From IT-Business Strategic Alignment to Performance

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From IT-Business Strategic Alignment to Performance: A Moderated Mediation Model of Social Innovation and Enterprise Governance of IT

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Preface

The issue why IT and Business aligned strategies fail to achieve the desired goals has been often brought up for discussion by my EMBA (Executive Master of Business Administration) students. I am privileged to teach them *organizational performance and management information systems*. The rich experience as a consultant in the design and implementation of strategic *performance* systems enabled me to show the students the intricacies of their question. The main controversial decisions are taken in the period between (1) having reached a consensus of aligned strategies, specifically concerning business and IT strategies, and (2) the implementation of the aligned strategies by the organization.

As a result of both professions (teacher and consultant), I stumbled into an interesting and significant issue. First, I observed that firms in their daily practice had several theoretical techniques available for aligning their business and IT strategies (e.g., the Balanced Score Card cascading and the matching matrix of business and IT processes). Then I saw that those techniques generated aligned strategies (in theory). However, many firms fail to implement them satisfactorily. Thus, two prevailing questions remained: (1) *Why does the implementation fail? and (2) What factors could lead to the realization of a higher performance and a higher rate of return on IT investments?* This continuous inquiry in the area connecting practice and academia has been the main source of inspiration underlying this PhD study.

The *Enterprise Governance of IT* (EGIT) as it is known today and defined in this study is a relatively new and unexplored concept. In addition, *Innovation* is an important and well established antecedent factor of organizational *performance*. In the literature, there are only a few studies performed at the departmental level combining strategy alignment, EGIT, social innovation, and *performance*. Consequently, I was inspired to take on the challenge and explore the interesting combination of these *performance* factors.

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List of Abbreviations

AMOS	Analysis of Moment Structures - Statistical software
ANOVA	Analysis of Variance
ARPAnet	Advanced Research Projects Agency Network
BI	Business Intelligence
BSC	Balanced Score Card
CEO	Chief Executive Officer
CFI	Comparative Fit Index
CIO	Chief Information Officer
CIS	Community Innovation Survey
CISR	Center for Information Systems Research
COBIT	Control Objectives for Information and Related Technologies
CRM	Customer Relationship Management
CS	Corporate Sustainability
CSO	Civil Society Organization
DBS	Digital Business Strategy
DCT	Dynamic Capabilities Theory
DJSI	Dow Jones Sustainability Index
DSS	Decision Support System
EC	European Commission
EGIT	Enterprise Governance of IT
EMBA	Executive Master of Business Administration
ENIAC	Electronic Numerical Integrator and Calculator
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
ESS	Executive Support System
GDP	Gross Domestic Product
GLS	Generalized Least Square
HRM	Human Resource Management
IBM	International Business Machines Co.
INTEL	Integrated Electronics Co.
IS	Information Systems
ISACA	Information Systems Audit and Control Association
IT	Information Technology
IT/IS	Information Technology/Information Systems
ITAG	IT Alignment and Governance Research Institute
ITBSA	IT Business Strategic Alignment
ITGI	IT Governance Institute

ITS	IT Strategy
KM	Knowledge Management
MAS	Multi-Agent System
MIS	Management Information Systems
MIT	Massachusetts Institute of Technology
ML	Maximum Likelihood
MNC	Multi National Corporation
NFP	Non-for Profit Organization
NGO	Non-Governmental Organization
NNFI	Non-Normed Fit Index
PC	Personal Computer
PCFI	Parsimonious Comparative Fit Index
PIMS	Profit Impact of Marketing Strategies
PLS	Partial Least Squares
PS	Problem Statement
RM	Research Methodology
RMSEA	Root Mean Square Error of Approximation
RQ	Research Question
SAM	Strategic Alignment Model
SCM	Supply Chain Management
SEM	Structural Equation Modeling
SIS	Strategic Information System
SIW	Social Innovation at Work
SOX	Sarbanes-Oxley Act of 2002
SP	Social Performance
SRMR	Standardized Root Mean square Residual
TBL	Triple Bottom Line
TLI	Tucker–Lewis Index
TPS	Transaction Processing System
UAMS - ITAG	University of Antwerp Management School - IT Alignment and Governance Research Institute
VAL IT	Value from IT
WLS	Weighted Least Square

List of Definitions

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CHAPTER 1 INTRODUCTION

The relation between Information Technology (IT) investments and business performance is a challenging topic of research. In the recent years, it has been investigated from many perspectives (cf. Mithas & Rust, 2016). It is claimed that the stronger the strategic alignment of IT is with the business strategy, the more gain a firm achieves from IT investments and the more profitable a firm will be (cf. Luftman, 2015). Moreover, it is stated that about half of a firm's profits can be explained by IT alignment with the business strategy. However, only one-quarter of the firms achieve the aimed alignment (and hence the desired profitability) (cf. Laudon & Laudon, 2014).

A modern line of research is studying *IT governance* which is nowadays seen as a serious player in realizing the envisaged organizational values from the precious IT investments (see De Haes & Grembergen, 2009; Coleman & Chatfield, 2011; Haghjoo, 2012; De Haes & Grembergen, 2013; Shin, Lee, Kim, & Rhim, 2015). Researchers and practitioners currently understand quite well that the value from the IT investments will mostly be created at the business side. By understanding the impact, we are aware that some business values may lead to social changes. Those social changes may in turn lead to social innovation at the departmental level, at the firm level, and even at a broader level, i.e., at national level and global level. Yet, the technological innovation will remain the main initiation concerning IT involvement and IT investment. Therefore, we will start with a focus on the business side and will examine the social dimension thereafter.

Following the recent societal development, researchers and practitioners initiated a shift in the definition of IT governance by focusing on the business involvement. The shift resulted in the occurrence of *Enterprise Governance of IT* (*EGIT).* This thesis will investigate (1) to what extent business and its strategic involvement with IT is crucial for organizational *performance* and (2) how this crucial relationship is affected by EGIT. Our research aim is to develop a framework for an IT-strategy implementation. The effect and positioning of the implementation will be thoroughly examined in terms of (a) Information Technology and Business Strategic Alignment (ITBSA), and (b) the firm's *performance* as signified by the *Social Innovation at Work* (SIW) and the departmental-level *performance*.

The relation between IT governance and the productivity resulting from IT investments has received much attention from researchers over the past ten years (cf. Haghjoo, 2012; Berghout & Tan, 2013; Lunardi, Becker, Macada, & Dolci, 2014). Yet, the voices were diverse: they showed controversy

and mixed findings (see, e.g., Syaiful, 2006; Bowen, Cheung & Rohde, 2007; Luftman & Ben-Zvi, 2009; Berghout & Tan, 2013). When going back into history, Solow (1987) was one of the first researchers who asserted: "we see computers age everywhere, except in the productivity statistics". His assertion was based on a phenomenon that has puzzled many researchers up to then. It is commonly known as the "Productivity Paradox". It poses the question of why information technologies have not provided a measurable value to the business world?

In this chapter, we provide some relevant background on the relationship between IT investments and a firm's *performance* (section 1.1). The role of IT-Business Strategic Alignment (in this thesis referred to as ITBSA) on this relationship is described in section 1.2. Social innovation at work (SIW) is addressed in section 1.3. EGIT as a major factor in the relationship between IT investments and *performance* is introduced in section 1.4. Section 1.5 formulates the problem statement of this research. Four research questions are given in section 1.6. Section 1.7 describes the research methodologies. The aim of the study is described in section 1.8. Section 1.9 provides the significance of the study and its main contributions. Finally, the structure of the thesis is described in section 1.10.

1.1 IT Investments and a Firm's Performance

Information technology often entails large capital investments in organizations (cf. Almajali & Dahalin, 2011; Berghout & Tan, 2013; Renaud, Walsh, & Kalika, 2016). In spite of the considerably large investments in IT, only a few studies on this topic have revealed the desired positive impact (cf. Schwarz, Kalika, Kefi, & Schwarz, 2010; Wong, Ngan, Chan, & Chong, 2012). Due to this fact, and due to the recent global economic recessions, there is an increased pressure by senior management to reduce IT spending and to simultaneously increase the business value from IT (cf. Coleman & Chatfield, 2011). A majority of productivity indicators point to a stagnating productivity growth or even a productivity slowdown at the aggregate level (see, e.g., in the past DeJager, 1995; more recently, Almajali & Dahalin, 2011). The view is in agreement with Strassmann (1990) who indicated that studies prior and during the 1980s found no direct relationship between IT investment and productivity neither at the level of organizations and industries, nor at the level of the economy. Historically, researchers have generated mixed results. For example, Brynjolfsson (1993) showed no significant correlation between IT investment and firm *performance*. Other researchers have supported this view by calling attention to the intermediate processes that benefit from IT rather than claiming a direct link from IT to organizational value (see, e.g., Schwarz et al., 2010; Maçada, Beltrame, Dolci, & Becker, 2012). In contrast, a third group of researchers have pointed to a positive relationship between IT and organizational value (see, e.g., Rayner, 1995; Rai, Patnayakuni, &

Patnayakuni, 1997; Neirotti & Paolucci, 2007; Coleman & Chatfield, 2011; Lunardi et al., 2014). Of course, such a controversy gave rise to a demand for further detailed research into assessing the IT-related impact on the organizational value. By the observed diversity, it was clear that the required research should have a fundamental nature. Therefore, it should examine the causal links between IT and organizational *performance* (see Sabherwal & Chan, 2001; Chan, Sabherwal, & Tatcher, 2006). The challenge was to identify the *critical factors on the path from IT investments to a firm's performance* (cf. Im, Dow, & Grover, 2001) as shown in Figure 1-1.

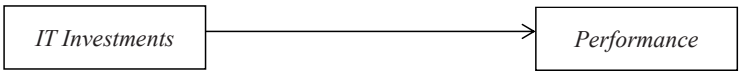


Figure 1-1 IT investments-*performance* relationship

1.2 IT Business Strategic Alignment (ITBSA)

IT Business Strategic Alignment (ITBSA) is an ambiguous and a complex issue in strategy and (IT) research (cf. Debreceny & Gray, 2011; Acur, Kandemir, & Boer, 2012; Coltman, Tallon, Sharma, & Queiroz, 2015). In general, there is no consensus on (1) what exactly alignment is[1], and (2) how it could be defined or measured. With respect to measurement, academics and practitioners do not agree what measures should be taken to maintain and improve the level of strategic alignment (cf. Silva, Plazaola, & Ekstedt, 2006; Schwarz et al., 2010; Jorfi & Jorfi, 2011; Wong et al., 2012).

Research has explored at least six types of alignments, including (a) business alignment, (b) IT alignment, (c) contextual alignment, (d) structural alignment, (e) strategic alignment, and (f) social alignment. The focus of our research is on *strategic* alignment, viz. ITBSA as defined in Ch2, Definition 2-9.

At the beginning of this century two alignment-related phenomena started to happen, (1) chief executive officers (CEOs) started to be more involved in IT-strategy formulation, and (2) chief information officers (CIOs) begun to be more active in organizational-strategy design and planning (cf. Tam, 2007; Baker & Jones, 2008; Luftman & Ben-Zvi, 2010). As a result of (1) and (2) there has been an increased interest in examining the ITBSA concept. Below we briefly discuss four groups of researchers.

[1] Chapter 2 will present various forms of alignment, see Table 2-2.

The first group of researchers (called academic researchers) studied the antecedents of the ITBSA concept in various research projects such as those described by Sabherwal & Chan (2001), Chan et al. (2006), Maçada et al. (2012), and Wu, Detmar, & Liang (2015).

The second group of researchers had a somewhat different orientation (called application-oriented researchers). They explored the consequences of ITBSA (e.g., Kearns & Lederer, 2001; Kearns & Sabherwal, 2006; Byrd, Lewis, & Bryan, 2006; Kathuria, Joshi, & Porth, 2007; Acur et al., 2012; Luftman, 2015)[2].

The third group of researchers (called organization-oriented researchers) suggested that ITBSA is a construct that *helps* organizations improve the positive impact of IT investments on organizational successes (see, Henderson & Venkatraman, 1993; Luftman, 2000; Sabherwal & Chan, 2001; Chan et al., 2006; Kathuria et al., 2007; Dong, Liu & Yin, 2008; ITGI, 2008; Issa-Salwe, Ahmed, Aloufi, & Kabir, 2010; Jorfi & Jorfi, 2011; Wu et al., 2015).

The fourth group (called environment-oriented researchers) even goes as far as asserting that (1) alignment is important for organizational *performance*, and (2) that misalignment leads to losing competitive advantage by increasing wasted effort and creating a negative environment for IT investments (cf. Silva et al., 2006; Tallon, 2011). They consider (2) as equally important to (1).
Based on the studies mentioned above, Figure 1-2 depicts the proposed IT- investment value-chain framework including the ITBSA concept.

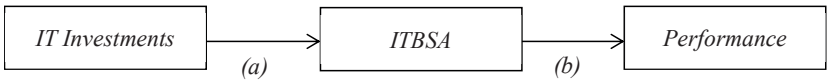


Figure 1-2 IT investments-*performance* relationship including ITBSA in the value chain

1.3 Three Different Types of Innovation

This subsection focuses on the positioning of the social innovation concept within the relationship between ITBSA and *performance*. Hence, we discuss three types of innovation, viz. technological innovation, social innovation, and social innovation at the workplace (SIW). In order to achieve significant results in information systems research, it was already a long time ago stated that there is

[2] Section 3.4 describes in details some of the most noticeable studies of antecedents and consequences of ITBSA.

a need to *"identify the variables on which the technology is likely to have more direct impact"* (Bakos, 1987). In line with this statement, we briefly discuss the European Commission. The idea was that knowing the right variables could lead to a technology push, which, by turning the variable in the right way, would either speed up delivery or improve the production and services. We show a first linear path upwards.

Technological innovation

Technological innovation as the first type of identified innovation, was long thought to have a positive impact on the effectiveness of IT investments, e.g., by increasing the speed (production and delivery) and the availability of products and services with shorter lead times and more novelty (see, e.g., Licht & Moch, 1999). In those times, IT-*performance* studies focused on the economic approach in evaluating the IT outcomes (cf. Berghout & Tan, 2013). They used *performance* indicators such as (1) profitability, (2) efficiency, and (3) growth (cf. Oh & Pinsonneault, 2007). In the period 2000-2010, researchers have reached a consensus that only relying on any one of those traditional financial indicators is not always efficient to assess the IT value for business (cf., e.g., Maçada et al., 2012).

Social Innovation

Currently, the evaluation of IT results is given from a socio-technical perspective (see, e.g., Bechor, Neumann, Zviran, & Glezer, 2010; Koh, Gunasekaran, & Goodman, 2011; Li & Mao, 2012). This consensus on a socio-technical approach has had two major effects.

(1) From the technical portion of the approach, it provided credibility to the view that ITBSA is identified as one of the key preconditions for a successful innovation activity as previously expressed by several authors (cf. Whitley, 2002; Petrovic, Mihic, & Stosic, 2009; Neubert, Dominguez, & Ageron, 2011).

(2) From the social portion of the approach, mainly due to the shift towards knowledge-based economies (see Oeij, Dhondt, & Kraan, 2012; Nichols, Phipps, Provençal, & Hewitt, 2013), there was also a paradigm shift on innovation.

So, the technological innovation moved towards the recognition of social innovation. Here social innovation was a newly identified innovation to be considered as a catalyst of sustainable economic growth (cf. Dortmund/Brussels Declaration, 2012; EC, DG Regional & Urban Policy, 2013; Nichols et al., 2013). The transition from pure technological innovation to social innovation was facilitated

by (a) the melt down of the boundaries between the private and social sectors (cf. Murray, Caulier-Grice, & Mulgan, 2010) and (b) the commitment of EU Member States and institutions to pursuing the Europe 2020 Strategy with the aim of transforming the EU into a sustainable economy and the recognition that social innovation was to become an important prerequisite for achieving the 2020 goals (Dortmund/Brussels Position paper, 2012). We provide a full description and a formal definition of social innovation in Chapter 2, subsection 2.3.2.

Workplace Innovation

Workplace Innovation is complimentary to both technological innovation (cf. Pot, Dhondt, de Korte, Oeij, & Vaas, 2012) and social innovation (EC, DG Regional & Urban Policy, 2013). The cited authors argue that it includes several managerial aspects, such as effective management, leadership, the culture of working smarter, continuous improvement of skills and competencies, and mainly, networking between and/or within organizations. On the service front, it includes service-oriented aspects such as in-service products, new or improved ways of designing and producing services, and the actual innovation of the service-oriented organizations. Furthermore, Pot et al. (2012) argue that organizations can only gain the assumed benefits of technological innovation if it is effectively rooted in a workplace innovation environment.

Hence social innovation is quite closely associated with Workplace Innovation (cf. Pot et al., 2012; Dortmund/Brussels Position Paper, 2012). Workplace Innovation is considered the representation of "Social Innovation at the organizational level". For our study, we take the Workplace Innovation as the third type of identified innovation. Immediately after this decision we remark that in the Netherlands and Belgium the term social innovation is used to express workplace innovation (cf. EC, DG Regional & Urban Policy, 2013). It is often expressed as social innovation at work (or at the workplace) which covers the societal level (labor market innovation) and organizational level (workplace innovation) (see Pot et al., 2012). Therefore, in the context of this thesis we will use the term Social Innovation at Work (SIW) to represent *Workplace Innovation*[3].

The European Commission

With regard to the relation between SIW and organizational *performance*, the European Commission has for a long time acknowledged that (1) economies are increasingly dependent on knowledge and

[3] Detailed discussion and definitions of workplace innovation and social innovation are provided in Chapter 2 (subsection 2.3.2).

information, and (2) innovative competence is considered a key driver of long-term competitiveness and business success (see, EC, 2004; OECD Eurostat, 2005; European Commission, 2009). Furthermore, research in the Netherlands has shown that social innovative organizations are ahead in their *performance* compared to the non-social innovative ones (cf. Pot et al., 2012). This view concurs with several previous examinations (see, e.g., Narayanan, 2001; Kleinknecht & Mohnen, 2002). The authors of the publications have always supported the view of the positive relationship between an innovative activity and a firm's *performance*. Further discussion of this topic and a focused literature review is presented in Chapter 3.

A first linear path upwards

Figure 1-3 demonstrates our conceptualization of the path from IT investments to a firm's *performance* in a linear format for conceptual demonstration purposes. At a later stage, we formulate a model that demonstrates the actual relationships (moderating and/or mediating relationships) from IT investments to a firm's *performance*.

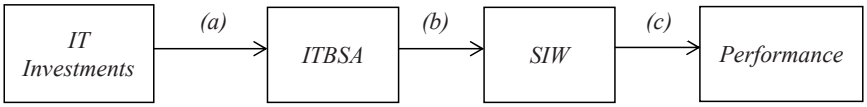


Figure 1-3 IT investments-*performance* relationship, including ITBSA and SIW

Enterprise Governance of IT (EGIT)

In this section, we are concerned with Enterprise Governance of IT (EGIT). The EGIT concept and its positioning are discussed with regards to the relationship between ITBSA and SIW.

The relationship between ITBSA and *performance* is controversial. Tallon (2011) argues that the relation is not a direct relation. Considering the relationship, we see two major opinions in the literature. On the one hand, West & Schwenk (1996), Homburg, Krohmer & Workman (1999), and Joshi, Kathuria & Porth (2003) are in favor of a variety of factor(s) *mediating* this relationship. On the other hand, other researchers are opining the view that the relationship is *moderated* by a range of another factor(s) (cf. Lindman, Callarman, Fowler, & McClathey, 2001; Tallon & Pinsonneault, 2011)[4]. In our research, moderating will play a major part and therefore we will speak of mediating and moderating (in this order) effect.

[4] For definitions and detailed explanation of mediating and moderating variables, please see Chapter 2.

In the next four paragraphs, we provide a brief overview leading to the need for a *strategy implementation framework*. We conclude by proposing to involve EGIT with SIW to be an appropriate factor in improving the *performance*.

Business Mission and IT Strategies

Every firm has its own business mission. In close connection with the business mission, the IT strategies are formulated (see Lahdelma, 2010). ITBSA underlines the concurrence of the business mission and the IT strategies. Moreover, ITBSA emphasizes the reciprocity. As a consequence, planning and assimilation of the objectives need to be studied in depth. On the one side, we see the missions' assimilation of business and IT. On the other side, we see strategy assimilation of IT objectives and strategic plans. Both Lahdelma (2010) and Tallon (2011) describe these two observations and confirm their existence. They assert (1) that there exists a dual strategy and (2) that a cross-referenced formal written business mission may coincide with IT plans. So, there is a need to examine how the strategy is realized in practice in order to achieve the desired *performance* results.

Strategy Implementation

As early as in 1998 it was argued that the area of strategy implementation, which deals with the operationalization of strategic plans, has been largely neglected (cf. Roberts & Gardiner, 1998). This was later confirmed through an extensive literature review by Silva et al. (2006). They showed that (1) approximately 60% of references to strategic alignment referred only to the strategic integration (the external focus) and (2) approximately 40% of the references to strategic alignment referred only to the functional integration (the internal focus). The trend with two different tracks continued as confirmed by Cameron (2009) who argued as follows:

"The process for operationalizing strategic plans is still largely unexplored territory. It is difficult to envision how successful strategic plans can be devised in the absence of knowledge about how they are to be implemented."

IT Governance

As a result of the repeated calls since the 1990s on the need for a strategy implementation framework, we see that both tracks have been converging to one concept, viz. the concept of *IT governance*. This concept has been emerging as a central issue gaining great attention in both business and IT domains (see Syaiful, 2006; Coleman & Chatfield, 2011; Zarvic, Stolze, Boehm, & Thomas, 2012). Here, the 40% of the internal focus group took the lead. The components of the *internal focus,* such as

processes, metrics, structures, and governance (cf. Luftman & Kempaiah, 2008) have emerged and are strongly proposed as supporting mechanisms to strategy implementation. The *metrics* component was re-conceptualized into *relational mechanisms* in later models of EGIT. Chapter 2 provides a detailed discussion and a definition of the EGIT concept.

EGIT and SIW

Figure 1-4 shows the proposed positioning of the EGIT concept in the IT investments - *performance* relationship. Here we note again that the diagram does not depict a conceptual model in terms of the mediating and moderating effects, it is merely a sequential picture of the involved concepts. Therefore, both EGIT and SIW are in dotted lines. A detailed and scientific conceptualization of the relation culminating in a model is given in Chapter 4.

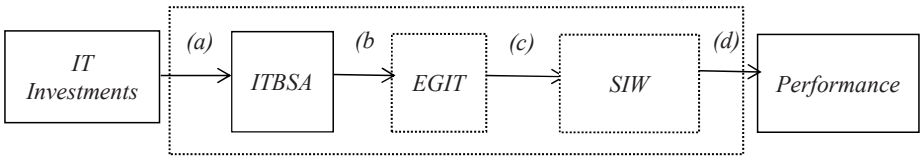


Figure 1-4 The combination EGIT-SIW along the path of IT investments to a firm's *performance*

A lack of research

In summary, we observe a lack of research along the path from ITBSA via EGIT and SIW to *performance* ((b), (c) and (d)). However, our research will mainly explore the impact of the EGIT and its components (processes, structures, and relational mechanisms) on the combined relationship (b) + (c) (as given in Figure 1-4). The formulation of our problem statement will underline this statement[5].

1.4 The Problem Statement

As pointed out in section 1.1, Im, Dow, and Grover (2011) stated that the challenge is to identify critical factors on the path from IT investments to a firm's *performance* (which is (a), (b), (c), and (d) in Figure 1-4). ITBSA was identified as a critical factor along the above mentioned causal path (see, e.g., Kearns & Lederer 2000; Chan et al., 2006; Chan & Reich, 2007; Johnson & Lederer, 2010;

[5] The relationship between SIW and performance (relationship (d) of figure 1-4) is investigated through the detailed research questions, specifically, RQ2 & RQ3.

Luftman, 2015; Wu et al., 2015). The mentioned researchers have repeatedly called for more investigation into the processes from ITBSA to enhanced business *performance*.

Linear models of innovation, as depicted in Figure 1-4 (i.e., (a), (b), (c), and (d)) assumed logical and direct steps from the input (e.g., ITBSA or an even earlier stage such as IT investments) via EGIT to a next stage such as SIW and then to *performance*. The proponents of linear models have overlooked two main facts: (1) that firms may operate at different levels of efficiency and (2) that they operate within a set of variable *environmental* factors which may state that higher levels of input might not automatically imply higher levels of innovative output (cf. Klomp, 2001). These two facts may give rise to study the importance of moderating variables (and/or a combination of mediators and moderators), and to examine whether it is possible to better understand those relationships.

Many publications have pointed out that alignment is an ambiguous and complex concept. Historically, strategic and integrated planning is considered by many authors as the most suitable *alignment* approach to realize the impact of IT on business value (cf. Ward, Griffiths, & Whitmore, 1990; Earl, 1993; Weill & Broadbent, 1998). Magalhães (2004) and Schwarz et al. (2010) argue that alignment is not only achieved by planning linkages but by emphasizing managerial actions and enabling processes. Here, we see that IT governance creates a worthwhile distinction vis-à-vis the daily management of all IT-related activities. *Enterprise Governance of IT (EGIT) and its components (processes, structures, and relational mechanisms)*, as mentioned in section 1.4 (see also Chapter 2 for a detailed literature review on the EGIT concept) have emerged as the conceptualization of what started as IT governance. EGIT is a relatively new concept that is concerned with integrating processes, structures, and relational mechanisms. As a direct consequence, they enable both business and IT departments to execute their responsibilities in creating value from IT-enabled business investments (cf. Van Grembergen & De Haes, 2012; De Haes & Van Grembergen, 2013).

Currently, EGIT is gaining more interest in the academic and practitioner's world. Its exact influence on the causal chain from IT investments to a firm's *performance* has not yet been firmly established. In addition, IT investments seemed to be especially effective when innovations increase the delivery speed and the spatial or temporal availability of service. Nowadays, SIW has been linked to *performance* in several research papers in the literature[6]. It is considered an important actor along the path from IT investments to a firm's *performance*.

[6] For detailed discussion of innovation and *performance* see section 3.2 in Chapter 3.

Previous studies have shown that internal cooperation on innovation is more effective than external innovation (cf. Hochleitner, Arbussa, & Coenders, 2016), and most of innovation decisions are made at the business-unit level and that firm data or industry-level data is too aggregate to provide a reasonable measurement of innovative activity (cf. Holthausen, Larcker, & Sloan, 1995). Furthermore, SIW is considered to be a multi-disciplinary knowledge-sharing collaborative approach (cf. Xue, Ray, & Sambamurthy, 2012; EC, Guide to Social Innovation, 2013; Nichols et al., 2013). Therefore, as described and justified in Chapter 4, we use *inter-departmental collaboration on SIW* as a representation of social innovation, and "single departments" as our unit of analysis with the aim to reach specific and realistic results.

In an effort to respond to the calls from well-known scholars on the issue of exploring the path from IT investments to a firm's *performance*, this research specifically explores the interaction of SIW and EGIT in affecting the relationship between ITBSA and the *performance* at the departmental level (i.e., the relations (b), (c), and (d) in Figure 1-4). So, we are now ready to formulate our problem statement.

Problem Statement (PS):
To what extent can we make transparent the effects of Enterprise Governance of IT and SIW on the relationship between IT Business Strategic Alignment and the Organizational Performance at the departmental level?

We intend to answer the problem statement with the help of four research questions. They are presented below.

1.5 Four Research Questions

From the problem statement, we read that there is a need to characterize the relationship between ITBSA and *performance*. So far, this relationship per se (i.e., the combined relations (b), (c) and (d) of Figure 1-4) had controversial results (cf. Silva et al., 2006). In the broader picture of the relation between IT investments and a firm's *performance*, we would like to refer to established scholars such as Henderson & Venkatraman (1993), Sabherwal & Chan (2001), and to a more recent research by Luftman & Kempaiah (2008), De Haes & Van Grembergen (2013), and Héroux & Fortin (2016). They have demonstrated a positive effect of ITBSA on a firm's *performance* along several dimensions.

Nevertheless, direct and linear relationship was not always established. In certain cases, it was even rejected (see, e.g., Joshi et al., 2003). This rejection happened in favor of a moderating or mediating effect of other factors (cf. West & Schwenk, 1996; Lindman et al., 2001; Tallon, 2011). Our research aims to characterize the relationship between ITBSA and *performance* through the mediating effect of SIW at the departmental level. A positive outcome of the mediating effect will allow us to consider SIW as an important factor stimulating the firm's *performance* (cf. Coad & Rao, 2008). With the aim towards a mediating effect of SIW on the relationship between ITBSA and *performance*, we first attempt to investigate the nature of the direct relationship between ITBSA and SIW. Hence, our first research question is formulated as follows.

RQ1: What is the effect of IT Business Strategic Alignment on Social Innovation at Work (SIW) at the departmental level?

Two of the relationships of Figure 1-4 are fundamental to this research, namely the relationship from IT investments to ITBSA (relationship (a) in Figure 1-4) and the relationship from SIW to *performance* at the departmental level (relationship (d) in Figure 1-4). Relationship (a), which establishes ITBSA as an enabler of the relationship of the IT investments value, has been historically well explored in the literature (see section 3.1 for a detailed review of this issue). Therefore, it will not be empirically tested in this research. Relationship (d) of Figure 1-4, which deals with the effect of SIW on the departmental *performance*, is a critical relationship to this research in the sense that it establishes SIW as a mediator between ITBSA and *performance* at the departmental level. Moreover, there is a controversy regarding this relationship in the literature. Therefore, this relationship is the subject of our second research question as discussed in the following paragraphs.

In the past, Tsai & Ghoshal (1998) concluded that effective implementation of an innovation strategy is significantly dependent on the extent of information sharing among different functional departments. Even earlier, Daft & Lengel (1986) argued that the positive influence of inter-departmental collaboration on SIW is due to the large amount of information that must be processed across departmental boundaries which in turn facilitates the anticipation and mitigation of downstream risks. Lately, this view has been supported by several scholars claiming a strong connection between SIW, collaboration and information sharing (see, e.g., Pot et al., 2012; Xue et al., 2012; Nichols et al., 2013; Arvanitis & Loukis, 2016)[7].

[7] For a definition on inter-departmental collaboration on innovation we refer to Definition 2-19.

In spite of the fact that inter-departmental collaboration is strongly motivated by its expected benefits in terms of innovation *performance* (cf. Becker & Lillemark, 2006), it has been identified as source of increased coordination cost (cf. Cuijpers, Guenter, & Hussinger, 2011) due to increased coordination efforts that eventually cause project delays[8]. Bry, Vallée, & France (2011) in their article on SIW assert that innovation teams do not deliver the expected results, even worse, they claim that "most of the time team members don't even agree on what the team is supposed to be doing".

Moreover, Homburg et al. (1999) have claimed that there is no direct relationship between ITBSA and *performance* in terms of cost-leadership strategy; which gives rise to more controversy on the topic. Given the three questions surrounding (1) the significance of the innovation process for the relationship between ITBSA and *performance*, (2) the critical role of the inter-departmental collaboration on the SIW process, and (3) the controversy regarding the effect of inter-departmental collaboration on SIW on *performance*, we formulate our second research question, which reads as follows.

RQ2: What is the role of Social Innovation at Work (SIW) on the departmental performance?

RQ1 and RQ2 are exploring components of the relationship between ITBSA and *performance* at the departmental level, i.e., the individual components of Figure 1-3. The direct relationship between SIW and a firm's *performance* was the focus of several studies (e.g., Coad & Rao, 2008). Yet, there was no study, to the best of our knowledge, which identified the actual role that the SIW plays in the relationship between ITBSA and a firm's *performance* at the departmental level. Here, we are concerned with the combined relationship ((b)+(c), and (d)) of Figure 1-3. Hence, our third research question reads as follows.

RQ3: How does the Social Innovation at Work at the departmental level affect the relationship between the ITBSA and departmental performance?

ITBSA has at least three major components: (1) IT strategy, (2) business strategy, and (3) IT governance factors (see Henderson & Venkatraman, 1993). A majority of researchers consider those three factors as one entity simultaneously forming the "alignment" factor. However, in practice, most enterprises concentrate on aligning the IT strategy with their business strategy. Those enterprises do

[8] For details on controversies regarding inter-departmental collaboration see Chapter 3.

so, in theory, by taking business strategic goals and by placing them into the IT strategy guidelines with the aim of creating a "fit" (see, e.g., Kearns & Lederer 2000; Silva et al., 2006).

Any strategic fit, in particular the perfect fit, runs the risk to remain on paper. As a direct consequence, the envisioned alignment may be a potential success factor that is never realized in the absence of an effective governing process and a governing structural support. Some researchers have identified and categorized the most common IT governance mechanisms (see, e.g., Weill & Ross, 2004; Sohal & Fitzpatric, 2002) but only a few have attempted to study the effect of those mechanisms on effective governance, as did for example, Syaiful & Peter (2005) and De Haes & Van Grembergen (2009). Our investigation aims to fill this research gap by conceptualizing the EGIT as an environmental variable *moderating* the relationship between ITBSA and *performance*. In order to achieve this goal, we formulate the fourth research question.

RQ4: How does EGIT affect the relationship between ITBSA, SIW and performance at the departmental level?

1.6 Research Methodology

In this section, we define six research methodologies that are used in our research to answer the RQs and the PS.

The nature of our research is exploratory/descriptive and to rather than predictive/hypothesis testing.

Our research is (a) Exploratory, in that we have explored the possible factors that "might" be present along the path from IT investments to performance. And (b) descriptive, in the sense that we describe the factors and their proposed role along the proposed path. Furthermore, we would like to mention that explanatory models aim at "establishing" a causal relationships. And predictive models use those causal relationships in predicting a future state of the independent (criterion) variables. We did not conduct an explicit experimental causal analysis (see subsections 6.1.1. and 6.1.3 for detailed discussion of causality and theory testing methodology). We do not consider our model to be formally explanatory/predictive, nevertheless, since we based the relations among our studied factors on a previously established theories, we claim that the results of our SEM analysis indicate a possible "effects" and we can draw expectations of directional changes in the criterion variables based on changes in the predictors, as proposed by our conceptual model.

Two reasons for this choice are: (1) research in the domain of IT governance implementations and its relationship with ITBSA is in its infancy and (2) theoretical models are scarcely available.

The scientific methodology in unexplored areas is a mixed approach of qualitative and quantitative research (for an extensive support of our choice we refer to Creswell, 2003). Therefore, we are convinced that the current formulation of the PS and four RQs is an adequate start for our investigation. Below we briefly summarize the characteristics of our choice before we list and describe our research methodologies.

The research is qualitative in the sense that it solicits and evaluates expert attitudes and opinions with regard to *performance* variables, such as (1) the level of strategic alignment between the various departments and the IT department, and (2) the level of inter-departmental collaboration on innovation through a qualitative, multidimensional approach. The research is also quantitative since it utilizes quantitative methods in data analysis and establishes quantitative relationships between the various concepts.

The research will be carried out using six specific methodologies.
RM1: *Literature review*. An extensive literature review is carried out to establish: (1) a detailed knowledge about each concept involved in the studied relationship, and (2) thorough background about the previously established relationships in the literature (if any) among the studied concepts.

RM2: *Field-work Survey (questionnaires)*. The field work of our research is based on primary data collection by using four separate surveys to establish (1) the IT Business Strategic Alignment, (2) the EGIT level, (3) the level of collaboration on Social Innovation, and (4) the departmental *performance*. IT Business alignment was measured using an instrument developed by Weill & Ross (2004). Innovation, and departmental *performance* data was collected with the latest version of an instrument developed and used by the European Commission (the updated OECD *Oslo manual*, third edition (2005, 2011))[9]. EGIT maturity was measured using a survey instrument originally developed by the IT Governance Institute (2001) and described in detail in Chapter 5 which provides a detailed description of the data collection instruments and the field work process.

RM3: *Data validation and analysis of the results*. Data validation is performed using three main techniques: (1) Cronbach's Alpha analysis, (2) fit for SEM testing, and (3) factor analysis.

[9] See subsection 4.1.2 for more details.

Ad1 Survey instruments were tested for validity and integrity using Cronbach's Alpha.

Ad2 The fit for SEM analysis was validated by testing: (a) Convergent validity, (b) discriminant validity, (c) normality, and (d) collinearity.

Ad3 Constructs integrity was tested using factor analysis.

RM4: *Establishing the effect scientifically (by analyzing, predicting, and validating)*. The methodology uses two main techniques: (1) a mediating and moderating test, and (2) a direct effect test.

Ad1 The mediating and mediating effects are tested, i.e., established and validated using the methodology described in Baron & Kenny (1986) applied in the SEM environment. Their research was cited 40,452 times and used by several authors to describe the process of testing moderating and mediating effects (see, e.g., Frazier, Barron, & Tix, 2004; Hopwood, 2007; Hayes, 2012; Wu, Detmar, & Liang, 2015). The Structural Equation Modeling (SEM) technique was used to test and validate the proposed models (cf. Hopwood, 2007).

Ad2 The direct relationships (e.g., between ITBSA and SIW) were also established and validated using SEM techniques.

RM5: *Evaluation of the results*. The results of the analyses described above are evaluated for conceptual validity and alignment with the expectations and predictions from our extensive literature review.

RM6: *Drawing conclusions*. Following the evaluation of the results, answers to the four research questions are provided and conclusions on the PS are drawn.

Our research examines two direct, one mediating and one moderated mediation relationship. All data analysis is performed using the SPSS and AMOS statistical software. Detailed data analysis and implications are discussed in Chapter 6. In Table 1-1 we provide an overview of the relation between chapters, PS and RQs, and research methodologies.

In Table 1-1 we see that the four RQs are closely related, in fact they are immediately derived from the PS. This has clear consequences for our research and for the composition of the thesis.

		PS	RQ1	RQ2	RQ3	RQ4
Chapter	1	RM1				
	2		RM1	RM1	RM1	RM1
	3		RM1	RM1	RM1	RM1
	4				RM1	RM1
	5		RM2	RM2	RM2	RM2
	6		RM3-5	RM3-5	RM3-5	RM3-5
	7	RM6	RM6	RM6	RM6	RM6

Table 1-1 The relation between chapters, PS and RQs, and research methodologies

For instance, the literature reviewed (RM1) in Chapters2, 3, is directly related to all four RQs. In Chapter 4, the literature reviewed was focused on the mediation and moderation concepts concerning RQ3 and RQ4. RM2 and RM3-5 are again related to all four RQs in Chapters 5 & 6. Hence, we see that generally the four RQs can be considered as one block forming the main concept of this study. This one main concept is distributed among four sub questions.

1.7 The Aim of the Study

The aim of our research is to provide a genuine contribution to the field of information technology and management information systems through identifying mechanisms[10] affecting the path from ITBSA to a firm's *performance*.

Here we would like to note that because both (1) research in the domain of IT governance implementations, and (2) the relationship between ITBSA, *Social Innovation*, and *performanc*e are in its early stages, and because (3) grounded theoretical models are scarcely available (cf. De Haes & Grembergen, 2009), the nature of our research is exploratory/descriptive rather than normative.

1.8 The Significance of the Study

In the introductory paragraph of this chapter, it was highlighted that around half of a firm's profitability is explained by an effective strategic alignment of IT and business goals. The importance

[10] The term mechanisms refer to the mediators and moderators affecting a relationship between constructs.

of our study lays in the significant contributions it makes to both theory and practice in identifying some of the significant factors along the path from ITBSA to a firm's *performance*. The results of our study have both cost and efficiency implications. The following two subsections will highlight those contributions in two dimensions: the theoretical contributions in subsection 1.8.1 and the practical contributions in subsection 1.8.2.

1.8.1 Theoretical Contributions

Our study is claimed to make four original contributions to the existing body of knowledge in the area of IT governance and Management Information Systems. It does so by drawing upon existing theory and literature from organizational and strategic management, knowledge management, and information technology in investigating the relationship between ITBSA and *performance* at the departmental level. The four contributions are as follows.

First, our research contributes to the literature of innovation by providing a model that sheds the light on the importance of the collaborative actions on *Social Innovation at Work* on the link between ITBSA and departmental *performance*.

Second, the developed complex model of a *moderated mediation* contributes to the literature field of strategic studies, namely ITBSA, introducing a new theoretical approach of investigating the relationship between ITBSA and organizational *performance*. It does so through exploring the interaction of effect between ITBSA and the *Enterprise Governance of IT* EGIT on affecting organizational *performance*.

Third, assuming that data on firm-level or industry-level is too aggregate to provide a reasonable examination of any innovative activity, we performed empirical studies on the level of a department. It is claimed that most innovation decisions are made at the level of the business unit. Since the innovative activity of the business unit transpires to the department, we claim that social innovation at work at the department level is measurable.

Fourth, our research contributes to the literature on the SAM (strategic alignment model) by shedding a light on the relationship among three of the four components of the model, namely, IT strategy, business strategy, and IT structures (in our research represented by EGIT)[11].

1.8.2 Practical Contributions

Our thesis has three major practical contributions that aid managers in effectively focusing their efforts and physical resources for improved organizational *performance*.

First contribution is based on the proposed mediation effect of SIW between ITBSA and *performance*. This proposition emphasizes the importance of cross-departmental collaboration on innovation and its efficiency outcome.

The second contribution relies on the ability to identify EGIT as a valid moderator to the relationship between ITBSA and *performance*. This contribution demonstrates the importance of establishing effective IT structures and processes in order to effectively capitalize on IT investments.

The third practical contribution of this research provides managers with a platform for implementing change. According to Kingdon (2003), implementing a change is challenging and needs a policy implementation window. Those windows could be either predictable (e.g. a scheduled event such as management change or a quality certificate renewal), or unpredictable (e.g. organizational problems, low financial performance). In either case, those windows provide for an opportunity to implement organizational change. Major problems faced by managers in implementing changes (once a windows is spotted) are (a) obtaining senior management's approval, and (b) prioritize the proposed change on the decisions agenda. Changes are prioritized when three main factors are present, (1) the problem, (2) the change proposal, and (3) the political receptivity. Our model provides managers with a guidance to satisfy the second and third conditions, viz. prepare effective change proposals and obtain political receptivity. We do so by showing the performance implications of aligning IT and business strategies and implementing proper processes and structures that aim towards collaborative innovation. According to our results, proposals within those areas (e.g. strategy change proposals and IT strategic expansions) lead to enhanced and sustainable performance. As a result, the third condition

[11] See subsection 2.1.2 for description of the SAM model, and subsection 6.4.4 for the discussion of our results as related to the model.

of “political receptivity” should be more attainable. The performance enhancement justification should make a change proposal easier to lobby, prioritize, and implement.

1.9 Structure of the Thesis

Below we describe the structure of the thesis. Emphasis is placed on the relation between the chapters.

Chapter 1 provides an introduction to the study. A problem statement is formulated and four research questions are derived. Research methodologies are presented. The significance of the study and its contributions are mentioned. Finally, the structure of the study is described.

Chapter 2 presents background and definitions of the main concepts studied in this thesis.
Chapter 3 provides an extensive literature review of the main concepts of our research, namely, ITBSA, EGIT, SIW, and the departmental *performance*.

Chapter 4 provides, based on the literature review performed in Chapter 3, the theoretical framework and develops the conceptual models. It sets the stage for the field work performed and described in Chapter 5.

Chapter 5 presents a detailed description and analysis of the field work performed. It provides the fundamental information for the *data analysis* performed in Chapter 6.

Chapter 6 performs the statistical analysis of the relationship between the various concepts of the study as described in the conceptual model developed in Chapter 4. It also provides a discussion and analysis of the results.

Chapter 7 presents the answers to the RQs and the PS. Then, the conclusion of our research is given. It also provides personal recommendations and describes the limitations of our study, as well as, proposes a possible future research path.

CHAPTER 2 BACKGROUND AND DEFINITIONS

In this chapter, we aim to provide a common ground for the analysis and investigation of the relationships between ITBSA, EGIT, and SIW. The chapter provides a literature-based background. Moreover, definitions of all related concepts are gathered. The ITBSA concept is introduced and defined in section 2.1. Section 2.2 provides an insight into the EGIT concept, its roots in the corporate governance, its relationship to ITBSA, and a literature-based definition of EGIT. Social Innovation at the work place and its relationship to process and product innovation is explored and defined in section 2.3.

2.1 IT Business Strategic Alignment

IT Business Strategic Alignment (ITBSA) is an important factor for gaining competitive advantage and enhancing organizational *performance* (cf. Jorfi & Jorfi, 2011). Having said this, we must observe that it continues to challenge organizations as well as researchers (cf. Luftman & Ben-Zvi, 2009; Xue et al., 2012).

There are two threads of research with respect to ITBSA. A first line of research considers IT systems and strategies as an enabler of competitive advantage, while the second line, mainly in the management science, concentrates on the business strategic practices and theories. But, as the saying goes: *"It takes two to tango"*. For an enterprise to achieve a competitive edge, it is necessary to integrate successfully the IT strategy with the corporate strategy and consider them of equal importance (cf. Kahre, Hoffmann, & Ahlemann, 2017). Each of these two strategies has its own focus. However, in the following sections we will show that there is a common ground in support for each other's stages of development.
In this section, we provide a background of the ITBSA by describing (1) the evolution of the IT strategy and (2) the integration of the IT strategy into the business strategy.

2.1.1 The Evolution of the IT Strategy

This subsection provides a brief background on the main evolution stages of the IT strategy.
It is widely accepted that information technology is vital for today's organizations. Organizations need information technology to survive because it plays a critical role in assisting organizations to

offer better products and services. Below we provide definitions of both IT and IS for the reader's reference. We start with the definition of IT.

Definition 2-1 Information Technology

Information technology (IT) is defined as "consisting of all the hardware and software that a firm needs to use in order to achieve its business objectives". (Laudon & Laudon, 2014)

By definition, IT covers a large-scale area of technological needs of an organization including all aspects of general-use hardware and software systems (storage, retrieval, archiving, and transaction processing). The term information systems (IS) is used to express a more specific meaning that is related to data management and information management with the aim of supporting management *decisions making*. Next, we provide a definition of IS.

Definition 2-2 Information Systems

An information system is defined as "a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization". (Laudon & Laudon, 2014).

In the literature, the terms information technology (IT) and information systems (IS) are commonly used interchangeably. Since the focus of this thesis is on topics of a wider scope than IT and IS, they could therefore be considered in the larger picture as belonging to the same class and for this class the term IT will be used throughout the thesis.

Although we focus on Information Technology, and in particular on its evolution, it is wise to keep in mind that the description of the evolution should be concerned with the disciplines of Management Science and Business Strategy. The reason is that these disciplines have studied *strategy* as a concept for a long time. *Strategy* is pivotal to the analysis process of this research; therefore, it is important to provide a consensus definition for *strategy*. As early as 1987 Henry Mintzberg has claimed that the field of strategic management "*cannot afford to rely on a single definition of strategy"* (cf. Mintzberg, 1987). Favaro, Rangan, & Hirsh (2012) implicitly confirmed the fact that there is a vigorous disagreement among scholars (even though they have provided a single definition as we show later). Historically, the definitions of strategy went through a few major milestones. In 1979 George Steiner, in his book "Strategic Planning", pointed out that there was little agreement on what strategy was, and referred to strategic planning as the action to counter rival moves. He did not provide a formal definition of strategy. Andrews (1980) and later Mintzberg (1987) and Mintzberg (1994) have shifted the focus to aspects such as *plans, patterns* of action, and a specific *perspective*;

introducing the concept of strategic competitive *position* that reflects decisions concerning products, services, markets, and locations (cf. Robert, 1997).

Michael Porter (1996) stated that strategy is about being different through "choosing a different set of activities to deliver a unique mix of value". Initially, Porter has stressed the concept of creating a competitive *position* expressing a particular product/service for a specific market (as previously proposed by Mintzberg, 1994). This view was later criticized, even by Porter himself, as being too static for the currently dynamic world in which competitors could imitate at a very fast pace (cf. Porter 1996). We choose to define strategy as put forward by Favaro et al. (2012).

Definition 2-3 Strategy

Strategy is defined as "the result of choices executives make, on where to play and how to win, to maximize long-term value". (Favaro et al., 2012)

Thus, the task of strategy is to maintain a dynamic, not a static balance. Organizations which use strategic planning do not straightforwardly react to events in the present, but are pro-active in considering and anticipating future events and deciding ahead on actions in order to achieve future objectives (cf. Scot, 1997; Tang & Walters, 2009). Those organizations are known to practice strategic management. In general terms, it is agreed that strategic management could be defined as follows.

Definition 2-4 Strategic Management

Strategic management is defined as to be concerned with "managerial decisions and actions that determine the long-term prosperity of the organization". (Tang & Walters, 2009)

As strategies and strategic management evolved along with their organizations, IT has become critically indispensable to organizational strategic management practices, requiring a shift of the general role of IT from merely a back office transactional support to a major player in shaping core competencies.

So, the competencies of the organizations have evolved from organizational strategic management through active integration into organizational strategies (cf. Tang & Walters, 2009).

The road towards the integration of IT into organizational strategy has gone through a long and gradual journey. The following paragraphs provide a brief description of the major milestones of this evolutionary process.

During the 1950s and 1960s computers were merely used for data collection, processing and storage. The MIS (Management Information Systems) came into development during the 1960s providing managerial-support information through report-based output with limited decision support capabilities. Before further discussion of the evolution stages of IT, which include the reference for strategic decision support systems, we provide a formal definition of strategic IT.

Definition 2-5 Strategic IT

Strategic IT is defined as "an information system to support or change an enterprise's strategy and to assist in strategic decision making". (Hemmatfar, Salehi, & Bayat, 2010)

The roots of the *strategic relevance* of IT systems have originated during the 1970s with the appearance of the mainframe computers. The nature of the IS was transaction processing with a focus on the efficiency of monitoring and control operations with limited decision support capabilities. Those early systems provided support for solving complex problems, such as planning and forecasting, with the help of a flexible user interface.

During the microcomputers stage (1980s and 1990s) Decision Support Systems (DSS) have eventually evolved into systems for decision support of top management. The emergence of systems such as executive support systems (ESS) and enterprise resource planning (ERP) has facilitated an emphasis on effective problem solving functions during this era. Effectiveness became the motivation behind the establishment of such systems. Moreover, during this era, the IT relevance and its involvement with the business planning processes became apparent.

The emergence of the direct IT support for strategic initiatives and the recognition of its direct involvement in organizational strategic value creation came about after the 1990s. More specifically, the direct and timely support of IT to the business strategy was facilitated by the emergence of an effective internet and networking systems. This era has shown the appearance of systems such as supply chain management (SCM), customer relationship management (CRM), and knowledge management (KM) (cf. Leidner & Elam, 1995; Applegate, Austin, & McFarlan, 2007; O'Brien, 2012, Laudon & Laudon, 2014). This development was motivated mainly by the quest for a greater business value and growth through organizational transformations.

Even though the period after the 1990s has witnessed an initial dis-integration of IT strategy (ITS) from business strategic planning (mainly due to the recession), ITS has later returned to the business mainline planning in search of competitive advantage with the business side taking ownership of the

ITS (cf. Ward, 2012). At a later time, this integration of ITS into the business strategy has led to the emergence of the concept of *IT and business strategic alignment* (ITBSA) as will be discussed later. The above described milestones of the relevance of IT and strategic management are summarized in Table 2-1.

In Table 2-1, we see a cross tabulation of IT aspects such as: dominant technology, information systems, IS motivation, and strategic management relevance, with major hardware categorization, namely, (1) mainframe era, (2) microcomputer era, and (3) the internet networking era. This cross tabulation provides an overview of the evolution stages of IT and their integration into the strategic management field.

In order to effectively integrate the previously described IT technology and systems into business operations, there is a need for an IT-related strategy that is to be aligned with a business value-creating strategy. Below, we briefly provide a background and a definition of the IT strategy as it relates to the evolution stages described in Table 2-1. Given the fact that IT strategy is not a very well-known and well defined concept, we provide the following definition as it applies to our line of research.

Definition 2-6 IT Strategy (ITS)

IT strategy is defined as "activities directed toward (1) recognizing organizational opportunities for using information technology, (2) determining the resource requirements to exploit these opportunities, and (3) developing strategies and action plans for realizing these opportunities and for meeting the resource needs". (cf. Boynton & Zmud, 1987)

2.1.2 The Integration of the IT Strategy into the Business Strategy

In this subsection, we explore the ITBSA concept by (A) providing a background and a definition of the ITBSA concept, and (B) providing a basic literature-based framework for the ITBSA concept.

A: The ITBSA concept: background and definition

The start of the integration is situated in the diligent observation of the facts. What we see is the following. Investors seek reward for the vast investments their companies channel into IT. Those investments amount to approximately 20% to 40% of capital investments (cf. Berghout & Tan, 2013). This fact imposes significant pressure on boards of directors to (a) attempt to reduce IT spending, (b) closely monitor IT investments, and (c) develop a framework of policies that work towards best utilization of those investments in realizing business strategic objectives (cf. Nolan & McFarlan,

2005; Coleman & Chatfield, 2011; Ward, 2012). The pressure noted emphasizes the discussion that we have provided in the previous subsection on strategic management and IT integration.

Tech Era / Evaluation Characteristics	(1) Mainframe Era 1950s – 1970s	(2) Microcomputer Era 1980s – early 1990s	(3) Internet & Networking era 1990s – to present
(a) Dominant technology	• Mainframes • Stand-alone applications • Centralized databases	• Microcomputers • Workstations • Stand-alone and client-server applications	• Networked microcomputers • Client-server applications • Internet technology • Web browser • Hypertext • Hypermedia
(b) Information Systems	• Transaction processing • Systems • Management information systems • Limited decision support systems	• Comprehensive decision support system • Executive support systems • Enterprise resource planning • Business intelligence • Human resource management • Expert systems	• Supply chain management • Customer relationship management • Knowledge management • Strategic information sys. • Multi-agent systems • Mobile information sys.
(c) IS motivation	Efficiency	Effectiveness	Business value
(d) Strategic management relevance	Provide information for monitoring and control of operations.	Provide information and decision support for problem solving	Support strategic initiatives to transform organizations and markets
(d) IT Strategy Relevance	Information provision Mainly organizational based	Perform comprehensive planning for all types of IS (above) investments and the start of the integration of ITS with business planning processes	• Initially, disintegration of ITS and business strategy due to recession • Later on, IT-enabled business change and significant integration of ITS into business strategies • Business ownership of ITS

Table 2-1 IT Evolution and strategic relevance

Adapted from Applegate et al. (2007); Chen, Preston, Mocker, & Teubner (2010); Ward (2012)

Moreover, we here repeat that business value from IT investments will be created at the business side and cannot be realized by IT alone (cf. Schwarz et al., 2010; Baker, Jones, Qing, & Jaeki, 2011). For example, there will be no business value created even if IT delivers a new sales tracking or CRM system application on time and within the budget. What should happen thereafter is that the business integrates the new IT system into its business operations. Any business value will only be created when new and adequate *business processes* are designed and executed, enabling the sales people of the organization to increase turnover and profit.

In spite of the fact that the main IT responsibilities are at the business side, the IT management and planning discussions remained mainly within the IT area (cf. Luftman & Kempaiah, 2008). Hence, a discussion should time and again emerge on the importance of the IT/Business co-involvement which we call *alignment* (cf. Luftman, 2015).

There are at least six common types of alignment in the literature. We summarize those common types of alignment in Table 2-2.

Most of the research on IT is concerned with the fifth type of alignment, namely *strategic alignment* (cf. Boynton & Zmud, 1987; Sabherwal & Chan, 2001; Chan & Reich, 2007; Oh & Pinsonneault, 2007). In our research, we choose for using *strategic alignment* in the design of our conceptual model where this type of alignment fits best with our idea on ITBSA.

Over the years, ITBSA became a key issue for researchers and managers. It has been identified as one of the main factors along the path from IT investment to realizing organizational competitive advantage and the desired return on IT investment (cf. Papp, 1999; Sabherwal & Chan, 2001; Schwarz et al., 2010). Organizations, which manage to align business and IT strategies, are able to use IT for competitive advantage and perform better in general (cf. Sabherwal & Chan, 2001; Kearns & Lederer, 2004; Byrd et al., 2006; Kearns & Sabherwal, 2006; Tallon & Pinsonneault, 2011; Baker et al., 2011).

	Alignment type	Common Description	Source
1	Business Alignment (Aligning organizational resources and strategy)	The organization's structure and resources should evolve to support the strategic mission of the organization.	(Andrews, 1971) (Sabherwal, Hirschheim, & Goles, 2001)
2	IT alignment	An organization is well-positioned to execute its IT strategy; the IT resource deployment is guided by that IT strategy.	(Sabherwal, Hirschheim, & Goles, 2001)
3	Contextual alignment	Organizations are expected to align their organizational resources with their competitive context.	(Drazin & Van De Ven, 1985) (Sabherwal, Hirschheim, & Goles, 2001)
4	Structural alignment	The resemblance between organizational resources and IT resources is structurally aligned.	(Henderson & Venkatraman, 1993) (Sabherwal, Hirschheim, & Goles, 2001)
5	Strategic alignment	The link between IT strategy and organizational strategy is aligned.	(Sabherwal, Hirschheim, & Goles, 2001; other references are in the text)
6	Social alignment	The state in which business and IT executives within an organizational unit understand and are committed to the business and IT mission, objectives, and plans.	(Reich & Benbasat, 2000).

Table 2-2 Six common types of alignment in literature and practice

At this point it is important to distinguish between two concepts that are sometimes used interchangeably in the literature, viz. integration and alignment. To distinguish between integration and alignment we provide the following two definitions indicating which researchers we take as founding fathers of our investigations.

Definition 2-7 Integration

Integration is defined as "providing specific IS support for a specific business activity". (Rockart & Short, 1989)

Integration usually refers to the *functional focus* (also called the internal focus). It implies the utilization of IT with the aim of coordinating and integrating specific roles and functions of the firm's members within the value-chain activities (cf. Rockart & Short, 1989; Schwarz et al., 2010). An

example would be the usage of a centralized company knowledge database to allow maximum information sharing among internal functions. In contrast, alignment is defined as follows.

Definition 2-8 Alignment

Alignment is defined as "the development of a generalizable IT/IS capability that is consistent with the general strategic directions of the organization". (cf. Chan & Huff, 1993)

As the definition implies, alignment refers to a technical capability of IT being exploited to serve one or more strategic objectives on the business side. In the literature, many terms and dimensions have been used to describe alignment including: linkage (Luftman & Brier, 1999), bridge (Peppard, 2001), and harmony (Weill & Ross, 2004). Consequently, the level of alignment to be explored has been extensively described in the literature.

The most prominent model of alignment is the SAM model (cf. Renaud et al., 2016). The SAM model integrates both strategic and functional types of alignment. Schwarz et al. (2010) argue that organizations are bi-focused, i.e., they simultaneously look at (a) operational efficiency and (b) the utilization of IT as a driver of competitive advantage. Seen from this perspective, the various terms used to describe alignment converge to the most common type of alignment (see Table 2-3 for alternative definitions of alignment) *the strategic alignment*, which is the main concept used in the IT research and practice (cf. Schwarz et al., 2010).

B: The ITBSA concept: a literature-based framework

Nowadays, CEOs focus more on IT and CIOs are taking a more intensive strategic role. Consequently, strategic alignment has become an issue among the top concerns of executives and managers (cf. Luftman, Kempaiah, & Nash, 2005; Chan & Reich, 2007; Luftman & Ben-Zvi, 2009; Chang et al., 2011). All in all, we therefore define ITBSA as follows.

Definition 2-9 IT Business Strategic Alignment (ITBSA)

IT Business Strategic Alignment is defined as "The extent to which the IT mission and strategies support (and are supported by) the business mission and strategies". (cf. Reich & Benbasat, 1996; Sabherwal & Chan, 2001; Chan, 2002)

This definition of ITBSA closely describes the concept as related to this thesis. Nevertheless, to provide a broader overview it is important to mention that there are several other definitions of ITBSA in the literature. Table 2-3 shows nine of the other common definitions of ITBSA in the literature. They are classified into seven classes. The emphasis is as follows.

Class 1: the relation internal - external

Class 2: the business mission

Class 3: IT in harmony with business strategy

Class 4: IT coexisting with the overall strategy

Class 5: IS strategy fits with business strategy

Class 6: alignment of IT strategies to achieve the grand strategies

Class 7: top management positively supports IT business strategic alignment

Class	IT Business Strategic Alignment Definitions	Source
1	"The strategic fit (between the internal and external business domains) and functional integration of: business strategy, IT strategy, organizational infrastructure and processes, and IS infrastructure and processes."	(Henderson & Venkatraman, 1993)
	"The organization of the IS function within a given firm should be contingent upon the internal and external factors specific to the firm."	(Brown & Magill, 1994)
2	"…the degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives, and plans."	(Reich & Benbasat, 1996)
3	"Applying IT in an appropriate and timely way and in harmony with business strategies."	(Luftman & Brier, 1999)
4	"Using IT in a way consistent with the firm's overall strategy."	(Palmer & Markus, 2000)
5	"The fit between IS strategy and business strategy of Organizations."	(Yayla & Hu, 2009)
6	"the extent of fit between information technology and business strategy."	(Tallon & Pinsonneault, 2011)
	"Alignment of organization's information technology strategies is a plan for coordinating information technologies tasks to organization's grand strategies."	(Kordnaeij, Zali, Mohabatian, & Forouzandeh, 2012)
7	"Top Management and executive support positively influences IT business alignment on the strategic level"	(Lederer & Mendelow, 1989) (Beimborn, Schlosser, & Weitzel, 2009)

Table 2-3 Various definitions of ITBSA in the literature
Initial table adopted from Baker & Jones (2008, p8)

At this point we would like to refer to Chang, Hsiao, & Lue (2011) who in their research on the IT alignment in service oriented enterprises have pointed out that the ITBSA definitions which refers to the fact that "both business and IT executives share a common vision" actually capture the social dimension of alignment, hence rising to the concept of social alignment. For a cross reference with classical definition of ITBSA, we provide a definition of social alignment as put forward by Reich & Benbasat (2000).

Definition 2-10 Social Alignment

Social dimension of alignment is defined as "the state in which business and IT executives within an organizational unit understand and are committed to the business and IT mission, objectives, and plans." (Reich & Benbasat, 2000)

In spite of the resemblance of social alignment and strategic alignment, in this research thesis we will maintain the naming convention of ITBSA (IT Business Strategic Alignment) to maintain consistency with literature and the main aim of this research. Below we describe (B1) the general framework of ITBSA and (B2) the SAM model

B1: The general framework of ITBSA

Historically, multiple frameworks have been put forward in the literature to express ITBSA (see, e.g., Henderson & Venkatraman, 1993; Reich & Benbasat, 1996). Studies in the field of ITBSA have utilized various configurations and schemes of components that are based on the multiple definitions expressed in Table 2-3. A generic framework of ITBSA components is depicted in Figure 2-1.

Figure 2-1 Basic framework of the alignment between IT and business strategies
Adopted from Boddy, Boonstra, & Kennedy (2005).

The basic framework shows the interaction of the common components of ITBSA which are the (a) corporate strategy and (b) the IT strategy. It is important to note, as depicted in Figure 2-1, that the corporate strategy (also called the organizational strategy) could take any or all of the various components of strategic management including: production, finance, marketing, and human resources.

B2: The SAM Model

As mentioned above there are many frameworks expressing ITBSA. Due to its importance to the ITBSA framework, as well as, its relevance to this research, the SAM (strategic alignment model) will be described below.

The SAM model was developed by Henderson & Venkatraman (1993). Figure 2-2 shows two *main* integrations, (1) functional integration (2) strategic alignment.

We discuss the full integration process in three stages. First, the horizontal double arrow connecting the top two boxes stresses the (as expressed by the SAM model) *functional integration* between the business strategy and the IT strategy. Meanwhile, the horizontal double arrow connecting the lower two boxes of Figure 2-2 demonstrate the *functional integration* among business-side factors (such as the administrative and organizational processes) and the IT-side factors (such as IT infrastructure and processes). Second, the vertical double arrows connecting the upper and lower boxes (at the right side and at the left side) demonstrate the strategic alignment among the strategic and infrastructure levels on both the business and IT sides. Third, the crossed arrows in the middle of Figure 2-2 demonstrate the overall necessary balance between business strategies, IT strategies, business processes, and IT processes in order to achieve successful operations and consequently high levels of *performance*.

Researchers such as Maes (1999) and Sabherwal & Chan (2001) have built on this concept and provided a more in-depth view into ITBSA. They defined ITBSA as "the degree to which the information technology mission, objectives, and plans support and are supported by the business mission, objectives and plans". Nevertheless, Sabherwal & Chan (2001) provide two important warnings, viz. (1) that the concept needs to be studied as a whole, and (2) that both strategic and functional aspects, and any attempts for a reduced bivariate approach could lead to serious operational problems.

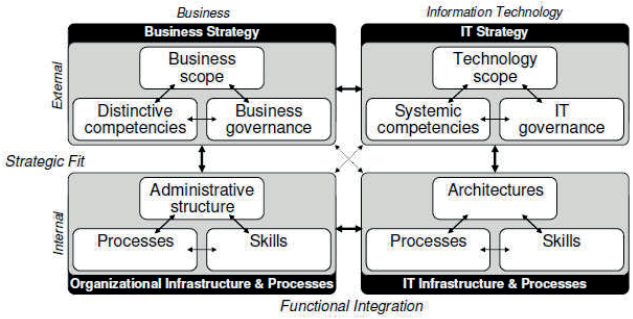


Figure 2-2 Strategic alignment model SAM
Adopted from Silvius, de Wall, & Smit (2009)

It is important to mention that this model has not escaped controversy. Renaud et al. (2016) have performed an extensive analysis of the literature on the SAM model and papers citing the SAM model between 2011 and 2014. They have concluded that the SAM model has been used and explored in

the literature from at least the following seven perspectives (for specific references on the perspectives, please see Renaud et al. (2016)).

(1) Managing the strategic alignment. This group of researchers posit the SAM model (a wholistic view) as being a source of competitive advantage. They propose conditions on how to enhance the effect of the SAM model on firm's *performance.*
(2) Operationalization of the SAM domains. This group is influenced by statistical analysis, and provide tools on the operationalization of the SAM domains.
(3) Planning of the alignment. The researchers that are within this group focus on the planning process of the SAM domains, mainly, the IT strategy and the business strategy. Some of the authors even consider the IT strategy as a subordinate to the business strategy. They claim that the IT strategy should be planned *ex post* and only according to the outcomes of the business strategy plan (no co-planning).
(4) Strategy content perspective. This group studies the conditions that led to strategic alignment, as well as, the impact of strategic alignment on the organizational *performance*.
(5) The IT strategy planning management. In this line of research, the authors claim no direct relationship between IT investments and firm's *performance*. They propose methods of transferring those investments into a competitive advantage.
(6) The business strategy planning and implementation. These research papers are focused on the business strategy side of the SAM. Their main concern is the methods of business strategy implementation
(7) The inter-organizational coordination. This group's focus is on inter-organizational IT systems' implementation. It mainly concerns the managers of IT. They claim that strategic alignment is less important, yet, they accept that it is a precondition for managers in order to succeed in IT projects implementation.

Based on those perspectives, Renaud et al. (2016) have put forward the following three criticisms to the model. (1) There is a discrepancy between the literature trends and the practical applicability of this model. (2) The model is being designed and studied for the top-level management, and therefore, it is not realistic for implementation. (3) The model is being treated in the literature as a prescriptive black box (not enough consideration for its internal structures). Finally, (4) the model's antecedents and consequences are being analyzed, yet, no in-depth analysis is performed on its fundamental assumptions.

A detailed analysis and investigation of the SAM model is beyond the scope of this research. Nevertheless, in subsection 6.4.4 we touch on the controversy surrounding the SAM model and the contribution of our results to this topic.

2.2 Enterprise Governance of IT

In this section, we start exploring the background of the Enterprise Governance of IT (EGIT). In subsection 2.2.1, we demonstrate that its roots are in the IT governance and the corporate governance. In subsection 2.2.2 we provide a logical connection between IT governance and EGIT. In addition, we provide a formal literature-based definition of EGIT.

2.2.1 IT Governance and Corporate Governance

At the beginning of the twentieth century industrialism was a collection of economic systems. CEOs of the competing corporations imposed, in most cases, objectives and strategies on the board of directors. The real owners acted at a distance in the position of being shareholders. In the rest of the world, with the exception of the UK, industrialism was represented by a handful of quite wealthy families owning (most of) the corporation (cf. Morck & Steier, 2007).

In the above described system of management, investors started to worry about a miss-utilization of their investments, giving birth to the importance of the good governance concept. CEOs became responsible for effective governance practices and investors closely monitored the quality and *performance* of the listed firms. We define the term governance as follows.

Definition 2-11 Governance

Governance is defined as "the relationship among various participants in determining the direction and performance of corporations". (Monks & Minow, 1995)

In recent decades, the term "corporate governance" has topped the list of public attention in association with the severe corporate failures which have surfaced the corporate world internationally. Corporate governance has existed for as long as various forms of human organizations have existed. It was intensively discussed, analyzed, and used in many reform proposals after decades of corporate failures. A common definition for corporate governance as used in the literature is presented below.

Definition 2-12 Corporate Governance

Corporate governance is in its basic form defined as "the systems and processes put in place to direct and control an organization in order to increase performance and achieve its objectives and a sustainable shareholder value". (ISO FDIS 26000)

Shareholders, the management, and the board of directors are the primary participants in corporate governance. The following quote by Fahy, Roche, & Winer (2004) clearly demonstrates the importance of corporate governance for organizational survival.

"Businesses that embrace a culture of transparency, honesty and social responsibility will enhance their business *performance* and maintain sustainable shareholder value. Those that fail to embrace or accept corporate governance, corporate social responsibility, and risk management practices will eventually fail." (Fahy et al., 2004)

Before the collapse of those corporate giants, corporate governance was not as popular in the public arena. Calls have intensified for at least three issues, viz. (1) transparent financial regulatory compliance, (2) balanced board structure, and (3) *performance*-based compensations for senior executives. In the USA, the Sarbanes–Oxley act 2002 (SOX) was born following a comprehensive research into America's existing legislation which already had 4,000 pages of legislation, governing accounting and auditing. Outside the USA, there were also efforts to enhance and enforce proper corporate governance practices. One of the most influential acts outside the USA was the European Union's 8th Company Law Directive on Statutory Audit (Directive 2006/43/EC). The 8th directive is considered the European post Sarbanes-Oxley regulatory retaliation.

Corporate Governance and IT governance cannot be considered as two distinct disciplines, IT Governance ought to be integrated into the overall corporate governance structure (cf. Guldentops, 2003; ITGI, 2001). In terms of *reporting, monitoring, and performance evaluation*, effective corporate governance requires that organizations not only have the ability to monitor and measure historic *performance* on a monthly basis, but also that they are able to meet the more forward-looking direction of setting the needs of the firm.

A critical backbone component of this forward-looking direction setting is the heavy reporting requirement. These reporting requirements (seen as a legal requirement) clearly point to the critical dependency on information technology. Hence, IT governance has become the focus of multinational corporations. There are several definitions of IT governance. We will use the definition provided by ITGI (2003) which defines IT governance as follows.

Definition 2-13 IT Governance

IT governance is defined as "the responsibility of executives and the board of directors, and consists of the leadership, organizational structures and processes that ensure that the enterprise's IT sustains and extends the organization's strategy and objectives". (ITGI, 2003)

Through enabling an effective monitoring, evaluation, and reporting functionality, IT governance empowers an organization with the ability to realize three equally important and critical objectives: (1) regulatory and legal compliance, (2) operational excellence, and (3) optimal risk management (cf. Robinson, 2005).

2.2.2 IT Governance and EGIT

Due to the focus on ''IT'' in the naming of the *IT Governance* concept, the IT governance discussion mainly stayed as a discussion within the IT area, while of course, one of the main responsibilities is situated at the business side. This discussion raised the issue that the involvement of business should be credited in the name, since it is crucial. As a direct result, a shift in name and definition was proposed, focusing on business involvement. The new term was *Enterprise Governance of IT*. We provide the following definition for the Enterprise Governance of IT.

Definition 2-14 Enterprise Governance of IT

EGIT is defined as "integral part of corporate governance and addresses the definition and implementation of processes, structures and relational mechanisms in the organization that enable both business and IT people to execute their responsibilities in support of business/IT alignment and the creation of business value from IT-enabled business investments" (Van Grembergen & De Haes, 2009, p3).

In recent years, the term Enterprise Governance of IT (EGIT) has been taking a center-stage in IT-Strategy related studies (see De Haes & Grembergen, 2013). Chapter 3 provides a detailed literature review on the EGIT concept and its relationships with both ITBSA and SIW.

2.3 Social Innovation at Work (SIW)

Innovation in general terms is anchored around the concept of turning knowledge into economic benefit. It involves (1) the discovery followed by the (2) application of new techniques and concepts; eventually leading to (3) growth, (4) economic prosperity, and (5) a better living standard. In this section, we will provide a discussion about the background and importance of the concept of innovation as a general concept in subsection 2.3.1. An overview and description of innovation, the

bridge to social innovation, the relationship with workplace innovation, and a formal definition of both social innovation and workplace innovation are presented in subsection 2.3.2. In subsection 2.3.3 we discuss the issue of inter-departmental collaboration on innovation in more detail.

2.3.1 Importance and Background of Innovation in General

Innovation (in general terms) has been shown to be a very complex and heterogeneous subject. It is situated far beyond and around the limitation to *process innovation* as explicitly assumed by the mainstream economic theory (cf. Edquist, Hommen, & McKelvey, 2001). In terms of importance, we focus at first on growth (cf. Goedhuys & Veugelers, 2011).

Due to the continually re-occurring financial crises in recent years, firms are faced with decreased profits and a consequent reduction of budgets (cf. Luftman & Ben-Zvi, 2009; Zarvic et al., 2012). As a result, in search for an alternative to the traditional financial focus, innovation as a means of the growth-realization factor has replaced the traditional cost-cutting focus and the creative accounting methods and practices (cf. Hamel & Schonfeld, 2003; Robeson & O'Connor, 2007). Innovation, in general terms, was identified by several national and international organizations as the major factor of economic growth and wealth (see, e.g., De Clercq, Menguc, & Auh, 2008; EU, 1995; OECD, 1997a; De Clercq, Menguc, & Auh, 2008; Lightfoot & Gebauer, 2011; Xue, Ray, & Sambamurthy, 2012).

Consequently, innovation plays a critical role in shaping the organizational survival through enabling organizations (a) to deal with new and emerging technologies, (b) to improve continuously their existing capabilities, and (c) to create a new competitive edge (cf. Banbury & Mitchell, 1995; Coad & Rao, 2008; Armbruster, Bikfalvi, Kinkel, & Lay, 2008). Moreover, innovation (d) improves labor productivity and (e) enables new technology to be put to work at innovative work organizations by enhancing the effectiveness of IT investments through effective outputs and services (cf. Licht & Moch, 1999; Pot, 2010). A detailed discussion of the relationship between innovation and *performance* is presented in Chapter 3.

In spite of its critical role which innovation plays in the organizational growth and prosperity, the European 2010 survey on working conditions has shown that only 47% of the European workforce is involved in work process, work organization, and the *performance*-target setting related to their work. Moreover, the report shows that only 40% of European workers are consulted and have an influence on the decisions concerning their work. This surprising result (some even called it shocking)

prompted an increased attention to innovation and the involvement by workers in the innovative activities.

2.3.2 The Social Innovation Concept and Definition

In order to position the concept of innovation into its context for our research, this subsection will provide a discussion of (a) innovation in the general form (process and product), (b) the path from process innovation to social innovation (passing along the product and workplace innovation), and (c) the various dimensions for social innovation in the literature. Moreover, we will provide definitions for the concepts mentioned along the above described line of reasoning, namely, process, product, social innovation, and workplace innovation.

Examining the history of innovation definitions, we find the roots dating back to an inspirational work by Schumpeter (1934) who has defined innovation as "*the first introduction of a product, process, method or a system*"[12]. At a later time, Porter (1990, p. 780) identified innovation as: "*a new way of doing things".* More recently, Freeman and Soete (2000) mention the following.

*"*An innovation in the economic sense is accomplished only with the first commercial transaction involving the new product, process system or device, although the word is used also to describe the whole process."

The definition list is almost endless. In order to establish a standard scope and definition based on the aim of the research, it is important to make an analytical distinction between the various *general* categories of innovation. Historically, in the literature a distinction was made between technical innovation and administrative innovation. Technical innovation involves the creation or significant improvement of technologies, products, and services; whereas, administrative innovation involves procedures, processes, and policies of an organization (see, Damanpour, 1987). We formally define process innovation as follows.

Definition 2-15 Process Innovation

Process innovation is defined as "being related to the introduction of new methods and responsibilities that cause a significant change in a way service is provided". (Davenport, 1992; Tarafdar & Gordon, 2007)

[12] This work highlights the dual nature of innovation: a *process* and an *outcome*. When the "process" notion is used, it implies introduction, application, development and application of a new idea. In contrast, when definitions are "outcome" oriented they imply a product, process, new software or a new concept.

Product innovation is an extremely complex issue involving product development and project management practices (efficiency and effectiveness of design and implementation processes) (cf. Grubisic, Ferreira, Ogliari, & Gidel, 2011). Its definitions date back as far as 1911 when Schumpeter (1911) defined product innovation as: *"The introduction of a new good … or a new quality of a good"*.

At a later time, some authors have put forward definitions that point to the factor of meeting the market needs (see, e.g., Utterback & Abernathy, 1975). They have defined product innovation as *"represented by the new products or services introduced to meet the needs of the market"*; a framework with this definition was later commonly used in product innovation research (see, e.g., Popa, Preda, & Boldea, 2010; Bertrand & Mol, 2013). Product innovation was also defined in terms of the firm's *capability* to generate new products; we will adopt this definition as it relates to the concepts of our thesis.

Definition 2-16 Product Innovation

Product innovation is defined as" a focal firm's technological abilities to develop innovative products which are new to the market or the firm, in terms of monitoring the new technology resources required by the firm, integrating these resources with its own technologies and developing marketable new products". (Kleinschmidt & Cooper, 1991; Day, 1994)

Process innovations may be technological as well as organizational[13]. Product innovations may be goods or services. It is more difficult to make such distinction in the service industries because the formal R&D is less important for the development of new service products. Hence, it is rather difficult to make a clear distinction between product and process innovation.

As mentioned in Chapter 1, due to the inadequacy of the financial indicators alone to assess the IT's value for business, there was a shift of focus via a socio-technical approach to an evaluation that involved exploring the IT-outcome. This shift, besides providing credibility to ITBSA as an antecedent to successful innovation, has emphasized a policy shift from technological innovation to the concept of s*ocial innovation,* establishing the importance of *social innovation* as a factor of a firm's *performance*.

[13] Significant empirical studies in the knowledge-based view of the firm have also made a distinction between product and process innovation in terms of knowledge usage and dependency. Most of those studies claim no direct or specified linking mechanisms between knowledge and innovation (cf. Williamson, 1999) in favor of a moderating or mediating effect of knowledge and innovation in a larger and more generic framework of a firm's performance. They consider factors such as a firm's capability to synthesize knowledge (Kogut & Zander, 1992), absorptive capacity (Cohen & Levinthal, 1990), and core competencies (Prahalad & Hamel, 1990). Yet, they agree that process innovation integrates more systemic and complex knowledge than product innovation (Gopalakrishnan, Bierly, & Kessler, 1999).

In spite of the substantial increase in the interest surrounding social innovation, an in-depth research providing the concept's definition and categorization is in its early stages (cf. Pol & Ville, 2009; Rüede & Lurtz, 2012). Several authors have provided their own categorization of social innovation (see, e.g., Bestuzhev-Lada, 1991; Moulaert, Martinelli, Swyngedouw, & González, 2005; Pol & Ville, 2009). The derived categorizations demonstrate how diverse the understanding is about what actually social innovation is, let alone, the criteria that should be used for its categorization. Rüede & Lurtz (2012) argue that the derived categorizations, besides the challenge of selecting effective categorization criteria, face two critical issues: (a) the lack of mutual exclusivity and (b) the vagueness of the individual categories. These constraints cause a difficulty in selecting the appropriate category for social innovation definitions.

In their extensive research on the social innovation in respect to categorization and definitions, Rüede & Lurtz (2012) decided to sum up the various categorization schemes into seven general categories. Table 2-4 documents the seven categories and provides a guiding question to each category for further clarification. The authors further indicate that the most cited categories in the literature are the categories 1-4, which also conform to the criteria of the notion concept clarity[14] as defined by Suddaby (2010).

Our focus in this research matches the characteristics of category 4. We are concerned with the work process re-organization and innovation. Next, we provide our definition of social innovation.

Category	Characterization	Guiding Question
1	To do something good in/for society	Which innovations are needed for a better society?
2	To change social practices and/or structure	What can we say about changes in how people interact among each other?
3	To contribute to urban and community development	How can we approach development at a community level when we put human needs and not business needs first?
4	To reorganize work processes	What else can we say about innovations within organizations if we leave out technological innovations?
5	To imbue technological innovations with cultural meaning and relevance	What else is needed for a technological to become a successful innovation?
6	To make changes in the area of social work	How can we improve the professional social work provision in order to better reach the goals of social work?
7	To innovate by means of digital connectivity	What possibilities to innovate do we have in a world where people are digitally connected in social networks?

Table 2-4 Social innovation categorization
Adopted from Rüede & Lurtz (2012, p.9)

[14] Suddaby (2010) states that *concept clarity* has four main components: (1) precise definition, (2) clear scope conditions, (3) stated semantic relationship to related concepts, and (4) logical consistency and coherence that provide a logical fit with all other aspects.

Definition 2-17 Social Innovation

Social innovation is defined as "the development and implementation of new ideas (products, services and models) to meet social needs and create new social relationships or collaborations". (EC, DG Regional & Urban Policy, 2013)

Social innovation is quite closely associated with the concept of workplace innovation (cf. Pot et al., 2012; Rüede & Lurtz, 2012). Workplace innovation is considered the locus of social innovation at the organizational level. In the Netherlands and Belgium, the term social innovation is used to express workplace innovation (cf. EC, DG Regional & Urban Policy, 2013). There are several definitions of workplace innovation; consensus has not been reached about a single formal definition. Here we provide a definition that will be adopted in this thesis.

Definition 2-18 Workplace Innovation

Workplace innovations are defined as "new and combined interventions in work organization, human resource management and supportive technologies". (Pot et al., 2012; Rüede & Lurtz, 2012; Pot, 2013)

The issue of defining innovation is still controversial. Improving the analysis of innovation issues is suggested to happen through achieving consistency within a single definitional approach (cf. Archibugi, Evangelista, & Simonetti, 1994). Due to the complexities mentioned above and given the close association of social innovation with workplace innovation (and innovation in general), in our context we will use the term Social Innovation at Work (SIW) to represent the combined concept of *Social Innovation at the Workplace*, as expressed by Pot et al. (2012). Social innovation at the workplace includes, by both definitions, i.e., the definitions of *workplace innovation* and *social innovation*, the introduction of new or significantly improved ideas and processes, dynamic management, and supportive technologies.

2.3.3 Inter-Departmental Collaboration on SIW

The definition of social innovation at work in the previous section (see also Definition 2-18) states in its context that the development and implementation of new ideas is associated with the creation of new collaborations. Many researchers support this notion and have identified collaborative activity as a main ingredient of achieving successful SIW (cf., e.g., Mulgan, Tucker, Ali, & Sanders, 2007; Bry, Valee, & France, 2011; Pot et al., 2012; Ganotakis, Hsieh, & Love, 2013; Nichols et al., 2013).

These innovation-stimulated collaborations could take one of three main dimensions: (1) intra-organizational innovation that occurs within an organization and may involve particular departments

or functions (cf. Mulgan et al., 2007; Rosenbusch, Brinckmann, & Bausch, 2011; Pot et al., 2012); (2) inter-organizational innovation that includes organizational structures beyond the organizational boundaries, such as, just-in-time inventory systems with suppliers or an external R&D collaboration (cf. Armbruster et al., 2008; Ganotakis et al., 2013); and (3) inter-institutional knowledge flow, expressing the collaboration of higher education and public research institutes (cf. El Harbi, Anderson, & Amamou, 2011).

Our research is concerned with the first type, namely, the intra-organizational collaboration; in particular, we are concerned with the inter-departmental collaboration on SIW. In this subsection, we explore the background and its importance. Moreover, we provide a formal definition of inter-departmental collaboration on SIW.

The implementation of a successful innovation strategy is argued to depend on two main factors, (a) the cooperation among various functional departments, such as R&D, marketing and IT (cf. Mulgan et al., 2007; Ganotakis et al., 2013; Nichols et al., 2013) and (b) the extent to which they effectively share both information (cf. Cuijpers et al., 2001; Jansen, Tempelaar, van den Bosch, Volberda, 2009) and resources (cf. Tsai & Ghoshal, 1998) towards the actualization of such a strategy.

The importance of inter-departmental collaboration on SIW lays in at least four major advantages. First, it enhances utilization of resources by stimulating flexibility in pooling knowledge, skills, and capital resources from different functions (cf. Ford & Randolph, 1992). Second, inter-departmental information integration assists in the achievement of common understanding of a new product or service by employees, consequently, enhancing the decision-making process throughout all development stages (cf. Sethi, 2000; Ganotakis et al., 2013). Third, it is argued that inter-departmental collaboration leads to the willingness to accommodate diversified view points and consequently to developing a healthy working environment through enhancing fair allocation of various resources which creates effective leadership skills and trust (cf. De Luca & Atuahene-Gima, 2007; Bry et al., 2011). Fourth, as a consequence of such fair allocation of resources, positive collaboration from other functional departments is encouraged, providing the necessary ingredients of a successful innovation strategy (cf. De Clercq et al., 2008). The inter-departmental collaborations are usually in the form of information sharing, interaction, and cross functional coordination (cf. Troy, Hirunyawipada, & Paswan, 2008). In general, there is agreement that innovation is about people and their collaborative culture (cf. Naranjo-Valencia, Jiménez-Jiménez, & Sanz-Valle, 2016), and that inter-departmental collaboration is an important factor for a successful innovation (see, Troy et al., 2008; Botzenhardt,

Meth, & Maedche, 2011). Hence, this thesis will utilize inter-departmental collaboration on SIW as a representation of measuring the social innovation at the workplace activity (as will be explained in Chapter 5). In Definition 2-19 we provide our formal definition of inter-departmental collaboration on SIW.

Definition 2-19 Inter-Departmental Collaboration on SIW

Inter-departmental collaboration on SIW is defined as: "the intangible and unstructured degree of cooperation, the extent of representation, and the contribution of several functional units to the innovation process". (Li & Calantone, 1998; De Luca & Atuahene-Gima, 2007)

Inter-departmental collaboration is intangible and unstructured in the sense that it reflects (1) the recognition by the individual or collective departments of their strategic interdependence and (2) their need to cooperate for the common innovative goal of the organization (cf. Olson, Walker, Ruekert, & Bonnerd, 2001; De Luca & Gima, 2007).

The notion of networks in organizations is not new, nevertheless, historically organizational network's lacked efficiency (the ability to manage complexity beyond a certain size of operations, and to mobilize and focus resources on a specific task). This reduced efficiency was mainly due to the lack of effective communication means. Castells (2000) proposed that the global society has undergone major social and economic transformations during the last quarter of the twentieth century. The rapid technological advance allowed for the formation of (a) new social formation which is centered around electronic information networks, and (b) new forms of production and management (cf. Castells, 2000). In his book, Castells (2014) names this new social formation a *network society* and described it as " The social structure that results from the interaction between social organization, social change, and a technological paradigm constituted around digital information and communication technologies" (cf. Castells, 2004, p. xvii).

Towards the end of the twentieth century, the emergence of modern electronic communication networks has significantly reduced the communication limitations within and among networks. Consequently, the new notion of "network society" has emerged. The main advantage of a networks is its flexibility and adaptability in managing tasks. Networks grow, shrink, and re-configure according to the needs of a specific task. Moreover, they have a higher chance of survivability because they do not have a central node which holds all the critical knowledge. The loss of such node would be potentially lethal to a given network. The flexibility and adaptability of networks has fostered the emergence of a new form of business structure in the advanced societies called the Network

Enterprise. This new structure requires the adaptation to new concepts and methodologies which focus on networked operations, as opposed to the classical hierarchical structures (Castells, 2000). The presence of such networks has the potential of significantly reduce the effect of the barriers to SIW described above. Network Society is not directly explored in this research, yet in Chapter seven we will link the importance of such networks to our answer of RQ3.

In our research, we will investigate the concept of SIW from the perspective of *inter-departmental collaboration on SIW*. A detailed literature review on the concept of SIW as related to ITBSA and *performance* is presented in Chapter 3, description of the construct is provided in Chapter 5, and an empirical analysis of the relationship between inter-departmental collaboration on SIW and *performance* is given in Chapter

CHAPTER 3 LITERATURE REVIEW

This chapter performs a literature review of the relationships among the studied concepts ITBSA, EGIT, and SIW (see Figure 3-1) and their relationship with the departmental *performance*. The ITBSA concept and its relationships to both IT investments (relationship (a) of Figure 3-1) and organizational *performance* (a combination of relations (b), (c), and (d) of Figure 3-1) are discussed and reviewed in section 3.1. In the discussion, we arrive at the finding that the linear representation as given in Figure 3-1 is not the most adequate representation. In our opinion EGIT plays a more supervising role (see Figure 3-4) and therefore we discuss the SIW concept in section 3.2 and thereafter the EGIT in section 3.3. Thus, section 3.2 investigates the SIW concept and its relationships to *performance* (relation (d) of Figure 3-1) and the relationship between SIW and ITBSA (relationships (b) and (c) combined). The EGIT concept, its components, and its relationships with both SIW and ITBSA are reviewed in section 3.3.

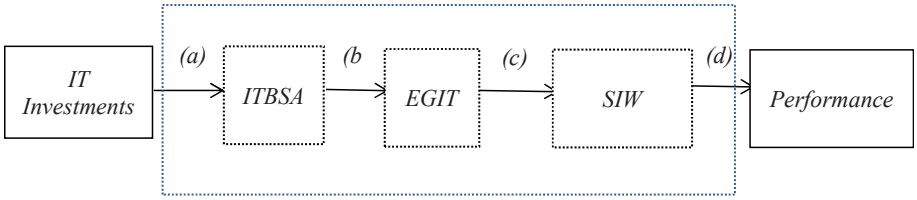


Figure 3-1 The concepts and relationships to be explored in Chapter 3

3.1 IT Business Strategic Alignment and a Firm's Performance

This section reviews the main issues in the literature that relate to the investments in IT resources and the relationship of those investments to the ITBSA concept. In subsection 3.1.1 we investigate the issues concerning the value that IT contributes to the organizational *performance*. Subsection 3.1.2 will explore the proposed relationship between IT investments and ITBSA (relationship (a) of Figure 3-1) with the aim to establish the position of ITBSA along the path from IT investments to a firm's *performance*. This will be achieved by showing that the literature supports the idea that IT is a valid antecedent to ITBSA.

In brief, we may state that in this section we review, in particular, the literature on the relationships which are marked by question-marks followed by the subsection number that explores the given relationship (see Figure 3-2).

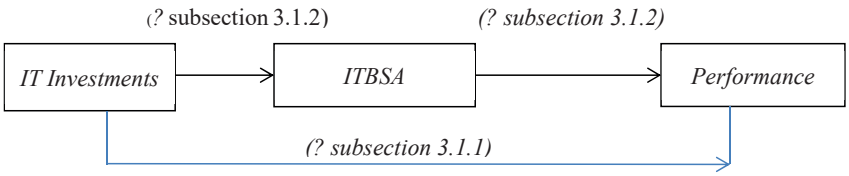


Figure 3-2 Literature review of IT, ITBSA and *performance*

3.1.1 The IT Value for Organizational Performance and Growth

The topic of IT value for organizations has been one of the most frequently debated topics in the literature since the emergence of IT technology (cf. Maçada et al., 2012). Given the significant percentage of organizational spending on IT resources, and following the global financial crises and economic recessions, there has been an increased pressure on CIOs to reduce IT spending and to capitalize on the limited budgets in creating an explicit business value (cf. Coleman & Chatfield, 2011; Zarvic et al., 2012). The difficulty of value-creation does not only reside in the process of value creation itself, but also in the difficulty to define and measure the IT impact on the bottom line (cf. Dedrick, Gurbaxani, & Kraemer, 2003; Strassmann, 2004; Maçada et al., 2012). The difficulty to measure adequately the impact is one of the factors that have prompted a controversy with regard to the value of IT for an organization.

At the start of the discussion of the IT value creation, we provide a definition of the value of IT for the organization. We put forward a definition originally proposed by Melville, Kraemer, & Gurbaxani (2004). This definition is supported by Hemmatfar et al. (2010). Below we adopt their version.

Definition 3-1 IT Business Value

IT business value is defined as "the benefits that IT provides towards the performance of the organization at the intermediate process levels, such as cost reductions and increased productivity in a specific task". (Hemmatfar et al., 2010)

Supporters of the positive impact of IT on the organizational value argue that IT has a significant value-adding role through creating innovative applications which allow for *direct* strategic advantage. The innovative applications improve the project management success rate and the effective knowledge management. Moreover, they provide for cost reduction through increasing general efficiency of operations (cf., e.g., Ahlemann, 2009; Hemmatfar et al., 2010; Coleman & Chatfield, 2011; Mithas & Rust, 2016). Other authors have promoted the view that IT has an indirect effect on a firm's *performance* and competitive edge. Those authors have proposed an *indirect* effect through mediating constructs, such as IT-enabled business processes (cf. Schwarz et al., 2010; Nazari &

Nazari, 2012), innovation and cost reduction (cf. Hemmatfar et al., 2010; Coleman & Chatfield, 2011; Kleis, Chwelos, Ramirez, & Cockburn, 2012), inter-organizational collaboration (cf. Zarvic et al., 2012), and IT governance (cf., e.g., De Haes & Grembergen, 2009; Haghjoo, 2012).

Historically, there have also been skeptics of the positive value of IT on the organizational *performance*. They were the main stimulants behind the trend towards IT outsourcing and downsizing. For example, Earl and Feeny (1994) (in their *Sloan Management Review* article titled "Is Your CIO Adding Value?") read that "General Managers are tired of being told that IT can create a competitive advantage". Most of the manager's observations are focused on the IT project failures and rising cost of information management. The absence of an objective framework to evaluate IT's contribution to the bottom line gave this controversial scientific article unexpected popularity. It led to radical decisions, such as outsourcing and/or downsizing the IT investments and, in some cases, even to firing the CIO. This skeptical view was also shared by Kettinger et al. (1994) who have challenged a sustainable return from IT investments by showing that only 20% of the companies have sustained competitive advantage after a period of 10 years.

In almost all firms, the business side has the advantage of decision making in its relationship with IT. Hence, quite often do business executives threaten to outsource IT services when IT does not deliver sufficient value. Moreover, the business side usually rejects the possibility that their own actions and decisions may be behind the IT's inability to function effectively. A senior manager once stated that "*IT in our organization is viewed as the technical core of the MIS function, the wide spread feeling is that it has very little to do with our business strategy*" (cf. Henderson & Venkatraman, 1993).

At a later time, this pessimistic view was supported by a famous article by Carr (2003) in the *Harvard Business Review* journal named *IT doesn't matter*. Carr has prompted an ongoing argument by making an analogy between commodities such as water and gas and information technology. His main argument was that IT resources have been transferred to a commodity through its ubiquity and replicability causing IT to lose its strategic value as being a scarce resource[15]. Carr argued that companies should stop investing heavily in IT and concentrate more on reducing operational risk associated with IT. More recently, his views were debated in the literature and a general consensus was reached arguing that IT has strategic importance but is not the only factor for sustaining

[15] Carr justified his argument by pointing out that the core functions of IT such as mass data storage and data processing capabilities are available to all and hence its strategic importance has diminished and that IT factors are no more than "costs of doing business".

competitive advantage (see, e.g., Schwarz et al., 2010; Davenport, Barth, & Bean, 2013; Kellermann & Jones, 2013).

The controversy shows that the role and value of IT to an organization undoubtedly differs based on the economic sector of the firm (cf. Mittal & Nault, 2009). Recent researchers argue that it is the method of measurement of the IT value that creates this skeptic view (see, e.g., Maçada et al., 2012; Nazari & Nazari, 2012). For example, some scholars and practitioners have traditionally used an approach that measures the direct causal effect of an independent variable (such as IT investment) on a traditional financial and market-oriented variable. Quan (2003) and Maçada et al. (2012) argue that IT value cannot be measured using traditional financial and market-oriented indicators. Their reasoning is that those indicators do not demonstrate the value of the accumulated knowledge and organizational capabilities (cf. Strassmann, 2004).

A proposed solution was put forward initially by Melville et al. (2004) and later supported by Schwarz et al. (2010). In their solution, they argue that a specific outcome of IT investments, "a *performance-driving resource that is reconstituted within capabilities*", need to be evaluated. In their argument, they utilize the Dynamic Capabilities Theory (DCT) which, according to Makadok (2001), implies that the source of competitive advantage is the result of the joint interaction between resource-picking and capability-building (as distinguished from the *static* nature of resource-picking in the resource-based theory). Schwarz et al. (2010) have focused on two main dynamic capabilities: (1) IT-enabled processes and (2) IT *strategic alignment*. Their conclusion was that ITBSA, among other factors, enables organizational value from IT investments.

In the next section, we will extensify this finding, and explore the literature on the ITBSA as well as on its connection to organizational *performance*.

3.1.2 ITBSA, an Enabler of Organizational Performance from IT

In this subsection, we will start exploring the literature on the relationship between IT investments and ITBSA by establishing IT investments as an antecedent of ITBSA (relationship (a) in Figure 3-1). Then we review the literature on the relationship from ITBSA to a firm's *performance* (this implies a direct combined relationships (b), (c), and (d) in Figure 3-1).

Studies on organizational strategic alignment (in general terms) have a long-rooted history dating back to 1961 when Likert was the first to shed some light on the importance of coordination in the

corporate business and functional strategies. Then in 1978, Hofer and Schendel emphasized the importance of the linking strategies at three levels of an organization, viz. the corporate, business, and functional level. Subsequently, Venkatraman & Camillus (1984) also called for the alignment of organizational resources with environmental opportunities.

In the more recent decades, ITBSA has been examined according to (A) antecedents, (B) consequences (including organizational *performance*), and (C) moderating and mediating variables along the path from ITBSA to *performance*. Below we will explore each of these items to establish the proposed positioning of ITBSA along the path from IT investments to organizational *performance*.

Here we remark that it is almost impossible to provide a comprehensive list of all the factors that have a tangible influence as the antecedents and consequences of ITBSA. Yet, we aim in our analysis at getting the most contributors and will announce them in advance. This facilitates comprehensible reading.

A: The antecedents of ITBSA

Research exploring IT-related antecedents of ITBSA has focused on several critical factors. Below we mention seven of them.

(1) Shared knowledge and understanding (see, e.g., Croteau & Raymond, 2004; Preston & Karahanna, 2009; Pirkko, 2010; Sabegh & Motlagh, 2012).

(2) Effective internal collaboration (see, e.g., Masa'deh, Hunaiti, & Bani Yaseen, 2008; Zarvic et al., 2012). The studies listed above have shown that shared knowledge through effective collaborative communication has been a significant antecedent to ITBSA.

(3) Accumulated IT capabilities and mechanisms (cf. Wu, Detmar, & Liang, 2015).

(4) A successfully described history of IT projects.

The factors (3) and (4) have also shown a positive effect on the ITBSA concept (cf. Chan et al., 2006; Yayla & Hu, 2009; Jorfi, Nor, & Najjar, 2011; Sabegh & Motlagh, 2012).

(5) Cross-involvement of IT executives and business executives.

On the line of cross-involvement, the mutual competence of IT executives and business executives was investigated by Luftman, Papp, & Brier (1999), Bassellier, Reich, & Benbasat (2001), and Bassellier, Benbasat, & Reich (2003). Their studies have shown that business managers are expected to show an increased willingness to lead and participate in IT projects. On this basis, a positive causal relationship of mutual competence on ITBSA could be expected.

(6) IT flexibility (in terms of flexible infrastructure).

(7) The importance of an executive's familiarity with the elements that make IT flexible.

Factors (6) and (7) were also shown to have a positive influence on ITBSA (cf. Yayla & Hu, 2009; Almajali & Dahalin, 2011; Jorfi, Nor, & Najjar, 2011).
Each of the explored studies has separately shown a strong positive influence of basic IT-related investments on ITBSA. In summary, the seven factors and their accompanying studies imply (1) a positive relationship between investments in IT resources and ITBSA (relationship (a) in Figure 3-1) and (2) establishes ITBSA as a valid consequence of IT.

B: The consequences of ITBSA (Performance Aspects)

Below we investigate the consequences of ITBSA, i.e., we look at the relationship between ITBSA and a firm's *performance*.

The effect of ITBSA on organizational *performance* has been studied along various dimensions. We mention four of them, (a) positive improvements on a firm's *performance* (effectiveness, efficiency, internal coordination), combined with competitive advantage, (b) cost implications, (c) financial indicators, and (d) SIW *performance*.

(a) Positive improvement on a firm's *performance* combined with the achievement of competitive advantage (through positive effect of ITBSA on increased effectiveness, efficiency, marketing activity, internal coordination and processes) has been investigated and confirmed by a number of researchers (see, e.g., Sabherwal & Chan 2001; Pollalis, 2003; Bergeron, Raymond & Rivard, 2004; Croteau & Raymond, 2004; Kearns & Sabherwal, 2006; Jorfi, Nor, & Najjar, 2011; Chang et al., 2011; Luftman, 2015).

(b) Oh & Pinsonneault (2007) have explored the cost implications of the alignment concept in view of the contingency approach. They concluded that ITBSA has a negative association in combination with the firm's expenses, i.e., effective ITBSA is a cause of reduced cost to the organization.

(c) The direct effect of ITBSA on financial indicators such as return on investment (ROI) and return on assets (ROA) was also investigated. It was shown that ITBSA has a positive implication on financial indicators (cf. Feidler, Gorver, & Teng, 1995; Papp, 1999; Jorfi & Jorfi, 2011, Luftman, 2015; Wu, Detmar, & Liang, 2015).

(d) Along the innovation-related dimension, SIW *performance* enhancement due to ITBSA was also supported by several scholars (see, e.g., Chan, Huff, Barclay & Copeland, 1997; Holthausen, Larcker, & Sloan, 1995; Croteau & Raymond, 2004; Coltman et al., 2015; Héroux & Fortin, 2016)).

It is worth mentioning that on a different level of analysis, alignment was operationalized on the process level (as opposed to the firm level) by Tallon (2008) and Luftman (2015). They have found a similar positive association between alignment and business value at that level of analysis.

C: The Mediating and Moderating Variables

In spite of the fact that the majority of research shows a positive relationship between ITBSA and a firm's *performance*, some scholars argue that the relationship from ITBSA to *performance* is not a direct one, but that it is mediated and/or moderated by other factors. We mention six factors together with a reference.

(1) IT flexibility.

(2) Environmental volatility (cf. Tallon & Pinsonneault, 2011).

(3) Industry environment (cf. Xue et al., 2012).

(4) IT-enabled business processes (cf. Schwarz et al., 2010; Luftman, 2015)

(5) Service integration level (cf. Chang et al., 2011).

(6) SIW (cf. Masa'deh et al., 2008).

The controversy on the precise relationship between ITBSA and *performance* shows that there is a need for further investigation of this relationship (cf. Schwarz et al., 2010; Tallon & Pinsonneault, 2011; Coltman et al., 2015). Due to our interest in the SIW concept, the next section will specifically explore the literature on SIW from two main perspectives: (1) its relation to the organizational *performance* and (2) as a factor along the relationship between ITBSA and *performance* (see factor 6 above).

3.2 SIW: The Facilitator between ITBSA and Performance

It is well known that the ability of an organization to achieve such a strategic advantage that it will be distinguished from its competitors depends on the extent to which the organization invests in innovative activities through combining valuable resources (cf. Conner, 1991; Teece, Pisano & Shuen ,1997; Spanos & Lioukas, 2001; Armbruster et al., 2008). Our aim is to investigate the position of SIW as a valid factor on the path to organizational *performance*.

We start our investigation by reviewing the literature on the relationship between SIW and *performance* in subsection 3.2.1 (relationship (d) in Figure 3-1). In subsection 3.2.2 we use inter-departmental collaboration on SIW as a representation of SIW. Here we provide a review on the concept of *inter-departmental collaboration on SIW*. In subsection 3.2.3 we review the literature on the relationship between ITBSA and SIW to investigate the claim made by some researchers that SIW is a consequence of ITBSA. In Figure 3-3 question marks indicate the studied relationships of this section.

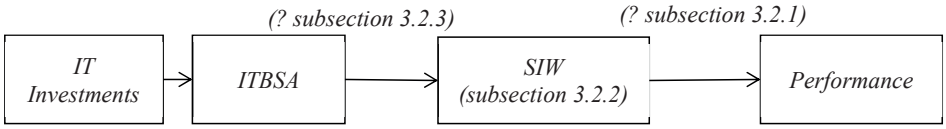


Figure 3-3 Literature review of SIW

3.2.1 SIW and Performance

In general, the literature has been supportive on the positive impact of SIW on organizational *performance*. The Dortmund/Brussels Position Paper (2012) argues that SIW-induced *performance* enhancements come from combining both human and organizational dimensions. The integrative process involves knowledge and experience of all organizational levels, leading to an increased *performance* on at least four levels of analysis. We discuss them below.

(1) On the *public level*, it is reflected in a positive impact on (a) economic value creation, (b) increased work force capabilities in the labor market, and (c) the delivery of essential community services (cf. Alee & Taug, 2006; Gardner, Acharya, & Yach, 2007; Oeij, Dhondt, & Kraan, 2012).

(2) On the *organizational level*, the integration process positively affects the behavioral outcomes such as high *performance* work practices and increased organizational capacities (cf. Black & Lynch, 2004; Pot & Fietje, 2008).

(3) On the *employee level*, two main effects are noted: (a) an increased employee-related outcome such as job satisfaction and motivation (cf. Cox, Rickard, & Tamkin, 2012), and (b) increased participation and productivity (cf. Alasoini, 2004; Pot & Fietje, 2008; Rüede & Lurtz, 2012).

(4) On the *financial level*, researchers have argued that SIW is an effective tool for cost reduction and increased returns for both private and public organizations (Barraud-Didier & Guerrero, 2002; Gunday, Ulusoy, Kilic, & Alpkan, 2011; Dhondt, ten Have, & Kraan, 2012; Pot et al., 2012).

The positive effect of SIW on *performance* has not refuted doubts and controversy in the literature. The historical track of SIW project failures has led to a pessimistic view due to three major issues with SIW projects: (A) the risky nature, (B) the efficiency vs. innovation paradox, and (C) the multi-functional team (inter-departmental) collaboration issues. Next, we provide a brief overview of these three issues.

A: The risky nature of SIW projects

SIW projects usually involve new methods which are based on trial and error. Mostly the SIW projects have no historical track record for making choices and decisions, which in some cases could lead to project failures (cf. EC, DG Regional & Urban Policy, 2013).

B: The paradox of efficiency vs. innovation

The paradox of efficiency vs. innovation is a source of another controversy[16]. Some researchers argue that SIW is a *distraction from efficiency* (cf. Mulgan et al., 2007).

The argument has to do with the human nature to resist change. Over time, process and rules get stabilized around the organization. In spite of the fact that SIW does not necessarily create a new invention, it is argued that it at least brings about new combinations and permutations of existing systems (cf. Webber, 2012). The new systems and/or processes, no matter how effective, seem to be inefficient, risky, and in certain cases against people's interests. Managers of SIW projects are usually faced with difficult tradeoff decisions[17]. This scenario is sometimes a source of internal competition for scarce resources causing, at least initially, a reduced *performance* (cf. Sarkees & Hulland, 2009; Xue et al., 2012).

[16] In some research papers, it is called "Exploitation vs. Exploration". It refers to the act of balancing between exploiting current resources with minimal or incremental innovation vs. exploring new frontiers in a radical innovative way (cf. Andriopoulos & Lewis, 2009).

[17] The proposed solution is an effective simultaneous balancing of innovation and efficiency in a strategy called *Ambidexterity* (cf. Andriopoulos & Lewis, 2009). It is noted that very few firms are capable of effectively realizing this balance, but those that succeed usually outperform those that do not (cf. Sarkees & Hulland, 2009). A detailed investigation of the Ambidexterity strategy is beyond this research.

C: The multi-functional team collaboration

Most innovative activities are cross functional (cf. Mulgan et al., 2007) which includes the involvement of multiple departments (inter-departmental collaboration). Although this collaboration is considered critical and inevitable, it is argued that it brings about several efficiency issues. Due to the importance of this topic for our research, we dedicate the next subsection (subsection 3.2.2) to a detailed investigation of the issue of inter-departmental collaboration.

3.2.2 Inter-Departmental Collaboration on SIW

Owing to the fact that our level of analysis is at the departmental level, and the data instrument used is oriented towards inter-departmental collaboration on SIW, it is to be expected that we provide much attention to the literature review on the issue. In the current subsection, we build on the background and importance of inter-departmental collaboration provided in Chapter 2 (subsection 2.3.3). We provide a review of the literature on the relationship between inter-departmental collaboration on SIW and *performance*. We present (1) views that argue for a positive relation between inter-departmental collaboration on SIW and *performance*, as well as (2) nine opposing views to this positive relationship. We do so through the following line of reasoning. We start at the macro level by initially providing a brief literature review on the *inter-organizational* collaboration with the aim to establish the scope for the intra-organizational collaboration on SIW. Then we provide five more barriers from nine publications with controversial views regarding the relationship between the inter-departmental collaboration on SIW and *performance* with the aim to demonstrate the need for further investigation into the issue. The five main barriers are: (1) interpretive barriers, (2) functional diversity, (3) past experience, (4) cultural barriers, and (5) communication barriers.

In section 3.1 it was shown that aligning IT and business strategies is an important pre-requisite for increased *performance* (including innovation). However, it is also argued that the sole involvement of the IT department in the collaborative process, as important as it might be, is not a sufficient event to achieve effective pre-requisites for successful innovation (cf. Weill & Ross, 2004). This also holds true for the sole involvement of other departments such as the R&D (cf. Ulrich & Eppinger, 2000). The collaboration needs to be multi-departmental (multi-functional) for a consequent innovation success (cf. Bowen et al., 2007; Pot et al., 2012; Ganotakis et al., 2013; Nichols et al., 2013).
Subsection 2.3.3 (in Chapter 2) has provided a literature review for the background and importance of the inter-departmental collaboration on SIW; it was argued that there are three main schemes of collaboration, namely, intra-organizational, inter-organizational, and inter-institutional. The last type

of collaboration mentioned above, the inter-institutional, is out of the scope of this research. The second type, inter-organizational, which is concerned with knowledge sharing and information flow among various organizations, will be briefly explored (see A below) to provide a reference point for the scope of this research, namely, the intra-organizational collaboration (see B below) which is considered the most important collaboration for effective knowledge sharing among departments and for information flow (cf. Liu & Liu, 2008).

A: Inter-organizational collaboration

We start our literature research by exploring the inter-organization collaboration on SIW (the collaboration among organizations). Due to the increased sophistication of products and services, generating an innovative action usually involves crossing the resource boundaries not only within an organization, but also across a specific sector and possibly across the industry, placing an increased importance on the inter-organizational collaboration action (cf. Kamel, 2006; Mulgan et al., 2007; EU, DG Regional and Urban Policy, 2013). An attempt by an organization to acquire all the necessary competencies for a complex product/service is not the most efficient (and cost effective) path to achieve effective SIW. Hence, strategic management literature is placing an increased emphasis on effective collaborative frameworks. For example, Pot et al. (2012) and Ganotakis et al. (2013) have confirmed that for an effective innovative process it is important to network with external entities such as customers, suppliers, and trade unions. Those networks allow organizations to enhance their value-creation capability (cf. Kamel, 2006) through special tailoring of EGIT practices for more effective external collaborations (cf. Zarvic et al., 2012).

On the negative spectrum of inter-organizational collaboration research, some researchers have gone to the extreme of claiming no positive effect on *performance* from external collaborations (see, e.g., Rosenbusch et al., 2011); while others were more moderate and argued that external innovative networks are often coupled with internal networks and that they jointly participate in innovative activities (cf. Colombo, Laursen, Magnusson, & Lamastra, 2011). This claim leads us to our main point, namely, the intra-organizational collaboration (the inter-departmental collaboration).

B: Intra-organizational collaboration

Below we examine the intra-organizational collaboration on SIW. This type of collaboration implies that in order to create an integrated knowledge framework for effective SIW, employees of a given department must have access to out-of-their-expertise area in terms of knowledge and experience (cf.

Faniel, 2005), i.e., creating inter-departmental collaboration networks in the form of, for example, cross-functional teams (cf. Pot et al., 2012; Ganotakis et al., 2013).

Researchers have diverse opinions on the relationship between inter-departmental collaboration on SIW and *performance*. Some argue that in the presence of a number of success factors with positive effect, the effect of the collaborative efforts is not positive. For example, Holland, Gaston, & Gomes (2000) have identified three success factors for an inter-departmental innovation team. In their research, they showed strategic alignment, supportive climate, and team-based accountability to be the predominant success factors of inter-departmental collaboration leading to a successful innovation and a positive *performance*. Bry et al. (2011) in their paper on *social innovation as a collective adventure* argue that factors such as a common belief, proper selection of the people on the team, trust among the involved team members, and an effective leadership are the top factors of the success in innovation teams.

The contingent effect in inter-departmental task conflicts, seen as an enabler of successful SIW, was examined and confirmed by De Clercq et al. (2008). Their conclusion was that the higher level of a cross-departmental task conflict increases the positive relationship between the SIW strategy and a firm's *performance*. In general, it is agreed that external orientation, beyond the functional boundaries, makes innovation teams more efficient and successful (cf. Ancona & Bresman, 2007; Botzenhardt et al., 2011). Finally, Murray, Caulier-Grice, & Mulgan (2010), Ganotakis et al. (2013) and Arvanitis & Loukis (2016), all assert that using the appropriate IT technology provides for enhanced communication through an effective and free flow information sharing, which in turn has a positive impact on the organizational innovative efforts.

In spite of the argued positive effect of inter-departmental collaboration on SIW on the organizational *performance*, there are some scholars that argue for a negative effect due to well-known barriers. At least five main barriers were identified that made it difficult to get employees from different functional areas to share or transfer each other's knowledge across departmental boundaries (see Markus, Majchrzak, & Gasser, 2002; Carlile, 2002). We briefly discuss the following five main barriers below: interpretive barriers, functional diversity, past experience, cultural barriers, and communication barriers.

Interpretive barriers

A classical and significant contribution to this field was the suggestion that (a) interpretive barriers cause difficulties between individuals from cross departmental boundaries and that (b) those barriers lower the perceived value of cross-departmental knowledge on any innovative activity (cf. Dougherty, 1992). This view is supported by a *theory of thought worlds* proposed by Dougherty (1992) in an attempt to explain the difficulty of knowledge integration across different departments. Basically, she argues that people from different departments develop different thought worlds[18]. According to this theory, employees from different departments (thought worlds) specialize in different *domains of knowledge*. This specialization acts as a barrier to taking advantage of each other's knowledge. Those people from different departments have distinct approaches to making sense of situations and hence encounter barriers in: (a) judging the quality of knowledge, (b) understanding the knowledge, and (c) re-using the knowledge.

Functional diversity

Sethi (2000) argues that functional diversity may lead to decision complexity and confusion. The informal communication patterns combined with the participative decision-making can become a time-consuming process (cf. Olson, Walker, & Ruekert, 1995). The classical conflict between design and marketing departments is a real live example (cf. Beverland, 2005).

Past experience

Past experience with large scale projects is a key factor in determining the level and success of collaboration. The lack or the weakness of such experience in some departments could be a barrier to successful collaboration efforts (cf. Huang & Newell, 2003).

Cultural barriers

There are two forms of cultural barriers. First, we observe that inter-departmental collaboration and knowledge sharing often fail because instead of implementing sharing and collaborating practices to fit the culture, companies attempt to do it the other way around. They adjust their organizational culture to fit those practices (cf. Riege, 2005). A second form of cultural barriers to inter-departmental collaboration is as follows. In case an organizational culture apparently values certain departments

[18] A thought world is "a community of persons engaged in a certain domain activity who has a shared understanding about that activity" (Dougherty, 1992: 182).

over others (cf. De Long & Fahey, 2000), it may happen that such a valuation acts as a barrier to inter-departmental collaboration.

Communication barriers

Beverland (2005) already observed that communication problems and employee tension were classically reported as a major inter-departmental collaboration barrier. A classic example is the communication tension between the design and marketing departments. Designers see cost and internal functionality as a major factor in a new product, while marketing departments might see external look and ease of use as more important.

Those five barriers almost certainly hinder effective inter-departmental collaboration on SIW, bringing about the following two major controversies regarding the usefulness of those departmental collaborative networks.

Controversy 1 on Decision making efficiency

Researchers argue that inter-departmental collaboration is a source of decision-making delays due to the more complex decision-making procedures (cf. Olson et al., 1995). Hackman (2009) in his interview by Diane Coutu attributes the inefficiency to the fact that, due to this barrier, *"*teams don't even know what are they supposed to be doing*"*.

Controversy 2 on the Increased cost

Inter-departmental collaboration on SIW (in association with the above-mentioned barriers and controversy 1) is considered by some employees as a source of increased cost. These employees provide at least the following four reasons: (a) project delays (cf. Cuijpers et al., 2011), (b) less efficiency in decision-making (cf. Olson et al., 1995), (c) conflicts over resources (cf. Troy et al., 2008), and (d) budget over-runs (cf. Olson et al., 2001).

Conclusion

So, the topic on the relationship between (a) inter-departmental collaboration on SIW and (b) *performance* is really controversial. Yet, most researchers agree that an effective and aligned IT system is a must for collaborative activity to take place. In the next subsection, we discuss this suggestion by investigating the relationship between the ITBSA and SIW.

3.2.3 ITBSA and SIW

IT strategic alignment with a proper business strategy has been considered the basis for sustainable advantage and organizational success. Several studies have investigated the effect of ITBSA on business *performance* as represented by constructs such as financial *performance*, market growth, and company reputation; while others have specifically explored the relationship between ITBSA and innovation activity at the organizational level. For references, see below.

As a case in point, we mention that as early as in 1993 Chan & Huff (1993) have investigated and confirmed the positive association between ITBSA and a firm's *performance* factors such as market growth and service innovation at the organizational level. They explained that a given firm would understand that its main (core) strategic drive to remain competitive would be the development of new products and/or services. Furthermore, those firms would support thrust in products and services by designing its operational development plans for a new product in harmony with its IT strategic plans creating an aligned environment.

A positive effect of ITBSA on disruptive innovation that moves organizations from a stagnant (old) stage to new high returns was established by Dehning, Rishardson, & Zmud (2003). ITBSA was also shown to enhance the relationship between future innovation activities and senior management acceptance of those activities if the innovations were associated with the idea of ITBSA (cf. Silva, Figueroa, & Reinharta, 2007).

Tallon & Pinsonneault (2011) have asserted, in their study of IT alignment and agility, that the path dependencies created by agility[19] enable increased innovation and adaptiveness. Neubert et al. (2011) have expanded the stand- alone view of alignment as an internal issue between the organization and its IT systems into the inter-organizational level. They considered the effect of organizational alignment on the IT-driven innovations and confirmed a positive relationship.

In all of the mentioned studies, ITBSA is shown to be positively associated with an innovative activity of the organization. In this research, we propose that this relationship, on the departmental level, is *moderated* by the Enterprise Governance of IT (EGIT) which is the focus of the following section.

[19] Here we are referring to an environment where essential business strategy aspects are easily communicated to IT executives, and IT capabilities essential for directing business strategy are shared with business executives.

3.3 The Enterprise Governance of IT

At the start, we would like to point to the relative lack of research on the topic of EGIT as pointed by two authors who have executed an extensive literature research on the EGIT concept up to the year 2013 (see Valentine & Stewart, 2013). They note that *"*The primary limitation faced is the lack of scholarly research relating to enterprise business technology governance in the rapidly changing digital economy*"*. In a similar vein, this view is confirmed somewhat earlier by several other scholars (cf., e.g., Coleman & Chatfield, 2011; Haghjoo, 2012) who claimed that studies investigating the role of EGIT in value delivery are also scarce.

The aim of this section is to show that a proper EGIT is a significant player along the studied path from IT investments to SIW and *performance*. We build on the background, importance and definition of EGIT that was presented in section 2.2. Definition 2-14 has described EGIT as having three components: processes, structures, and relational mechanisms. Below we present a more detailed insight into those components (see subsection 3.3.1). Then, we investigate the relationships between EGIT and SIW in subsection 3.3.2. Finally, the controversial relationship between EGIT and ITBSA is investigated in subsection 3.3.3. Figure 3-4 depicts the relationships explored by this section.

In Figure 3-4 EGIT is positioned, as assumed by our research, in the moderating position between ITBSA and SIW. In this section, we have decided on this positioning because we are interested in examining the literature for the relationships between (a) EGIT and (b) both the ITBSA and SIW with the aim to investigate (and set the stage for) the possibility of the *moderating* effect of EGIT.

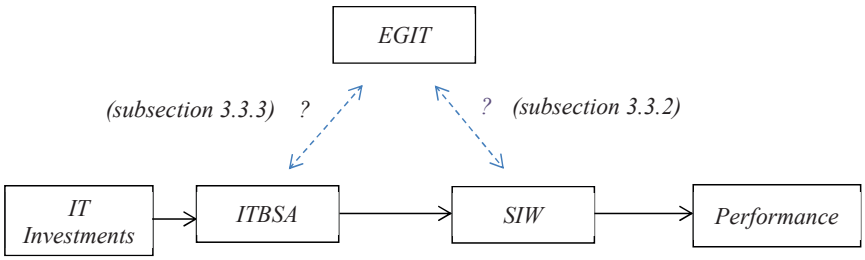


Figure 3-4 Literature review of EGIT

3.3.1 The Components of the Enterprise Governance of IT

There is no consensus on the specific factors composing the EGIT concept. A few studies have provided a segregated exploration of EGIT's components (as opposed to a holistic approach as will be discussed later). Those studies have examined several factors that supposedly compose the EGIT. For example, Sohal & Fitzpatric (2002) have worked on exploring IT governance components such as: decision-making structures, alignment processes, and communication approaches, while Weill & Ross (2004) have focused more on the decision-making oriented factors such as: IT steering committee, centralization of IT decision making, and the involvement of senior management in IT. Vaswani (2003) and Syaiful (2006) have studied the correlation between some of the above factors and effective IT governance. For example, they argued that certain individual mechanisms, such as: IT steering committee, involvement of senior management, corporate *performance* measurement systems, culture of compliance, and corporate communications systems, have a positive effect on the overall level of IT governance effectiveness.

A study closely related to our definition of EGIT was performed by De Haes & Van Grembergen (2009). They have set a more standardized categorization of the factors that compose the EGIT. In their study, they have explored two major research questions: (1) how do organizations implement EGIT? And (2) what is the relationship between EGIT and IT business strategic alignment? The first research question regarding the steps of implementing an EGIT is beyond the scope of this thesis. The conceptual model of their research question #2 is discussed in Chapter 4. At this stage, we are concerned with a part of their research question #2 in which they define the components of EGIT as a mixture of processes, structures, and relational mechanisms. We adopt this conceptualization of EGIT in our study. Hence, those components are further explored in the next paragraphs.

Processes

The *processes* of IT governance are referred to by Peterson (2004) as *"formalization and institutionalization of strategic IT decision making or IT monitoring procedures"*. Those processes include, among others, IT *performance* management system, formal IT governance framework, benefit management, and reporting.

Structures

Structures are pointing to formal mechanisms, such as an IT strategy committee at the level of the board that enables horizontal contacts between business and IT management (cf. Peterson, 2004). As previously mentioned, IT governance should be an integral part of corporate governance,

consequently, becoming the concern of the Board of Directors. Boards manage the various disciplines through specialized committees that oversee those areas. Since IT governance issues are critical to the business and to the achievement of effective corporate governance practices, IT issues should be managed with high commitment and accuracy.

Relational Mechanisms

Relational mechanisms are about "the active participation of, and collaborative relationship among, corporate executives, IT management, and business management" (cf. Henderson & Venkatraman, 1993; Weill & Broadbent, 1998). They are crucial in the IT governance framework even when the appropriate structures and processes are in place. The relational mechanisms include factors such as (a) cross-training and (b) the co-location of the IT leadership as an example.

As stated above, this categorization of EGIT components is adopted in our research, i.e., processes, structures, and relational mechanisms. Below, we will investigate the literature on the relationship between EGIT and SIW, as well as the literature on the relationship between EGIT and ITBSA.

3.3.2 EGIT and SIW

As mentioned in the introductory paragraphs of this section, the area of EGIT has not been extensively explored in the literature. More specifically, research exploring its relationship with innovation is even scarcer. So, in this subsection we concentrate on the available research performed in the area of the relation between EGIT and SIW.

The few available research projects on this theme have argued that there exists a positive relationship between IT governance and a firm's innovative activities. Moreover, they argued that SIW acts as an enabler of the positive impact of EGIT on *performance*. A nice example is the process-oriented framework developed by Mooney, Gurbaxani, & Kraemer (1995). They proposed that a firm's business value is achieved by the impact of IT on intermediate processes including innovation.

Similar importance and focus on business innovation was shown in several multi-sector industry research projects conducted by the UAMS – ITAG research institute with the aim to conclude a better view of the mutual support between business and IT goals. In those research projects, *business innovation* was identified, among other top ten common goals, to be a major link between IT and business strategic objectives showing the important influence of IT governance on innovation (cf.

Van Grembergen & De Haes, 2009). Similarly, Peterson (2004) has proposed a positive influence of EGIT (specifically the decentralized IT governance) on the innovation strategy in large and complex organizations. EGIT was also shown to support innovative activities through enabling collaboration by providing effective information sharing and smooth knowledge transfer (cf. Coleman & Chatfield, 2011; Zarvic et al., 2012; Ganotakis et al., 2013). As already discussed in subsection 3.2.2, this is a critical factor for successful innovation activities.

3.3.3 EGIT and ITBSA

The precise relationship between EGIT and ITBSA is controversial at least in the literature. Researchers both agree and disagree about certain aspects of the EGIT and ITBSA relationship.

On the one hand, researchers are in general agreement along two main lines: (1) EGIT and ITBSA are complimentary and closely related (cf. Tiwana & Konsysnski, 2010; Héroux & Fortin, 2016), and (2) as argued by Stolze, Boehm, Zarvić, & Thomas, (2011) and confirmed by Zarvic et al. (2012), there is a general consensus implying that the EGIT concept is about managing the strategic outcomes and value delivery of IT investment. The latter is achieved by setting a decision-making framework that encourages an IT-usage behavior. The essence is that the IT-usage behavior is aligned with the general strategic goals of the organization (cf. also, Weill & Ross, 2004; Fonstad & Robsertson, 2006; Becker, Pöppelbuß, Stolze, & Cyrus, 2009).

On the other hand, researchers disagree on two main aspects of the EGIT and ITBSA relationship: (1) some consider EGIT to be an antecedent to ITBSA, in which case the aim is to maximize ITBSA as an end stage of the investigated value chain (see, e.g., De Haes & Grembergen, 2009; Jorfi & Jorfi, 2011; Sabegh & Motlagh, 2012); and (2) some consider EGIT to be an enabler for ITBSA's ability to achieve strategic outcomes. The effect of these two disagreements could take one of two forms. The forms (a) and (b) correspond with disagreement (1) and (2) respectively.

(a) The first form assumes that ITBSA is a consequence of EGIT. Or, as we investigate in our research, that EGIT *moderates* the impact of ITBSA on other success factors. For example, Chang et al. (2011) in their research on assessing ITBSA in service organizations have shown that service

automation and integration acts as a moderator of the ITBSA's[20] effect on the organizational *performance*. Similarly, Tallon & Pinsonneault (2011) have examined the effect of EGIT factors such as IT flexibility. They have concluded that there is a positive moderating effect of IT flexibility (among other factors) on the relationship between ITBSA and *performance*.

(b) The second form assumes that EGIT acts as a consequence of ITBSA. Thus, EGIT *mediates* the effect of ITBSA on other *performance* factors. Along this path of reasoning we find, for example, Zhou, Cillier, & Wilson (2008) who argued that information management mediates the effect of ITBSA on *performance*. Moreover, Beimborn et al. (2009) have shown that EGIT is a consequence of strategic alignment and that it mediates the effect of ITBSA on structural alignment and organizational *performance*.

3.3.4 Chapter Conclusion

Based on the literature findings of this chapter, we may conclude that the issue of positioning of EGIT along the value chain from the investments in IT resources to *performance* is still controversial. It needs further investigation. Consequently, in order to provide further investigation into the issue, we have to investigate the models that relate EGIT and ITBSA. Moreover, we should build a conceptual model for our study. We do so in the following chapter.

[20] Chang et al. (2011) have examined three types of alignment: strategic, operational, and social alignments. They have concluded that the effect of all forms of alignments (including the strategic alignment) on performance is a moderated effect.

CHAPTER 4 THE CONCEPTUAL MODEL

Based on the background of Chapter 2 and the literature review in Chapter 3, this chapter focuses on the development of the main conceptual model for this study. We approach the development of our conceptual model by the following line of production. In section 4.1 we provide the theoretical background of the mediating and moderating models. In section 4.2 we show the significance of the departmental level analysis. In section 4.3 we develop an initial conceptual model that depicts the assumed relationship among the three basic concepts: ITBSA, SIW, and *performance*. In section 4.4 we eventually design those conceptual models which are assumed to have the distinct effects of EGIT on the relationship between ITBSA and *performance*.

4.1 The Theoretical Background of the Mediating and Moderating Models

In recent studies, strategic alignment mediators and moderators are playing an increasingly pivotal role (see, e.g., Chan et al., 2006; Tallon & Pinsonneault, 2011; Wu, Detmar, & Liang, 2015). These studies concur with our research interest. Therefore, we aim at exploring the mechanism that mediate and moderate the relationship between ITBSA and *performance* at the departmental level. However, there are not many studies of this type. So, our research focus is relatively unexplored both in the literature and in practice. Still, our objective is to align the relation: ITBSA, EGIT, and the departmental level of social innovation at work towards the departmental *performance*.

In this section, we set the stage for the development of our main conceptual model by introducing the two theoretical models, namely, the mediating model in subsection 4.1.1., and the moderating model in subsection 4.1.2.

4.1.1 The Mediating Model

In this subsection, the conceptual design of a generic mediating model is discussed. First, we provide a definition for the mediating variable.

Definition 4-1 Mediating Variable

A mediating variable is "a variable with a mediating effect that is based on the extent to which it accounts for the relationship between the independent variable and the dependent variable". (cf. Baron & Kenny, 1986)

So, mediation takes place in relation with A and B. The path diagram in Figure 4-1 depicts a basic mediating relationship.

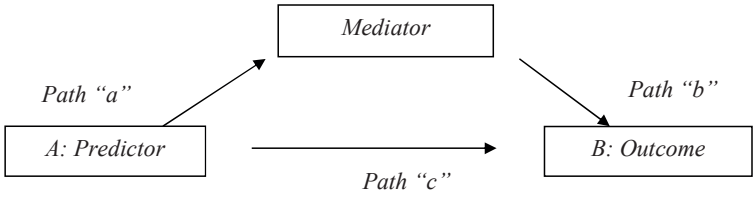


Figure 4-1 Path diagram for the basic casual chain of a mediator model
Adopted from Baron & Kenny (1986, p.1176)

Figure 4-1 assumes a three-variable model with two causal paths feeding into the outcome variable (Path "b" and Path "c"). The following four conditions must be satisfied.

1. *Path "a" is significant*. Variation in the predictor variable should significantly affect the variations in the mediator variable.
2. *Path "c" is initially significant*. Variation in the predictor variable must significantly affect the variation in the outcome.
3. When paths "a" and "b" are controlled:
    i. Path "c" has (preferably) less effect than its initial effect.
    ii. Path "b" must be significant.

Under a controlled scenario, a complete reduction of path "c" to zero indicates a single strong acting mediator. Otherwise, if path "c" remains at a statistically significant level, it indicates the presence of multiple mediating factors.

4.1.2 The Moderating Model

Below we provide a background concerning the conceptual design of a generic moderating model. It will be explored using the descriptive path diagram method. The discussion will include the needed conditions in order to satisfy the moderating status of a given concept (variable). We start by providing a formal definition of a moderating variable.

Definition 4-2 Moderating Variable

A moderating variable is defined as "a qualitative or a quantitative variable that affects the direction and/or strength of the relationship between an independent variable (also called a predictor) and a dependent or variable (also called a criterion)". (Baron & Kenny, 1986)

In ANOVA terms a moderating effect is expressed as the interaction of two variables, the independent variable and another variable. This interaction provides for conditions that allow the "other" variable to enforce (or even reverse) a relationship between the independent variable and the dependent variable(s).

A path diagram is a common method of describing both the correlational and experimental views of a moderating variable. Figure 4-3 depicts the path diagram of a moderating relationship. There are three causal paths that point into the outcome variable: (1) the predictor (independent variable) (path a), (2) the moderator (path b), and (3) the product of these two (path c). Moderation assumes that a relation between the two given variables (in this case the predictor and the outcome) changes as a function of the moderator. So, moderation takes place on the relation between A and B (see Figure 4-2).

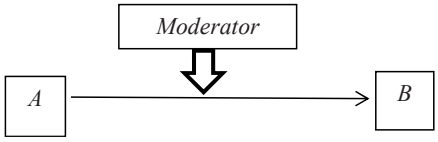


Figure 4-2 The conceptual depiction of a moderating

In order to show a moderating effect, Baron & Kenny (1996) suggest the application of a series of regression analyses in which the outcome (dependent) variable is regressed simultaneously over (1) the predictor, (2) the moderator, and (3) the product of the predictor and the moderator. For the moderating test to hold, the *product* variable (along the path c) must be statistically significant.

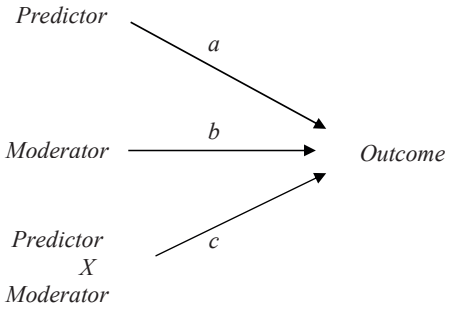


Figure 4-3 Path diagram for testing a moderating effect
Adopted from Glass & Singer (1972) in Baron & Kenny (1986)

4.2 The Significance of the Departmental-Level Analysis

In section 1.4 we have mentioned that the firm-level data are too aggregate to make a reasonable examination of the innovative activities of the firm. Since we believe that most of the innovative activities appear at the departmental level, we will use two approaches to emphasize the importance of the departmental-level contributions to a firm's *performance*. The approaches are: (1) The Balanced Score Card (BSC) strategic framework which shows the critical dependence on the departmental level in achieving strategic goals, and (2) the IT engagement model by Fonstad (2006).

In order to avoid a possible confusion, I would like to clarify the notion of "department". In this thesis, "department" refers to a component of a hierarchical structure such as marketing, training, or finance. Some international firms refer to those components as "business units". All firms that participated in our study had a unified naming, namely, "department". Moreover, I would like to emphasize that all firms in our study had a classical hierarchical structure with standard departments such as human resources, marketing, and accounting. Naturally, some organizations had their operation-specific departments. For example, the department of *foreign exchange* in the banking industry, and the department of *catering* in the oil industry. Yet, the notion of department remained unified. I stress here that none of the organizations had a working-group based structure, nor was any of those organizations structured as a *flat* or *networked* organization.

4.2.1 The BSC and the Importance of the Departmental Level

The Balanced Score Card (BSC) as a strategic *performance* management framework was introduced by Kaplan and Norton (1992). They have defined the Balanced Score Card framework as follows.

Definition 4-3 The Balanced Score Card (BSC)

The Balanced Score Card is defined as "A framework to facilitate the translation of the business strategy into controllable performance measures". (Kaplan & Norton, 1992)

Initially, in 1992 Kaplan and Norton introduced the BSC at the *enterprise level* emphasizing that firms should not restrict their *performance* evaluation to the financial dimension. In their view, the *performance* management and the *performance* measurement should include aspects such as customer satisfaction, internal processes, and innovation activities. The four main dimensions (called perspectives) of a Balanced Score Card framework are as follows. Below we mention the perspective and the focus question.

1. Learning & growth perspective
   How can we continue to improve, to grow and to create value?
2. Internal processes perspective (later called Business perspective)
   Where must we excel?
3. Customer perspective
   How do our customers see us?
4. Financial perspective
   How do we look to our shareholders?

Figure 4-4 depicts the three casual relations among the perspectives. IT tells the following story in three steps.

1. If we are a learning organization and have satisfied employees, we will excel in our internal processes (which are closely related to the business perspectives).
2. If our internal processes are effective, we will provide a good service/product to our customers (i.e., our business runs well).
3. Satisfied customers will lead to a financial success of the organization making our stakeholders happy, which is the ultimate goal of our efforts.

We show the importance of the departmental-level *performance* on the organizational growth through the mechanics of cascading the BSC objectives top-down and bottom-up as they were proposed by the original authors (Kaplan & Norton, 1992) (see Figure 4-5).

During the design and implementation stage, the BSC is initially designed at the senior-management level with broad (enterprise-level) strategic objectives. In order for the BSC framework to achieve its goals of translating strategy into action (as the authors claim) it is necessary for the BSC *to be cascaded down* from the top enterprise level to all business departments (units), such as IT, manufacturing, and marketing. By this process all business units within the organization contribute by upward activities to the execution of the organizational top-level strategy. Figure 4-5 shows an example of two business units A & B.

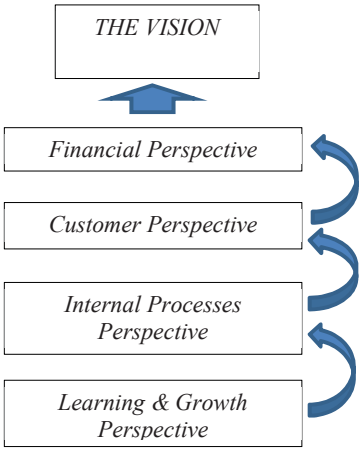


Figure 4-4 The causal relationship in the BSC framework

The cascading process basically creates a link between the strategic objectives at the departmental level (the unit level in BSC terminology) and the overall business objectives. The strategic objectives and measures of all departmental levels must be able to roll up the hierarchical ladder in a logical manner and eventually become aggregated into the top-level business objectives and measures.

For example, if at the corporate (senior) BSC level there is a strategic objective in the customer perspective (the upper left part of Figure 4-5) stating: "increase customer loyalty", it can only be achieved if the lower level departments (business units) also adopt objectives which in their own specialization lead to increased customer loyalty. Therefore, a lower level department, such as for example a *customer service department* (depicted as business unit A in Figure 4-5), might adopt a strategic objective in their customer perspective which states: "redesign customer service processes", i.e., an increase in customer loyalty for the corporation can be achieved through (among other factors) a business process re-design by the customer service department.

It is not a pre-condition that we match *Perspectives* from corporate to departmental level for the cascade of strategic objectives to be successful. The question is: how to effectively align them? As an illustration, we assume that a strategic objective at the corporate level in the business processes perspective states: "transform to enterprise level IT architecture". At the level of the IT department (e.g., the business unit A in Figure 4-5), with respect to their learning and growth perspective, there might be a strategic objective stating: "improve the programmer's knowledge of enterprise-level system design". This objective at the IT department level will have the effect of achieving the strategic

objective at the corporate level (depicted by the red arrow from the learning and growth perspective of the business unit A to the business process perspective at the corporate level).

As a result, it is the value delivered by lower-level departments that creates the overall business value at the upper levels. Hence, there is a value rollup from the lower business levels up to the corporate level without which, the organizational goals cannot be realized (depicted by the red arrows in Figure 4-5).

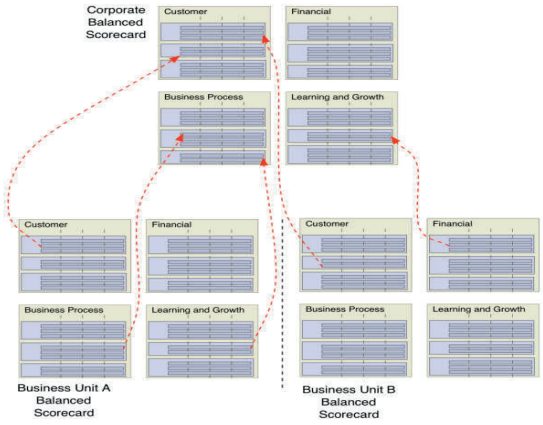


Figure 4-5 Cascading the Balanced Score Card to the departmental level
Source: http://www.virtualtravelog.net/

A study conducted in Dutch business-to-business firms found that the BSC affects organizational *performance* only if the *performance* measures and objectives are aligned, i.e., in order to create positive value at higher levels of organizational levels, the BSC of the corporate and functional managers must be strategically aligned (see Kaplan & Norton, 1992; Braam & Nijssen, 2004; Wu, 2012).

The authors of the Dutch study (Braam & Nijssen, 2004) explain that the organization has made three attempts to implement a BSC system, only the third time it was successful. They justify the eventual success to several factors, with the main factor being the use of multi-departmental project teams that created involvement from different functional areas. This reasoning clearly shows the critical contribution of the departmental level success to the overall organizational value. Hence, it emphasizes the importance of the departmental level analysis.

4.2.2 The IT Engagement Model

IT governance is by itself a top-down activity. However, IT governance research simultaneously is a top-down and bottom-up approach. It is a top-down approach by focusing on the decision making by the senior management. It is a bottom-up approach by focusing on pure project-oriented activities, viz. how projects are managed. MIT's Center for Information Systems Research (CISR) has emphasized a multi directional approach. In their description two main goals are emphasized, (a) the alignment between IT and the other business units, and (b) the alignment and coordination among multiple organizational levels. This emphasis is depicted in the IT engagement model by Fonstad & Roberston (2006) which is discussed below.

Fonstad & Roberston (2006) have described the linking mechanisms of the three main organizational levels, namely, the corporate level, the business unit level, and the project team level (see Figure 4-7, the right column). At those three levels, their model is concerned with three main components: (a) Company-wide IT governance component (which points to the decision making process at all organizational levels to stimulate appropriate IT-related behavior), (b) project management activities component (which describe the achievement of corporate objectives through effective resource and activities coordination), and (c) linking mechanisms component (which create linkages at the business, IT, and cross business-IT levels as will be described in the following paragraphs), see the center column of Figure 4-6.

The focus of the IT engagement model is on the linking mechanisms component which performs the function of facilitating information flow between and within the three organizational levels (corporate, business, and project levels). The basic concept of their model lies in the proposition that for an organization to succeed simultaneously in all organizational strategies, as well as in the managing of the implementation of local IT solutions, it must introduce two critical factors (1) horizontal alignment and (2) vertical alignment. *Horizontal alignment* means a successful coordination among the IT department and the other departments of the organization. *Vertical alignment* means an effective coordination across the three organizational levels.

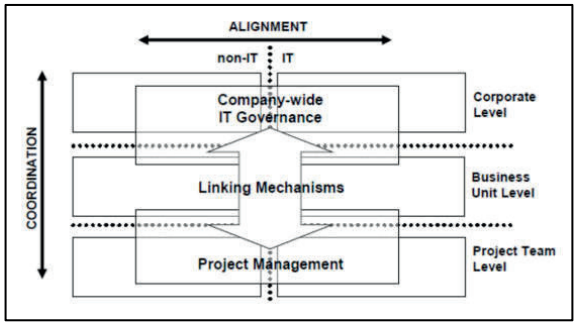


Figure 4-6 IT engagement model components
Adopted from Fonsted & Roberston (2006)

In order to achieve both horizontal and vertical alignment, three main types of linkages must be implemented.

(1) *Business linkages.* Are depicted as the upper left column of Figure 4-7. The business linkages mean linking the three non-IT organizational levels and making decisions regarding: program prioritization, post implementation reviews, company-wide objectives setting.

(2) *Architecture linkages.* Are depicted at the lower right column of Figure 4-7. The architectural linkages represent the IT-based physical linkages that satisfy the IT-demanding connections among the three organizational levels. The architectural linkages include activities such as monthly technology reviews and architectural compliance reviews.

(3) *Alignment linkages.* Create a horizontal interdepartmental alignment between the IT department and the other departments of the organization at a single level; see the central horizontal line in Figure 4-7.

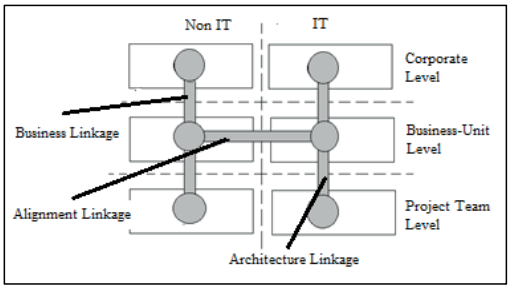


Figure 4-7 IT engagement model linkages
Adopted from Fonsted & Roberston (2006)

The IT engagement model emphasized the two critical roles played by the Business-Unit level in the alignment process. (a) It aids in aligning the IT and non-IT organizational levels, and (b) it is a critical link between the project team level and the corporate level assuring an effective project execution.

In conclusion, the discussion of the BSC and IT-engagement models has emphasized the importance of the departmental level (called the Business-Unit level in the IT engagement model) for an effective organizational value creation. Hence, we have decided (as initially mentioned in Chapter 1) to base our investigation on "single departments" as our unit of analysis, with the aim to reach specific and realistic results.

4.3 Criteria and Selection of the Model

This section starts developing our conceptual model. We do so in three steps. First, in subsection 4.3.1, we develop an initial mediating model that depicts the following relationships: (a) the direct relationship between ITBSA and SIW, (b) the direct relationship between SIW and departmental *performance*, and (c) the mediating effect of SIW on the relationship between ITBSA and departmental *performance*. The aim of this initial conceptual model is to set the stage for the main model of this thesis. Second, in subsection 4.3.2 we describe the various positionings of EGIT on the relationship between ITBSA and departmental *performance*. And third, in subsection 4.3.3 we justify our choice of the moderating positioning of EGIT on the relationship between ITBSA and *performance*.

4.3.1 The Base Model ITBSA, SIW, and Performance

In this subsection, we develop a base model that will be used to answer research questions: RQ1, RQ2, and RQ3. It will also set the stage for the moderating model that will answer RQ4. For readability, we repeat the RQs and the model (with the relation between the two actors mentioned in the RQs).

RQ1: What is the effect of IT Business Strategic Alignment on Social Innovation at Work at the departmental level?

RQ1 is concerned with the relationship between ITBSA and SIW. The first building block of our model (see Figure 4-8) will investigate the direct relationship between ITBSA and SIW.

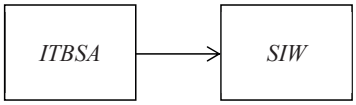


Figure 4-8 Conceptual Model: ITBSA – SIW relationship

RQ2: What is the role of Inter-Departmental collaboration on Social Innovation at Work (SIW) on the departmental performance?

So, RQ2 is inquiring about the relationship between SIW and departmental *performance*. It is the second building block of our mediating model. It will investigate the direct relationship between SIW and *performance* (see Figure 4-9). There is a group of researchers who believe in a strong positive relation, as well as an opposing group of researchers who do not see the strong positive relation (see subsection 3.2.3).

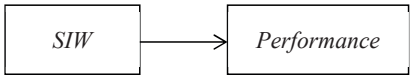


Figure 4-9 Conceptual Model: the SIW-*Performance*

RQ3: How does the Social Innovation at Work at the departmental level affect the relationship between the ITBSA and departmental performance?

RQ3 is inquiring about the nature of the effect of SIW on the relationship between ITBSA and performance. IT is the third building block of our mediating model. It will investigate the mediating effect of SIW on the ITBSA-performance relationship. At first glance, the relations between the actors of our full initial mediating model would look as suggested in the model in Figure 4-10.

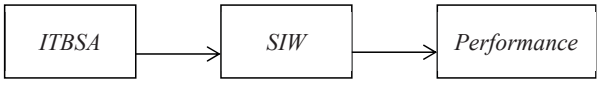


Figure 4-10 Conceptual Model: the mediating effect of SIW

However, in Figure 4-10 we miss the exact form of a mediating model depicting the assumed relation between ITBSA and *performance*. So, we reformulate the model as a mediating model in a formal form as defined by Baron and Kenny (1986). The result is depicted in Figure 4-11.

RQ1, RQ2, and RQ3 lead to the following base model.

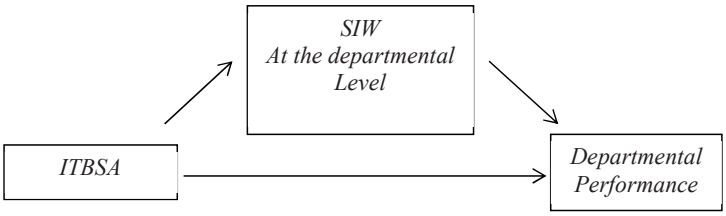


Figure 4-11 Conceptual Model: the formal mediating model of SIW

4.3.2 Incorporation of EGIT into the Base Model

In this subsection, we start incorporating the EGIT construct into the base model in order to answer RQ4 (the final complex model will be constructed in section 4.4). We initially show positioning of EGIT among the relationship between ITBSA and *performance* in the literature, then we make our choice with a justification. For clarity, we restate RQ4.

RQ4: How does EGIT affect the relationship between ITBSA and Performance at the departmental level?

Scholars have developed wide range of models showing IT as adding business value through ITBSA and EGIT (see, e.g., Silva et al., 2006; Beimborn et al., 2009; Chang et al., 2011; Laudon, & Laudon, 2014; Wu et al., 2015). Before we make and justify our choice of EGIT's position in our base model, we narrow the models in the literature to the three following representative models.

- Model 1 maps the *direct relationship* between ITBSA and *performance* with the EGIT in the position of an antecedent to ITBSA.
- Model 2 shows a *mediating relationship* of EGIT on the relationship between ITBSA and *performance*.
- Model 3 shows a *moderating relationship* of EGIT on the relationship between ITBSA and *performance*.

Model 1: EGIT as an antecedent of ITBSA

A study by De Haes & Van Grembergen (2009) has explored the following significant research question: "What is the specific relationship between ITBSA and EGIT on the path to *performance*?" In their study, they indicate that alignment is a complex and ambiguous concept. This was earlier mentioned by others, such as Silva et al. (2006). In their model De Haes & Van Grembergen focused on combining both strategic and operational processes. According to their view, they have modeled governance (processes, structures, and relational mechanisms) as antecedents to alignment (see

Figure 4-12). De Haes and Van Grembergen (2009) found a weak relationship between relational mechanisms and alignment. On that basis, they concluded that there *appears* to be some relationship with processes and structures; with processes being more difficult to realize than structures. A similar conceptual model was explored by Chan et al. (2006), but instead, they have used a shared domain of knowledge and prior IT success as a conceptualization of EGIT. In their model, EGIT is also considered an antecedent to ITBSA. Similar conceptual models have been recently explored by Wu et al., (2015) who have operationalized the EGIT concept as IT mechanisms, and have also found a positive mediating relationship of ITBSA on the relationship between EGIT and perforance at the organizational level. The conceptual model of those studies is described in Figure 4-12.

Figure 4-12 Conceptual Model: EGIT as an antecedent to ITBSA

For reasons mentioned later in this subsection, we do not continue the exploration of this conceptual model.

Model 2: EGIT as a Mediator between ITBSA and Performance

Zhou et al. (2008) have investigated a positive mediating effect of Enterprise Information Management. In their model, the conceptualization of EGIT is placed between strategic alignment and operational *performance*. They found a positive effect. Similar results were confirmed by Beimborn et al. (2009). The conceptual model of both studies is shown in Figure 4-13.

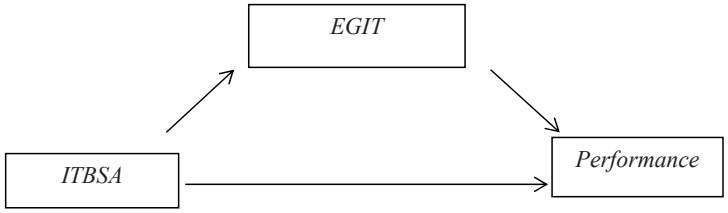


Figure 4-13 Conceptual Model: the mediating effect of EGIT

Model 3: EGIT as a moderator between ITBSA and Performance

A moderating model has been proposed by Chang et al. (2011). They have studied the moderating effect of the service-integration level on the relationship between ITBSA and *performance*. The essence of their model lies in the fact that the authors did not look at the model as a linear model in one dimension, but as a model in two dimensions. In their model, they propose a moderating effect of EGIT on the relationship between ITBSA and *performance* (see Figure 4-13). The authors have operationalized *performance* in terms of three categories: (1) customer satisfaction, (2) quick

response, and (3) customer value. The concept of the service integration level assumed the integration of the following issues: data, application, functions, process, supply chain, virtual infrastructure, and eco-system. The authors concluded that the service-integration level is an important *performance* moderator for strategic and operational alignment.

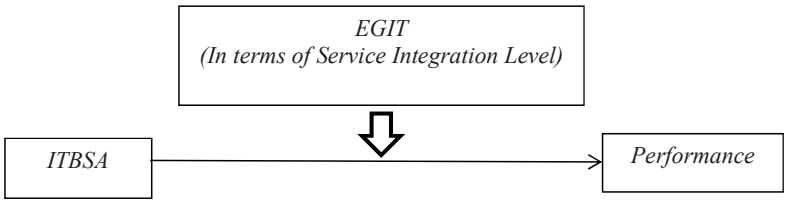


Figure 4-14 Conceptual Model: the moderating effect of EGIT

4.3.3 Five Reasons in Favor of the Moderator Positioning

The three models above show that EGIT (in various forms) is a major factor in the relationship between ITBSA and *performance*. However, the exact positioning of EGIT is not yet confirmed.

Based on the backgrounds and definitions provided in Chapter 2, and the literature review performed in Chapter 3, we have chosen to investigate a conceptual model conforming to the model 3 above, which assumes a moderating effect of EGIT on the relationship between ITBSA and *performance*. We justify our choice by the following five reasons.

First, in their influential paper, Chan & Reich (2007) asserted that it is not desirable to study ITBSA as an end state after EGIT. They opined that it would be more useful to study the effect of ITBSA on (a) other critical organizational factors and (b) the nature of this relationship. Therefore, we did not choose to conceptualize EGIT as an antecedent of ITBSA as depicted by model 1.

Second, a direct causal relationship among critical variables was the main aim of the predominant studies on the relationships regarding aspects of IT and a firm's *performance*. Yet, this approach, according to Pollalis (2003) [21] and Chan & Reich (2007), *ignores other variables* that could affect the

[21] Pollalis (2003) and Pollalis & Grant (1994) have also analyzed the use of contingency theory in IS research. They have considered both external and internal contingency approaches. They have concluded that researchers who have adopted the external view (external contingencies) in order to justify the strategic role of IT on organizational performance have focused on how IT applications create strategic advantage, but did not address the internal processes that are necessary to do so. There is little research on explaining how successful organizations built their internal infrastructure before achieving strategic advantage. In contrast, the internal view focuses on (1) the Identification of causal links between

mode by which the studied variables interact. Researchers, such as Kraemer, Wilson, Fairburn, & Agras (2002), insist on the fact that a moderation effect should be tested automatically with any mediation analysis. More specifically, the idea of moderating variables affecting the relationship between ITBSA and *performance* is supported by several authors (cf. Bergeron & Raymond, 1995; Yayla & Hu, 2012; Alyahya & Suhaimi, 2013). So, for studying the effect of EGIT on the relationship between ITBSA and *performance*, we prefer the moderating model 3 over the mediating model 2.

Third, the importance of a moderating effect on the organization has been mentioned by MacKinnon (2011) who has proposed that in the cases where a moderating effect has been found, an organization should focus its internal and/or external investments and innovations to where they are most effective.

Fourth, Tallon (2003) argued in his research that only 70% of the organizations experienced significant *performance* improvement as a result of any ITBSA improvement. This implies the presence of "other" factors affecting the relationship. For instance, the IT-engagement model by Fonstad & Robertson (2006), as discussed in subsection 4.1.3, integrates the departmental (horizontal) alignment with the (vertical) company-wide IT governance. The authors claim that organizations with a higher level of governance obtain some 40% more value from IT. Similar results were concluded by Gressgard, Amundsen, Aasen, & Hansen (2014) who have also found EGIT to significantly enhance the effectiveness of IT tools. The presence of the dichotomy concept is supported by Stoffers, Van der Heijden, & Notelaers (2014) who recommend the close association between high performing organizations and higher levels of the situational (moderating) variables.

Fifth, in spite of the several encouragements in the literature, only a few studies have modeled moderating variables that could have a significant effect on the causal relationship[22] between ITBSA and *performance*. Moreover, to the best knowledge of the researcher, there has not been a study at the departmental level exploring the moderating effect of EGIT (in the form of processes, structures, and relational mechanisms) on the relationship between ITBSA and *performance*.

From the models by Tallon and by Finstad & Robertson we derive two important conclusions that influence our choice of a model. First, the inconsistence of the *performance* improvement (as a result

organizational variables and (2) on the challenge how IT's effectiveness can improve the organizational performance. This internal approach is adopted in our research.

[22] For example, Masa'deh, Hunaiti, & Bani Yaseen (2008) have explored nine antecedents of IT's fit factors and only one performance mediating factor which was "Knowledge Management".

of ITBSA in the Tallon's (2003) model) points to the presence of other variables in the environment which *moderate* the relationship. Second, the dichotomous results by Fonstad & Robertson (2006) model in terms of high and low levels of IT governance imply that the source of the moderating effect could be situated in the EGIT. Therefore, we choose to study the moderating model of EGIT.

The proposed *moderating* influence of the EGIT on the *mediating* effect of SIW on the relationship between ITBSA and *performance* (as mentioned in subsection 4.3.1) complicates the issue considerably. The possible interaction between both effects (the mediating and the moderating effects) should therefore be a subject of investigation. The next section, therefore, explores the issue of complex models involving mediations and moderations in a single model.

4.4 How to Balance Mediation & Moderation

In section 4.3 we have identified two factors that act on the relation between ITBSA and *performance*, namely, SIW and EGIT. Still, a critical question remains: is it a *mediated moderation* or a *moderated mediation* relationship? In other words, we ask the question: which relationship precedes the other, the mediation or the moderation?

There are two main forms by which a *mediation* and *moderation* could be jointly integrated into a single model, (1) *mediated moderation* and (2) *moderated mediation*. There is an occasional confusion between the two forms in literature (cf. Preacher, Rucker, & Hayes, 2007). Therefore, we start showing some of the main differences between these two forms.

4.4.1 The Mediated Moderation

The *mediated moderation* model involves showing a moderating effect through an interaction effect of variables such as "X" and "W" in (Figure 4-15) on the independent variable "Y". Then, a mediating variable (such as "M") is introduced. This variable mediates the moderating effect of "W" onto the independent variable "Y", i.e., a moderation effect is mediated (cf. Muller, Judd, & Yzerbyt, 2005). Paradoxically, the same diagram (Figure 4-15) is used to hypothesize both (a) a *mediated moderation* and (b) a *moderated mediation* (cf. Preacher et al., 2007) as will be discussed in the following paragraphs. The difference lays in what relationships are analyzed (as will be elaborated in Chapter 6).

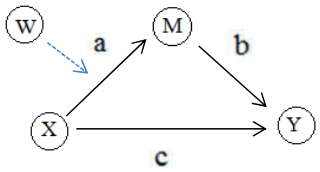


Figure 4-15 Moderated mediation vs. mediated moderation

Adopted from Preacher et al. (2007, model 2, p.194), and
Little, Card, Bovaird, Preacher, & Crandall (2007).

4.4.2 The Moderated Mediation

A plain introduction to the notion of moderated mediation is as follows. A moderated mediation happens when the strength of an existing mediated relationship depends on the level of a third variable (the moderator). In Figure 4-15, this means that the mediated relation between "X" and "Y" through "M" is moderated by a variable such as "W". In other words, the mediated relationship is always present independently of the variable "W". Yet, by the presence of a variable such as "W", the mediating relation is dependent upon the level of "W".

4.4.3 Comparisons

Historically, there have been several calls by scholars to test the moderating effect in association with all mediating relationships (see, e.g., James & Brett, 1984; Kraemer et al., 2002). This setup has been gaining popularity in the examination of *performance*-related models involving mediation effects (see, e.g., Tallon & Pinsonneault, 2011; Pratono, Wee, Syahchari, Nugraha, Kamariah, & Fitri, 2013; Stoffers, I.J.M. Van der Heijden, & LA Notelaers, 2014; McCaughey, Turner, Kim, DelliFraine, & McGhan, 2015; Shin et al., 2015).

We have initially proposed a mediating effect of SIW on the relationship between ITBSA and *performance* (our base model). However, according to James & Brett (1984) and Kraemer et al. (2002) all mediating models should be subject to a subsequent examination of a possible moderator effect. Therefore, we will investigate a suggested moderating effect of EGIT on this mediating relationship.

Yet, complex models attempt to explain both (a) how a given effect happens and (b) where a given effect occurs (cf. Frone, 1999). According to the literature (cf. Preacher et al., 2007; Little et al., 2007) the moderation effect of a given variable could act on any of the paths of the mediation model (e.g.,

paths a_1 or b_1 in Figure 4-15), i.e., there is a need to make an explicit assumption of which path of our base model does the EGIT affect. In the next section, we explore the various forms of moderated mediation models and arrive at a final conceptual model.

4.5 Our Conceptual Model

In this section, we develop our final conceptual model. In subsection 4.5.1 we present five most commonly moderated mediation models. In subsection 4.5.2 we conclude our final conceptual model by justifying our choice among the moderated mediation models presented in subsection 4.5.1.

4.5.1 Five combinations of Mediation and Moderation

There are at least five types of models by which the strength of a mediating relation is dependent on a moderation variable and in terms of the nature and number of moderating variables. We mention them below (see Table 4-1) with a brief description of each. From these, we will select in a later stage our proposed *moderated mediation* model. We base the following discussion on Little et al. (2007) and Preacher et al. (2007).

In the first type, the independent variable "X" affects (moderates) the relationship between the mediator "M" and the dependent variable "Y" (i.e., affects the path "b").

The second type introduces a new variable, such as "W", which affects the path "a", i.e., moderates the relation between the independent variable and the mediator. This setting could also express a "mediated moderation", i.e., the variable "M" mediates the moderating effect of the variable "W".

In the third type, an independent variable called "Z" affects (moderates) the relation between the mediator and the independent variable (path "b").

In the fourth type, two independent variables, "W" and "Z", separately affect the paths "a" and "b", respectively.

In the fifth type, a single independent variable called "W" affects both paths "a" and "b" simultaneously.

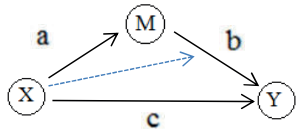
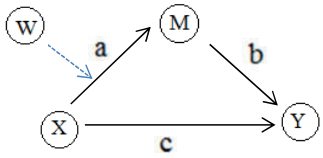
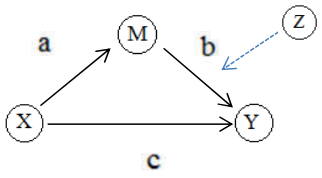
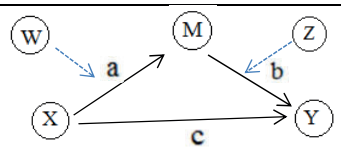
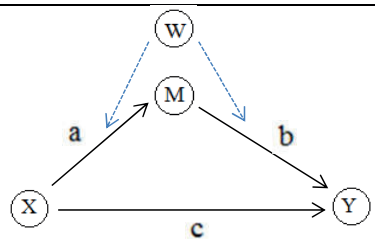
Model No.	Description	Diagram
1	The independent variable "X" acts as a moderator to the path "b".	
2	A fourth variable ,e.g., "W" affects the path "a".	
3	A fourth variable ,e.g., "Z" affects the path "b".	
4	The variable "W" affects path "a", and another variable ,e.g., "Z" affects the path "b".	
5	A variable ,e.g., "W" affects both paths "a" and "b".	

Table 4-1 Five types of complex models combining mediation and moderation
Adopted from Little et al. (2007)

4.5.2 The Complete Conceptual Model

In our study, we assume the interaction of two relationships. (1) The relation between ITBSA and *performance* is to be mediated by SIW (see Figure 4-11). (2) The relationship between ITBSA and *performance* is to be moderated by EGIT. Hence, we have the case of one external variable acting as a moderator to an assumed existing mediating relationship. Referring to subsections 3.3.2 and 3.3.3, where we mentioned from the literature that (1) ITBSA and EGIT

are both closely related and that EGIT moderates the effect of ITBSA on other success factors, and (2) that EGIT has a positive effect on innovative activities (SIW). Weighing the pros and cons of those subsections, we chose to investigate our PS and RQs with the assumption that EGIT acts as a moderator on the mediating relationship between ITBSA and *performance* through its influence on the relationship between ITBSA and SIW.

Therefore, we will choose model 2 from Table 4-1 as our proposed conceptual model. Figure 4-16 depicts our complete conceptual model of the mediating effect of SIW along the path from ITBSA to *performance*, and the moderating effect of EGIT on this mediating relationship. In Chapter 6 (the data analysis chapter) we will empirically investigate these relationships.

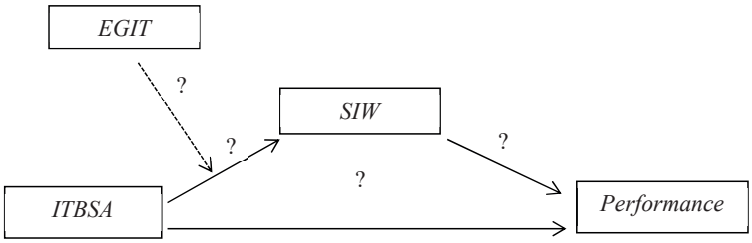


Figure 4-16 The complete conceptual model

In conclusion, Chapter 2 (the literature review) has investigated the background and the significance of the main concepts of this study, and Chapter 3 has explored the relationships among those concepts. It was concluded that those relationships are still controversial and need further investigation, specifically at the departmental level of analysis. In order to assist in the investigation of those controversial relationships, two main conceptual models were developed in this chapter. (1) A *mediating model* (relating ITBSA, SIW, and *performance*). (2) A model combining *mediation and moderation* (relating ITBSA, EGIT, SIW and *performance*).

CHAPTER 5 FIELD WORK and DATA COLLECTION

For the investigation of the relationships among the factors of our conceptual model designed in Chapter 4, we aim to perform an extensive multi-dimensional empirical analysis based on field data. Therefore, we should first collect the data and then analyze them. Referring to Figure 4-16, and to the four RQs, we should investigate the following four relationships.

(1) The effect of ITBSA on SIW.
(2) The effect of SIW on *performance*.
(3) The mediating effect of SIW on the relationship between ITBSA and departmental *performance*.
(4) The combined effect of EGIT and SIW on the relationship between ITBSA and *performance* at the departmental level.

To make the investigation of those four relationships effective, we should operationalize (decide which variables are going to reflect each construct) and collect data on those variables reflecting the four constructs: (1) ITBSA, (2) EGIT, (3) SIW, and (4) departmental *performance*. In section 5.1 we will operationalize the four constructs. In section 5.2 we describe the instruments (survey forms) that will be used to collect the data. Section 5.3 describes the field work performed to collect the necessary data. In section 5.4 a general description of the collected data will be provided.

For clarity, we show in Figure 5-1 our main conceptual model together with a reference to the subsections in which each construct is operationalized and the data collection instrument is chosen.

5.1 Operationalization of the Constructs

In this section, we present the operationalization of the four main constructs of this study. Subsection 5.1.1 will discuss the operationalization of the ITBSA construct. In subsection 5.1.2 the EGIT construct operationalization will be presented. In subsection 5.1.3 the SIW construct will be operationalized. In subsection 5.1.4 departmental *performance* will be operationalized.

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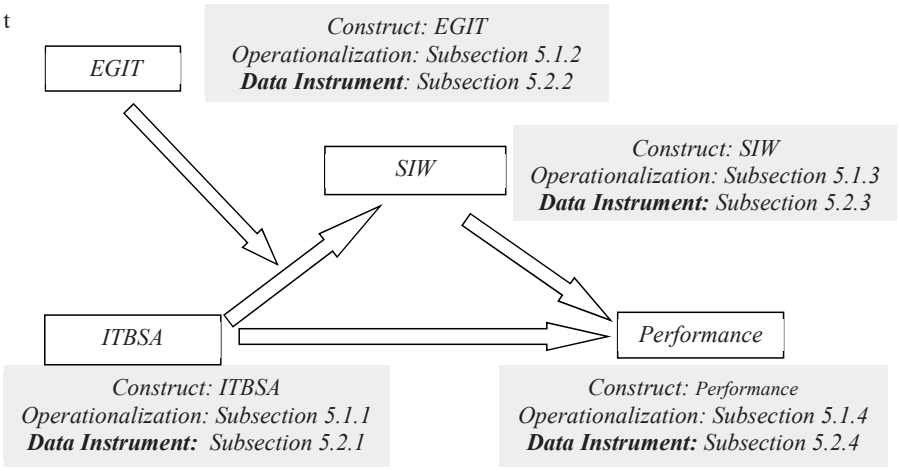

Figure 5-1 The conceptual model with references to subsections

Before we proceed, we would like to clarify our use of the term "construct". This term refers to a phenomenon or concept that is to be studied. Usually, such a phenomenon (or concept) is difficult to be directly measured. Therefore, it is measured (sometimes referred to as *operationalized*) using a number of variables (sometimes called indicators) represented by a group of statements on a questionnaire. The construct (referred to as a *latent* variable in structural equation modeling SEM) is then assessed from those "other" variables or indicators (cf. Ullman, 2006).

5.1.1 Operationalization of ITBSA

Researchers agree that there is no universal way to measure ITBSA. Many models were developed that attempted to measure the strategic alignment construct. The current study has operationalized the IT and business strategic alignment in a construct under the name ITBSA. For measuring the construct, we utilize a scoring approach developed by Weill and Broadbent (1998) and Weill and Ross (2004). They have developed a scoring instrument ''diagnostic to assess strategic alignment'' that requires the respondents to assess 10 statements representing 10 variables (indicators) that relate to the degree of alignment on a scale from 1 to 5 (1=always true, 5=never true). Subsection 5.2.1 shows a detailed description of the data instrument used for this operationalization.

5.1.2 Operationalization of EGIT

An effective method to assess and benchmark the Enterprise Governance of IT is the use of maturity models. A detailed maturity model was developed by the IT Governance Institute (2001). This model identifies six levels of maturity (from 0 to 5) ranging from non-existent (level zero) to optimized (level five) at each IT governance-related factor (see ITGI, 2001). Table 5-1 shows the six levels of maturity. They are briefly described and used to assess each of the three EGIT factors (processes, structures, and relational mechanisms).

In Table 5-1 we read that organizations at an overall level of zero are characterized by a complete lack of any recognizable IT Governance process. Level one assumes that the organization, at least, recognizes the importance of addressing IT Governance issues. The six levels all have a name, viz. non-existent (0), initial (1), repeatable (2), defined (3), managed and measurable (4), and optimized (5) (see Table 5-1). The highest level "five" implies an advanced understanding of IT Governance issues and solutions, supported by an established framework and best practices of processes, structures, and relational mechanisms.

This maturity scale is applied to a sequence of statements used to operationalize the EGIT construct. Furthermore, EGIT operationalization has been performed through a decomposition into three separate sub-constructs, namely, (1) the EGIT_Structures, which is operationalized as the average of the maturity scores given to the 12 individual statements (variables) concerning the IT structures in an organization; (2) the EGIT_Processes, which is operationalized as the average of the maturity scores given to 11 statements (variables) describing IT governance processes in an organization; and (3) the EGIT_Relation, which is also calculated as the average of the maturity scores given to 10 statements (Variables) regarding the IT governance relational mechanisms in an organization (see Table 5-5). In subsection 5.2.2 we describe the data collection instrument in details.

0 Non Existent Complete lack of any recognizable processes. Organization has not even recognized that there is an issue to be addressed.
1 Initial There is evidence that the organization has recognized that the issues exist and need to be addressed. There are however no standardized processes but instead there are ad hoc approaches that tend to be applied on an individual or case by case basis. The overall approach to management is chaotic.
2 Repeatable Processes have developed to the stage where similar procedures are followed different people undertaking the same task. There is no formal training or communication of standard procedures and responsibility is left to the individual. There is a high degree of reliance on the knowledge of individuals and therefore errors are likely.
3 Defined Procedures have been standardized and documented, and communicated through training. It is however left to the individual to follow these processes, and any deviations would be unlikely to be detected. The procedures themselves are not sophisticated but are the formalization of existing practices.
4 Managed & Measurable It is possible to monitor and measure compliance with procedures and to take action where processes appear not to be working effectively. Processes are under constant improvement and provide good practice. Automation and tools are used in a limited or fragmented way.
5 Optimized Processes have been refined to a level of best practice, based on the results of continuous improvement and maturity modeling with other organizations. It is used in an integrated way to automate the workflow and provide tools to improve quality and effectiveness

Table 5-1 The six levels of EGIT maturity assessment

5.1.3 Operationalization of SIW

Research has shown that surveys on innovation are not only feasible, but may yield also extremely interesting and useful results (cf. OECD, 1996; European Commission 2009).

The dissatisfaction with using R&D as an "industrial research and experimental development" input indicator has led to a belief that the actual SIW might not appear exactly at the firm or sector that has carried out the research (cf. Freeman & Soete, 2007). In the past years, researchers (See, for example, Rothwell, 1977; Pavitt, 1984) have stressed the complex sectorial origin of SIW rather than the simple but popular technological classification of industries into high, medium and low R&D intensity.

In subsection 2.3.3 we have elaborated on the fact that the development of new workplace ideas is based on a successful execution of collaborative activities such as cooperation among functional departments and effective information sharing. The importance of collaboration on innovation is further emphasized in subsection 5.4.3. There, factors hampering innovation are identified from the field-collected data. They rank the lack of effective information as being among the most important factors, i.e., stressing the importance of the SIW collaboration concept.

In spite of our efforts towards achieving a high level of internationalization and diversification of the participating organizations, there is always the possibility that the local culture will influence the results. In my view, the most probable factor which is subject to cultural effect is the collaboration on SIW. For example, three dimensions of the famous Hofstede (1983) cultural mix model (namely, power distance, uncertainty avoidance, and individualism vs collectivism) could have influenced some of the collaborative efforts on SIW. For instance, (a) power distance, could negatively affect lower level employees' ability to disseminate their innovative proposals, (b) uncertainty avoidance, might deter departmental management from embracing risky innovative projects, and (c) individualism vs collectivism, is often an incentive of collaboration avoidance.

We put forward two reasons why the local culture was not explicitly studied in the model. (1) According to my best knowledge, there is no formal and credible analysis of the Yemeni local culture. Such analysis would have been a necessary requirement to incorporate local culture into the model. Performing a local culture analysis as part of this study was beyond the scope and time limitation of this research. (2) The participating organizations were quite diverse in their cultural mix (American, Canadian, European, Africa, East Asia, and Middle east). I have a strong believe that this cultural mix might have reduced, to a high extent, the effect of the local culture. Nevertheless, we strongly urge future researchers to include the *culture* effect into their models (if credible data is available).

Hence, we have decided, for the purpose of our study, to operationalize the social innovation at work SIW construct in terms of eight variables (indicators) mostly relating to the inter-departmental collaboration on SIW. Subsection 5.2.3 will describe in more details those eight variables (indicators) and the eight statements that were used in the data collection instrument.

5.1.4 Operationalization of Performance

The operalization of the *performance* construct is a difficult topic. In spite of the fact that cost reduction remains among the final desired outcome of (1) IT investments (see, for example, Lunardi

et al., 2014), and (2) SIW (cf. Dhondt et al., 2012; Pot et al., 2012), there has been a shift in focus from pure cost consideration when evaluating the effect of SIW on *performance* towards other efficiency factors (cf. Robeson & O'Connor, 2007). Those other factors include capacities and capabilities (cf. Black & Lynch, 2004; Pot & Fietje, 2008; Oeij et al., 2012), productivity (cf. Pot & Fietje, 2008; Rüede & Lurtz, 2012), flexibility (cf. Ford & Randolph, 1992), and sustainability (cf. Eccles, Ioannis, & George, 2014; Epstein & Buhovac, 2014).

Social and Sustainable performance

An emerging dimensions of *performance* is gaining popularity and importance, viz. *social performance (SP) and corporate sustainability (CS)* with the formal being a pre-requisite of the later. According to Epstein & Buhovac (2014) establishing proper structures and processes that improve the SP is a pre-requisite for improved Corporate Sustainability. In spite of the fact that we will not directly use CS in the operationalization of the *performance* construct, it is important to elaborate on this factor of *performance* because of its critical relation to corporate performance.

Historically, scholars such as Peterson & O'Bannon (1997) have asserted that the relationship between coprorate social and financial performacne is not well established. In a more recent study, Eccles, Ioannis, & George (2014) have indicated that in the long run, high sustainability companies outperformed the low ustainability companies in terms of both economic profit (through higher revenues due to improved reputation and reduced costs due to improved processes) and corporate value.

Corporate Sustainability (as it is named in the literature) has initially appeared in the management literature under the naming convention of "ecological sustainability" by Shrivastava (1995). Montiel & Delgado-Ceballos (2014) have conducted an extensive review of the literature on the coverage of Corporate Sustainability for the years 1995 through 2013 in popular scientific journals. Their major findings were that (a) the term CS is still mainly used in academic literature rather than in top management and practitioner literature, (b) a standardized definition of CS does not exist, and (c) that it is still a major challenge to find a standard measure for CS.

There are two major threads for CS definitions in the literature. (1) In the academic publications, they refer to CS through dimensions such as: sustaincentrism, ecological sustainability, sustainable development, and corporate sustainability. (2) in the practitioner management publications, where they refer to CS through dimensions such as: sustainable organization, sustainable development

innovation, and sustainable enterprise. Montiel & Delgado-Ceballos (2014) have grouped the main dimensions of CS definitions into three main categories, economic, social, and environmental. Some scholars refer to this approach as the Triple Bottom Line (TBL) approach.

When examinig the relation between CS and performance, the majority of CS research has used secondary sources of data. The most common source of CS data in management literature is the Dow Jones Sustainability Index (DJSI). For the economic dimension, the DJSI uses measures such as corporate governance, codes of conduct/compliance, and customer relationship management. The social dimension is commonly measured through, social reporting, corporate citizenship philanthrophy, and stake holder engagement. And finaly, an example of environmental measures are, environmental reporting, environmental policy/engagement, and operational eco-efficiency (cf. Montiel & Delgado-Ceballos, 2014).

The CS dimension is not explicitly explored in this research for the following three reasons. (1) The issue of defining and measuring CS is a complex and controversial issue. This study involves a complex model which explores and describes factors that were grounded in previous theories as being related to the path from ITBSA to *performance*. (2) Developing CS strategy and its implementation plans is mainly a senior management role. This research was mainly concerned with the departmental level management and performance data. (3) The data in the global indexes include data at the corporate level, moreover, it does not include a geographically-specific information for the region of operations of the studied organizations of research.

In this study, the departmental *performance* construct is operationalized as three variables (indicators) reflecting the combination of the three main factors of *performance*: (1) cost reduction, (2) flexibility of production, and (3) capacity of production (of a product or a service). Those three factors (indicators) of departmental performance are reflected in three statements on the *performance* data instrument that is detailed in subsection 5.2.4. The statements are formulated in a way such as to reflect the *performance* enhancement as a result of SIW.

5.2 Data Collection Instruments

In this section, we outline the data collection instruments that were used to collect the data for our research. In subsection 5.2.1 we discuss the data instrument used to collect data related to the ITBSA construct variables. Subsection 5.2.2 describes the data instrument related to the EGIT construct variables. In subsection 5.2.3 we show the data instrument related to the SIW construct variables.

And finally, in subsection 5.2.4 we show the data collection instrument related to the departmental *performance* construct variables.

5.2.1 Data Instrument ITBSA

For collecting data on the variables that reflect the ITBSA construct, we have used a scoring approach developed by Weill and Broadbent (1998) and Weill and Ross (2004). The questionnaire used in our research relates to the most common variables (indicators) that have historically been used in literature to identify ITBSA, such as, (a) the degree to which IT mission / vision are supported in the Business Strategy (cf. Reich & Benbasat, 1996), (b) alignment of IT strategy with the business strategy (cf. Henderson & Venkatraman, 1993; Beimborn et al., 2009), (c) top management and executive support to the IT business alignment on the strategic level (cf. Lederer & Mendelow, 1989; Beimborn et al., 2009), and (d) applying IT in an appropriate and timely way (cf. Luftman & Brier, 1999) (for details of the definitions of those concepts see Table 2-3). Table 5-2 shows the statements that were used to collect the data related to the variables reflecting the ITBSA construct.

5.2.2 Data Instrument EGIT

Regarding to the EGIT construct, the instrument has a list of 33 statements that were used to collect data on the variables reflecting the EGIT construct. They are numbered as follows, 1-11, 12-23, and 24-33. In particular, there were 11 statements describing the process variables (see Table 5-3), 12 statements describing the structures variables (see Table 5-4), and 10 statements for the relational mechanism- variables (see Table 5-5). This list was based on a research in the UAMS – ITAG Research Institute (University of Antwerp Management School – IT Alignment and Governance Research Institute). It is based on literature, multiple in-depth case research and expert's reviews. It is primarily focused on strategic and management-oriented practices.

De Haes & Van Grembergen (2009) and De Haes & Van Grembergen (2013) have calculated each of the three factors (processes, structures, and relational mechanisms) as an average of their respective variables scores. The EGIT as a construct in its entirety was then calculated as an average of the three factors (processes, structures, and relational mechanisms). In our research, the SEM (Structural Equation Modeling) approach will be used. Each sub-construct of the EGIT (processes, structures, and relational mechanisms) will be first calculated as an average of its corresponding statements in the questionnaires reflecting its variables. Then, those averages of the three sub-constructs of the EGIT will be used to load into the EGIT construct.

No.	Statements of the ITBSA questionnaire	Variable Name
1	Senior management has no vision on the role of IT	ITBSA_Vision
2	Vital information necessary to make decisions is often missing	ITBSA_Info
3	Management perceives little value from computing	ITBSA_Value
4	A "them and us" mentality prevails (with IT people)	ITBSA_Mentality
5	The IT group drives IT projects	ITBSA_Projects
6	It is hard to get financial approval for IT projects	ITBSA_Finance
7	There is no IT component in the division's strategy	ITBSA_Component
8	Islands of automation exist	ITBSA_Islands
9	IT does not help for the hard tasks	ITBSA_Help
10	Senior management sees outsourcing as a way to control IT	ITBSA_Outsource

Table 5-2 Statements of the ITBSA questionnaire

Tables 5-3, 5-4, and 5-5 on the next pages describe the 33 statements with their definitions. This instrument was confirmed and the individual items were validated and cross-referenced from the literature (cf. De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2013).

EGIT - Processes

No	Index Processes	EGIT factor to be assessed	Definition
1	P1	Strategic information systems planning	Formal process to define and update the IT strategy
2	P2	IT performance measurement (e.g. IT balanced scorecard)	IT performance measurement in domains of corporate contribution, user orientation, operational excellence and future orientation
3	P3	Portfolio management (incl. business cases, information economics, ROI, payback	Prioritization process for IT investments and projects in which business and IT is involved (incl. business cases)
4	P4	Charge back arrangements - total cost of ownership (e.g. activity based costing	Methodology to charge back IT costs to business units, to enable an understanding of the total cost of ownership
5	P5	Service level agreements	Formal agreements between business and IT about IT development projects or IT operation
6	P6	IT governance framework (e.g. COBIT)	Process based IT governance and control framework
7	P7	IT governance assurance and self-assessment	Regular self-assessments or independent assurance activities on the governance and control over IT
8	P8	Project governance / management methodologies	Processes and methodologies to govern and manage IT projects
9	P9	IT budget control and reporting	Processes to control and report upon budgets of IT investments and projects
10	P10	Benefits management and reporting	Processes to monitor the planned business benefits during and after implementation of the IT investments / projects.
11	P11	COSO / ERM	Framework for internal control

Table 5-3 Items used to evaluate the EGIT construct for processes
Adopted from Van Grembergen & Haes (2009)

EGIT - Structures

No	Index Structures	EGIT factor to be assessed	Definition
12	S1	IT strategy committee at level of board of directors	Committee at level of board of directors to ensure IT is regular agenda item and reporting issue for the board of directors
13	S2	IT expertise at level of board of directors	Members of the board of directors have expertise and experience regarding the value and risk of IT
14	S3	(IT) audit committee at level of board of directors	Independent committee at level of board of directors overviewing (IT) assurance activities
15	S4	CIO on executive committee	CIO is a full member of the executive committee
16	S5	CIO (Chief Information Officer) reporting to CEO and/or COO	CIO has a direct reporting line to the CEO and/or COO
17	S6	IT steering committee (IT investment evaluation / prioritization at executive / senior management level)	Steering committee at executive or senior management level responsible for determining business priorities in IT investments.
18	S7	IT governance function / officer	Function in the organization responsible for promoting, driving and managing IT governance processes
19	S8	Security / compliance / risk officer	Function responsible for security, compliance and/or risk, which possibly impacts IT
20	S9	IT project steering committee	Steering committee composed of business and IT people focusing on prioritizing and managing IT Projects
21	S10	IT security steering committee	Steering committee composed of business and IT people focusing on IT related risks and security Issues
22	S11	Architecture steering committee	Committee composed of business and IT people providing architecture guidelines and advise on their applications.
23	S12	Integration of governance/alignment tasks in roles and responsibilities	Documented roles and responsibilities include governance/alignment tasks for business and IT people (cf. Weill)

Table 5-4 Items used to evaluate the EGIT construct for structures
Adopted from Van Grembergen & Haes (2009)

EGIT - Relational Mechanisms

No	Index Relational Mechanisms	EGIT factor to be assessed	Definition
24	R1	Job-rotation	IT staff working in the business units and business people working in IT
25	R2	Co-location	Physically locating business and IT people close to each other
26	R3	Cross-training	Training business people about IT and/or training IT people about business
27	R4	Knowledge management (on IT governance)	Systems (intranet, …) to share and distribute knowledge about IT governance framework, responsibilities, tasks, etc.
28	R5	Business/IT account management	Bridging the gap between business and IT by means of account managers who act as in-between
29	R6	Executive / senior management giving the good example	Senior business and IT management acting as "partners"
30	R7	Informal meetings between business and IT executive/senior Management	Informal meetings, with no agenda, where business and IT senior management talk about general activities, directions, etc. (e.g. during informal lunches)
31	R8	IT leadership	Ability of CIO or similar role to articulate a vision for IT's role in the company and ensure that this vision is clearly understood by managers throughout the organization
32	R9	Corporate internal communication addressing IT on a regular basis	Internal corporate communication regularly addresses general IT issues.
33	R10	IT governance awareness campaigns	Campaigns to explain to business and IT people the need for IT governance

Table 5-5 Items used to evaluate the EGIT construct for Relational Mechanisms
Adopted from Van Grembergen & Haes (2009)

5.2.3 Data Instrument SIW

The dissatisfaction with R&D (see subsection 5.1.3) as an input indicator (cf. Hervas, Ripoll, and Moll, 2012) for actual SIW results has sparked the process of successfully developing a new set of output indicators. The output indicators were developed within the framework of the original *Oslo manual* (1992 - 2005). Here we refer to the *Oslo manual* as the joint initiative of the OECD and Eurostat. In the early 1990s, this initiative marked the beginnings of the standardization in measurement of SIW by a methodological approach. The OECD published the original *Oslo manual*

on the measurement of technological innovation in 1992, and the first revision was adopted in 1997 (see OECD, 1992; OECD-Eurostat, 1997).

The updated third edition of the OECD *Oslo manual* (2005) has widened its scope considerably by publishing the measures of both the previous TPP (technological, process and product) of SIW and the non-technological or intangible aspects of SIW. The *Oslo manual* serves as a basis for the CIS (Community Innovation Survey) in the European Union and the OECD. The CIS defines a firm as innovative if it introduces at least one innovation at the work place that is new to the firm itself (see Arundel, 2007). The *Oslo manual* concentrates on aspects such as: products and processes introduced, objectives of innovation, factors hampering innovation, and sources of information for innovation with reference to a three-year period. The Oslo questionnaire has been widely used by the CIS[23] and its data has been utilized by a vast amount of research (see, e.g., Evangelista & Sirilli, 1998; Therrien & Mohnen, 2003; Lau, Yam & Tang, 2010). Moreover, Eurostat encourages other countries to adopt the CIS concept (cf. Klomp, 2001). The 2005 manual was used in the design of the questionnaire for the latest CIS survey of 2010 (OECD, 2013).

The main international organizations in the area are the European Commission and the OECD. They are responsible for collecting data and coordinating empirical research relevant to the purposes of this thesis. EC and OECD have developed an instrument consistently used at the 'firm-level' in the identification of innovation. Therefore, the *Oslo manual* is considered a main international guideline for data compilation and assessment that is related to workplace innovation (cf. Gunday et al., 2011). This was confirmed by the European Commission's Guide to SIW (2013) which stated that "the SIW approaches are notably innovations in the internationally recognized *Oslo manual* sense".

More recently, the *Oslo manual* was used in both the design of the questionnaire for the latest CIS survey of 2012 which was carried out in Germany and published in 2015, as well as in several recent research as a base for innovation surveys (see, e.g., Smit & Pretorius, 2015; Hochleitner et al., 2016). Therefore, the credibility of the *Oslo manual* as a general and up to date tool for innovation research is established.

In subsection 2.3.2 we have put forward a logical link between innovation in its generic sense and social innovation at the workplace. We used the concept of "re-organization and innovation of work

[23] The Community Innovation Survey (CIS) is the main statistical instrument of the European Union for measuring innovation activities at firm level (cf. Armbruster et al., 2008)

processes" as demonstrated by option four of Table 2-4. The *Oslo manual* defines innovation as representing the implementation of service, process, or organizational method that is new or significantly improved. This definition positions the *Oslo manual* as the appropriate tool for our research to investigate the SIW concept in concordance with our Definition 2-17 in Chapter 2. Therefore, it is appropriate for the operationalization of SIW.

Hence, we have utilized the *Oslo manual* as a base for the design of our data collection instrument. The wordings of the questionnaire were slightly modified to reflect SIW at the *departmental level* (see Table 5-6). The respondents were asked to give their opinions to what extent do they agree with the eight statements regarding SIW by selecting on a continuum between "Strongly agree" (rating 1) and "Strongly dis-agree" (rating 7) (see Appendix E for the complete data collection instrument). The detailed process of the application of this instrument for data collection is discussed in section 5.3.

No	Statements of the SIW questionnaire	Variable Name
1	People in our department come up with few good ideas on their own.	SIW_Own_Idea
2	Few of our projects involve team members from different departments/units.	SIW_Own_Team
3	Typically, our people DO NOT collaborate on projects internally, cross departments and subsidiaries.	SIW_Collaborate
4	At our department, ideas from outside are not considered as valuable as those invented within.	SIW_Within_Idea
5	Few good ideas for new processes/services actually come from outside the department.	SIW_Outside_Idea
6	Our departmental culture makes it hard for people to put forward novel ideas.	SIW_Culture
7	We have tough rules for investment in new projects.	SIW_Rules
8	We are too slow in realizing new ideas.	SIW_Slow

Table 5-6 Operationalization statements for the SIW construct

5.2.4 Data Instrument – Departmental Performance

In order to investigate the effect of SIW on the departmental *performance*, there was a need to collect data on departmental *performance* which was operationalized as consisting of three main factors (1) cost reduction, (2) increased productivity (capacity), and (3) increased flexibility (subsection 5.1.4.). For this reason, three statements from the *Oslo manual*, each representing one of the three operationalized factors, were used. The data instrument requires the respondents to assess the effect of innovation on the three statements on a scale from 1 to 7 (1= very high effect, 7=very low effect).

Table 5-7 depicts those statements as well as the variables associated with each statement (Appendix F shows the complete data collection instrument).

No	Statements of the *Performance* questionnaire	Variable Name
1	Increased Production Flexibility	P_Flexibility
2	Increased Production Capacity	P_Capacity
3	Reduced labor cost / unit of production	P_Cost

Table 5-7 The *performance* data collection instrument

The details of the data collection process are described in section 5.3. The collected data are described in section 5.4 and analyzed in Chapter 6.

5.3 Data Collection

In order to investigate the relationships that are proposed in our conceptual model, it is necessary to obtain data on the variables reflecting (operationalizing) the following constructs: ITBSA, EGIT, SIW, and *performance*. The data will be collected at the following organizational levels.

1. On the level of the organization: the data on variables related to EGIT will be collected for the organization as a whole.
2. On the departmental level: for each participating department, there is a need to obtain the following data.
    a. Data on variables (indicators) reflecting the ITBSA construct (the specific department's strategic alignment with the IT department).
    b. Data on variables (indicators) reflecting the SIW construct.
    c. Data on variables (indicators) reflecting the departmental *performance* construct (the department's *performance* enhancement as a result of SIW).

We will describe the general data collection process in subsection 5.3.1. The *common method bias* will be considered in subsection 5.3.2. There we also describe the precautions that are undertaken to minimize its effect.

5.3.1 The Data Collection Process

Our aim is to improve the generalizability of the results. Therefore, we formulate the two goals:

(1) the results should be derived from multinational/multicultural firms, and
(2) the results should be derived from a set of diverse industries.

The consequences are as follows. (Ad1) Only multinational firms (or organizations strongly associated with multinational firms, such as affiliates of international banks) operating in Yemen should be approached with the request to participate in the multi-questionnaire survey.

(Ad2) Diversification of industries was attempted as much as practically possible. The four major sectors with prominent international presence in Yemen are (a) banking, (b) communications, (c) oil and gas production, and (d) higher education.

The choice of the 20 international organizations was based on (1) consultation with a group of MBA students (active managers in the field) and also (2) an advise and confirmation of the choices by the local chamber of commerce to be a valid list of international organizations actively operating in Yemen at that time. The participating organizations had diversified backgrounds including USA, Canada, Europe, Africa, and the Middle East. Moreover, there was a significant cultural mix among the employees of those organizations. Our aim was that these diversifications (corporate backgrounds and cultural) would improve the generalizability of the results.

The 20 organizations were approached as follows: (a) nine banks (all banks in Yemen with foreign association), (b) three communication companies (all the local communications companies), (c) six oil production companies (all foreign oil exploration companies that were at the production level), and (d) two international higher education universities (there were only two universities with foreign association at the time of this study). Eight of the twenty approached organizations agreed to participate (see Table 5-8, 3rd column). The questionnaire study received a cumulative 40% response rate (see again Table 5-8, 4th column). This is a reasonable response rate considering similar IT Governance and strategic alignment surveys (cf. Sabherwal & Chan, 2001; Vaswani, 2003; Héroux & Fortin, 2016).

Industry	No. of organizations approached	No. of organizations accepted to participate	Response Rate
Banking	9	4	44%
Communications	3	1	33%
Oil & Gas	6	2	33%
Higher Education	2	1	50%
Totals	20	8	40%

Table 5-8 Study response rate

Due to the fact that EGIT is the inevitable construct to be studied (without which the data will have no value to the study) the organizations were approached through their IT senior managers. A letter explaining the purpose and details of the study was directed to each of the targeted organizations. Once the IT senior managers agreed in principle to participate in the study, they were requested to forward the issue to the organizational senior management for final approval.

Once acceptance was granted, the IT managers were requested to fill the EGIT questionnaire and consequently they were encouraged to solicit the participation of the other departments in the organization to fill the ITBSA, SIW, and the *performance* questionnaires. The approached organizations were promised insights into the results of their industry averaged over participants as a reward for their participation in the study (please note, local industry averages are not available in Yemen). Due to the sensitivity of some of the statements on the survey (e.g., "Senior management has no vision for the role of IT*"* on the ITBSA questionnaire) the participating organizations (and departments) have all requested anonymity of their specific names and department titles. Consequently, the departments were only numbered and no specific department-naming was attached to any of the questionnaires to encourage the highest possible response rate.

In order to accommodate the possibility of non-English speaking executives at the participating organizations, the questionnaire was translated into Arabic by a professional business-oriented translator and confirmed (through reverse translation) by two EMBA graduating students.

Initially, the questionnaires were tested in a pilot study including 12 EMBA students in their second year of study. The EMBA program participants were middle and senior managers in various industries including: communication, engineering companies, financial services, IT companies, and medical services organizations. They were asked to fill all of the three questionnaires and comment on any difficulties and/or misunderstandings. There were no major inquiries and the questions seemed sensible and reasonable to understand in a reasonable time frame. There were minor corrections to the Arabic version of the questionnaire.

Eventually, a total of 111 senior managers of various departments in a total of eight organizations have participated in the survey. In terms of sample adequacy, we have taken into consideration the following established standard arguments taken from Boomsma (1982). Boomsma has suggested that the ratio r = p/k (where p=number of indicators, and k=number of latent variables) is used to estimate an adequate sample size. Moreover, Boomsma has suggested a sample size of 100 for r=4, a sample

size of 200 for r=3, and 400 for r=2. Basically, he is suggesting the following formula in calculating the minimum sample size:

$$n >= 50(r)^2 - 450r + 1100 \text{ (n= sample size)}$$

In our study, this ratio is 18/4 = 4.5. This calculates to a minimum of 87.5 observations. Therefore, our 103 valid observations are in the appropriate range.

For further confirmation, Hatcher (1994) recommended that the number of subjects should be the larger one of (a) 5 times the number of variables, or (b) 100. In our case, we have 18 variables which calculates to (18 x 5 = 90), i.e., suggesting that 103 observations (the largest of 90 and 100) is adequate. Due to the fact that the unit of analysis for this research is the departmental level, the number of departmental observations is considered to be our sample size. Therefore, the number of responses is sufficient for the type of analysis needed to answer the research questions.

We are aware that thirty years ago, it was impossible to have computer questionnaires. However, we believed that the theory cited is still valid, since the full population of such multinationals with a large diversity is an almost “overseeable” set of firms.

For the four different industries (banking, communications, oil & gas, and higher education) we designed the same questionnaires in order to receive consistent answers (data) over different industries. Off course, our submission letter was different for each organization in each industry.

During the data collection process, the four questionnaires were initially handed to the IT senior executive. A designated person at the IT department was requested to act as a coordinator with the other participating departments. The IT executive was asked to fill in the EGIT questionnaire and the coordinator was requested to hand a copy of the ITBSA, SIW, and *performance* questionnaires to each of the senior executives at the other departments that has agreed to participate in the survey. The ITBSA, SIW, and *performance* questionnaires were sequentially numbered in order to maintain anonymity and enable the process of grouping questionnaires from a given department. The executives of the participating departments were kindly requested to have the ITBSA, SIW, and *performance* questionnaires filled by a different senior manager (as many as practically was possible). This was to avoid the effect of *common method bias* as much as possible (see subsection 5.3.2 for a discussion of this issue). A series of follow-up calls were made to the coordinators at the IT

departments to follow on the individual departments. In certain cases, the executives of the individual departments were contacted to stimulate responses. The whole process took a little over nine months.

A difficulty was faced with some senior managers not filling any of the sequence of questionnaires (ITBSA, SIW, and *performance*) due to travel, other priorities or simply not willing to spend more time in cooperating with the research project. Eventually, there were 111 (groups) of questionnaires received.

Out of the 111 questionnaires, 6 questionnaires had missing data (several blank fields) and were eliminated. Two questionnaires had outliers where the respondents filled the highest value for all questions (5 on a five scale and 7 on a seven scale questionnaires). A final set of 103 questionnaires was used in the analysis. Table 5-9 depicts the numbering of the participating organizations as it is used throughout this study. The grouping is in descending order of the four types of firms.

Org.	Main Activities	Multinational Status
1	Banking	Branch of an MNC
2	Banking	Branch of an MNC
3	Banking	Closely affiliated with an MNC
4	Banking	Closely affiliated with an MNC
5	Oil and Gas exploration services	Direct subsidiary of an MNC
6	Oil and Gas exploration services	Direct subsidiary of an MNC
7	Communications	Direct subsidiary of an MNC
8	Higher Education Institute	Direct subsidiary of an MNC

Table 5-9 Overview of the participating organizations in the survey

5.3.2 Considerations of the "Common Method Bias"

Researchers agree that *common method bias* is a potential problem for a measurement error in behavioral research (cf. Podsakoff, MacKenzie, & Lee, 2003). This problem could threaten the validity of the conclusions about the relationships between measures (cf. Bagozzi & Yi, 1991)[24]. Taking into account the possible occurrence of such reasons, our study has given this problem a serious consideration. Three precaution measures were taken to avoid the common method bias as much as practically possible.

[24] According to Bagozzi and Yi (1991), it refers to the variance of the measurement method as opposed to the concerned construct. "At a more abstract level, method effects might be interpreted in terms of response biases such as halo effects, social desirability, acquiescence, leniency effects, or yea- and nay-saying"

First, a great deal of effort was made to obtain the measures of the predictor and the independent variables at different times and from different persons. The ITBSA questionnaire was given (sent) to the senior managers of the departments first. After responses were received, the SIW questionnaire was distributed and the departments were asked to kindly have it filled by a separate senior manager or a senior employee (of course only if practically possible). Even in cases where the measurement responses were provided by the same senior manager, a time lag and a proximal separation was created. The same was applied to the *performance* questionnaire. This technique aims to (1) reduce the respondent's motivation to use previous answers to fill in gaps by what is recalled and (2) to allow previously recalled information to leave the short-term memory.

Second, the respondent's anonymity was protected by assuring the respondents that (a) their department names will be anonymous and (b) will only be numbered for the purpose of creating matching pairs of responses (ITBSA, innovation, and *performance*) in an effort to reduce the potential for "socially desirable" responses. Here we remark the following. Since some of the questions prompted the respondent to evaluate the behavior and knowledge of the senior management, the anonymity measure has increased the probability of "honest" responses.

Third, some of the questions were on purpose originally somewhat negatively worded. The idea was that this would aid in reducing the probability of a response pattern bias.

5.4 General Description of the Collected Data

The purpose of this section is to (a) provide the reader with a general overview of the collected data to reflect the constructs of this study, namely, ITBSA, EGIT, SIW, and *performance*, and (b) to show that our data is in alignment with the trends in the prevailing literature. A detailed and statistical analysis will be provided in Chapter 6. Subsection 5.4.1 will provide a general description of the ITBSA data. EGIT-related data will be described in subsection 5.4.2. Subsection 5.4.3 will describe the SIW and the supporting SIW-related data. Finally, subsection 5.4.4 will refer to the *performance* data.

5.4.1 Data of ITBSA

The aim of collecting the data related to the ITBSA construct variables is to evaluate to which extent a strategic alignment between each individual department and the IT department exist. The collected data is critical to all relationships that will be investigated in this study. It will assist in (a) the analysis

of the effect of ITBSA on SIW, (b) investigating the effect of EGIT on the relationship between ITBSA and SIW, and (c) the analysis of the role of SIW on the relationship between ITBSA and departmental *performance*.

Subsections 5.1.1 and 5.2.1 have depicted the statements that were used in the questionnaire to represent variables reflecting the ITBSA construct (see Table 5-2). Each department's senior manager was asked to evaluate the level of strategic alignment with the IT department through the evaluation of the ten statements in Table 5-2 on a scale was from 1 to 5 (1=always true, 5=never true). Table 5-10 depicts the descriptive statistics of the collected data reflecting the ITBSA construct.

Basic examination of the statistics in Table 5-10 reveals the following three basic facts. First, our average score of ITBSA is 3.08. De Haes & Van Grembergen (2009) suggest that a score of 3 is appropriate for organizatios dependent in their operations on IT. Moreover, Luftman & Kempaiah (2008) has reported an average strategic alignment score of 3.04 among a group of 197 global organizations. And Lahdelma (2010) has reported a mean score of 3.03 for ITBSA. Therefore, we consider our average to be in alignment with the common literature on ITBSA.

Second, De Haes & Van Grembergen (2009) has found the score of financial sector firms (in Belgioum) to be 2.69. They have suggested that due to the dependecy on IT and strong impact of regulations in the financial sector, the score should be at least 3. Moreover, Luftman & Kempaiah (2007) have found that, contrary to the expected opinion, financial organizations had a lower alignment score compared to the manufacturing organizations. In our collected data, we found that the financial (banks) sector had an average ITBSA score of 3.0 (see Table 5-11) , where the oil & gas sector has a higher score of 3.8. Our results are also in contrast to the expected opinion, yet in alignment with the above mentioned literature.

No.	Statements	N	Min	Max	Mean	Std. Dev.
1	Senior management has no vision on the role of IT	103	1	5	3.21	1.026
2	Vital information necessary to make decisions is often missing	103	1	5	3.21	0.90
3	Management perceives little value from computing	103	1	5	3.41	0.95
4	A "them and us" mentality prevails (with IT people)	103	1	5	2.75	0.99
5	The IT group drives IT projects	103	1	5	2.74	1.00
6	It's hard to get financial approval for IT projects	103	1	5	2.87	0.94
7	There is no IT component in the division's strategy	103	1	5	3.19	1.01
8	Islands of automation exist	103	1	5	2.81	0.89
9	IT does not help with the hard tasks	103	1	5	3.46	0.84
10	Senior management sees outsourcing as a way to control IT	103	1	5	3.13	0.92
					3.08	

Table 5-10 ITBSA data descriptive statistics

Third, Luftman & Kempaiah (2007) have concluded that their average score of the service sector (calculaed as being 2.3) is below that of the financial sector and the manufacturing sector. Our study has shown that a combined average score for the service sector begins at 2.65, which is also below the financial and manufacturing sectors.

All in all, we consider our collected data on the variables reflecting the ITBSA construct as being reasonbly aligned with similar data in the literature.

No.	Sector	Strategic Alignment Score
1	Financial	3.00
2	Oil & Gas	3.60
3	Services (Communication + Education)	2.65

Table 5-11 ITBSA scores by sector

5.4.2 Data of EGIT

The EGIT components (processes, structures, and relational mechanisms) were calculated as the averages of the respondent's answers to the statements in the questionnaire on each of those

components. Those averaged single dimensions were then fed into the SEM model to form the organizational EGIT construct (see Chapter 6). For demonstration purposes, EGIT was calculated here as an average of the three sub-constructs of EGIT, namely, processes, structures, and relational mechanisms (cf. De Haes & Van Grembergen, 2009; Van Grembergen & De Haes, 2012).

Table 5-12 summarizes the descriptive statistics for each sub-construct of the EGIT (processes, structures, and relational mechanisms). This table is sorted in an ascending order by the composite score of EGIT. By closer examination of the EGIT scores, we notice two issues. (1) Out of the three organizations with the lowest scores of EGIT (organizations 5, 6, and 8), two organizations (5 & 6) had a high relative score for relational mechanisms as compared to the scores of processes and structures. (2) The three organizations with the highest EGIT scores (4, 2, and 7) had a relatively low score for relational mechanisms as compared to the scores of processes and structures. This implies that, in alignment with the argument given by De Haes & Van Grembergen (2009), organizations that are at the start of the process of implementing the EGIT (indicated by a low average scores of EGIT), are more focused on relational mechanisms (such as awarness campaigns, co-location (IT and business departments). Whereas, organizations that have a more mature EGIT, are less focused on those activities.

This finding is shown graphically by plotting average scores of processes, structures, and relational mechanisms (vertical axis) against the overall EGIT score (horzontal axis). Each point on the graph represents an organization at a given level of EGIT. The organizations were sorted in an increasing order of EGIT score from left to the right of the horizontal axis.

EGIT	Organization	Processes	Structures	Relational Mechanisms
1.3	8	1.5	1.2	1.1
2.4	5	2.2	2.1	2.9
3.0	6	2.6	3.0	3.4
3.0	1	2.7	3.1	3.3
3.1	3	2.9	2.8	3.7
3.3	4	3.3	3.8	3.0
3.6	2	3.5	3.8	3.4
4.1	7	4.9	4.02	3.4

Table 5-12 The basic distribution of the EGIT in the collected data

From the graphs we see that the relational mechanisms score increases up to a certain threshold (approximately 3.5), thereafter, the level of relational mechanisms flattens out (see Figure 5-2) as compared to the processes and structures. This graphical finding enforces the view that relational mechanisms receive less focus after an organization has reached a certain level of EGIT maturity.

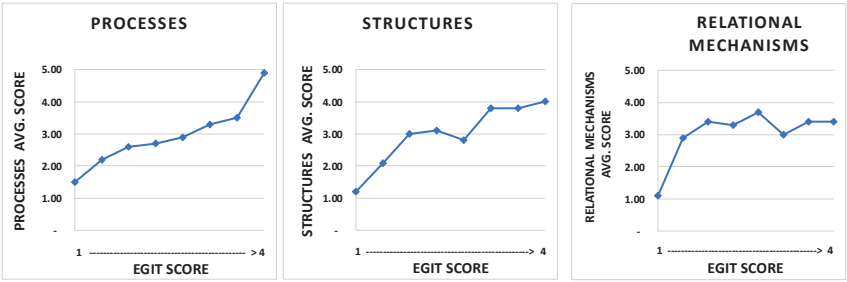

Figure 5-2 Average maturity levels of processes, structure and relational mechanisms

Finally, De Haes & Van Grembergen (2009) asserts that structures are easier to implement than processes. In their research, their claim is based on the fact that structures are having a higher average scores than processes. Our results are marginally in alignment with this claim. Table 5-13 shows our statistics of the overall EGIT and its components. It can be seen that the mean of the scores for structures (2.98) is slightly higher that the mean score for processes (2.96). The difference is marginal, yet the result points to the expected direction. The analysis of the reasons behind the fact that structures are easier to implement than processes is beyond the focus of this thesis. The purpse of the description of the data as performed so far is, as mentioned in the introduction of this section, to demonstrate that our data is in alignment with the general trend of the data in the prevailing literature.

EGIT Components	N	Minimum	Maximum	Mean	Std. Deviation
EGIT_Processes	8	1.50	4.90	2.96	.94
EGIT_Structures	8	1.20	4.02	2.98	.90
EGIT_Relation	8	1.10	3.70	3.03	.76

Table 5-13 Descriptive statistics of the EGIT components

5.4.3 Data of Inter-Departmental Collaboration on SIW

Social innovation is innovation in the internationally recognized *Oslo manual* sense. Generally, social innovation has to do with guiding public actions through the creation of new values that guide collaborative working on service innovation. Social innovation approaches are (1) open rather than

closed and (2) multi-disciplinary rather than single departmental when it comes to knowledge-sharing and ownership.

To emphasize on the importance of our choice to operationalize SIW in terms of collaboration on innovation, respondents were asked to assess the importance level of factors that hamper innovation on the departmental level (see Appendix G for details of the SIW questionnaire). According to the respondents, the most significant factors that hampered business innovation were (1) lack of qualified personnel (64% of respondents) followed by (2) lack of information in general (60% of respondents). The other factors hampering business innovation, are in descending order, (3) lack of information on technology within the department (53% of departments), and (4) difficulty in finding cooperation partners (50% of departments) (see Table 5-14). As a result, we could summarize the factors critical to departmental innovation in descending order as follows, (1) inter-departmental collaboration in personnel qualifications and (2) information exchange, and (3) information technology (infrastructure) within the department.

Factors hampering innovation	% of departments assessing the factor as significant.
Lack of qualified personnel	64%
Lack of information	60%
Lack of information on technology within the department	53%
Difficulty in finding cooperation partners	50%

Table 5-14 Factors hampering innovation

This ranking of the reasons hampering innovation supports our choice of variables (indicators) for the operationalization of SIW (see subsection 5.2.3). The majority of the eight statements from the *Oslo manual* (statements 1-6) directly relate to the inter-departmental collaboration on innovation. The remaining two statements (7,8) are indirect indicators of the need for various department's collaboration and support to put forward innovative ideas. Table 5-15 shows the descriptive statistics of the 103 valid responses obtained by this study on the eight statements.

No.	Statements	N	Min	Max	Mean	Std. Dev.
1	People in our department come up with few good ideas on their own.	103	1.00	7.00	3.28	1.41
2	Few of our projects involve team members from different departments/units	103	1.00	7.00	3.75	1.47
3	Typically, our people do not collaborate on projects internally, cross departments and subsidiaries	103	1.00	7.00	3.85	1.34
4	At our department, ideas from outside are not considered as valuable as those invented within	103	1.00	7.00	3.53	1.33
5	Few good ideas for new processes/services actually come from outside the department	103	1.00	7.00	3.42	1.41
6	Our departmental culture makes it hard for people to put forward novel ideas	103	1.00	7.01	3.61	1.45
7	We have tough rules for investment in new projects	103	1.00	7.00	3.39	1.63
8	We are too slow in realizing new ideas	103	1.00	7.00	3.30	1.45
	Valid N	103				

Table 5-15 Descriptive statistics for the SIW collected data

5.4.4 Data of Departmental Performance

Table 5-16 shows the basic descriptive statistics for the responses of 103 departments to the statements reflecting the variables (indicators) operationalizing the departmental *performance* construct (see subsection 5.1.4 for details of the instrument).

Statements	N	Min.	Max.	Mean	Std. Deviation
Increased Production Flexibility	103	3	7	5.73	0.93
Increased Production Capacity	103	3	7	5.12	1.12
Reduced labor cost / unit of production	103	2	7	4.91	1.15
Valid N	103				

Table 5-16 Descriptive statistics of the effect of SIW on departmental *performance*

A basic examination of the descriptive statistics is given in Table 5-16. It shows that, in-spite of the claim in the literature that cost considerations of *performance* are losing ground in favor of other efficiency factors (cf. Robeson & O'Connor, 2007), our results slightly differ. The lowest *mean*

(which indicates the highest effect[25]) is still associated with product cost reduction. However, the second highest effect is associated with increased capacity. Finally, according to our data, the least effect of SIW on departmental *performance* is the improvement of production flexibility.

It is important to note that the means are very close to each other (all within less than one scale point), indicating that all three factors are important, and the ordering is merely a numerical sequencing of importance.

The collected data described in this chapter will be used in Chapter 6 to investigate the relationships of our conceptual model, consequently, to provide (in Chapter 7) answers to our four research questions and the problem statement of this study.

[25] The questionnaire is setup such that 1=highest effect and 7=lowest effect. See subsection 5.2.4.

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CHAPTER 6 DATA ANALYSIS and RESULTS

In this chapter, we empirically investigate the conceptual model developed in Chapter 4 by analyzing the data described in Chapter 5. The course of the chapter is as follows. In section 6.1 we define and justify our choice for the SEM (Structural Equation Modeling) methodology. In section 6.2, we select our model-fit indicators. In section 6.3, the confirmatory factor analysis, validity analysis, and model modification is performed. Finally, the SEM models, results and discussions are presented in section 6.4.

6.1 Why SEM?

In this section, we define and justify the use of the SEM methodology to investigate our proposed conceptual model. In subsection 6.1.1 we define the SEM technique and briefly describe its advantage over the method of OLS (Ordinary Least Square) regressions. In subsection 6.1.2 we present four advantages of using SEM for our analysis. In subsection 6.1.3 we introduce the concept of theory testing vs predictive application and justify our use of the theory testing approach.

6.1.1 SEM Defined

Structural Equation Modeling (SEM) is an advancement in the analysis of multiplicative effects, mainly because of its ability to detect measurement errors within a given model (cf. Weston, Chan, Gore, & Catalano, 2008; Yang, Yen, & Chiang, 2012). SEM definitions are hard to find, at least a consensus definition. At this stage we provide a definition of SEM for this study.

Definition 6-1 Structural Equation Modeling

SEM is defined as "a test of a theory by specifying a model that represents predictions of that theory among plausible constructs measured with appropriate observed variables" (Hayduk, Cummings, Boadu, Pazderka-Robinson, & Boulianne, 2007).

Causal Relations in SEM

There has been a discussion in the literature relating to the actual role of SEM. Researchers are in disagreement about the extent to which the results of SEM can be interpreted as a causal relations among the latent variables. Nachtogall, Kroehne, Funke, & Steyer (2003) point out that SEM attempts to asses to what extent does a given proposed model fits the empirical data. If a fit is found, we can

assume that the data supports both the measurement model (relationship between latent and observed variables), and the structural model (the proposed relationship between the latent variables). Nevertheless, Nachtogall et al. (2003) emphasize the point that even if we use the word "effect" to express the relationship between the latent variables, it does not imply that the proposed structural model (even if well fitted) is a causal model.

On the other side of the spectrum is an opinion that attempts to preserve some implication of "effect" to the SEM model's results. This view includes researchers such as Pearl (2012) who agrees that the issue of causality in SEM is controversial. At the start of his paper, Pearl states that "The role of causality in SEM research is widely perceived to be, on the one hand, of pivotal methodological importance and, on the other hand, confusing, enigmatic, and controversial" (cf. Pearl, 2012). Initially, he introduces the views of those researchers who oppose to the use of SEM results as being causal relations. Perl cites Wilkinson & Task Force (1999) asserting that "The use of complicated causal-modeling software [read SEM] rarely yields any results that have any interpretation as causal effects". Later, Pearl (2012) points out that the statement by Wilkinson & Task Force (1999) might be an "overstatement", and puts forward the following question "If SEM methods do not 'prove' causation, how can they yield results that have causal interpretation?".

According to Pearl's view, the controversy lies in the presence of a logical gap between "establishing causation" through an elaborate experimental testing and "interpreting" parameters as causal effects which are based on a previous scientific and theoretical knowledge. By using this proposition, Pearl implies that if the proposed relations among the latent variables in a model are based on previously tested and documented relationships, the results could be "interpreted" as indicating a possible causal direction (without being proven). This view brings both sides of the controversy a bit closer. Nachtogall et al. (2003) also proposes a compromising view by stating that (a) many users of SEM are implicitly interested in "indicating" causality, and (b) a framework of mathematically formalized theory has been developed for testing causality in SEM.

In our research, we have based the directional relations of our proposed complex model on previously established models from the literature. We have explored and described our complex model involving those relations by fitting the model to the empirical data. We interpret our results only as "effects" and have not explicitly "established causality" by experimental testing methods.

SEM vs OLS

OLS (Ordinary Least Square) regression generally assumes that all variables are measured without an error and that they are perfectly reliable. This assumption is rarely true and may result in an unknown parameter estimate bias (cf. Busemeyer & Jones, 1983). The measurement error is not only problematic for all variables in the regression, but is also challenging to the reliability of the interaction term (used for moderation analysis) of which the reliability is a result of its principal variables from which it is composed (cf. Little et al., 2007). In our thesis we incorporate an interaction term to estimate the moderating effect of EGIT on the relationship between ITBSA, SIW, and *performance*. Therefore, a series of regressions might not yield a reliable results and SEM will be the approach of choice.

6.1.2 Advantages of Using SEM

There are four main advantages in using SEM over other methods in the examination of mediated and moderated models.

First, the SEM method possesses the ability to accommodate estimates of error variance, while other methods (such as path analysis or regression) assume that all variables are measured without error (cf. Weston et al., 2008).

Second, the SEM method uses latent variables as opposed to observed variables. Latent variables represent scores of several observed variables assumed to be measuring the same phenomenon. In mediation and moderation studies, using latent variables has an advantage of providing better reliability. This is due to the fact that variance associated with a measurement error of a given observed variable is not likely to contribute to the score of the latent variable because this variance is less likely to be shared among other observed variables (cf. Baron and Kenny, 1986; Hopwood, 2007). Consequently, the use of SEM reduces the effect of *unreliability* and the *method-effect* in mediation and moderation models.

Third, the SEM method possesses the ability to (a) estimate at first glance indirect relationships and (b) to test the significance of any of the modeled paths. These advantages add power to testing complex conceptual models and to providing a strong empirical evidence either with or against a mediation and/or moderation model (cf. Iacobucci, 2012).

Fourth, the SEM method allows for the distinction between a poor measurement and a miss-specified model. The two components of SEM (factor analysis and the structural model) take care of those issues, respectively (cf. Kenny & McCoach, 2003).

6.1.3 Predictive Application vs. Theory Testing

Historically, there have been two main uses for SEM. (1) Predictive application and (2) theory testing (cf. Joreskog & Wold, 1982; Fornell & Bookstein, 1982; Barroso, Carrión, & Roldán, 2010). First, the predictive application is based on an econometric perspective that focuses on parameter prediction (predicting the dependent variable). Parameters are estimated with the aim to maximize the variance explained. The fit of such predictive models does not use the classical goodness-of-fit measures, it is rather evaluated on the model's ability to account for the sample covariance and hence, it is based on the amount of a variance-explained basis. The PLS (Partial Least Square) approach is advantageous in this kind of applications because it considers all the variance of the observed measures as a useful variance. Yet, according to both publications, Joreskog & Wold (1982) and McDonald (1996), the PLS estimates are correct under the assumptions of a large sample and a large number of observed variables per latent construct. The approach of predictive application and the PLS method are frequently used in consulting applications (cf. McDonald, 1996).

Second, the theory testing methodology is used whenever there is a strong theoretical background for the components of a model and further theoretical testing is the main objective (cf. Barroso et al., 2010). For these kind of applications, the ML (maximum likelihood) methodology (also sometimes refered to as *full-information* estimation approach) is commonly used. In the ML approach, each proposed relationship among the latent constructs should be justified by previous theory. Using ML for theory testing has at least four advantages.

The first advantage is that the *uniqueness* (a combination of random error variance and measure specific variance associated with the common factor model of ML) is of no theoretical interest and is excluded from the definition of the latent constructs. Consequently, the covariance among the latent variables is adjusted to reflect this reduction on variances. Because of this assumption, the amount of variance explained in a group of observed variables is not of a main concern (cf. Anderson & Gerbing, 1988).

A second advantage of the ML method is that it allows for an estimate of a model fit using classical fit-indices (due to the fact that the fit function is asymptotically distributed as Chi-square).

Third, the ML approach provides for a very efficient parameter estimates (cf. Joreskog & Wold, 1982).

The fourth advantage of ML, in comparison to its family of methods (covariance based analyses) such as GLS (generalized least square) and WLS (weighted least square), is concerned with the relaxed strictness of the multivariate normality requirement. In general terms, the literature shows that ML performs better than both GLS and WLS (cf. Olsson, Foss, Troye, & Howell, 2000; Iacobucci, 2010). In more specific terms regarding the effect of non-normality on the standard errors, Olsson et al. (2000) and Lei & Lomax (2005) assert that ML is relatively robust and there is no effect on the standard errors of parameter estimates. They claim that there is an effect on the parameter estimates themselves for samples less than 100, which does not concern us as our sample is above 100. For further re-assurance, there are scholars asserting that even the parameter estimates themselves are also generaly robust to multivariate non-normality (cf. Finch, West, & MacKinnon, 1997; Fan & Wang, 1998).

Our research is characterized by these issue: (a) the components of our model are well rooted in theory, (b) our purpose is to test a theory and the general trend among known constructs (ITBSA, EGIT, SIW, and departmental *performance*), and (c) we are not concerned with predicting a dependent construct. Therefore, we will utilize the ML methodology to test the extent to which our proposed model fits the collected data.

Moreover, we will not need to be particularly concerned with the amuont of variance explained by our model and our chosen methodology should be well robust to multivariate non-normality.

6.2 The Fit Indicators of the Model

Our choice of ML methodology avails the test of model fit. Yet, it is important to mention that the SEM models are an attempt to approximate a proposed model of construct relationships to an actual model in the collected data. It is only an approximation, a perfect fit is too high a dream (cf. Wolfle, 2003). In order to assess the level of estimation, it is neither recommended, nor realistic, to include every index known and generated by a computer in its program's output.

Thus, it is difficult to answer the question "what is the appropriate choice of indices?". Below we list three views on index categorization as published in the literature. Then we give our choice for the categorization of the fit indices.

Three Views in the Literature

There are several views in the literature about the issue of index categorization. Below we mention three of them.

First, Hu and Bentler (1999) suggested the use of a two-index combination of the standardized root mean square residual (SRMR)[26] with either one of Non-Normed Fit Index (NNFI) (sometimes called the Tucker–Lewis index TLI), the standardized root mean square residual (RMSEA), or the comparative fit index (CFI).

Second, Iacobucci (2010) points out that there is an agreement among researchers on the following combination of indices: (a) the Chi-square with the degrees of freedom and the associated p-value, (b) the SRMR, and (c) CFI.
Third, Newsom (2012) prefers to use the combination of incremental fit index (IFI) (also known as DELTA2) and the SRMR. It is important to note that the IFI is sensitive to sample size and not recommended for routine use. Consequently, we will not refer to IFI. It was mentioned for reference only.

Fit Indices Categories

There are various categorizations of the fit indices. One of the common categorizations is by Hooper, Coughlan, & Mullen (2008). They name three specific main categories:[27] (a) the *absolute* fit indices, such as the Chi-square, RMR/SRMR, GFI, and RMSEA, (b) the *Incremental* fit indices, such as the NFI and CFI), and (c) the *Parsimonious* fit indices, such as the PNFI. For our choice of fit indices, we will adopt the Hooper et al. (2008) categorization of the indices.

In the following three subsections (6.2.1, 6.2.2, and 6.2.3) we provide a description of each of the categories (Absolute, Incremental, and Parsimonious) respectively. In subsection 6.2.4 we make our final choice of indices for our model fit analysis.

[26] The indices that are eventually used in this thesis will be explained in details in the following subsections.

[27] The number of categories and the naming varies with scholars, for example Newsom (2012) names four categories: Absolute, relative, Parsimony, and non-centrality.

6.2.1 The Choice for Absolute Fit Indices

These indices basically describe how well does the proposed model (theory) fit the sample data. The result is directly derived from the fit between obtained and implied covariance matrices (and the ML minimization function) (cf. McDonald & Ho, 2002; Newsom, 2012). In other words, the indices do not use an alternative model for comparison (as used by the relative indices discussed in the following subsection). This group of indices include (among others) (1) the Chi-square, (2) the RMR, SRMR, RMSEA, and (3) GFI. Below we briefly describe those indices (the GFI will be described for its historical importance, but it will not be referenced in our models).

(1) *The Chi-square index (χ^2)* is the only inferential statistic while all the others are descriptive[28] (cf. Iacobucci, 2010). This index basically assesses the goodness of fit (the discrepancy between the sample and the fitted covariance matrix). For a good fit, the χ^2 should be non-significant at the 0.05 threshold, therefore, in some literature it is referred to as the badness of fit measure (cf. Barrett, 2007). The index is sensitive to both (a) multivariate normality (for slightest deviation from multivariate normality it tends to reject even well specified models), and (b) to sample size. For large samples, it tends to reject fitted models, and for small samples it lacks the power of discriminating between good and bad fitted models. Therefore, in order to minimize the impact of sample size, a normed χ^2 is usually reported. It is calculated as (χ^2/Degrees of freedom). Even though there is no consensus on a fixed cutoff value for this ratio, a widely acceptable value is as high as 2 (cf. Ullman, 2006; Tabachnick & Fidell, 2007). We will report the χ^2 index, the significance (p-value), the associated degrees of freedom, and the normed χ^2 (χ^2/df).

(2) *Root mean square error of approximation (RMSEA)* is practical approach to model fitting. It accepts the reality that a perfect fit is an exaggerated goal to aim at. Therefore, an acceptance of the fact that models are only an approximation of the true model is more realistic (cf. Wolfle, 2003). This view led to the invention of the RMSEA indicator. It indicates the extent to which a model with optimal parameter estimates fits the population covariance (cf. Byrne, 1998; Iacobucci, 2010). Because of its sensitivity to the number of parameters (it favors models with less parameters), it has become a very popular index to report. Higher values indicate worst fit. Hu & Bentler (1998) and Hu & Bentler (1999) have suggested a cut off point of 0.06, and Steiger

[28] This statement means that it is the only statistic that makes a clear statement about the significance of a hypothesis, the other statistics only use *rule of thumb* for goodness of fit assessment.

(2007) has suggested that values as high as 0.07 are acceptable for a fair fit[29]. We will report RMSEA and consider values close to 0.06 as a good fit value.

(3) *Goodness-of-fit index (GFI)* has been created by Jöreskog & Sörbom (1996). The index is an alternative to the χ^2 index. It basically calculates the proportion of the variance that the estimated population accounts for (cf. Tabachnick & Fidell, 2007). It ranges from 0 to 1. It is sample sensitive, as large samples increase its value. Moreover, it is sensitive to the proportion of the degrees of freedom (df) to the sample size, i.e., as the number of degrees of freedom increases in proportion to the sample size, this indicator tends to decrease in value. Due to these sensitivities, it has been recommended that this index should not be used (cf. Sharma et al., 2005).

6.2.2 The Choice for Incremental Fit Indices

Incremental fit indices describe the fit of a model in relative to another reference model, therefore, in some literature those indices are described as *comparative* (or relative) indices (cf. Miles & Shevlin, 2007; Iacobucci, 2012). This group includes indices such as the CFI (cf. McDonald & Ho, 2002). Below we describe some characteristics of the index.

The Comparative Fit Index (CFI) was first introduced by Bentler (1990). It is a revised form of the normed-fit index NFI[30] in that it performs well even with small samples (cf. Tabachnick & Fidell, 2007). This index compares the sample covariance to a null model which assumes no correlation among latent variables. The CFI's values range from 0 to 1 with values closer to 1 indicating a good fit. Initially a value > 0.9 was considered a good fit, later Hu & Bentler (1998) has proposed a cut off of > 0.95 which became acceptable among the research community. Due to its tolerance to small samples and as a representation of the comparative fit indeces, we will report the CFI index with our analysis.

[29] Some earlier literature has suggested values between .05 and 0.1 to be acceptable for fair fit. Other scholars have suggested values between 0.8-0.1 to be an indication of mediocre fit and values bellow 0.8 to be fair fit. See for example (MacCallum et al.,1996).

[30] The NFI index was criticized for three main reasons (1) it was influenced by sample size, (2) it underestimated a fit in small samples, and (3) it was difficult to compare across data sets (cf. Iacobucci, 2012).

6.2.3 The Choice for Parsimonious Fit Indices.

The parsimonious fit indices are in principle *incremental* (or relative) indices. They are adjusted (for the degrees of freedom) to penalize complex (less parsimonious) models. The aim is to encourage a straightforward theoretical process (cf. Newsom, 2012). The more complex models would obtain lower values for the indices. Mulaik, James, Van Alstine, Bennett, Lind, & Stilwell (1989) is credited for developing several of those indices. The category of parsimonious fit indices includes indices such as the parsimonious CFI and parsimonious NFI. Those indices are very difficult to interpret and have no agreed threshold values (cf. Newsom, 2012). A model could obtain a value close to 0.5 for a parsimonious index while having a value of 0.95 for other indices (cf. Mulaik et al., 1989). There is a fundamental debate in the literature whetheher the parsimonial indices are appropriate to use and report (cf. Hooper et al., 2008). We will report PCFI as a reference only (in comparison to the CFI index that was chosen in the previous subsection).

6.2.4 Final Choice of Model Indices

The issue of choosing a set of indices is not a trivial task. Iacobucci (2010) has pointed out to an agreement in the literature that, fundamentaly, the following three indicators should be reported: χ^2 (with its p-value and df), the RMSEA, and the CFI. Based on the discussion and descriptions in the previous subsections, we put together a balanced set of indices that would provide a reasonable indicator of fit for our analysis. First, for the absolute indices we will utilize the χ^2 (with degrees of freedom and the p-value, as well as the ratio of χ^2/df) and the RMSEA. Second, as a representative of the incremental indices group we will choose the CFI index. Third, we will report the PCFI index to provide a reference point for the model complexity. We will use the estimation thresholds as depicted in Table 6-1. Our choice of indices is supported by a study performed by Jackson, Gillaspy, & Purc-Stephenson (2009) in which they have reviewed the frequency by which various indices were used in the literature. They have shown that χ^2 was reported in 89% of the studies. CFI was reported in 78.4% of studies. And RMSEA was reported in 64.9% of studies. Moreover, 92.8% of the studies have reported more than one type of indicators (such as an absolute and an incremental).

Indicator	Approximation threshold	Reference
χ^2/df	< 2	(Ullman, 2006; Tabachnick & Fidell, 2007)
p-value	> 0.05 (non-significant)	(Barrett, 2007)
RMSEA	Close to 0.06	(Hu & Bentler 1998 & 1999)
CFI	> 0.95	(Hu & Bentler 1998 & 1999)
PCFI	>0.5	(Mulaik et al., 1989; Hooper et al., 2008)

Table 6-1 Model fit indicators and threshold values

6.3 CFA and Validity Analysis

There are two major components of SEM, the *measurement* model and the *structural* model. The measurement model is a confirmatory factor analysis (CFA) model that is concerned with the latent variables, the unmeasured covariance among all possible pairs of the latent variable, and their associated indicators. The structural model explores the potential causal dependencies between the endogenous and exogenous variables. It utilizes path coefficients to indicate direct effects among those dependencies. Subsection 6.3.1 will discuss the measurement model (the CFA analysis). Subsection 6.3.2 will describe the model modification process as a result of the CFA. Finally, subsection 0 will provide the reliability and validity analysis of the modified model as preparation for the structural model analysis in section 6.4.

6.3.1 Confirmatory Factor Analysis

Our research is based on survey instruments adopted from previous literature. In such cases, confirmatory factor analysis (CFA) is preferred (over exploratory analysis) to assess to what extent do the measured variables reflect the desired construct (cf. Tallon & Pinsonneault, 2011). We have used the AMOS software and the SEM methodology to perform the CFA. All constructs with their indicators are modeled as reflective measures[31] with all pairs of constructs allowed to correlate. The scales of the latent variables are standardized by fixing the loading of the most indicative variable "1". The chosen most-indicative variables are: Senior Vision (for ITBSA), Processes (for EGIT), Project Collaboration (for SIW), and Cost (for departmental *Performance*). Figure 6-1 shows the CFA model. The results of the measurement model as calculated by the AMOS software are as follows[32]: χ^2=419.7, df=246, $p < .001$, χ^2/df=1.7, RMSEA=.083, CFI=.858. The RMSEA, and the CFI are outside the limits of acceptable thresholds.

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[31] The majority of models take a priory decision to use reflective (vs. a formative) approach (cf. Coltman, Devinney, Midgley, & Veniak, 2008). In reflective models rhe construct predicts the measured variables. That means a change in the construct causes a change in the indicators (the arrows in a SEM model point from the construct to the indicators – as in our model), whereass in a formative model, a change in the indicators cause a change in the construct (the arrows in the SEM model point from the indicators to the construct). In reflective measures, the indicators collectively share a common theme and usually have high intercorrelation. Removing some of the indicators does not fundamentally change the content vaidity of the construct (cf. Roy, Tarafdar, Ragu-Nathan, & Marsillac, 2012). Our constructs fall into this category and hence were modelled as reflective.

[32] There are several references that discuss the details on how the model fit indices are calculated, see for example, Yuan (2005).

In the case where fit indices of a model are not meeting the desired level, it is a common practice in literature to perform several trials of model refinement. There are at least two major approaches (among others) to modify a model.

First, parameters with non-significant loadings or parameters with loadings below a chosen cut-off point (such as 0.7) could be deleted (cf. Fornell & Larcker, 1981).

Second, theoretically and logically justifiable co-variances among error terms are added. Those proposed co-variances are sometimes referred to as "Lagrange multiplier statistics" (cf. Mueller & Hancock, 2008) and are usually generated by SEM software packages in the form of modification indices[33] (cf. Hox & Bechger, 1998). Researchers use those modification indices to execute a sequence of iterative model modifications till a reasonable fit is reached (cf. Hox & Bechger, 1998).

It is important to stress that those covariance relationships should be added within a given latent variable (not across latent variables), should be theoretically justifiable, and should be added among error terms of variables that are likely to be answered in the same way but are not likely to have a causation relationship. In the following subsection, we will perform the model modification.

6.3.2 The Model Modification

This subsection addresses model modification. We investigate the loadings of the parameters and the error covariance of the model constructs, viz. ITBSA, EGIT, SIW, and the *performance* construct.
In order to have suggestions for a model modification, we start analyzing the loadings of the parameters on the latent variables. As indicated in subsection 6.1.3, our purpose is to test a theory and the general relationships among known variables. We are not much concerned with predicting a dependent construct, and hence, the amount of variance explained is not our main concern. Table 6-2 depicts the results of the initial CFA run. It shows the parameters, the latent variables, the parameter's

[33] Those modification indices are generated by most SEM software packages and appear within the standard output of a SEM model. A given value of a modification index is basically the minimum amount that the Chi-square statistic will decrease as a result of freeing the given parameter (cf. Hox & Bechger, 1998). It is important to note that the re-specified model should be viewed as an exploratory model that does not resemble reality any more than the initially conceptualized model (cf. Mueller & Hancock, 2008).

estimate, the standard error (SE), the critical ratio (CR), and the probability level (significance) of the estimate.

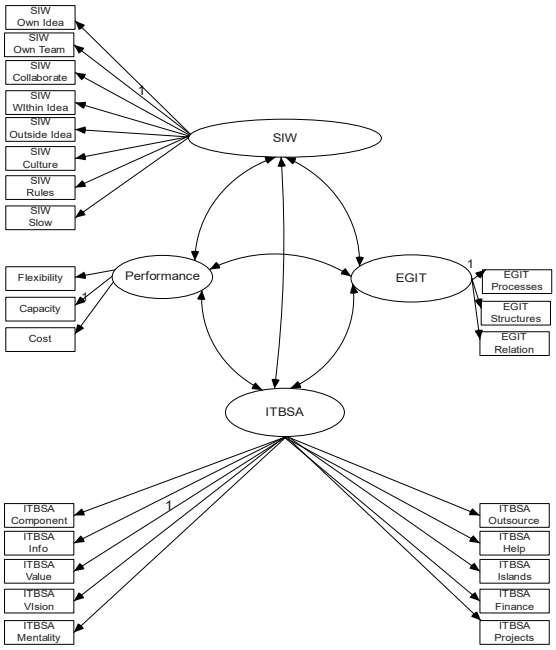

Figure 6-1 CFA Before model modification

We will utilize the unstandardized estimates and initially attempt to remove the parameters with estimates below the level of 0.7. The model is then re-run and the fit indices will be re-examined.

Following this process, the four eliminated parameters were as follows (see Table 6-2 for details and positioning of those variables – eliminated variables are in bold):

(1) EGIT_Relations[34]
(2) ITBSA_Islands
(3) ITBSA_Help
(4) ITBSA_Outsource

[34] This is consistent with some of the literature that suggested that for mature firms the EGIT relationships component is not a focus anymore as much as the processes and structures (see, for example, De Haes & Van Grembergen, 2009).

The model was re-run and the following fit indices were found. The $\chi^2 = 268$, df=183, $p < .001$, $\chi^2/df=1.63$, RMSEA=.079, CFI=.89. There has been some improvement in the model fit, yet the RMSEA, and the CFI indices are still outside the limits of acceptable thresholds and the model might be further improved.

Consequently, the modification indices were examined for possible co-variances among error terms. The following three co-variances were theoretically and logically justified and, hence, implemented.

Parameter		Latent Variable	Estimate	S.E.	C.R.	P
SIW_Collaborate	<---	SIW	1.000			
SIW_Own_Team	<---	SIW	1.051	.168	6.258	***
SIW_Within_Idea	<---	SIW	.841	.151	5.570	***
SIW_Outside_Idea	<---	SIW	.996	.161	6.169	***
SIW_Culture	<---	SIW	1.399	.170	8.214	***
SIW_Rules	<---	SIW	1.280	.188	6.805	***
SIW_Slow	<---	SIW	1.345	.169	7.956	***
SIW_Own_Idea	<---	SIW	1.174	.163	7.199	***
ITBSA_Senior_Vision	<---	ITBSA	1.000			
ITBSA_Mentality	<---	ITBSA	1.252	.180	6.954	***
ITBSA_Finance	<---	ITBSA	.855	.159	5.364	***
ITBSA _Component	<---	ITBSA	.760	.167	4.550	***
ITBSA_Info	<---	ITBSA	.828	.153	5.431	***
ITBSA_Value	<---	ITBSA	.720	.157	4.571	***
ITBSA_Islands	<---	ITBSA	.482	.143	3.376	***
ITBSA_Help	<---	ITBSA	.625	.140	4.470	***
ITBSA_Outsource	<---	ITBSA	.599	.150	3.990	***
ITBSA_Projects	<---	ITBSA	.815	.167	4.893	***
EGIT_Processes	<---	EGIT	1.000			
EGIT_Structures	<---	EGIT	1.111	.072	15.532	***
EGIT_Relation	<---	EGIT	.663	.076	8.758	***
P_Flexibility	<---	*Performance*	1.279	.267	4.787	***
P_Capacity	<---	*Performance*	1.399	.288	4.867	***
P _Cost	<---	*Performance*	1.000			

Table 6-2 Results of initial CFA run
Note: Eliminated variables by CFA are in bold

The ITBSA Construct

First, within the ITBSA construct, the following modification indices were added and accepted.

(a) The senior management's vision for the IT department is related to the availability of information for decision making (ITBSA_Vision <-> ITBSA_Info). It is logical to assume that if the senior management has no vision for IT, there will be a deficiency of the availability of information. Hence, it is feasible to believe that those factors have something in common and are strongly related.

(b) It is suggested that the senior management's vision for IT and the senior management's perceived value from IT are related (ITBSA_Vision <-> ITBSA_Value). Indeed, those parameters are logically related. Actually, they are a redundant confirmation parameter in the data instrument. We can safely assume that if the senior management has no vision for the IT department, it implies that the senior management perceives no value from the IT department. Therefore, we will retain this path.

(c) It was suggested that the parameter of "them and us" mentality is related to the fact the IT department drives IT projects (ITBSA_Mentality <-> ITBSA_Projects). From a logical point of view, it is expected that if the prevailing mentality is "them and us" between the IT department and the rest of the firm, the IT will not be guiding most of the IT projects. After adding this co-variance and re-analyzing the model, the value of the path between the error terms was negative, hence, confirming the logical view that IT does not guide the IT projects if the "them and us" mentality prevails. Therefore, we have decided to retain the path.

The SIW Construct

Second, for the SIW construct, two paths among error terms were tested and retained.

(a) It is proposed that the collaboration on innovation projects with other departments is related to the involvement of external members in our innovation teams. It is expected that those two parameters (collaboration and external member's involvement) are positively related. The positive value of the path connecting their error terms has confirmed the concept.

(b) The modification indices have suggested relating the parameters for valuing external ideas on innovation and accepting external suggestions for innovation. We can logically assume that

perceiving an idea as valuable is very much related to accepting that specific idea. And therefore, we will retain the path.

The Performance Construct

Third, the following co-variance among error terms were suggested for the *performance* construct. The *performance* construct contains two major dimensions (a) cost related dimension (the cost of production and the cost of energy), and (b) the capacity related dimension (flexibility and capacity of production).

The suggested modifications to the model have indicated a covariance among error terms of the non-cost-related parameters, namely, production capacity and production flexibility (P_Capacity and P_Flexibility). Actually, those parameters are both production-related and have something in common that is not directly related to cost. This covariance was retained.

The model was re-run with the above described co-variances implemented. At this point of analysis, the values of the fit indices are demonstrating an acceptable level of fit. The following parameters were achieved. $\chi^2 = 197.7$, df=158, p =.018, χ^2/df=1.25, RMSEA=.05, CFI=.962. These values indicate an adequate fit and we consider the measurement model acceptable for structural analysis. Figure 6-2 demonstrates the measurement model after modification.

6.3.3 Reliability and Validity Analysis

Due to the modifications of some constructs because of the CFA, Cronbach's Alpha was recalculated to assure construct validity. The Cronbach's Alpha for the modified constructs was ITBSA= .81 and EGIT=.94. Both are acceptable.

In order to explore the convergent and discriminant reliabilities, the following four values were calculated: CR (composite reliability), AVE (average variance extracted), MSV[35] (maximum shared variance), and ASV[36] (average shared variance). Table 6-3 shows those values for our constructs.

[35] MSV is calculated as the squared maximum correlation with any variable.

[36] ASV is calculated as the average squared correlations with the other constructs in the model.

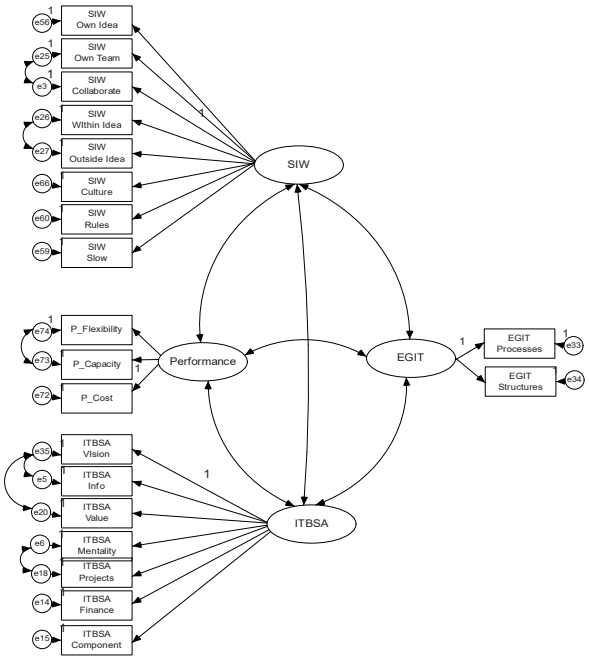

Figure 6-2 CFA After model modification

For internal consistency reliability, CR should exceed 0.7. This condition is satisfied in all our constructs providing for a satisfactory internal consistency (see Table 6-3).

Construct	AVE	CR	MSV	ASV
ITBSA	.38	.80	.52	.33
EGIT	.89	.94	.45	.26
SIW	.53	.90	.52	.32
Performance	.53	.77	.09	.04

Table 6-3 Reliability statistics

In order to assess the convergent validity, CR should exceed the AVE, and AVE should be above .5. The first condition (CR>AVE) is satisfied for all our constructs. As for the second condition (AVE>.5) it is satisfied for all constructs except the ITBSA. Our closer inspection reads as follows. To start with, we have used literature-approved data collection instruments in order to build our constructs. Moreover, as mentioned in subsection 6.1.3, we aim at performing a procedure for general theory testing (as opposed to predictive analysis). Hence, we are not much concentrating on and thus

not so much concerned with the average variance extracted. Therefore, we will consider the ITBSA construct valid for the purpose of our study.

The discriminant validity is assessed by comparing the MSV and ASV to the AVE. Both MSV and ASV should be less than AVE. This condition is satisfied for all our constructs except for the ITBSA. The ASV is less than AVE as desired, nevertheless, the MSV (maximum shared variance) exceeds the AVE. Table 6-4 shows an alternative method of assessing the discriminant validity. This method compared the square root of the AVE to all the other correlations of the given construct. It is recommended that the square root of the AVE should exceed all the correlations of a given construct with the other constructs in the model. Again, this condition is satisfied for all the constructs except the ITBSA. Here it is due to the low AVE of the ITBSA construct, which as mentioned above, is not our main focus owing to the nature of our research. Yet, it is important to mention that this situation is indicative. The possible reason for the low value is that some of the variables of the ITBSA construct cross load into other constructs.

Moreover, we would like to remark that in this research, we have not developed our own data instruments. We have used literature-approved instruments. Therefore, we believe still to be in the region of what is acceptable and reliable (and do not consider further modification of our model). So, we will continue with the constructs composition as shown in Figure 6-2 as a result of the CFA analysis.

	SIW	ITBSA	EGIT	*Performance*
SIW	.73			
ITBSA	.72	.62		
EGIT	.59	.67	.94	
Performance	.30	.15	.01	.73

Table 6-4 Convergent/discriminant validity and correlations
The diagonal elements in bold & underlined are the square root of AVE

As for the multivariate normality, in subsection 6.1.3 we have discussed the fact the ML analysis is robust to marginal levels of departures from multivariate normality. We have performed a visual inspection of the histogram graphs and a Q-Q graphs of the variables composing the two dependent constructs (SIW and *performance*). No major deviation from normality was detected (see Appendix A). Furthermore, skew and kurtosis statistics were inspected for departures from acceptable values (-.8 and +.8). The only variable that was close to the +1 value was the SIW_Own_Idea with a value of .90 (see the skew and kurtosis tables in Appendix A). Therefore, we have decided to perform a log

(10) transformation on the variable SIW_Own_Idea. The resulting skew value after transformation was -.297 which is in the acceptable range. The transformed variable was used in the analysis. The kurtosis statistics had no major departures from critical range values.

The multicollinearity issue is addressed by examining the correlation matrix of all the variables in the model (see Appendix B). All correlations are within the acceptable value (< 0.85) except for the correlation between the two variables which compose the EGIT construct (EGIT_Processes and EGIT_Constructs). Those two variables have loaded highly on the EGIT construct (as opposed to the EGIT_Relations variable which was eliminated in the CFA process). De Haes & Van Grembergen (2009) have suggested that processes and structures go along with the firm as it matures, whereas the relational mechanisms lose emphasis with mature organizations. This might justify the correlation between the two variables in the surveys as all the organizations surveyed were over 10 years in operations and could be considered in their maturity stages.

6.4 The Structural Models – Results and Discussions

In this section, we will examine the structural models that test the relationships questioned in our RQs. In each subsection, we will present a model, the results, and the discussion of those results. Subsection 6.4.1 will present a model of the direct effect of ITBSA on SIW. In subsection 6.4.2 a model of the direct effect of SIW on the departmental *performance* will be presented and investigated. In subsection 6.4.3 we will look at the role that SIW plays in the relationship between ITBSA and *performance* by introducing a SEM mediation model. Finally, in subsection 6.4.4 we first introduce the EGIT construct into the mediating relationship with SIW. Then we form our final model of the *moderated mediation* relationship.

6.4.1 The Direct Effect of ITBSA on SIW Model

In this subsection, we will examine a SEM model that tests a direct relationship between ITBSA and SIW. We will also present the results of this proposed model and discuss the implications of those results.

The Model

To test the effect of ITBSA on SIW (which is the essence of RQ1), data has been collected on the variables relating to the two constructs (ITBSA and SIW) through literature-approved instruments (see section 5.2 for details). The CFA has confirmed seven variables to load into the ITBSA latent

variable and eight variables to load into the SIW latent variable. We have setup a SEM model to test the direct effect of ITBSA on SIW as in, for example, Hopwood (2007), or in Wu, Detmar, & Liang (2015). The directional arrow connecting the ITBSA and SIW latent variables tests our proposed effect between those two latent variables. The model will also setup the stage for the examination of the effect of SIW on the relationship between ITBSA and *performance* (RQ3). Figure 6-3 depicts the SEM model.

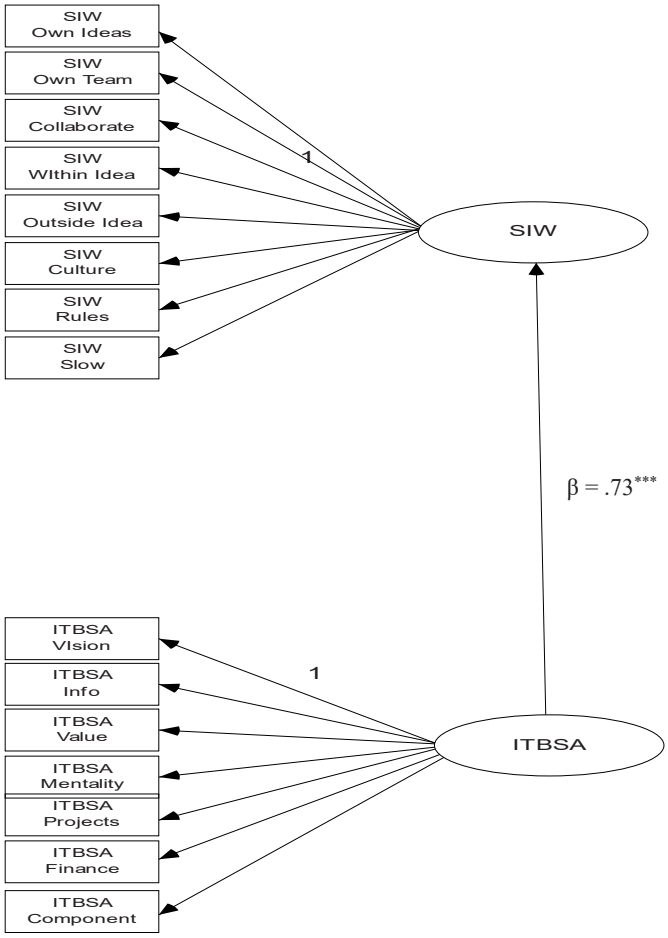

Figure 6-3 SEM model - direct effect of ITBSA on SIW
***p < 0.001; **p <0.05; *p < 0.1; ns: not significant

The Results

The model has χ^2 =97 and 84 degrees of freedom. The p value was equal to .157, which is acceptable. The ratio χ^2/df=1.16 which is also within the acceptable range. The values of CFI=0.98, RMSEA=0.039, and PCFI=0.78 are all within the acceptable ranges. Therefore, we consider the model having a good fit (see Table 6-1 for a list of acceptable ranges for the fit variables). The standardized coefficient of the ITBSA construct was β =.73 ($p<0.001$) showing a positive effect of ITBSA on SIW.

The Discussion

Studies in the strategic alignment between IT and the business side have attempted to study the path from ITBSA to the firm's *performance*. The controversy about the exact components of this path have prompted several studies attempting to suggest factors along this path. It was suggested that SIW is one of those factors. As part of our investigation of the path from ITBSA to *performance*, we are proposing that the strategic alignment between the IT and business strategies has a positive effect on SIW. The statistically significant association between the ITBSA and SIW constructs in our model of Figure 6-3 have provided an empirical evidence supporting our proposition.

Our findings support previous findings that confirmed the general view of the positive effect of strategic alignment on SIW (see, for example, Silva, Figueroa, & Reinharta, 2007; Tallon & Pinsonneault, 2011) or the more recent ones reporting a positive impact of IT and alignment on innovation (such as, Cui, Ye, Teo, & Li, 2015; Ferreira, Fernandes, Alves, & Raposo, 2015).

Moreover, our results expand the concept of ITBSA's positive influence to include the collaboration on SIW at the departmental level which has not been studied intensively. The importance of our findings lies in the fact that we stress the critical role of formulating aligned strategies between the IT and other business departments in enhancing the interdepartmental collaboration on SIW.

In order to affirm that SIW is a representation (and an important antecedent) of *performance*, we aim to empirically associate SIW with departmental *performance* in subsection 6.4.2.

6.4.2 The Direct Effect of SIW on Performance Model

In this subsection, we will propose a SEM model to investigate the relationship between the SIW and *performance* constructs (RQ2 of this thesis). We will present the model, the results, and then discuss the results.

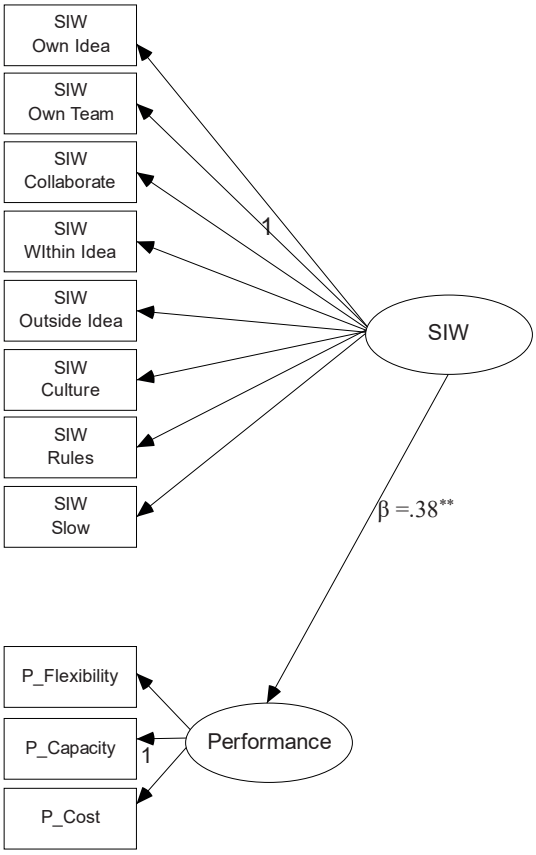

Figure 6-4 Direct Effect of SIW on Performance

***p < 0.001; **p <0.05; *p < 0.1; ns: not significant

The Model

In RQ2, we investigate the relationship between the social innovation at the workplace and the departmental *performance*. In order to investigate this relationship, we have designed a SEM model that includes those two constructs (SIW and *performance*). The two constructs are represented in the

form of two latent variables each composed of its observed variables (see Figure 6-4). The CFA in section 6.3 has confirmed six observed variables to load into the SIW latent variable and three observed variables to load into the *performance* latent variable. The arrow pointing from SIW to *performance* is proposing a test of directional effect from SIW to *performance*.

The Results

The model results have shown χ^2 value of 54.5 with 40 degrees of freedom (p 0.062). The χ^2/df ratio was 1.36 which is considered within the acceptable range and the p value exceeding .05 confirms an acceptable model. The CFI=0.97, RMSEA=0.06 (borderline), and the PCFI=0.71 were all also within acceptable ranges. Below, we consider and discuss the structural model having an acceptable fit.

The Discussion

The standardized coefficient of the SIW latent variable was β=.38 (p=.008). This loading indicates a positive and significant relationship between the SIW and departmental *performance*.

In literature, the effect of SIW on *performance* has been a controversial topic. This controversy was the main stimulant behind our investigation of this relationship. Our findings have shown a positive influence of SIW on departmental *performance*. These findings are in concordance with recent studies confirming the positive effect of SIW on a firm's *performance* (see, for example, Leal-Rodríguez, Eldridge, Roldán, Leal-Millán, & Ortega-Gutiérrez, 2015; Piening & Salge, 2015; Yamin & Mavondo, 2015; Sok & O'Cass, 2015). Those studies have supported a positive effect of SIW on *performance* on several dimensions including, organizational, learning, financial, and individual.

Furthermore, our level of investigation is on the departmental level and specifically focusing on the effect of collaboration on SIW. We show that on the departmental level, it is critical to collaborate among various functional departments to achieve the desired SIW-induced *performance*.

On this level of analysis our findings are in alignment with scholars such as Ganotakis et al. (2013) and Nichols et al. (2013) who have called for general collaboration needs for successful innovative efforts. Our results are also in alignment with researchers that have more specifically argued for an intra-departmental (cross functional) collaborative efforts towards innovation (see, for example, Pot et al., 2012; Ganotakis et al., 2013), and with scholars such as Naranjo-Valencia et al. (2016) who have stressed the importance of the creation of a collaborative culture at the people-level.

Our findings are not in agreement with the results by Mulgan et al. (2007) who have claimed that SIW is a distraction from efficiency. Moreover, our results show that the final impact on *performance* is positive despite claims by scholars such as Xue et al. (2012). They claim that SIW creates internal competition for resources (and hence is reducing *performance*). This disagreement between our findings and their conclusions might be due to the difference in the level of analysis. While their research was on the firms aggregate level, we have focused on the intra-departmental collaboration level, which might be the key success factor for an effective resource management and the eventual positive impact on *performance*.

6.4.3 The Mediating Effect of SIW Model

The findings of the last two subsections (6.4.1 and 6.4.2) have shown a positive and significant effect of both ITBSA on SIW, and SIW on *performance*. A quite frequently voiced and popular view in the literature claims that the effect from ITBSA to *performance* is mediated by other critical factors (see, for example, Masa'deh et al., 2008; Tallon & Pinsonneault, 2011; Luftman, 2015).

This trend has prompted our investigation into a possible mediating effect. Our literature review has revealed that SIW is (a) a critical factor for firm's *performance* (see, for example, Pot et al., 2012; Rüede & Lurtz, 2012; Nichols et al., 2013; Naranjo-Valencia et al, 2016), and (b) possibly positioned as a mediator on the path from IT investments to firm's *performance* (cf. Masa'deh et al., 2008; Cui, Ye, Teo, & Li, 2015; Arvanitis & Loukis, 2016).

The claims mentioned above have stimulated further inquiry into the actual role that SIW plays in the relationship between ITBSA and *performance* by others and by us (RQ3 in our research). This inquiry and the controversy in the literature about this issue were the continuous drivers behind our RQ3. We are now proposing a mediating role of SIW on this relationship. In this subsection, we design a SEM models and discuss their results that explore the role of SIW on the relationship between ITBSA and *performance*.

Two Models

To design the SEM model, we utilize the mediation methodology by Baron and Kenny (1986) (see Chapter 4 for details) and apply the conceptual model designed in subsection 4.1.1 in a SEM framework (see, for example, Hopwood , 2007; Leal-Rodríguez et al., 2015; Wu et al., 2015). By following this methodology to explore the proposed mediating role, we need to show that (a) ITBSA is initially related to *performance*, and (b) that this relationship is reduced or diminished by the introduction of SIW into the relationship. To achieve this goal we need to design two SEM models, Model 1 that explores the direct relationship between ITBSA and *peformance*, and Model 2 that will simultaneously examine the relationships among ITBSA, SIW, and *performance*.

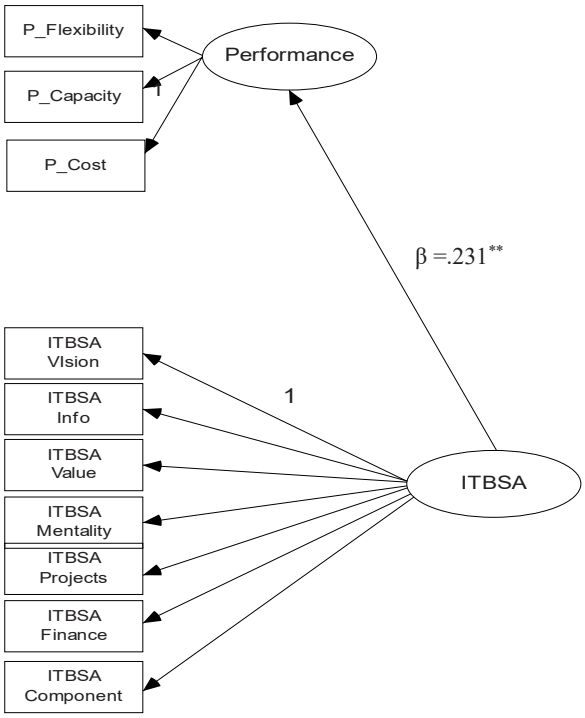

Figure 6-5 Model 1, direct effect of ITBSA on *Performance*
***p < 0.001; **p <0.05; *p < 0.1; ns: not significant

Model 1

First, we design Model 1 which investigates the relationship between ITBSA and *performance*. We do so by designing a model composed of the two constructs (ITBSA & *performance*) represented by two latent variables connected with a directional arrow from ITBSA to *performance* (cf. Hopwood, 2007; Wu et al., 2015). The directional arrow depicts our claim that ITBSA has a direct effect on departmental *performance*. The aim is to satisfy the first requirement by Baron and Kenny (1986) for a mediation relationship as proposed by our conceptual model in subsection 4.1.1. Figure 6-5 depicts the SEM model for this proposed relationship.

Discussion of Model 1 Validity Results

The results of the analysis were as follows. The χ^2= 45 (p=.5) with 31 degrees of freedom. The insignificant p-value (0.05) points to a valid model. The χ^2/df ratio was 1.45 which is also considered within the acceptable range (< 2).

The CFI=0.95, and the PCFI=0.65 were all within acceptable ranges. RMSEA=0.066 is slightly above the proposed value of .06. Given the good fit of the remaining indicators, the fact that fit indicator values are only an estimation, and that according to Hu & Bentler (1998 & 1999) values close to 0.06 are acceptable, we consider the structural model having an acceptable fit. We return to Model 1 when we discuss the results of the combined results of Model 1 and Model 2.

Model 2

For model 2, we implement the mediation conceptual model of subsection 4.1.1 in SEM methodology as depicted in Figure 6-6. The three constructs ITBSA, SIW and *performance* are connected via directional arrows to test for the significance of the paths (ITBSA->SIW) and (SIW->*performance*) to satisfy the second condition of mediation by Baron & Kenny (1986). The mediation will be considered a full mediation if the path (ITBSA->*performance*) becomes non-significant.

Discussion of Model2 Validity Results

The mediation model had a χ^2= 153 (p=.5), df=126. The χ^2/df ratio was 1.22 which is within the acceptable range. Hence, our model passed the inferential statistics test.
The values of CFI=0.97, RMSEA=0.046, and the PCFI=0.80 were all within acceptable ranges. Consequently, we consider the model in Figure 6-6 a valid model. We return to Model 2 when we discuss the combined results of Model 1 and Model 2.

The Combined Results of the Mediation test in Model 1 & Model 2

To assess whether SIW mediates the relationship between ITBSA and *performance*, we need to show (1) a direct relationship between ITBSA and *performance*, (2) a valid relationship from ITBSA to SIW, and (3) a valid relationship from SIW to *performance*.

First, in Model 1 (see Figure 6-5) the standardized loading of the ITBSA coefficient was significant with β=.231 and (p=.045). This finding shows a significant initial direct effect of ITBSA on *performance*, which satisfied the first condition above for a mediation test (cf. Baron and Kenny, 1986).

Second, in Model 2 (see Figure 6-6) (a) the ITBSA coefficient was β=0.731 (p<.001) satisfying the second condition above. And (b), the coefficient for SIW was β=.415 (p=0.48) which satisfies the third mediation condition above. Hence, all three required relationships for a mediation relationship are valid. By this results we confirm the mediating role of SIW on the path from ITBSA to *performance*.
Furthermore, the significant direct relationship from ITBSA to *performance* (in Model 1) has changed to insignificant in Model 2 (β =-.05, p=0.848) indicating a full mediation situation.

The Discussion of the Combined Results by Model 1 and Model 2

Our initial findings of this subsection have confirmed a relatively[37] positive effect of aligning the IT and business strategies on the departmental *performance*. These findings are in concordance with scholars that have established ITBSA as an enabler of organizational *performance* through improving several organizational success factors including efficiency and effectiveness (cf. Jorfi et al., 2011; Chang et al., 2011), cost effective operations (cf. Oh & Pinsonneault, 2007), and eventually improved financial *performance* (cf. Jorfi & Jorfi, 2011; Wu et al., 2015).

[37] We use the expression "relatively positive" to be on the conservative side due to the "borderline" indicators of the ITBSA->performance SEM model. In the following mediating model, we show that this relationship between ITBSA and performance is mediated by SIW at the departmental level.

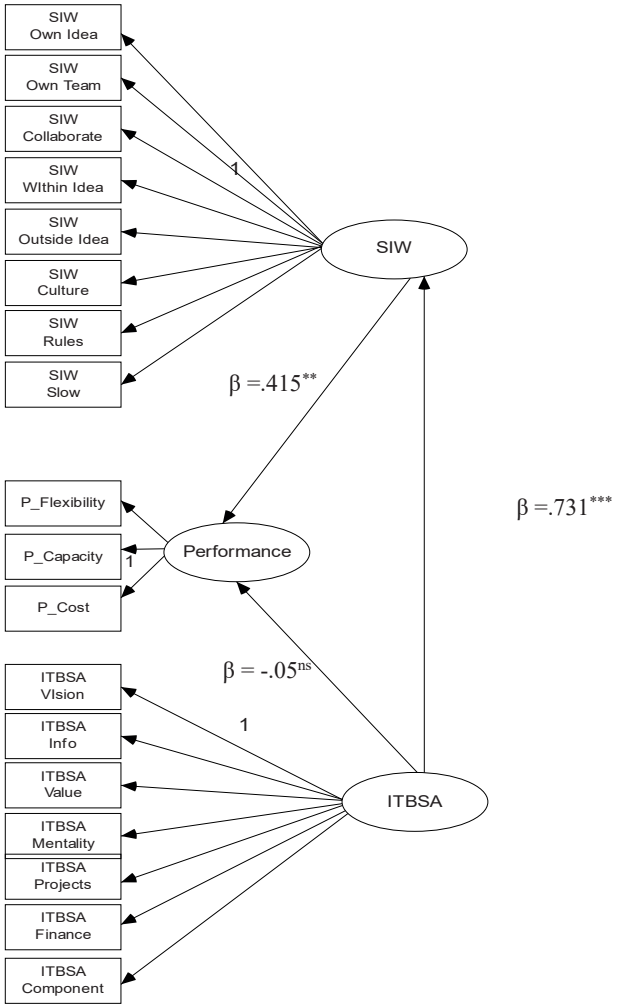

Figure 6-6 Model 2, the mediation model of SIW
***p < 0.001; **p <0.05; *p < 0.1; ns: not significant

Moreover, our findings of subsection 6.4.2 have confirmed the assertions in points (a) and (b) above, namely, that ITBSA has a positive influence on SIW, and that SIW (as claimed by many researchers) is a critical factor for achieving higher *performance* levels. In summary, we have shown that the relationship between the IT/business strategic alignment and the organizational *performance* at the

departmental level is mediated by other factors, and among them the social innovation at work (SIW) plays an important role. We are pleased to report this as a contribution to the ideas published so far.

6.4.4 The Moderated Mediation Model

There are a few views in the literature (including our own) that have claimed a mediating role of SIW on the relationship between ITBSA and *performance*. Nevertheless, this issue is still controversial. There have been strong calls to include the study of "other" variables in any linear relationships (cf. Chan & Reich, 2007). Some researchers have called specifically for the investigation of moderating effect on any mediating relationship with the hope to clarify the controversy (see, e.g., Kraemer et al., 2002). These calls inspired us to formulate RQ4. The aim is to explain the controversial results of the relationship between ITBSA, SIW, and departmental *performance* considering the EGIT involvement as a potential moderator. In this subsection, we design a moderated mediation model, test the model, present the results, and discuss their implications.

The Model

To investigate the effect of EGIT on the ITBSA-SIW-*performance* relationship, we follow the conceptual model designed in subsection 4.5.2 which positions EGIT as a proposed moderator to this relationship. The SEM model incorporates the four constructs (ITBSA, EGIT, SIW, and *performance*). The constructs are represented by four latent variables composed of their respective observed variables as per the CFA in section 6.3.

To test a moderation effect in a regression setting, an interaction term is used (see subsection 4.1.2 for details). The simplest form of an interaction term is the result of the multiplication of the independent and the moderator variables (cf. Baron & Kenny, 1986). The apparent problem with such interaction term is that it usually is highly correlated with its first order predictor variables from which it was calculated, causing a major fluctuation in the estimated regression weights by even a small fluctuation in the sample (cf. Little, Bovaird, & Widaman, 2006). As a solution to this collinearity problem, researchers have used the mean centering technique. Nevertheless, in certain instances of using this technique, some collinearity might remain. In those cases, a residual centering could be applied[38]. This technique involves a two-step regression procedure in order to orthogonalize

[38] For detailed description of those techniques and their advantages/disadvantages, please refer to Kenny & Judd (1984), Little et al., (2006), and Steinmetz, Davidov, & Schmidt, 2011).

(eliminates non-essential multi-collinearity) in regression analyses. This process ensures that the product term is independent from its first order components. In our case, SEM is used for the moderation analysis and the product term is composed of two latent variables (ITBSA and EGIT). We have followed the procedure described in Little et al. (2006) and Steinmetz et al. (2011) to create the (residual-centering-based) orthogonalized indicators for the interaction product term. The interaction term is named ITBSAxEGIT and consists of fourteen (2 EGIT x 7 ITBSA) residual terms as input variables (see Appendix C for details of the calculations).

The SEM model expressing the conceptual moderated mediation model of subsection 4.5.2 is based on the SEM model in Preacher et al. (2007) and Fairchild & MacKinnon (2009, model "b") (see Figure 6-7). To match the model of Figure 6-7 into our constructs, the letter "X" would represent ITBSA, "M" would correspond to SIW, and "W" would be the EGIT. The letter "Y" is the departmenal *performance*. Our moderated mediation model is depicted in Figure 6-8.

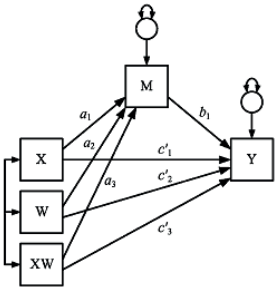

Figure 6-7 SEM model of moderated mediation

Adopted form Preacher et al. (2007), p194

The Results

The moderated mediation model in Figure 6-8 had χ^2= 472 (p=.399) and df=465. The χ^2/df ratio was 1.02 which is within the acceptable range. Hence, our model passed the inferential statistics test. The model had CFI=0.99, RMSEA=0.012, and PCFI=0.826. The CFI, RMSEA and PCFI were all within acceptable values (see Table 6-3). As a result, we consider the model valid and will continue the investigation. The coefficient of the product term (ITBSA x EGIT) was positive and significant, β =0.21 (p=.049). The coefficients of the ITBSA and SIW variables were all valid with values of β =0.59 (p<.001), and β =0.53 (p<.027) respectively.

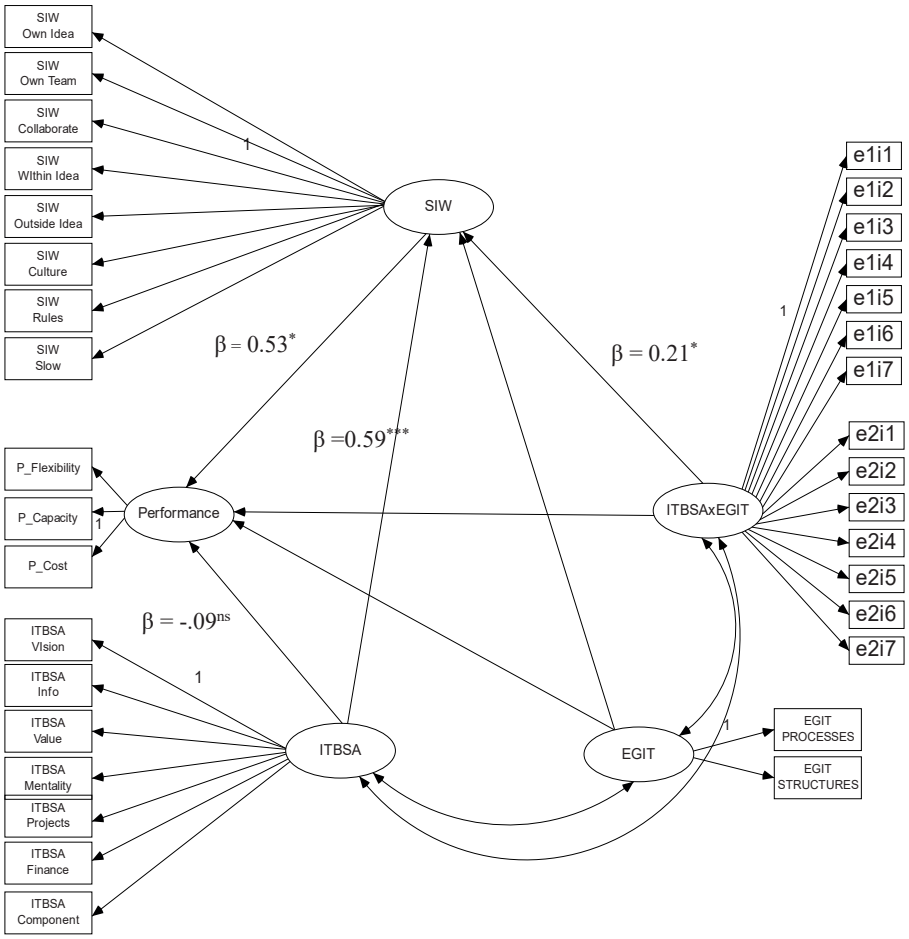

Figure 6-8 The complete moderated mediation SEM

***p < 0.001; **p <0.01; *p < 0.05; ns: not significant

The Discussion

A consensus on the relationship between ITBSA and EGIT has not been well established in the literature (see subsection 3.3.3). The literature agrees that both (ITBSA and EGIT) are closely related (cf. Tiwana & Konsysnski, 2010), and have an eventual positive effect on *performance* (see, e.g., Faryabi, Fazlzadeh, Zahedi, & Darabi, 2012; Tallon et al., 2013; Luftman, 2015; Héroux & Fortin, 2016). Nevertheless, some scholars have categorized EGIT as an antecedent of ITBSA as in the SAM model where EGIT is one of ITBSA's maturity factors (see, Sabegh & Motlagh, 2012; Luftman,

2015), while others have concluded that ITBSA is a predecessor of a successful IT governance (EGIT) (cf. Beimborn, Schlosser, & Weitzel, 2009; Chang et al., 2011; Tallon, Ramirez, & Short, 2013).

As a response to this controversy, we have decided to investigate EGIT as a moderator for the effect of ITBSA on *performance* (mediated by SIW). Initially, in subsection 6.4.3 we have constructed a mediation model of ITBSA, SIW, and *performance*. In the current subsection, we have built a complex model of moderated mediation that builds on the mediation model of subsection 6.4.3. This complex model investigates two critical concepts. First, it investigates a popular suggestion in the literature that mediating relationships need to be investigated for possible moderators. Second, it specifically investigates EGIT as being one of those possible moderators in the specific case of the mediating relationship among ITBSA, SIW, and *performance*. The positive and significant coefficient of the product term (ITBSAxEGIT) points to a significant *moderating* effect of EGIT on the relationship between ITBSA and SIW (cf. James & Brett, 1984; Wgener & Fabrigar, 2000). Moreover, the change in the coefficients of the ITBSA and SIW, as a result of the introduction of the EGIT into the mediating model of subsection 6.4.3, also confirm the moderating effect of EGIT (cf. Preacher, Rucker, & Hayes, 2007).

Consequently, our findings are in alignment with both main trends in the literature. First, we confirm the validity of the calls by scholars for testing moderating effects with mediating relationships (e.g., James & Brett, 1984; Kraemer et al., 2002). Second, by introducing EGIT as a moderator into the mediating relationship of SIW, and by confirming a significant moderating effect, we are confirming our choice of EGIT as a moderator to the effect of ITBSA on *performance* (through the mediation of SIW). This finding is in alignment with scholars such as Chang et al. (2011) who have modeled EGIT in a moderating position.

Our results also contribute to the SAM literature. The controversy, criticism, and researcher's classification in regard to the SAM model was explored in subsection 2.1.2. In spite of the fact that there are no rigid borderlines between some of the 7 groups of researchers as put forward by Renaud et al. (2016) (see subsection 2.1.2), we claim that our research could be classified within the two groups of (1) & (2). This is because we have both used statistical methods, and studied the effect of strategic alignment on *performance*.

Our contribution to the literature is in two unique directions. (1) We explored the internal structures of the SAM model. We have shown that the IT strategies and the business strategies (a) need to have a strategic alignment (rather than functional integration). And (b) in order for this alignment to have a positive effect on *performance*, it needs to have, first, a focus on innovation and second, there need to be effective IT processes and structures in place. These findings provide a distinct insight into the internal structure of the SAM model in terms of the relationships among three of its domains (IT strategy, business strategy, and IT structures). (2) We have performed the analysis at the departmental level. Hence, giving guidance to the middle-management of an organization. This fact aids with the criticism of the SAM model as being designed and analyzed for the top-management level of the organization. Finally, based on the results discussed above, we may conclude that EGIT improves the effectiveness of IT Luftman (2015), and Héroux & Fortin (2016)[39]. Table 6-5 summarizes the results and investments on *performance* as earlier proposed by Haghjoo (2012), Table 6-5 presentes conclusions of all the SEM models.

[39] Inspite of the fact that Héroux & Fortin (2016) have not modelled EGIT specifically in the moderating position, our results agrees with their research in the principle that EGIT enhances the effectiveness of IT investments on the innovation process.

The Model	χ^2	df	χ^2/df	p	CFI	RMSEA	PCFI	Standardized Coefficients	Conclusion
Direct Effect of ITBSA on SIW									
ITBSA -> SIW	97	84	1.16	.157	0.98	0.039	0.78	ITBSA=0.73***	Valid and positive effect of ITBSA on SIW
Direct Effect of SIW on Performance									
SIW -> Performance	54.5	40	1.36	.062	0.97	0.06	0.71	SIW=0.38**	Valid and positive effect of SIW on Performance
Mediating Effect of SIW									
Sub-Model 1 Direct Effect of ITBSA -> Performance	45	31	1.45	.5	0.95	0.066	0.65	ITBSA=0.231**	Marginally valid and positive effect of ITBSA on Performance
Sub-Model 2 The mediation of SIW ITBSA -> SIW -> Performance	153	126	1.22	.5	0.97	0.046	0.80	ITBSA->SIW = 0.731*** SIW->Perf. = 0.415** ITBSA->Perf. = -0.05^{ns}	SIW is a valid mediator between ITBSA and Performance
Moderating Effect of EGIT									
EGIT ↓ ITBSA -> SIW -> Performance	472	465	1.02	.34	0.99	0.012	0.83	(ITBSAxEGIT)=0.21** ITBSA->SIW=0.59** SIW->Perf. =0.53* ITBSA->Perf.= -0.09^{ns}	EGIT acts as a moderator on the mediating effect of SIW on the relationship between ITBSA and Performance

Table 6-5 Summary of the SEM models results

$^{***}p < 0.001$; $^{**}p < 0.01$; $^{*}p < 0.05$; ns: not significant

Chapter 6

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CHAPTER 7 CONCLUSION

In this chapter, we provide a conclusion to our research. We will do so by providing answers to the research questions in section 7.1 and the problem statement in section 7.2. We will provide observations and personal opinions in section 7.3. In section 7.4 we give four limitations of the study. Finally, in section 7.5 we give five suggestions for future research.

7.1 Answers to the Research Questions

In Chapter 1 we presented our problem statement. This problem statement was investigated by four research questions presented in section 1.5. The answers of those research questions will be summarized in subsections (7.1.1 - 7.1.4).

7.1.1 Answer to RQ1

The research question RQ1 reads as follows: "*What is the effect of IT Business Strategic Alignment on Social Innovation at Work (SIW) at the departmental level*?"

We have investigated this relationship by initially conducting an extensive literature review. Despite the controversies in the literature regarding the direct effect of the strategic alignment (ITBSA) on the organizational social innovation at work (SIW), we have claimed in this research that, at the departmental level, there exists a positive relationship between the ITBSA and the SIW.

Our empirical testing of this proposition included collecting data at the departmental level through a questionnaire on ITBSA and SIW. The survey has produced 103 valid data points. The data was analyzed using the SEM methodology. The analysis has led to a valid model showing a positive and significant effect of ITBSA on SIW (see subsection 6.4.1 for the analysis and the discussion of the results).

As a conclusion to our literature review and empirical data analysis, we provide an answer to RQ1 as follows.

"The empirical results support our claim that there is a positive impact of ITBSA on Social Innovation at Work SIW."

This result is in alignment with studies such as Silva et al. (2007), Neubert et al. (2011), Cui et al. (2015), and Ferreira et al. (2015)/ They also have concluded a positive impact of strategic alignment on promoting innovative activities and collaboration.

7.1.2 Answer to RQ2

Research question RQ2 is concerned with an important yet controversial topic. That is, the collaboration on social innovation at work (SIW) and its effect on *performance* at the departmental level.

The research question RQ2 reads as follows: *"What is the role of Social Innovation at Work (SIW) on the departmental performance?*

Our literature review in Chapter 3 has revealed that SIW, as a concept, is critical not only to the organizational success but also to the survival of an organization. However, we have pointed to the fact that scholars have different opinions on the issue of the effect of SIW on *performance*. SIW, while considered a vehicle for effective resource and knowledge sharing, was shown by some scholars to be a source of conflicts and unnecessary project delays causing significant cost overruns[40].

In order to investigate this controversial relationship, we have used a matched data collection instruments for SIW and departmental *performance* (see subsections 5.2.3 and 5.2.4, respectively). Overall 103 valid data points were collected. Our SEM model and the results of the empirical analysis in subsection 6.4.2 have established a positive and statistically significant effect of SIW on the departmental *performance*.

Therefore, we state our answer to the research question RQ2 as follows.
"*The departmental social innovation at work SIW has a positive effect on the departmental performance in terms of service flexibility, production capacity and cost reduction* ".

[40] See (section 4.1) for detailed discussion and references.

Despite some studies which have shed some doubt on the positive effect of SIW on *performance* (see, for example, Cuijpers et al., 2011; Bry et al., 2011), our answer to RQ2 concurs with studies such as Quintane, Casselman, Reiche, & Nylund (2011), Yamin & Mavondo (2015), and Piening & Salge (2015) in establishing a positive effect of SIW on *performance*. We believe that by this study we have contributed to the body of knowledge on this topic. Our re-focusing on this research topic has strengthened the confirmation to a departmental level of analysis.

7.1.3 Answer to RQ3

The research question RQ3 reads as follows: *"How does the Social Innovation at Work at the departmental level affect the relationship between the ITBSA and departmental performance?*

Our research has demonstrated empirically (by answering RQ1 & RQ2 above) that (a) ITBSA has a positive effect on SIW, and (b) SIW has a positive effect on the departmental *performance*. Furthermore, there were studies on the organizational level which argued in favor of a mediating role of SIW between organizational factors and *performance* (see, e.g., Han, Kim and Srivastava, 1998; Hurley and Hult, 1998; Kirca, Jayachandran and Bearden, 2005). To investigate our claim that at the departmental level, SIW acts as a mediator between ITBSA and *performance*, we have (a) performed an extensive literature review, and (b) collected data reflecting the three constructs of our proposed model, namely, ITBSA, SIW, and departmental *performance*. Our proposed model was analyzed using the SEM methodology. The examination of the model has shown that it is a valid structural model. Moreover, not only all conditions of a mediating model were satisfied (see subsection 6.4.3), but also, the direct path from ITBSA to *performance* has turned to be a non-significant (as a result of introducing the mediator). All in all, our research indicated a full mediation effect of SIW.

Based on those results, we provide the following answer to the RQ3.
"*SIW has a full mediating role between ITBSA and departmental performance* ".

Our answer to RQ3 contributes to the clarification of the ongoing controversy regarding the direct link of ITBSA to *performance* vs. an indirect link through mediating factors. Our results are in accordance with both (a) studies indicating the general presence of mediating factors between ITBSA and *performance* (cf. Hurley & Hult, 1998; Kirca et al., 2005; Schwarz et al., 2010; Maçada et al., 2012), and (b) a more specific studies pointing to SIW as a mediator along the path from IT

investments to *performance* (e.g., Hemmatfar et al., 2010; Coleman & Chatfield, 2011; Kleis et al., 2012).

In our answer to RQ3, we have stressed the critical role of the collaboration on SIW. Moreover, in subsection 5.4.3 we have shown that our respondents have ranked the two factors (1) lack of information, and (2) the difficulty of finding cooperation partners for innovation projects among the highest factors hampering innovation efforts. In spite of the fact that none of the studied organizations in this research was organized as a formal network structure, we fully recognize the importance of the concept of network society (please see subsection 3.2.2 for discussion of the concept) in supporting effective collaboration towards successful SIW. For example, social communications networks have led to an increased cross-department communications (both formal and informal mode of communications). Such communications may reduce the barriers to collaborative innovation efforts, such as, communications barriers, and cultural barriers (see subsection 3.2.2). Therefore, we believe that facilitating the creation of an effective (flexible and adaptable) *network society* within an organization is inevitable for improved performance.

7.1.4 Answer to RQ4

Research question RQ4 reads as follows: *"How does EGIT affect the relationship between ITBSA and performance at the departmental level?"*

The importance of moderating variables in research is large. Moreover, the suggestion in the literature is that moderating variables should be tested with mediating relationships. Thus, we have investigated in this research to what extent does the EGIT have a moderating effect on the relationship between the ITBSA and *performance* by acting on the path between ITBSA and SIW (subsection 4.4.3). To test our claim, we have performed an extensive literature review and designed a complex conceptual model incorporating both the mediating effect of SIW as shown in RQ3, and the proposed moderating effect of EGIT (see subsection 4.5.2). This conceptual model has utilized and combined the collected data on the following four constructs: ITBSA, SIW, EGIT, and *performance*. The model was designed and tested using SEM (see subsection 6.4.4). The analysis and discussion has revealed that the model is significant and indicated that EGIT has a moderating effect along the path from ITBSA to *performance*.

Consequently, our answer to the research question RQ4 is as follows.

"EGIT has a moderating effect along the path from ITBSA to performance at the departmental level."

These results are in agreement with researchers who have claimed that a relationship between ITBSA and *Performance* is moderated by other factors (cf. Lindman et al., 2001). Our results are also in concordance with more specific studies that point directly to IT governance as a factor along this path (see, e.g., De Haes & Van Grembergen, 2009; Haghjoo, 2012; De Haes & Van Grembergen, 2013).

7.2 Answer to the Problem Statement

The problem statement of this research thesis reads as follows:

"*To what extent can we make transparent the effects of SIW and Enterprise Governance of IT on the relationship between IT Business Strategic Alignment and the Organizational Performance at the departmental level?"*

The complex model that we have designed in subsection 4.5.2 and analyzed using the SEM methodology in subsection 6.4.4, has revealed a moderating effect of EGIT as resulted from RQ4. But, the complex nature of the model has also revealed that there is an interaction between the mediating effect of SIW (RQ3) and the moderating effect of EGIT (RQ4). The analysis and discussion in subsection 6.4.4 has shown that the nature of this interaction is "moderated mediation", i.e., the mediating effect of SIW (on the relationship between ITBSA and *performance*) is moderated by EGIT. Therefore, our formal answer to the main problem statement is as follows.

"EGIT and SIW both significantly act on the path from ITBSA to performance in the form that SIW mediates the relationship between ITBSA and performance, and this mediating relationship is moderated by EGIT."

Our answer to the problem statement emphasizes the that Social Innovation at the workplace (SIW) is a critical and inevitable factor in realizing value from IT investments. Yet, to achieve the best potential of those investments, an effective Enterprise Governance of IT processes and structures must be in place. These findings constitute our main contribution of this study.

7.3 Observations and Personal Opinions

Based on our models which were developed, validated and investigated in this study, and the statistically significant relationships among the studied factors, we formulate the following four observations and personal opinions.

(1) Literature has proposed that SIW has positive improvement effects on several levels (public, organizational, employee, and financial). Our answer to RQ1 states that ITBSA has a positive effect on SIW. This observation emphasizes that managers need to make this activity (strategic alignment) a survival duty as opposed to a luxury option. Moreover, we opine that for our departmental level of analysis it is important to practice strategic alignment at all organizational levels including the departmental level.

(2) Given the valid mediating effect of SIW on the relationship between ITBSA and *performance*, managers should refrain from the harmful competition on innovative resources. Rather, in our opinion, they should (a) establish an incentive program that ranks rewards of innovative activities on collective *performance* across departments, and (b) emphasize the importance of focusing on the organizational strategic alignment efforts to include (on the business side) strategic objectives *stimulating departmental collaborative actions* on social innovation at work (c) spend efforts to establish an effective and formal *network society* within the organization. Such organizational and social structures will enhance innovation-related collaborative activities across functional departments, leading to an enhanced and sustainable performance levels. On the IT side of the equation, those strategies may include, for example, an objective stating "enhancing interdepartmental innovation-related collaborative IT networks" (such as the establishment of innovative ideas-hunting portals and innovation collaboration platforms).

(3) The ability of this research to identify the EGIT as a moderator for the relationship between the ITBSA and the departmental innovation, allows IT managers and business managers to focus on efforts and activities which may lead to efficient use of IT resources. For example, up to now managers needed to monitor and benchmark the level of IT investment and become satisfied if a joint committee of a business unit and IT has formed a joint strategy for the next period. This research has shown that to capitalize on IT investments through effective interdepartmental collaboration on SIW, managers need to develop and establish effective IT governance structures and processes. From these observations, we see that the highly-recommended structures include the establishment of IT strategy committee at the level of Board of Directors, IT projects and governance function steering committees, and the integration of IT governance tasks into the

general roles and responsibilities. While an example of effective IT processes might include the establishment of a formal IT governance framework, a formal process to define and measure IT strategic plans, and
prioritizing IT investments in which both IT and business strategies are involved.

(4) Social performance and the consequent Corporate Sustainability performance is a vital factor for organizational survival. Our research has emphasized the importance of strategic alignment and the implementation of proper EGIT structures and process. A consequence of such implementation will implicitly support higher levels of corporate sustainability. For example, incorporating social responsibility measures (such as pollution monitoring and control) into the corporate business strategy, aligning the strategy with IT, and implementing an effective IT portfolio management process by which those pollution reduction projects get priority, will improve both social performance and sustainability.

7.4 Limitations of the Study

This study has four limitations that could be overcome in future research. Those limitations are summarized below: (1) restricted generalizability, (2) the assumptions of model modification, and (3) geographical limitations (4) employee layers limitations

(1) Restricted generalizability.
The current research has a prevailing exploratory/descriptive nature. The proposed causal relationships have not been "confirmed" through experimental theory methods. Therefore, the outputs of the model cannot formally be considered predictive. Moreover, this research has used one type of questionnaires and one method of data collection for ITBSA, SIW and *performance*. There are several other instruments for the identification of the ITBSA, SIW, and *performance* constructs. So, the limitation is in the restricted generalizability. For further research, we suggest confirming the relationships utilizing different data instruments to conclude more generalizable results.

(2) The assumptions of model modification
Our proposed models and the methodology used (cf. Baron & Kenny, 1986) to test the mediating and moderating relationships have shown a specific trend in the relations between ITBSA, EGIT, SIW, and *performance* that is valid under the assumptions described in subsection 6.3.2 (the model modification). This design has put a stamp on the analysis and the way to draw conclusions.

For further research, we propose a re-confirmation of the results by using alternative techniques to test the mediation and moderation relationships.

(3) Geographical limitations

Although our aim was to allow for the most generalizable results through (a) involving multinational organizations in the data collection process, and (b) designing the conceptual model from components well-grounded in previous theories in the literature, it is a reality that all the collected data was from Yemen branches of those multinationals. This might have imposed certain level of a culture and/or country bias in the responses.

(4) Employee-level limitations

The type of the requested information for this study requires respondents with a senior level management experience (at the minimum, on the level of heads of departments) from both IT and business sides. Therefore, we have only targeted high-level executives and their direct assistants. We did not involve ordinary or medium-level employees in the studied organizations. This fact might impose a restriction on our understanding of the, sometimes contradictory, views of different layers of employees on issues such as willingness of collaboration on innovation or effects of various factors (structures and processes) on production flexibility. Nevertheless, we feel this compromise was inevitable due to the nature of the required information.

7.5 Future Research

For future research, we suggest the following five lines of investigation: (l) larger variety of thematics, (2) deepen the study of the interaction level, (3) using different techniques, and (4) inclusion of more variables in the model, and (5) involve multiple layers of employees.

(1) Larger variety of thematics

Exploring different aspects (thematic) of *Social Innovation at work* such as, education, administrative capacity building, and social policies. Moreover, variety of thematics could be explored in combination with a specific EGIT component. For example, emphasizing capacity building by implementing EGIT processes. They should ensure and monitor objectives and results of the capacity building activities and projects.

(2) Deepen the study of the interaction level

A more in-depth study could be performed by studying the interaction of the components of the EGIT when acting as moderators.

(3) Using different techniques of analysis

As mentioned in the thesis, ITBSA is an ambiguous topic. Therefore, we suggest (a) to use a different variant of the data collection tool (for example, to explore a different variant of IT Business alignment such as the Social Alignment concept), and (b) to validate our results by examining different techniques of testing the moderator and mediator relationships. (c) Involve a causality "confirmation" technique which will allow the model to become more suitable for predictive and normative applications.

(4) Inclusion of more variables in the model

Some of our empirical results of the final *moderated mediation* model were at "borderline" values. This might suggest that including other variables (not in the model) as moderators and/or mediators along the path from IT investments to *performance* might improve the validity and predictability of the model. Such variables may include (a) the investigation of the recent and under-researched concept of digital business strategies (DBS) as proposed by Kahre et al. (2017). They propose going beyond "alignment" and considering the IT and business strategies as one entity. (b) Involving a factor of the "local culture"in the study might benefit the model fit, as well as, improving the explanatory power of the model. (c) Operationalization of the *performance* construct is a complicated issue. Inevitably, the model explanatory power will benefit from the inclusion of other factors of *performance* such as Corporate Sustainibility. Those factors will broaden the scope of *performance* from the cost/production aspects into the more sustainable form of *performance*.

(5) Involve multiple layers of employees

We have mentioned that one of the limitations of this study that it only involved senior level managers in the data collection process. We recommend to design future research in a form which invovles multiple layers of employees. The possible contradicting views of employees of various levels (mainly on the issue of collaboration on social innovation) might add to the explanatory power of the results.

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Web Sites:

Information Technology Alignment and Governance Research Institute: www.uams.be/ITAG

ISACA: www.isaca.org

ISO: www.iso.org

IT Governance Institute: www.itgi.org

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APPENDICES

The list of Appendices consists of the following seven appendices.

Appendix A: Data Validation Figures & Tables.

Appendix B: Bivariate Correlations Matrix.

Appendix C: Interaction Variable Calculation.

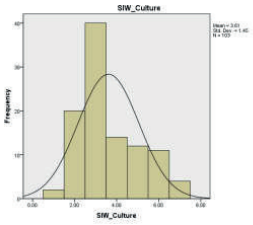
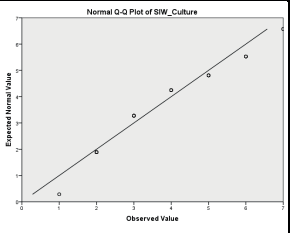
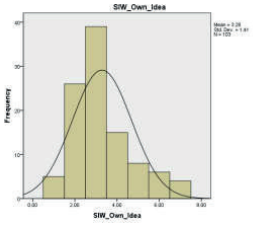
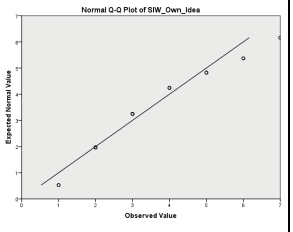
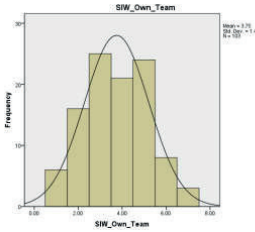
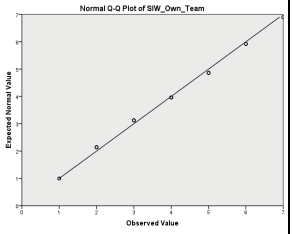
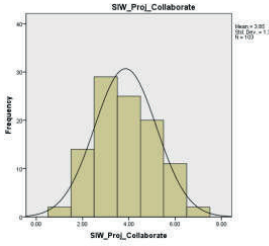
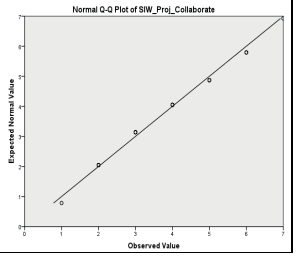
Appendix D: ITBSA Data Collection Instrument

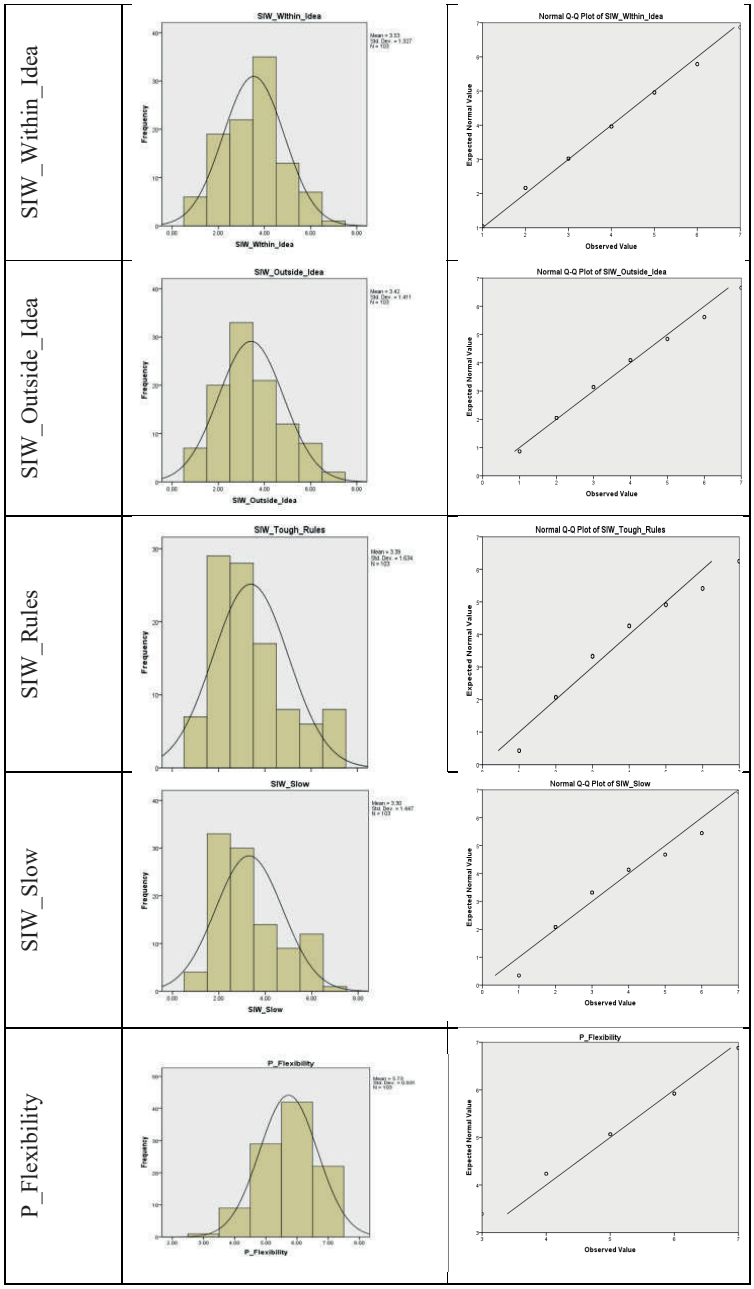
Appendix E: EGIT Data Collection Instrument

Appendix F: SIW Data Collection Instrument

Appendix G: *Performance* Data Collection Instrument

APPENDIX A: *Data Validation – Tables & Figures*

Variable	Histogram with normal curve	Q-Q plot
SIW_Culture		
Siw_Own_Ideas		
SIW_Own_Team		
Siw_Collaborate		


SIW_Within_Idea
SIW_Outside_Idea
SIW_Rules
SIW_Slow
P_Flexibility
SIW_Within_Idea
Normal Q-Q Plot of SIW_Within_Idea
SIW_Outside_Idea
Normal Q-Q Plot of SIW_Outside_Idea
SIW_Tough_Rules
Normal Q-Q Plot of SIW_Tough_Rules
SIW_Slow
Normal Q-Q Plot of SIW_Slow
P_Flexibility
Normal Q-Q Plot of P_Flexibility
Frequency
Expected Normal Value
Observed Value

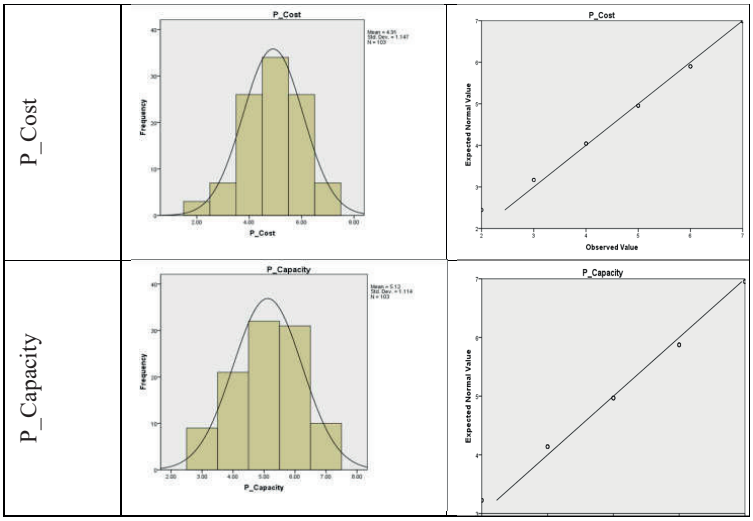


Figure A-1 Histograms and Q-Q plots of dependent constructs

SIW construct Variables	skew	kurtosis
SIW_Own_Idea	.904	.435
SIW_Own_Team	.068	-.648
SIW_Collaborate	.194	-.605
SIW_Within_Idea	.091	-.385
SIW_Outside_Idea	.432	-.292
SIW_Culture	.678	-.394
SIW_Rules	.782	-.180
SIW_Slow	.693	-.497

Table A-1 Skew & Kurtosis of SIW

Performance Variables	skew	kurtosis
P_Flexibility	-.389	-.342
P_Capacity	-.188	-.700
P_Cost	-.299	-.159

Table A-2 Skew and Kurtosis of *Performance*

APPENDIX B: *Bivariate Correlations Matrix*

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	ITBSA_Vision	1																			
2	ITBSA_Info	0.49***	1																		
3	ITBSA_Value	0.53***	0.21**	1																	
4	ITBSA_Mentality	0.52***	0.50***	0.46***	1																
5	ITBSA_Projects	0.29**	0.40***	0.29**	0.39***	1															
6	ITBSA_Finance	0.43***	0.32**	0.30**	0.51***	0.44***	1														
7	ITBSA_Component	0.24**	0.35***	0.19ns	0.42***	0.35***	0.33**	1													
8	EGIT_Processes	0.36***	0.23**	0.34***	0.62***	0.41***	0.35***	0.34***	1												
9	EGIT_Structures	0.33**	0.23**	0.34***	0.56***	0.41***	0.36***	0.39***	0.89***	1											
10	SIW_Own_Idea	0.20**	0.33ns	0.22**	0.48***	0.41***	0.30**	0.39***	0.41***	0.43***	1										
11	SIW_Own_Team	0.25**	0.34**	0.23**	0.39***	0.31**	0.18*	0.26**	0.41***	0.43***	.485	1									
12	SIW_Collaborate	0.10ns	0.27**	0.19ns	0.27**	0.37***	0.09ns	0.25**	0.37***	0.43***	.469	0.68***	1								
13	SIW_Within_Idea	0.12ns	0.31**	0.04ns	0.34***	0.37***	0.20**	0.37***	0.28**	0.35***	.490	0.42***	0.46***	1							
14	SIW_Outside_Idea	0.30**	0.38***	0.10ns	0.35***	0.28**	0.10ns	0.21**	0.29**	0.25**	.487	0.52***	0.50***	0.58***	1						
15	SIW_Culture	0.39***	0.39***	0.21**	0.58***	0.43***	0.29**	0.37***	0.47***	0.45***	.701	0.56***	0.61***	0.47***	0.56***	1					
16	SIW_Rules	0.23**	0.32**	0.21**	0.49***	0.52***	0.27**	0.38***	0.42***	0.47***	.603	0.41***	0.43***	0.41***	0.40***	0.62***	1				
17	SIW_Slow	0.41***	0.43***	0.24**	0.57***	0.51***	0.29**	0.38***	0.53***	0.52***	.635	0.49***	0.57***	0.44***	0.52***	0.80***	0.67***	1			
18	P_Flexibility	0.11ns	0.08ns	-0.02ns	0.05ns	0.10ns	0.01ns	0.15ns	-0.01ns	-0.06ns	.193	0.25**	0.25**	0.14ns	0.2**	0.24**	0.13ns	0.09ns	1		
19	Pe_Capacity	0.072ns	0.08ns	-0.03ns	0.09ns	0.13ns	0.04ns	0.06ns	0.03ns	-0.01ns	.222	0.3**	0.24**	0.25**	0.31**	0.15ns	0.19*	0.09ns	0.66***	1	
20	P_Cost	-0.01ns	0.22**	0.04ns	0.13ns	0.26**	0.13ns	0.24**	0.16*	0.11ns	.270	0.38***	0.31**	0.31**	0.31**	0.23**	0.18*	0.14ns	0.45***	0.41***	1

APPENDIX C: *Interaction Variable Calculations*

The interaction variable ITBSAxEGIT was calculated as follows.

1) Fourteen product variables were calculated as a result of multiplying the two variables of EGIT (EGIT_Processes and EGIT_Structures) by the seven variables of ITBSA (ITBSA_Vision, ITBSA_Info, ITBSA_Value, ITBSA_Mentality, ITBSA_Projects, ITBSA_Finance, ITBSA_Component). This multiplication formed the following 14 intermediate variables as follows.

   1)EGIT_Processes_x_ITBSA_Vision

   .

   7)EGIT_Processes_x_ITBSA_Component

   8)EGIT_Structures_x_ITBSA_Vision

   .

   14)EGIT_Structures_x_ITBSA_Component

2) Each of the above intermediary 14 variables was then regressed over all the first-order 9 variables (2 EGIT Variables and 7 ITBSA variables). The residuals of these regressions were saved as a new 14 variables. For example, the error residual of the first regression (resulting from regressing EGIT_Processes_x_ITBSA_Vision over the 9 first order variables of EGIT and ITBSA) we called "e1i1" ("e1" pointing to the first variable of EGIT, namely EGIT_Processes, and "i1" pointing to the first variable of ITBSA, Namely ITBSA_Vision). Finally, calculating all the 14 error residuals (e1i1, e1i2, ……e2i6, e2i7).

3) Those 14 error residuals were then used as the indicators of the interaction term used in the moderated mediation SEM model (see Figure 6-8).

APPENDIX D: *THE ITBSA Questionnaire*

Business / IT alignment Questionnaire

Organization: _____ **Matching Code:** _____

The purpose of this questionnaire is to assess the level of strategic alignment between your department and the IT department at your organization.

**** Please be kind to answer the questions as objectively as possible**
**** The anonimity of your evaluation will be preserved**

Please assess the following IT department alignment-related statements in relation to your department:	ALWAYS TRUE 1	2	3	4	NEVER TRUE 5
Senior management has no vision for the role of IT					
Vital information necessary to make decisions is often missing					
Management perceives little value from computing					
A "them and us" mentality prevails (with IT people)					
The IT group drives IT projects					
It is hard to get financial approval for IT projects					
There is no IT component in the division's strategy					
Islands of automation exist					
IT does not help for the hard tasks					
Senior management sees outsourcing as a way to control IT					

APPENDIX E: *The EGIT Questionnaire*

EGIT – Processes Questionnaire

Enterprise Governance of IT Maturity Level

Organization: _____ **Matching Code** _____

The purpose of this questionnaire is to assess the level of the Maturity Level of the "Enterprise Government of IT" at your organization.

Plese note the following:

- *** **The anonimity of your evaluation will be preserved**
- *** **Please use the description sheet to clarify the meaning of each item**
- *** **Please use the assessment sheet to assess the following statements to the best of your knowledge**

	STRUCTURES:	1	2	3	4	5
S1	IT strategy committee at level of board of directors					
S2	IT expertise at level of board of directors					
S3	(IT) audit committee at level of board of directors					
S4	CIO on executive committee					
S5	CIO (Chief Information Officer) reporting to CEO (Chief Executive) and/or COO (Chief Operational Officer)					
S6	IT steering committee (IT investment evaluation / prioritisation at executive / senior management level)					
S7	IT governance function / officer					
S8	Security / compliance / risk officer					
S9	IT project steering committee					
S10	IT security steering committee					
S11	Architecture steering committee					
S12	Integration of governance/alignment tasks in roles&responsibilities					

Appendix E: cont'd. EGIT-Structures Questionnaire

Enterprise Governance of IT Maturity Level

Organization: _____ **Matching Code** _____

The purpose of this questionnaire is to assess the level of the Maturity Level of the "Enterprise Government of IT" at your organization.

Plese note the following:

- *** **The anonimity of your evaluation will be preserved**
- *** **Please use the description sheet to clarify the meaning of each item**
- *** **Please use the assessment sheet to assess the following statements to the best of your knowledge**

	PROCESSES :	1	2	3	4	5
P1	Strategic information systems planning					
P2	IT performance measurement (e.g., IT balanced scorecard)					
P3	Portfolio management (incl. business cases, information economics, ROI, payback)					
P4	Charge back arrangements -total cost of ownership (e.g. activity based costing					
P5	Service level agreements					
P6	IT governance framework COBIT					
P7	IT governance assurance and self-assessment					
P8	Project governance / management methodologies					
P9	IT budget control and reporting					
P10	Benefits management and reporting					
P11	COSO / ERM					

Appendix E: Cont'd. EGIT-Relational Mechanisms Questionnaire

Enterprise Governance of IT Maturity Level

Organization: _____ **Matching Code** _____

The purpose of this questionnaire is to assess the level of the Maturity Level of the "Enterprise Government of IT" at your organization.

Plese note the following:

- *** **The anonimity of your evaluation will be preserved**
- *** **Please use the description sheet to clarify the meaning of each item**
- *** **Please use the assessment sheet to assess the following statements to the best of your knowledge**

		1	2	3	4	5
	Relational Mechanism					
R1	Job-rotation					
R2	Co-location					
R3	Cross-training					
R4	Knowledge management (on IT governance)					
R5	Business/IT account management					
R6	Executive / senior management giving the good example					
R7	Informal meetings between business and IT executive/senior Management					
R9	IT leadership					
R10	Corporate internal communication addressing IT on a regular basis					
R11	IT governance awareness campaigns					

APPENDIX F: *The SIW Questionnaire*

Departmental Innovation Questionnaire

Organization: _____ **Matching Code** _____

The purpose of this questionnaire is to assess the level of departmental innovation & the collaboration on innovation projects among the departments of your organization

*** **The anonimity of your evaluation will be preserved**
*** **Please be kind to answer the questions as objectivelly as possible**

Product/Service Innovation

During the past three years, did your Department/Business Unit introduce:

	No	Yes
New or significantly improved Services ?		

Process Innovation

During the past three years, did your Department/Business Unit introduce:

	Yes	No
New or significantly improved methods of manufacturing or producing goods or services		
New or significantly improved logistics, delivery or distribution methods for your inputs, goods or services		
New or significantly improved supporting activities for your processes, such as maintenance systems or		

For Each of the following statements , please state the extent to which you agree or disagree

	Strongly Agree 1	2	3	Neither Agree NOR Disagree 4	5	6	Strongly Disagree 7
Our departmental culture makes it hard for people to put forward novel ideas							
People in our department come up with few good ideas on their own							
Few of our projects involve team members from different departments/units							
Typically, our people DO NOT collaborate on projects internaly, cross departments and subsidiaries							
At our department, ideas from outside are not considered as valuable as those invented within							
Few good ideas for new processes/services actually come from outside the department							
We have tough rules for investment in new projects							
We are too slow in realizing new ideas							

Factors hampering Innovation at your department:

During the specified period, how important were the following factors for hampering your innovation activities or projects or influencing a decision NOT to innovate

	Very HIGH in Importance 1	2	3	4	5	6	Very LOW in Importance 7
Lack of qualified personnel							
Lack of information on technology							
Lack of information within company and markets							
Difficulty in finding cooperation partners/assistance for innovation							

APPENDIX G: *The Departmental Performance Questionnaire*

Departmental Performance Questionnaire

Organization: _____ **Matching Code** _____

The purpose of this questionnaire is to assess the effect of departmental innovation on the performance of your department

*** **The anonimity of your evaluation will be preserved**
*** **Please be kind to answer the questions as objectivelly as possible**

Performance Effect of Innovation:

How significant were each of the following effects on departmental performance, as a result of your departmental innovation introduced during the past three years

	Very HIGH Effect 1	2	3	4	5	6	Very LOW Effect 7
Improved flexibility of production/service provision							
Increased capacity of product/service provision							
Reduced labour costs per unit of output							

Summary

The relation between Information Technology (IT) investments and business *performance* is a challenging topic of research. Managers are more than ever pressed towards the realization of high returns on IT investments. Among the critical factors in the realization of such returns are IT Business Strategic Alignment (ITBSA), Enterprise Governance of IT (EGIT), and Social Innovation at Work (SIW). Several studies have explored the relations among those factors along the path towards organizational *performance*. Controversial results have prompted the need for further research into the nature of those relations.

In our research, we focus on the relationship between ITBSA and *performance*. Specifically, we investigate the effects of EGIT and SIW on this relationship.

In Chapter 1, we provide an overview and the background of the relationship between IT investments and the organizational *performance*. We also provide a brief background of the concepts of ITBSA, EGIT, and the social innovation.

Subsequently, the problem statement (PS) reads as follows.

PS: To what extent can we make transparent the effects of EGIT and SIW on the relationship between ITBSA and the Organizational Performance at the departmental level?

In order to answer the PS, we have formulated the following four research questions (RQs).

RQ1: What is the effect of IT Business Strategic Alignment on Social Innovation at Work at the departmental level?
RQ2: What is the role of Social Innovation at Work on the departmental performance?

RQ3: How does the Social Innovation at Work (SIW) at the departmental level affect the relationship between the ITBSA and departmental performance?

RQ4: How does EGIT affect the relationship between ITBSA, SIW and performance at the departmental level?

Chapter 2 provides the background and definitions for the main concepts of this study. It presents the history of the evolution of IT strategy and its integration into the business strategy. We relate EGIT to both the corporate governance and the IT governance. Finally, we link the innovation as a general concept to the more specific concept of social innovation.

In Chapter 3, we perform an extensive literature review. Literature is examined on the relationship between ITBSA and the firms' *performance*. We show that the relationship is controversial and needs further investigation. We also explore the positioning of SIW as a facilitator between ITBSA and *performance*. Finally, EGIT is investigated in terms of its relationship with both ITBSA and SIW. The literature review has revealed contradicting views on those relationships. Hence, the stage is set for the construction of our conceptual model in the next Chapter.

Chapter 4 presents the conceptual model. We do so by first providing a theoretical background on the mediation and moderation models. We then stress the importance of the departmental-level analysis by showing that successful innovation and *performance* originate at the departmental level. Consequently, we may conclude that our analysis will be at the departmental level of the organization. Next, in order to formulate our conceptual model, we present the model selection criteria and justify our preference for the moderation model for EGIT. Finally, we present our combined conceptual model which includes the ITBSA, EGIT, SIW, and *performance* constructs.

Chapter 5 presents the details of the data collection process. We first present and justify the operationalization of the main constructs (ITBSA, EGIT, SIW, and *performance*). We then choose and justify the data collection instruments that are used to collect the field data. Next, the process of the data collection is explained in details. The data collection was performed in eight multinational organizations operating in the country of Yemen. Those eight organizations represent four main business sectors (banking, communication, oil & gas, and higher education). Finally, the trends in the collected data are compared with similar data in the literature. The observation is that they are in alignment.

In Chapter 6, we perform an extensive statistical data analysis using the Structural Equation Modeling (SEM) technique. First, we justify the use of SEM as an appropriate technique to start exploring mediation and moderation relationships. We then choose and justify our choice of the indices, namely Chi Square, RMSEA, CFI, and the PCFI indices. A confirmatory factor analysis (CFA) on the model reliability is then performed. In order to reach a valid model for SEM analysis, there was a need for

slight modifications to the model. The modified model was then analyzed in the form of four sub-models. Each of those sub-models is related to one of the four research questions. The results have shown that (a) the four models are valid, and (b) each model points to one of the following four positive relationships: (1) ITBSA has a positive effect on SIW, (2) SIW has a positive effect on the departmental *performance*, (3) SIW mediates the relationship between ITBSA and departmental *performance*, and (4) EGIT moderates the mediating effect of SIW.

Chapter 7 summarizes the answers to the four research questions and the problem statement. We then provide three observations on how to realize *performance* enhancement from IT investments. We may state that (1) managers need to align their departmental strategies with the IT strategies, (2) managers need to direct the focus of this alignment on the collaborative effort to achieve organizational innovation, and (3) to maximize the effect of the strategic alignment of point 1, managers should direct their efforts to the development of the EGIT. The main focus should be on (a) IT processes and (b) IT structures. The chapter also discusses the limitations of the study and offers the following areas for further research: (1) exploring different aspects (thematic) of SIW, (2) a more in-depth study of the interaction among the components of EGIT when acting as moderators, (3) test the results with a different variant of the data collection tools (specific for ITBSA and SIW), and (4) test the models by including other variables that are not yet in the current model) as (a) mediators and/or (b) moderators along the path from ITBSA to *performance*.

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Samenvatting

De relatie tussen investeringen in informatie technologie (IT) en prestaties van bedrijven (*organizational performance*) is een uitdagend onderzoeksonderwerp. Managers staan meer dan ooit onder druk om maximaal rendement te realiseren op investeringen in IT. Enkele van de essentiële factoren in de realisatie van dit rendement zijn *IT Business Alignment* (ITBSA), *Enterprise Governance of IT* (EGIT) en *Social Innovation at Work* (SIW). Diverse studies hebben zich gericht op het onderzoeken van de relaties tussen deze factoren met het oog op organizational performance. Controversiële resultaten hebben verder onderzoek van deze relaties noodzakelijk gemaakt.

Om deze reden richten wij onze aandacht op de relatie tussen ITBSA en *performance.* Hierin onderzoeken wij de effecten van EGIT en SIW op deze relatie.

In hoofdstuk 1 geven we een overzicht van de achtergrond van de relatie tussen investeringen in IT en organizational performance. Tevens geven we een beknopt overzicht van de achtergrond van de concepten ITBSA, EGIT en SIW.

Vervolgens worden de probleemstelling (PS) en de vier onderzoeksvragen (OVs) geformuleerd. De probleemstelling luidt als volgt.

PS: In hoeverre kunnen we de effecten van EGIT en SIW op de relatie tussen ITBSA en de Organizational Performance op afdelingsniveau transparant maken?

Om deze PS te beantwoorden zijn vier onderzoeksvragen geformuleerd.

OV 1: Wat is het effect van ITBSA op SIW op afdelingsniveau?

OV 2: Welke rol speelt SIW op afdelingsniveau in de prestaties?

OV 3: Wat is het effect van SIW op afdelingsniveau op de relatie tussen ITBSA en prestaties van afdelingen?

OV 4: Wat voor effect heeft SIW op afdelingsniveau op de relatie tussen ITSBA en prestaties van afdelingen?

Hoofdstuk 2 beschrijft de achtergronden en definities van de belangrijkste concepten in deze thesis. Het geeft daarmee tevens een historisch overzicht van de ontwikkeling van de IT strategie en de integratie ervan in de bedrijfsstrategie. We relateren EGIT aan zowel bedrijfsbeheer als IT beheer. Tot slot linken we innovatie als breed concept aan het meer specifieke concept van sociale innovatie.

Hoofdstuk 3 geeft een uitvoerige literatuurstudie. De onderzochte literatuur bestaat uit onderzoek naar de relatie tussen ITSBA en de prestaties van bedrijven. Hier zullen we laten zien dat deze relatie controversieel is en beter onderzocht dient te worden. Tevens onderzoeken we de positionering van SIW als facilitator tussen ITBSA en de prestaties. Tenslotte wordt onderzocht hoe EGIT zich verhoudt in relatie tot ITSBA en SIW. De literatuurstudie toont aan dat er conflicterende meningen zijn over deze relaties. Hiermee zal de basis worden gelegd voor de constructie van ons conceptuele model in het volgende hoofdstuk.

In hoofdstuk 4 presenteren wij bovengenoemd conceptuele model. Dit doen wij door eerst een theoretische achtergrond te geven van de *mediation* en *moderation* modellen. Vervolgens benadrukken we het belang van analyse op afdelingsniveau door aan te tonen dat succesvolle innovatie en *performance* hun oorsprong vinden op afdelingsniveau. Vanuit deze resultaten mogen we concluderen dat onze analyse ook op afdelingsniveau geldig is.

Om ons conceptuele model te kunnen formuleren, presenteren we de selectie-criteria voor het model en verantwoorden we onze voorkeur voor een *mediation* model voor EGIT. Tenslotte presenteren wij ons gecombineerde conceptuele model bestaande uit de constructen van ITBSA, EGIT, SIW en *performance*.

Hoofdstuk 5 behelst een uiteenzetting van de details van het data-collectie proces. Eerst presenteren we de uitvoering van de belangrijkste constructen (ITBSA, EGIT, SIW en *performance*) en verantwoorden deze daarna. Vervolgens kiezen we de instrumenten die gebruikt worden in het proces van de data-collectie. Natuurlijk verantwoorden we wat we gekozen hebben. Daaropvolgend wordt het proces van data-collectie uitvoerig beschreven. De data is verzameld in acht internationale bedrijven gevestigd in Yemen. Deze acht bedrijven representeren vier voorname bedrijfssectoren (financieel/bankensector, communicatie, olie en

gas, en hoger onderwijs). Tenslotte wordt de verzamelde data beschreven door te laten zien dat de trends in onze data in overeenstemming zijn met gelijksoortige data uit de literatuur.

In hoofdstuk 6 voeren we een uitgebreide statistische data-analyse uit waarbij we gebruik maken van de *Structural Equation Modeling* (SEM) techniek. Eerst beargumenteren we de geschiktheid van SEM als techniek om de relaties tussen *mediation* en *moderation* te analyseren. Dan verantwoorden we onze keuze van de indices, zijnde Chi Square, RMSEA, CFI en PCFI, die gebruikt zullen worden voor de validatie van het model. Een bevestigende factor analyse (*confirmatory factor analysis (CFA)*) en een model betrouwbaarheidstest worden uitgevoerd. Om tot een valide model voor de SEM analyse te komen, was het nodig het bestaande model iets aan te passen. Het aangepaste model is vervolgens geanalyseerd door vier sub-modellen te bestuderen. Elk van deze modellen is gerelateerd aan een van de vier onderzoeksvragen.

Uit de resultaten bleek dat (a) de vier modellen valide zijn (b) ieder sub-model wijst op een van de volgende vier relaties:

(1) ITSBA heeft een positief effect op SIW. (2) SIW heeft een positief effect op het functioneren van afdelingen. (3) SIW werkt bemiddelend op de relatie tussen ITBSA en het functioneren van afdelingen. (4) EGIT modereert het bemiddelende effect van SIW.

Hoofdstuk 7 recapituleert de antwoorden op de vier onderzoeksvragen en de probleemstelling. Op basis van deze uitkomsten worden er drie mogelijkheden voorgesteld waarmee een positief effect op functioneren bereikt kan worden middels investeringen in IT. We stellen dat (1) managers hun bedrijfsvoering strategie op afdelingsniveau af moeten stemmen met de IT strategie, (2) managers zich moeten richten om punt 1 te implementeren op de collectieve inspanning om bedrijfsinnovatie te realiseren en (3) om het effect van de strategische afstemming genoemd bij 1 te maximaliseren, zouden managers zich moeten richten op het ontwikkelen van (EGIT). De focus zou moeten liggen op IT processen en IT structuren.

Vervolgens worden er vier mogelijkheden voor verder onderzoek uitgelicht: (1) het verkennen van thematische aspecten van SIW, (2) een uitgebreidere analyse van de interactie tussen de componenten van EGIT wanneer deze als moderators functioneren, (3) het testen van de resultaten uit deze thesis met andere data collectie instrumenten (met name voor ITBSA en

SIW) en (4) het testen van modellen door andere variabelen toe te voegen (niet in huidige model zijn toegepast) als middelaars of moderators in het traject van ITBSA naar *performance*.

Curriculum Vitae

Adel Alhuraibi was born in Nitra, Slovakia on January 30, 1967. He received his high school education partly in Prague (the Czech Republic) and Sana'a (Yemen). Thereafter, he graduated with a double major in business and computer science from Colorado State University in 1990. Moreover, he obtained his MSc. in financial management from the University of London in 1998. Subsequently, he joined Maastricht School of Management in 2006 and defended his M. Phil degree in 2008. With these credentials Adel joined the Tilburg University in 2012 for a PhD degree which he obtained in 2017.

Adel's working activities are as follows. He joined Sana'a University as an assistant instructor in the College of Business in 1997. Since then, he has been instructing a number of undergraduate courses at both Sana'a University and the College of Business at the Lebanese International University (since January 2010). The courses included Entrepreneurship, International Business, International Finance, Financial Modeling and Strategic Management. Moreover, Adel has been delivering an MBA course (*Performance* Management and Information Technology) for MsM (Maastricht School of Management) MBA program in Yemen since 2007.

Finally, Adel Alhuraibi has acted as a consultant and a trainer in the field of strategic *performance* management systems. He has executed several projects for both private enterprises (Banks, oil & gas, and commercial Trade Organizations in Europe & Yemen) and public/developmental agencies (including several Ministries and governmental agencies in Yemen). Some of the delivered public consultancy projects and training were funded by international agencies, such as the World Bank, UNDP, KfW, USAID and GOPA.

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Writing a Ph.D. thesis is a very challenging process. First of all, I faced the academic challenges as all normal Ph.D. students do. Then I experienced difficult logistic obstacles related to the political and military unrest that happened in Yemen (the country of my research) during the course of this long journey. It made the research an expedition with many adventures. Surely, reaching the completion would not have been possible on my own. Therefore, I am very grateful to many people who supported me in this endeavor.

I would like to start by expressing a great deal of appreciation to my supervising team headed by Professor Jaap van den Herik. Professor van den Herik has put his trust in me and continued to do so in a very rough period of my life. This included two civil unrests in Yemen, as well as a complete family relocation during the course of this research. His trust, valuable time dedication, and very detailed remarks were all main factors of inspiration which kept me on track towards the completion of this educational project. Professor van den Herik believed in my abilities and provided dedicated and professional support with remarkable patience. I will never forget his dedication, and honestly, I wish to adopt his level of personal commitment and attention to details for the future students in my own academic life (it will be tough, but at least I promise to try).

In other words with the same intentions, I would like to convey my appreciation and great respect to the efforts of Professor Suresh Ankolekar from the Maastricht School of Management. His technical guidance and constructive remarks throughout the journey were invaluable. Initially, he has assisted me at the very beginning with the formulation of my research idea. During the course of my research, he did not withhold any effort in providing critical suggestions and pointing to valuable literature that helped in overcoming pivotal hurdles in my research. Moreover, due to logistical and travel difficulties during the grim phases of this research, the skype sessions with Professor Ankolekar helped me to keep the research project on track. Similarly, I owe thanks and appreciation to Professor Bartel A. Van de Walle who has supported me during this project. His contribution were critical in establishing the foundation and the structure of my thesis. I appreciate the fact that in spite of his very busy (international) schedule, he has managed to dedicate a portion of his precious time to my support. Of course, my sincere thanks and gratitude are directed to Joke Hellemons for her continuous support, advise on logistical issues, and her nurturing of my communications with the supervising professors. Without her, it would have been a much more difficult journey.

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Special thanks are dedicated to the five members of the assessment committee, namely the Professors W.J.A.M. van den Heuvel, E. O. Postma, M. E. M. van Reisen, and J. N. Kok, as well as Dr. V. Feltkamp who spent a considerable amount of their time and effort in reading my draft version of the thesis. I am sure that their constructive comments are a valuable contribution to my learning experience and will assist me in attaining the ability to write and defend the research idea in a more multi-view and holistic manner.

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Last but not least, I am greatly thankful to all members of my family. Without their love, encouragement, and above all patience, the completion of this thesis would not have been possible. This includes my father who has never stopped inspiring me to continue my study towards completion. He was always the provider of my peace of mind, and the sense of tranquility about my immediate family during my frequent absence. His encouraging words will always remain with me. I am also confident that my mother would have been proud of my achievement if she was given the opportunity to stay among us. However, she passed away too early and had only my promise that I would do my utmost to reach this goal. I also thank my immediate family, my beloved wife, and my four children for putting up with my mental absence during my physical presence, and my physical absence during hard and unsecure times. You all were a great source of inspiration.

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