collaborative advantage: the art of alliances. Harvard business review, 72(4), 96-108.
26. Kearns, G. S. (2006). The effect of top management support of SISP on strategic IS management: insights from the US electric power industry. Omega, 34(3), 236-253.
27. Kovačič, A. (2004). Management in informatika - kako odpraviti prepad? (pp. 3-15). Portorož: Slovenian society Informatika.
28. Kovačič, A., & Bosilj-Vukšić, V. (2005). Management poslovnih procesov: prenova in informatizacija poslovanja s praktičnimi primeri (1st ed.). Ljubljana: GV založba.
29. Kovačič, A., Jaklič, J., Indihar Štemberger, M., & Groznik, A. (2004). Prenova in informatizacija poslovanja (1st ed.). Ljubljana: Ekonomska fakulteta.
30. Lee, D. M. S., Trauth, E. M., & Farwell, D. (1995). Critical skills and knowledge requirements of IS professionals: A joint academic/industry investigation. MIS Quarterly, 19(3), 313-340.
31. Lee, S., & Fang, X. (2008). Perception Gaps about Skills Requirement for Entry-Level IS Professionals between Recruiters and Students: An Exploratory Study. Information Resources Management Journal, 21(3), 39-63.
32. Litecky, C. R., Arnett, K. P., & Prabhakar, B. (2004). The paradox of soft skills versus technical skills in is hiring. Journal of Computer Information Systems, 45(1), 69-76.
33. Luftman, J. N. (2000). Assessing Business-IT Alignment Maturity. Communications of the Association for Information Systems, 4(14), 1-50.
34. Luo, J., Fan, M., & Zhang, H. (2012). Information technology and organizational capabilities: A longitudinal study of the apparel industry. Decision Support Systems, 53(1), 186-194.
35. Malena, C. (1995). Relations between northern and southern non-governmental development organizations. Canadian Journal of Development Studies, 16(1), 7-30.

36. Martin, V. A., Hatzakis, T., Lycett, M., & Macredie, R. (2004). Building the Business/IT Relationship through Knowledge Management. Journal of Information Technology Cases and Applications, 6(2), 27-47.
37. Mata, F. J., Fuerst, W. L., & Barney, J. B. (1995). Information technology and sustained competitive advantage: A resource-based analysis. MIS Quarterly, 19(4), 487-505.
38. McKeen, J. D., & Smith, H. A. (1996). Management challenges in IS: successful strategies and appropriate action. Chichester: Wiley.
39. Melville, N., Kraemer, K., & Gurbaxani, V. (2004). Information technology and organizational performance: An integrative model of it business value. MIS Quarterly, 28(2), 283-322.
40. Misic, M. M., & Graf, D. K. (2004). Systems analyst activities and skills in the new millennium. Journal of Systems and Software, 71(1-2), 31-36.
41. Mohr, J., & Spekman, R. (1994). Characteristics of partnership success: partnership attributes, communication behavior, and conflict resolution techniques. Strategic management journal, 15(2), 135-152.
42. Nelson, R. R. (1991). Educational Needs as Perceived by IS and End-User Personnel: A Survey of Knowledge and Skill Requirements. MIS Quarterly, 15(4), 502-525.
43. Newman, M., & Zhao, Y. (2008). The process of enterprise resource planning implementation and business process re-engineering: tales from two Chinese small and medium-sized enterprises. Information Systems Journal, 18(4), 405-426.
44. Niederman, F., Brancheau, J. C., & Wetherbe, J. C. (1991). Information Systems Management Issues for the 1990s. MIS Quarterly, 15(4), 474-500.
45. Nord, J. H., Nord, D. G., Cormack, S., & 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(3), 265-292.
46. Papp, R. (1999). Business-IT alignment: productivity paradox payoff? Industrial Management & Data Systems, 99(8), 367-373.
47. Peppard, J. (2001). Bridging the gap between the IS organization and the rest of the business: plotting a route. Information Systems Journal, 11(3), 249-270.
48. Peppard, J., & 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(1), 29-60.
49. Philip, G. (2007). IS Strategic Planning for Operational Efficiency. Information Systems Management, 24(3), 247-264.
50. Piccoli, G., & Ives, B. (2005). Review: IT-dependent strategic initiatives and sustained competitive advantage: A review and synthesis of the literature. MIS Quarterly, 29(4), 747-776.
51. Ragu-Nathan, B. S., Apigian, C. H., Ragu-Nathan, T. S., & Tu, Q. (2004). A path analytic study of the effect of top management support for information systems performance. Omega, 32(6), 459-471.

52. Ranganathan, C., & Kannabiran, G. (2004). Effective management of information systems function: an exploratory study of Indian organizations. International Journal of Information Management, 24(3), 247-266.
53. Rockart, J. F., Earl, M. J., & Ross, J. W. (1996). Eight Imperatives for the New IT Organization. Sloan Management Review, 38(1), 43-56.
54. Sledgianowski, D., Luftman, J. N., & Reilly, R. R. (2006). Development and validation of an instrument to measure maturity of IT business strategic alignment mechanisms. Innovative Technologies for Information Resources Management, 19(3), 18-33.
55. Teng, B. S. (2003). Collaborative advantage of strategic alliances: value creation in the value net. Journal of General Management, 29(2), 1-22.
56. Teo, T. S. H., & Ang, J. S. K. (2001). An examination of major IS planning problems. International Journal of Information Management, 21(6), 457-470.
57. Tian, J., Wang, K., Chen, Y., & Johansson, B. (2010). From IT deployment capabilities to competitive advantage: An exploratory study in China. Information Systems Frontiers, 12(3), 239-255.
58. Todd, P. A., McKeen, J. D., & Gallupe, R. B. (1995). The evolution of IS job skills: A content analysis of IS job. MIS Quarterly, 19(1), 1-28.
59. Tuten, T. L., & Urban, D. J. (2001). An expanded model of business-to-business partnership formation and success. Industrial Marketing Management, 30(2), 149-164.
60. Vitalari, N. P. (1985). Knowledge as a Basis for Expertise in Systems Analysis: An Empirical Study. MIS Quarterly, 9(3), 221-241.
61. Wade, M., R. , & Parent, M. (2001). Relationships between job skills and performance: A study of webmasters. Journal of Management Information Systems, 18(3), 71-96.
62. Wagner, H. T., & Weitzel, T. (2007). Towards an IT production function: Understanding routines as fundamental for IT value creation. Journal of Enterprise Information Management, 20(4), 380-395.
63. Ward, J., & Peppard, J. (1996). Reconciling the IT/business relationship: a troubled marriage in need of guidance. The Journal of Strategic Information Systems, 5(1), 37-65.
64. Watson, H. J., Young, D., Miranda, S., Robichaux, B., & Seerley, R. (1990). Requisite skills for new MIS hires. SIGMIS Database, 21(1), 20-29.
65. Yen, D. C., Chen, H.-G., Lee, S., & Koh, S. (2003). Differences in perception of IS knowledge and skills between academia and industry: findings from Taiwan. International Journal of Information Management, 23(6), 507-522.
66. Young, R., & Jordan, E. (2008). Top management support: Mantra or necessity? International Journal of Project Management, 26(7), 713-725.