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The Influence of Software-as-a-Service on IT Decision Authority

Understanding the Transformation of IT Governance

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ABSTRACT:

The emergence of Software-as-a-Service (SaaS) simplifies the implementation of powerful business IT solutions. The notably lower technical knowledge required and the minimum capital investment needed enable non-IT professionals to adapt, develop and operate IT solutions independently. Therefore, research on shadow IT and IT consumerization notes the transformative impact of SaaS on organizational structures and challenges the assumption that the IT function controls the entire IT contribution of the organization. As a result, SaaS directly influences the allocation of IT decision authority by shifting responsibility away from the traditional IT function towards business units. Due to the identified crucial need of folding IT decision authority successfully into the new IT governance model the factors that led to this change of the historical role of the IT functions under SaaS is sought to be identified. This thesis proposes a research model which includes various factors and applies data of 82 distinct organizations to test the hypothesized associations. The dissatisfaction of the business units with the provided IT solutions, the business knowledge of IT professionals and IT governance mechanisms are identified as factors which influence the allocation of IT decision authority the most.

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Abbreviations

AT	Agency theory
AVE	Average variance extracted
CA	Cronbach's Alpha
CR	Composite Reliability
ECT	Expectation confirmation theory
EDM	Expectation disconfirmation model
EDT	Expectation disconfirmation theory
IaaS	Infrastructure-as-a-Service
IS	Information systems
IT	Information technology
KBV	Knowledge-based view of the firm
NIST	National Institute of Standards and Technologies
PaaS	Platform-as-a-Service
PLS	Partial-Least-Squares
PLS-SEM	Partial-Least-Squares Structural-Equation-Modelling
P^2	P-squared
SaaS	Software-as-a-Service
SIM	Society for Information Management
STS	Socio-technical system
TAM	Technology-acceptance model
TOE	Technology-Organization-Environment
UTAUT	Unified theory of acceptance and use of technology
VIF	Variance inflation fact

1 Introduction

Since being named the second most important key technology by the SIM IT trends survey[1] in 2011 (Luftman & Derksen, 2012), cloud computing was said to profoundly change how information technology (IT) services are paid, maintained, updated, scaled, developed, deployed and invented (Marston et al., 2011). In the two latest editions of the SIM IT trends survey, cloud computing was found to be the third largest IT investment area for organizations, and Software-as-a-Service (SaaS) is named the most dominant externally sourced cloud service (Kappelman et al., 2018, 2019). Besides its advantages, cloud computing also introduced additional challenges, especially for the IT function. During the same time, other innovations such as web 2.0, mobile devices and no-code programming further introduced powerful IT solutions to the broad public (Baskerville, 2011; Gregory et al., 2018; György et al., 2012). All these technological innovations led to the phenomenon of IT consumerization which is described as an increased technical awareness of the public (Gregory et al., 2018) or a greater exposure of employees to IT in their private life (Yoo, 2010).

Cloud-computing-based offerings, such as SaaS, challenge the prevalent assumption that the IT function possesses the authority to manage and control all activities in regard to IT contribution in the organization (Baskerville, 2011; Gregory et al., 2018; Peppard, 2018). The lowered requirements in IT knowledge and capital (Baskerville, 2011; György et al., 2012; Jarrahi et al., 2017) enables business units to introduce IT solutions without the IT function, and thus, business units can take over more and more traditional IT activities (Winkler et al., 2011). If business units introduce IT solutions without incorporating the IT function, researchers consider it shadow IT. While some consider shadow IT to be a driver of innovation (Behrens, 2009; György et al., 2012; Silic, Silic & Oblakovic, 2016) and creativity (Magunduni & Chigona, 2018), others suggest that it proposes a threat to security (Rentrop & Zimmermann, 2012) and undermines existing IT governance (Khalil, Fernandez & Fautrero, 2016).

Other IS researchers suggest that the IT function will have to specifically adapt to the cloud era by undergoing a transformation (Vithayathil, 2018) so that it could act as an integrator and mediator of SaaS services (Winkler et al., 2011). This shift of IT decision authority from the IT function towards business units (Kopper et al., 2018; Winkler & Brown, 2013) has been coined terms such as *business-managed-IT* (Kopper et al., 2018), *user-driven IT* (Fürstenau & Rothe, 2014) and *bring-your-own-device* (Leclercq-Vandelannoitte, 2015). This development is greatly influenced by the presence and enforcement of IT governance mechanisms (Gregory et al., 2018; Tiwana, Konsynski & Venkatraman, 2013; Weill & Ross, 2004a). Since, the accountability for IT decision-making in the organisation is claimed to be crucial for the successful management of IT (Agarwal & Sambamurthy, 2002; Sambamurthy & Zmud, 1999; Weill &

[1] The yearly study of the Society for Information Management (SIM) on IT trends surveys IT executives about key concerns, IT budgets and technology use (Society for Information Management, 2019). The results are published in the *SIM Trends Study Comprehensive Report* as well as in *MIS Quarterly Executive.*

Ross, 2004a) the objective of this thesis is to examine the factors of SaaS, that influence the allocation of IT decision authority between the business units and the IT function.

1.1 Problem Area

The allocation of IT decision authority within an organization is a critical issue due to its importance for the successful management of the organization's IT contribution (Agarwal & Sambamurthy, 2002; Sambamurthy & Zmud, 1999; Weill & Ross, 2004a) and the achievement of the desired state of business-IT alignment (Henderson & Venkatraman, 1993). This makes the allocation of IT decision authority an essential cornerstone of IT governance research. Correspondingly, academic contributions during the emerging phase of research on IT governance investigated the allocation of IT decision authority within the organization's IT function to address the question whether a central or decentral organisational structure is more suitable for the IT function (Brown, 1997; King & Leslie, 1983; Olson & Chervany, 1980).

With the further introduction of IT into the business domain, the allocation of IT decision authority between business units and the IT function became a major concern in IT governance research (Agarwal & Sambamurthy, 2002; Dawson et al., 2016; Gregory et al., 2018; Kopper et al., 2018; Sambamurthy & Zmud, 1999; Tiwana, 2009; Tiwana & Kim, 2015; Weill & Ross, 2004a; Winkler & Brown, 2013). More recently, the investigation of decision authority allocation between business units and the IT function under the influence of IT consumerization (Gregory et al., 2018; György et al., 2012) as well as under the influence of cloud computing (Khalil, Fernandez & Fautrero, 2016; Vithayathil, 2018; Winkler et al., 2011; Winkler & Brown, 2013) emerged as research streams.

The predominant concept of the IT function views this organizational sub-unit as the main actor of the IT contributor to the organization who delivers IT solutions and manages external IT vendors (Agarwal & Sambamurthy, 2002; Guillemette & Paré, 2012; Weill & Ross, 2004a). However, the technological progress in IT drastically reduced the knowledge and capital requirements for the implementation of IT solutions (Gregory et al., 2018; Harris, Ives & Junglas, 2012) and enabled non-IT employees to implement powerful IT solutions for business problems without support of IT professionals (Baskerville, 2011; György et al., 2012; Jarrahi et al., 2017). This particular development challenges the assumption that the IT function governs the entire IT contribution within organizations (Gregory et al., 2018; Peppard, 2018).

The scalable nature, high cost-efficiency and subscription-based payment model of SaaS solutions (Armbrust et al., 2010; Benlian & Hess, 2011; Bibi, Katsaros & Bozanis, 2012; Jede & Teuteberg, 2016; Vithayathil, 2018) support the redundancy of the IT function (Vithayathil, 2018) for the introduction, customization and operation of IT solutions that are delivered by SaaS (Benlian, Koufaris & Hess, 2011; Winkler & Brown, 2013). However, the need for research to provide empirically grounded support for the factors which explain the influence of SaaS on the overall IT decision authority allocation in organizations is overlooked in these studies.

1.2 Research Question

As highlighted above, the allocation of IT decision rights is an important issue within IT governance research which scholars addressed within different contexts (Agarwal & Sambamurthy, 2002; Tiwana, 2009; Weill & Ross, 2004a; Winkler et al., 2011; Winkler & Brown, 2013). Scholars claim that the emergence of cloud computing, and SaaS, in particular, change the role of the IT function as the IT decision authority within organizations shifts towards the business units (Choudhary & Vithayathil, 2013; Gregory et al., 2018; McAfee, 2011; Vithayathil, 2018). The objective of this thesis is to examine the factors that influence this phenomenon. Hence, we pose the following research question:

What factors of Software-as-a-Service influence the allocation of IT decision authority between the IT function and business units?

1.3 Purpose

The purpose of this thesis is twofold. First, from a theoretical point of view, the thesis identifies factors which have the potential to explain the influence of SaaS on IT decision authority. Furthermore, from a practical point of view, the thesis examines in what way organizations and their IT functions are affected by the influence of SaaS on the allocation of IT decision authority. Research has been conducted to analyse application-specific IT governance in a SaaS context (Winkler & Brown, 2013), the transformation of IT governance due to IT consumerization (Gregory et al., 2018) and the shadow IT driven circumvention of IT governance mechanisms (Fürstenau, Rothe & Sandner, 2017). This thesis addresses the influence of SaaS on overall IT decision authority allocation, which is a crucial component of a successful IT governance practise in organizations (Agarwal & Sambamurthy, 2002; Sambamurthy & Zmud, 1999; Weill & Ross, 2004a).

1.4 Delimitation

This thesis focuses on the influence of SaaS on the allocation of IT decision authority in organisations, excluding the influence of other forms of cloud computing such as Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS). Furthermore, the study investigates the allocation of IT decision authority within organizations between business units and the IT function. Thereby, it is of less importance of how the IT function itself is organized. The question whether the IT function should be organized as a centralized or decentralized organizational unit is addressed by earlier research on IT governance (Brown, 1997; King & Leslie, 1983; Olson & Chervany, 1980). In contrast, more recent IT governance research addresses the allocation of IT decision authority between business units and the IT function (Agarwal & Sambamurthy, 2002; Dawson et al., 2016; Gregory et al., 2018; Kopper et al., 2018; Sambamurthy & Zmud, 1999; Tiwana, 2009; Tiwana & Kim, 2015; Weill & Ross, 2004a; Winkler et al., 2011; Winkler & Brown, 2013). This thesis contributes to the later research stream.

1.5 Thesis Outline

The thesis is composed of seven chapters, which are illustrated in Figure 1-1. After this introduction, chapter 2 is concerned with the theoretical background of the thesis and introduces the key concepts, related research, as well as the applied theoretical perspectives. Next, chapter 3 presents the research model of the thesis and the development of the corresponding hypotheses. The thesis proceeds with laying out the research methodology, which is employed in chapter 4, before chapter 5 presents the results of the empirical study. Chapter 6 goes beyond the reported data by outlining the practical and theoretical contributions of the thesis. Finally, the conclusion reflects on the conducted research.

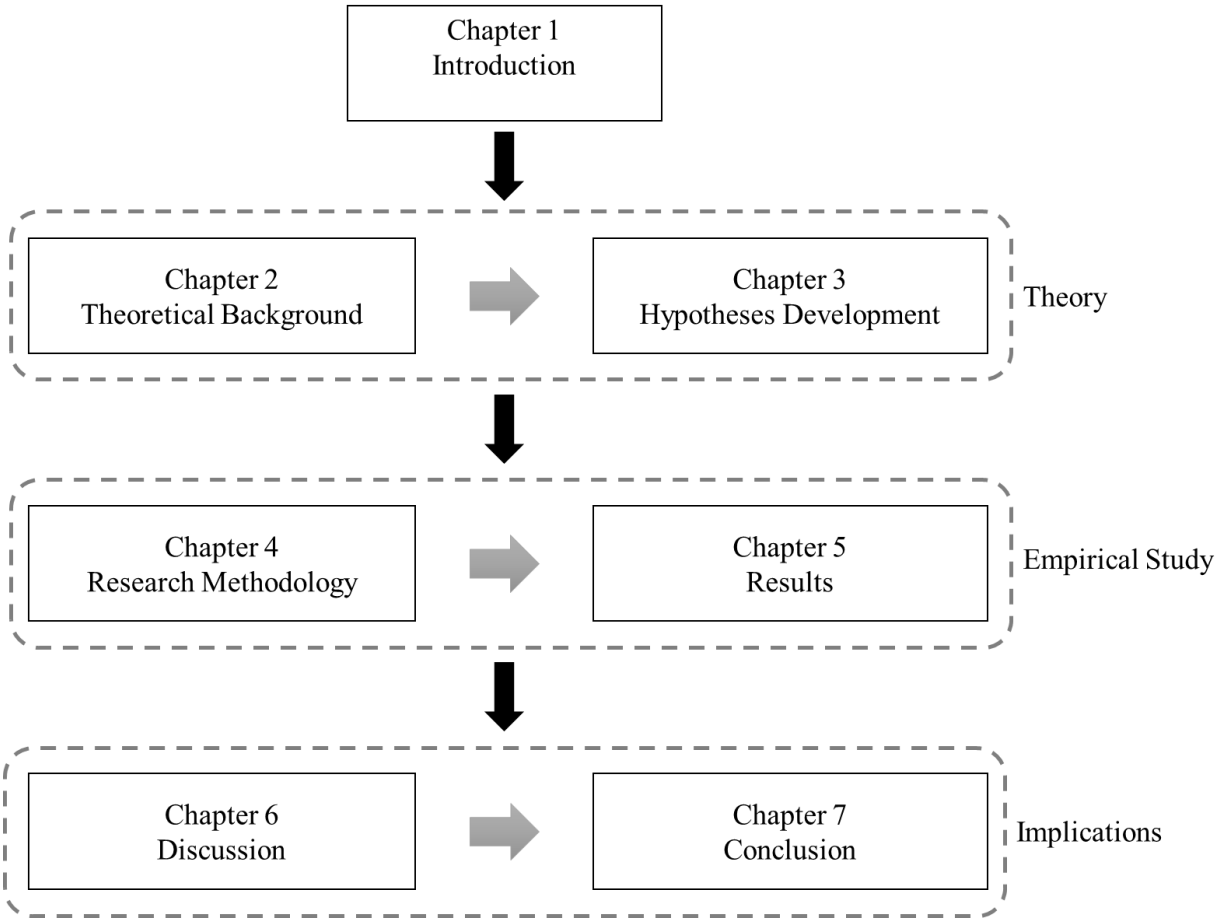


Figure 1-1: Thesis Structure

2 Theoretical Background

The theoretical background of this thesis consists of two main sections. First, relevant concepts and prior research are presented. Second, the theoretical framework guiding this thesis is illustrated. The chapter explains relevant theories and highlights their relationship with the key concepts and prior findings. It builds the foundation for the third chapter, which demonstrates the hypotheses development of this thesis. The three consecutive steps and its mapping to the thesis chapters are illustrated in the figure below Figure 2-1.

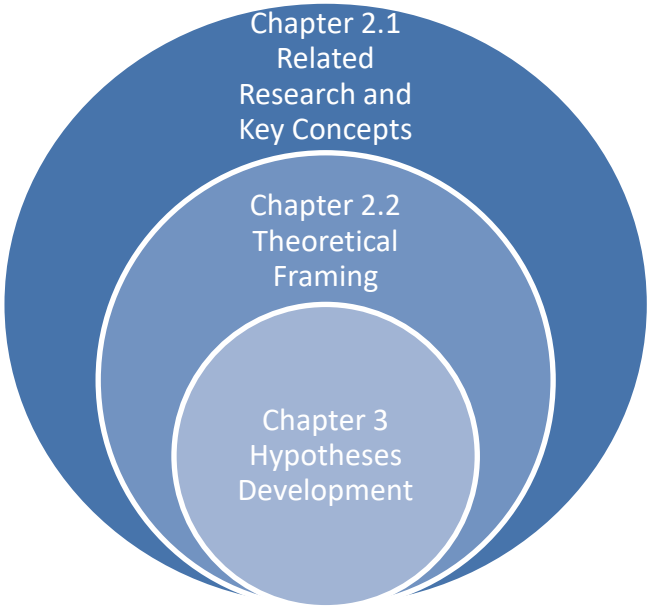


Figure 2-1: Structure of Theoretical Background

2.1 Related Research and Key Concepts

The main phenomenon of interest of this thesis, the SaaS-influenced allocation of IT decision authority between the IT function and business units, is closely related to the major concepts in IS research cloud computing (e.g. Benlian et al., 2018; Vithayathil, 2018; Winkler & Brown, 2013), the IT function (e.g. Baskerville, 2011; Guillemette & Paré, 2012; Peppard, 2018) and IT governance (e.g. Gregory et al., 2018; Tiwana & Kim, 2015; Weill & Ross, 2004a). The phenomena of shadow IT (e.g. Fürstenau & Rothe, 2014; György et al., 2012; Rentrop & Zimmermann, 2012), business-managed IT (Kopper et al., 2018) and IT consumerization (e.g. Gregory et al., 2018; Leclercq-Vandelannoitte, 2015; Webb, Schmitz & Teng, 2017) arise at the intersection of these concepts and are closely related to the allocation of IT decision authority between the IT function and the business units. The collective of these concepts forms the macro level of this thesis. Furthermore, prior academic findings related to these concepts, which are presented below, serve to position this work in the existing body of scientific knowledge.

2.1.1 Cloud Computing

The term cloud computing was first mentioned in 1996 by engineers at Compaq when they were envisioning the future of the internet and was picked up by Amazon and Google in 2006 when they started to describe their new offerings where users access processing power, storage and software through the internet (Regalado, 2011). Despite the disruptive potential and major organizations already providing solutions (Cudanov, Krivokapic & Krunic, 2011; Hayes, 2008), it took three years until cloud computing was first recognized and ranked as No. 17 in the list of key technologies by the SIM survey in 2009 but then quickly moved up the ladder and was ranked 2nd just two years later only behind business intelligence (Luftman & Derksen, 2012). As of then, cloud computing was said to deeply and permanently change how computing power is consumed and that it sharply differs from the current status quo (McAfee, 2011). Furthermore, it fundamentally changes how IT services are paid, maintained, updated, scaled, developed, deployed and invented (Marston et al., 2011). While noting that cloud computing is still considered an evolving paradigm, the National Institute of Standards and Technologies (NIST) (Mell & Grance, 2010) has described cloud computing as a convenient and on-demand model to access shared and configurable computing resources (Armbrust et al., 2010). Furthermore, they also define the different service models that are present in the cloud computing model: Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS).

SaaS provides enterprise applications that run on the cloud infrastructure of external vendors, and the applications can be accessed by different companies through the internet (Mell & Grance, 2010; Winkler & Brown, 2013). While the deployment model of SaaS solutions can differ slightly as the applications can be hosted in public, private or hybrid clouds (Benlian et al., 2018), the consumers usually do not have access or control over the infrastructure that the application is running on and thus, also have limited control over configurations and customizations (Mell & Grance, 2010).

PaaS offers consumers a cloud infrastructure which includes services such as networking, operating systems and storage where the consumer has full control over the deployed application and has access to application-specific configurations (Mell & Grance, 2010). The provided and standardized components that come with PaaS usually offer tools such as programming environments and other development-specific toolsets (Benlian et al., 2018). That is one of the reasons why PaaS cannot only be used for execution, but also for testing and development purposes (Benlian et al., 2018; Dillon, Wu & Chang, 2010).

IaaS provides the fewest features of the three and enables consumers to access fundamental computing resources such as processing power, networking and storage that are accessible as virtualized resources (Benlian et al., 2018). Consumers thus have full control over operating systems, deployed applications, storage and partial control over networking components (Mell & Grance, 2010). According to Khajeh-Hosseini, Greenwood & Sommerville (2010), the IaaS-layer is the most accessible as it allows consumers to move their systems into the cloud without the need to adjust their applications.

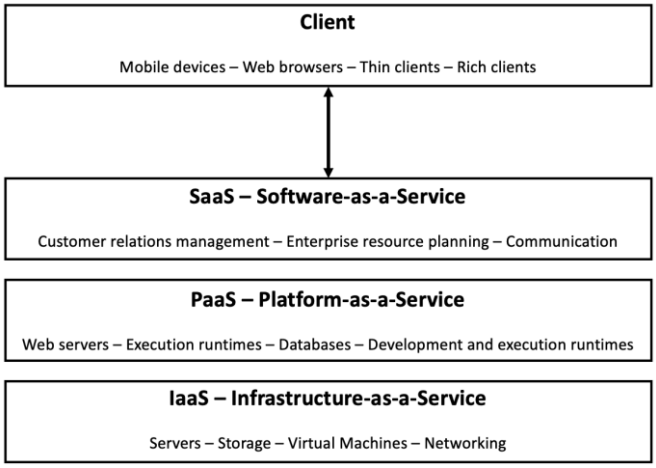


Figure 2-2: Layers of Cloud Computing (with changes adapted from Miyachi, 2018, p.2)

Various researchers share the opinion that, with the emergence of cloud computing, the structure of organizations will change. Cudanov, Krivokapic & Krunic (2011) argue that a shift from a more hierarchical structure towards more network-like structures is one of the outcomes. Organizational flexibility is considered to be an important requirement for organizations nowadays (Bharadwaj & Lal, 2012) and cloud computing serves this need for flexibility, scalability, efficiency and agility with the on-demand offerings for the business needs (Benlian et al., 2018; Hayes, 2008; Low, Chen & Wu, 2011; Marston et al., 2011; Vithayathil, 2018). Furthermore, cloud computing also helps to avoid large upfront investments as they are often seen in large organizations (Marston et al., 2011).

This increased attractiveness and potential of cloud computing will put immense pressure on the classical IT function as they are no longer needed to introduce solutions and the business side can take over more and more IT activities (Winkler et al., 2011). The IT function will have to adapt to the cloud era and undergo a transformation (Vithayathil, 2018). This could be from becoming more of a central mediator and integrator for SaaS services (Winkler et al., 2011) to spending more time on innovative applications instead of maintaining systems (Marston et al., 2011) to partnering up with business units to better understand them (Khalil, Fernandez & Fautrero, 2016).

2.1.2 IT Consumerization

A global survey from 2011 among 4,017 employees, which was conducted by the IT consulting and professional service corporation Accenture, revealed that more than half of the respondents regularly use personal IT devices for work purposes (Harris, Ives & Junglas, 2012). Furthermore, the study revealed that 24 per cent of employees frequently craft their own IT solutions to solve business problems, and another 25 per cent does the same occasionally. IS scholars use the term IT consumerization to describe the phenomenon that consumer IT devices and applications are adopted by employees in the professional sphere (Gregory et al., 2018; Harris, Ives & Junglas, 2012; Jarrahi et al., 2017; Leclercq-Vandelannoitte, 2015). IT consumerization lets the borders between development and usage of IT solutions blur (Gregory et al., 2018; Harris, Ives & Junglas, 2012) because the recent technological advancements lowered the required knowledge and capital to implement IT solutions (Baskerville, 2011; Györy et al., 2012; Jarrahi

et al., 2017). The increased exposure of employees to IT in private life as a consumer of IT solutions significantly influences the expectations and habits concerning IT in work life (Yoo, 2010). Gregory et al. (2018) introduce the term consumer-workers to refer to this generation of employees.

The phenomenon of IT consumerization challenges the prevalent assumption employed by many IS scholars that an organization's IT function possess the power to manage and control all activities of an organization which create business value from IT (Baskerville, 2011; Gregory et al., 2018; Peppard, 2018). A specific manifestation of IT consumerization that illustrates this claim is the case of *bring-your-own-device (BYOD)*. BYOD describes the use of personal IT devices by employees who are not sanctioned by the IT function of an organization (Jarrahi et al., 2017). Scholars investigated how organizations react to employees' usage of personal devices (Leclercq-Vandelannoitte, 2015) and how it affects the management of an organization's IT infrastructure (Jarrahi et al., 2017). It is claimed that users who adopt devices of their own choice for business tasks create unforeseeable use cases for devices and contribute value to the organization by their innovative behaviour (Webb, Schmitz & Teng, 2017). In parallel to the use of private devices by employees, the practitioner literature introduced the terms *bring-your-own-app (BYOA)* and *develop-your-own-app (DYOA)* to express the phenomenon that employees use their own applications which are not sanctioned by an organization's IT function to fulfil their work, respectively that they even develop these applications themselves (Bennett, 2016).

Even though the introduction of the above-stated terminology is a recent development, the notion that users notably shape IT solutions is not new within IS research. Correspondingly, an earlier academic contribution introduced the term *end-user-programmers* to refer to those users who apply programming to serve personal IT requirements and therefore "develop their own applications" (Rockart & Flannery, 1983). Furthermore, various ways in which users shape technologies are recognized in such an earlier contribution (Orlikowski, 1992). In the light of this thesis, the concept of IT consumerization provides an explanation for the changed expectations of users on IT solutions in the professional context (Gregory et al., 2018; Yoo, 2010). In addition, IT consumerization explains the increasingly important role of end-users for the IT contribution in an organization and thus stands in close relation to the phenomenon that greater IT decision authority in organizations is possessed by the business units.

2.1.3 The Information Technology Function

Since the emergence of IS as a research discipline, scholars applied a wide variety of terms to refer to the organizational subunit which is responsible for IT in the organization (Peppard, 2018). The terms *Information Technology (IT) Department* (e.g. Rentrop & Zimmermann, 2012; Tiwana & Kim, 2015; Vithayathil, 2018), *Information Technology (IT) Function* (e.g. Agarwal & Sambamurthy, 2002; Applegate et al., 2003; Gregory et al., 2018), *Information Systems (IS) Function* (e.g. Brown, 1997; Brown & Magill, 1994; Sambamurthy & Zmud, 1999) are commonly used in earlier and current academic contributions, while other terms such as *Management Information Systems (MIS) Department* (e.g. Bostrom & Heinen, 1977; Weill & Olson, 1989) and *Information Services Function* (e.g. Harkness, Kettinger & Segars, 1996; Olson & Chervany, 1980) are not frequently used anymore. Among these terms, IT and IS are used interchangeably, and the applied terminology of the organizational sub-unit is not linked to distinct tasks and responsibilities (Peppard, 2018). Although, the profile and contribution of the organizational sub-unit, which is in charge of IT are much-discussed topics among

researchers in the IS discipline (Guillemette & Paré, 2012). Lately, scholars introduced the terms *Digital Business Department* and *Business Technology* to emphasize the increased importance of IT for the core business (Peppard, 2018). A common prefix added to the previously listed terms is *central or local* (Fürstenau & Rothe, 2014), respectively *corporate* or *business unit* (Weill & Ross, 2004a), to express whether the organizational sub-unit has enterprise-wide responsibility for IT issues or only within a certain business unit. The question whether the organizational sub-unit which oversees IT issues should be centralized or decentralized is another heavily investigated question within IS research (Brown, 1997; King & Leslie, 1983; Olson & Chervany, 1980). To address to the central or local organizational sub-unit, which is concerned with IT, this thesis employs the term IT function, in line with other recent academic contributions listed above.

A review of the IS literature reveals an inconsistent conception among authors regarding the tasks and responsibilities of the IT function. A study by Guillemette & Paré (2012) provides an extensive overview of this discourse by differentiating five distinct archetypes which differ in the strategic contribution and key activities of the IT function. They introduce the terms Partner, System Provider, Architecture Builder, Technological Leader and Project Coordinator to label the archetypes and emphasize that their contribution states ideal profiles of the IT function. They claim that an IT function achieves the most effective contribution to the organization by adopting one distinct archetype. The partner archetype denotes IT functions, which major mission is the transformation of the business by identifying promising technologies and advising the business how to exploit them (Brown & Magill, 1994; Venkatraman, 1997). Architecture builder IT functions focus on providing an IT infrastructure which best supports the organization's business processes and enables an efficient IT architecture (Agarwal & Sambamurthy, 2002; Brown & Magill, 1994). In contrast, system provider IT functions rather respond to requests from the business units than initiating changes themselves (Guillemette & Paré, 2012) and concentrate on the maintenance of support of existing IT solutions (Venkatraman, 1997). Project coordinator IT functions also mainly serve business needs instead of proactively originating initiatives, but add value to the organization by coordinating activities (Guillemette & Paré, 2012). IT functions of this type manage relationships to external partners such as IT vendors and manage internal interdependencies (Agarwal & Sambamurthy, 2002). Finally, the technological leader archetype covers IT functions which contribute to the organization on a highly strategic level by participating significantly in the development of business strategies which rely on novel technologies (Venkatraman, 1997). While these archetypes describe ideal profiles, in practice, the IT function shows the characteristics of two or more archetypes (Guillemette & Paré, 2012).

The current concept of the IT function as a separate organizational sub-unit follows the established approach of functionally divided organizational structures as it is practised by many companies with, for instance, sub-units for research and development, marketing, logistics, purchasing or accounting (Peppard, 2018). Recently, the assumption that IT in organizations can be managed by a sperate IT function is questioned by various studies (Gregory et al., 2018; Kopper et al., 2018; Peppard, 2018). The emergence of new technologies which increased the variety of used IT in the organization (Leclercq-Vandelannoitte, 2015) and the reduced knowledge and capital barriers for non-IT professionals to develop and operate IT solutions (Baskerville, 2011; György et al., 2012; Jarrahi et al., 2017) are major drivers that challenge the established concept of the IT function. Since IT decision authority is an important aspect to evaluate whether an organization's IT is actually managed by the IT function or the business units (Peppard, 2018; Sambamurthy & Zmud, 1999; Winkler & Brown, 2013), this thesis contributes to the recent discourse on the role of the IT function in the organization.

2.1.4 Shadow IT

The term shadow-IT refers to IT solutions in organizations which are used without permission of the organization's IT function and are usually implemented by employees themselves (Khalil, Fernandez & Fautrero, 2016; Rentrop & Zimmermann, 2012). The development of shadow IT solutions is a recent but increasingly dominant phenomenon due to the lowered knowledge and capital requirements for the implementation of powerful IT solutions by non-IT professionals (Fürstenau & Rothe, 2014; György et al., 2012). Innovations in information technology, especially cloud computing, web 2.0, mobile devices and no-code programming, have enabled this circumstance (Baskerville, 2011; Gregory et al., 2018; György et al., 2012). While these technological advancements enable the creation of shadow IT, it is found that the cause of the phenomenon is employees' dissatisfaction due to the absence of suitable IT solutions which effectively support their tasks (Behrens, 2009; György et al., 2012). Such cases are commonly referred to as a misalignment between business requirements and the IT solutions provided by the IT function (György et al., 2012). The prevention of this undesirable state is the central objective of business-IT alignment, which is a major concept in IS research (Henderson & Venkatraman, 1993) and since more than a decade one of the most important issues of top-level IT executives (Kappelman et al., 2018). Although, it is suggested that the development of shadow IT can only be limited but not totally prohibited by a perfectly aligned business-IT relation (Zimmermann, Rentrop & Felden, 2014).

There is no common understanding among scholars regarding the consequences of shadow IT. One party argues that the development of shadow IT solutions is a valuable source of innovation (Behrens, 2009; György et al., 2012; Silic, Silic & Oblakovic, 2016) and creativity (Magunduni & Chigona, 2018), whereas opposing scholars argue that shadow IT is a threat to the efficient operation of corporate IT solutions (Fürstenau & Rothe, 2014), a potential IT security risk (Rentrop & Zimmermann, 2012) and requires a reinforcement of IT governance (Khalil, Fernandez & Fautrero, 2016). The disagreement might be a result of the small but increasing number of publications concerned with shadow IT, which emerged during the last five years (Magunduni & Chigona, 2018). It is claimed that employees develop better IT tools for the automation of their routine tasks compared to the solutions provided by the IT function (Silic, Silic & Oblakovic, 2016) and that the potential of user-driven innovation linked to shadow IT enhances the effectiveness of IT usage (György et al., 2012). Likewise, shadow IT is labelled as "a resource of creativity and innovation" (Behrens, 2009). In contrast, Fürstenau & Rothe (2014) emphasize that a high prevalence of shadow-IT bears critical risks for the continuity of an organization's overall IT architecture. Furthermore, it is suggested that the missing integration of shadow IT into the existing system landscape, the missing incorporation in IT service management arrangements and the noncompliance with IT security policies is a significant risk for organizations (Rentrop & Zimmermann, 2012).

Recent academic contributions expand up on the shadow IT terminology and introduce related terms such as *business-managed-IT* (Kopper et al., 2018), *user-driven IT* (Fürstenau & Rothe, 2014) and *bring-your-own-device* (Leclercq-Vandelannoitte, 2015). These terms are as well as shadow IT heavily related to the central phenomenon of this thesis, the allocation of IT decision authority between the IT function and business units. While shadow IT implicates a hidden and unknown implementation and usage of unpermitted IT solutions, the above listed and related terms assume that the user-driven IT solutions are widely acknowledged in the organization (Kopper et al., 2018). The same applies to the shift of IT decision authority from the IT function to the business units (Kopper et al., 2018; Winkler & Brown, 2013).

2.1.5 IT Governance

With the increasing use of IT in organizations starting in the 1970s and the growing awareness of the upper-level management for the transformative value of new information technologies, the question of how to organize IT to meet the need of organizations best arise (Olson & Chervany, 1980). Before the introduction of the term IT governance in the late 1990s, research focused on the centralized versus decentralized allocation of IT decisions and tasks (Brown, 1997; King & Leslie, 1983; Olson & Chervany, 1980) Between the centralized governance model, where a corporate IT function has the control of all IT decisions and tasks, and the decentralized model, where business units or divisional IT functions take over responsibility for IT decisions and tasks, researchers identified a variety of hybrid governance arrangements (Brown & Magill, 1994; Sambamurthy & Zmud, 1999). With the growing use of IT in the business domain, the focus of IT governance (the what to govern) significantly enlarged (Gregory et al., 2018). Weill & Ross (2004a) introduced a recognized model of IT domains to be governed, which discerns IT principles, IT architecture, IT infrastructure strategy, business application needs and IT investment. In contrast, the scope of IT governance, the accountable actors to be governed, remained heavily focused on the IT function, while the business units are seen as internal customers (Sambamurthy & Zmud, 1999; Tiwana & Kim, 2015; Weill & Ross, 2004a).

Recent claims that the IT function as a separate sub-unit in the organization is an inadequate concept (Gregory et al., 2018; Peppard, 2018), challenges this IT function centric view of IT governance. Due to recent technological advancements and the trend of IT consumerization, non-IT employees are capable of implementing and operating powerful business IT solutions (Gregory et al., 2018; György et al., 2012; Jarrahi et al., 2017). Consequently, the assumption that centralized or decentralized IT functions represent the main contributor for the generation of business value from IT is inappropriate since business units play a major role in this activity (Peppard, 2018). A study by Winkler et al. (2011) has revealed that companies are undecided which department should be in charge of governing SaaS applications since some companies reported that they are predominately promoting an IT-centric governance approach, others stated that they are reinforcing their business units with these capabilities. While the result of this study remained ambivalent, a study by Winkler & Brown (2013) suggests that applications, which are delivered using the SaaS model and have a limited spread, are more suitable for a non-IT-centric governance approach. Furthermore, the study also proposes that leaders in IT should focus on improving the business capabilities of their departments and promote horizontal connections of IT decision makers with business stakeholders and future project initiators. Gregory et al. (2018) analysed how IT consumerization influences IT governance and claim that with the ongoing consumerization in IT, a transformational shift in IT governance is likely. As a result, they suggest a platform-based IT governance approach.

This thesis adopts a recognized three dimensional view on IT governance which differentiates the focus, the scope and the patterns of IT governance (Constantinides & Barrett, 2015; Gregory et al., 2018; Tiwana, Konsynski & Venkatraman, 2013): (1) the focus of IT governance clarifies what IT objects, such as IT application, IT infrastructure and data assets, and what IT tasks need to be governed; (2) the scope of IT governance specifies the organization's actors which hold responsibility for IT-related decisions; and (3) the patterns of IT governance clarify what mechanisms are implemented in the organization, such as organizational processes and structures, to achieve the pursued IT contribution to the business.

This thesis contributes to the body of scientific knowledge regarding the scope of IT governance by investigating the allocation of decision authority among actors from business units and the IT function. The focus dimension of IT governance is reduced to IT applications for this study since the transformative value of SaaS is the main phenomenon of interest. The allocation of IT decision authority is a common IT governance mechanism (Gregory et al., 2018; Tiwana, Konsynski & Venkatraman, 2013; Weill & Ross, 2004a) and thus the specific IT governance pattern investigated in this thesis.

2.2 Theoretical Framing

The theoretical framing describes the theories which are applied for the hypotheses development. The key concepts that were introduced in the previous chapter are used in connection with well-known theories in IS to derive more specific knowledge. Each of the theories that were analysed and taken into consideration for this thesis is introduced, and a connection is drawn how they have been applied for similar research in the past. Lastly, all the theories are being compared, and the final selection of theoretical perspectives for the thesis is motivated.

2.2.1 Agency Theory

Agency theory is concerned with relationships in which one or several principals hire an agent to carry out tasks for them, for instance, because the principal does not have the required knowledge or capital, whereby decision-making related to such tasks is delegated to the agent as well (Jensen & Meckling, 1976). Eisenhardt (1989) points out two problems which can arise in such relationships: (a) the agency problem which is caused by conflicting goals of the principal and the agent as well as situations where it is difficult or expensive for the principal to verify the activities of the agent; and (b) the problem of risk sharing which can emerge when agent and principal have different risk-taking preferences. Whereas the agency problem addresses the circumstance that the principal cannot check the appropriate behaviour of the agent, the risk sharing problem highlights the issue that both parties may favour divergent behaviour due to a different attitude towards risk (Eisenhardt, 1989).

The theory can be transferred to the relationship between business units, the principals, which hire the IT function of an organization, the agent, to develop or operate IT solutions. Scholars applied agency theory to the relationship between business and IT to investigate IT governance under cloud computing usage (Vithayathil, 2018) and to investigate application level IT governance (Winkler & Benlian, 2012; Winkler & Brown, 2013). In this relationship, the agency problem is of interest. The principal, in this case, the business units, cannot verify the agent's actions due to information asymmetry between them, which describes the situation that one party has exclusive information (Eisenhardt, 1989). It is claimed that the use of cloud computing brings further information asymmetry to enterprise IT management since the cloud vendor as an external partner of the organization is likely not to share all valuable information (Vithayathil, 2018). To conclude, since the agency problem (Eisenhardt, 1989) is applicable to the agency relationship between business units and the IT function, agency theory provides a valuable theoretical lens for this thesis to explain a business units motivation to bypass the organization's IT function.

2.2.2 Socio-Technical System Theory

The socio-technical systems (STS) perspective explains organizations as a system of two interrelated sub-systems, which are the social and the technical system (Bostrom & Heinen, 1977). While the term socio-technical systems was originally developed earlier and was used to describe the work system, it can be applied to enterprise systems as well and facilitates the design of such systems (Baxter & Sommerville, 2011). Furthermore, the socio-technical systems approach is considered to be an influential theory with a background in organizational behaviour but has been used extensively in IS studies (Jede & Teuteberg, 2015). Action research is also common amongst IS researchers and both, STS and action research have evolved in the early 1950s and are closely allied as they share a lot of similarities (Mumford, 2006).

While the technical system handles the processes, tasks and technology, the social system addresses the connections between the people of an organization and their values, skills and attitudes (Bostrom & Heinen, 1977). By combining the two separate systems, the theory has not only helped researchers understand the connection between the two better but, as Lamb & Kling (2003) describe, also has a positive impact on working conditions and could change the structure and use of technology in companies so that it benefits managers as well as workers. While STS was amongst the first theories to include a social aspect, Kettinger, Teng & Guha (1997) base their own Business Process Reengineering methodology on it and state that IS professionals are unlikely to have expertise in behavioural elements, and that is why IS should put more focus on the usage of STS.

As seen in this previous literature, STS can be used to analyse the interplay between the technical and social subsystem and Palvia, Sharma & Conrath (2001) use STS when they qualitatively assess computer systems in their study. Furthermore, they even state that the STS framework reflects the ideal symbiosis between man-made machines and the quality that is perceived by the users. Other researchers such as Allen (2003) and Lu et al. (2011) also argue that the socio-technical theory cannot only be used to explain the emergence of new technologies, but also to analyse the social contribution, quality and usefulness. Jede & Teuteberg (2015) take the STS theory to study the effects of SaaS on individual employees but also include the perceived quality and how this affects the job outcomes.

2.2.3 Delone & McLean Information Systems Success Model

The first version of the model was introduced by Delone and McLean in 1992 and aimed to measure the success of IS systems by analysing the system quality, the information quality and how they influence the use of IS and user satisfaction (DeLone & McLean, 1992). The model gained some attention amongst IS researchers. Likewise, Pitt, Watson & Kavan (1995) use the model to measure IS effectiveness, and Wixom & Watson (2001) use it to identify the characteristics of data warehousing success. Pitt, Watson & Kavan (1995) even altered the model by adding an additional measurement, which was service quality. Various other researchers have validated and attempted to extend or redefine the initial model, but in the year 2002, DeLone & McLean (2002) introduced an improved model based on 150 research papers that they have analysed and taken into consideration for their improved model.

The new model has six interrelated dimensions to measure IS success: net benefits, user satisfaction, use, service quality, system quality and information quality (Urbach & Müller, 2012). This model has become a popular framework in IS research, and numerous articles have used

the model as a theoretical basis by adopting it to their respective studies or by adding additional dimensions (Urbach & Müller, 2012).

Nevertheless, researchers such as Mueller et al. (2010) imply that the framework is best suitable if the unit of analysis is on the individual level only. In their research about client satisfaction in the SaaS environment, Liu, Chang & Tsai (2015) also argue that individual user satisfaction is depending heavily on a high level of service quality according to the DeLone and McLean IS success model. Park & Jeong (2013) also created their own quality model that relies heavily on DeLone's and McLean's and most of the criteria they introduced applied to individual user satisfaction (e.g. functionality, reliability, usability).

2.2.4 Technology-Organization-Environment Framework

The technology-organization-environment (TOE) framework was first mentioned in a book by Tornatzky & Fleischer (1990) and aimed to identify the influence of the organizational context, the technical context and the environmental context on the adoption of technological innovations (Baker, 2012; Thong, 1999). The TOE framework has been used by various researchers and Kuan & Chau (2001) report that the framework is useful to study the adoption of innovations and that not only technologically related characteristics are addressed but also the internal organization and the external environment. When analysing the value creation of e-businesses in the finances industry, Zhu et al. (2004) described the three contexts as following: (1) technological context: external and internal technologies that are relevant to the organization; (2) organizational context: descriptive measures for organizations and internally available resources; (3) environmental context: suppliers, competitors and government. Since the contexts are only defined broadly, the framework is considered to be generic (Baker, 2012). That is one of the reasons why researchers usually specify the framework towards their needs. Some narrow down the scope of the contexts (Zhu et al., 2004), others add more theories for clarification (Hart, Ojiabo & Longlife, 2017) and others adopt the theory by replacing one of the contexts (Seethamraju, 2015).

The TOE framework has been criticized for not having evolved since its initial development (Baker, 2012). One of the reasons is the high adaptability that was explained in the previous paragraph. Furthermore, another argument is that the framework aligns well with other theories that explain innovation adoption and is thus, not competing against them (Baker, 2012). For example, it goes well in hand with the theory of innovation diffusion that was introduced by Rogers in 1983 and also examined technological precedents for the adoption of new technologies (Low, Chen & Wu, 2011; Oliveira & Martins, 2011).

Based on the fact that the adoption of innovation has a clear connection to the contexts that are used in TOE (Baker, 2012), various researchers are using TOE in their work. Oliveira & Martins (2011) provide an extensive list in their literature review on technology adoption models, and TOE is used most often for e-commerce and e-business studies. Nevertheless, the framework has recently also been used in cloud adoption studies (Al-Hujran et al., 2018; Gangwar, Date & Ramaswamy, 2015; Low, Chen & Wu, 2011) and SaaS adoption studies (Oliveira et al., 2019; Safari, Safari & Hasanzadeh, 2015; Seethamraju, 2015).

2.2.5 Expectation Confirmation Model

The expectation confirmation model is based on the expectation confirmation theory (ECT) which was initially published in the Journal of Applied Psychology by Oliver (1977) and with the aim to analyse how expectations, perceived performance and disconfirmation influence post-purchase satisfaction. The expectation disconfirmation theory (EDT) is the same as ECT, with confirmation being changed to disconfirmation (Bhattacherjee, 2001). Otherwise, the models can be used the same way. The initial model was developed further by Bhattacherjee (2001) as he applied the theory in an IS related environment and removed the expectation construct. Furthermore, he also stated that the model is suitable to measure user satisfaction and how it affects continuance intention in IS (Bhattacherjee, 2001). The resulting expectation confirmation model then quickly gained traction, being called influential in the IS field (Benlian, Koufaris & Hess, 2011) and Urbach & Müller (2012) state that it is one of the most used theories in IS to measure satisfaction and continuance intention. Although Benlian, Koufaris & Hess (2011) highly praise the model, they further adapt it for their SaaS-quality model and state that by providing more measure items, a more granular result can be achieved.

Other researchers such as Venkatesh & Goyal (2010) base their research on the model provided by Bhattacherjee, but refer to the model as being either expectation confirmation theory or expectation disconfirmation theory (EDT). Lankton et al. (2016) also use the model provided by Bhattacherjee and refer to it as EDT and use it to measure trust in information systems. On the other hand, Fan & Suh (2014) use the initial model with similar adaptions towards IS to investigate why users switch towards disruptive technologies. Tan, Benbasat & Cenfetelli (2016) use EDT to determine how failures in e-commerce affect users abandoning the platforms.

According to Hossain & Quaddus (2012), both ECT and ECM studies, are mostly concentrated on individuals rather than organizations. And when a product is enforced by an organization, confirmation and satisfaction level do not matter anymore as users cannot discontinue using the product (Hossain & Quaddus, 2012). These statements are confirmed by researchers such as Tan, Benbasat & Cenfetelli (2016), which imply that the framework is suitable best when the unit of analysis is on the individual level only.

2.2.6 Knowledge-Based Theory of the Firm

According to the knowledge-based view of the firm, the most important strategic resource of a firm is knowledge, and the main purpose of the firm is to transfer the specialist knowledge possessed by individuals, the employees, into products or services (Grant, 1996). The resource-based view of the firm, on which the knowledge-based view of the firm builds up, also recognizes knowledge as an important resource and perceives the optimal combination of existing resources and capabilities as the primary task of the firm but does not further break down knowledge characteristics (Wernerfelt, 1984). In contrast, the knowledge-based view of the firm differentiates specialized and common knowledge, as explained by Grant (1996). He points out that specialized knowledge is held by a variety of individuals and the integration of this knowledge is challenging due to the coordinative difficulty. The specialized knowledge that is possessed by individuals is characterized by high costs for its transfer between individuals due to the limited human mental capacity (Jensen & Meckling, 1976). The successful knowledge integration of various individuals heavily depends upon the presence of common knowledge, which is the knowledge that is possessed by all members of an organization (Grant, 1996).

Based on these guiding principles of the knowledge-based view of the firm, it is suggested that central decision making within an organization is only effective if all required knowledge can be merged to a single point, whereas otherwise, decentralized decision making is desirable (Grant, 1996). Within the specific context of IS, the allocation of IT decision rights between business units and the IT function is a much addressed issue of IT governance research, whereby business knowledge and IT knowledge are recognized as the two complementary types of knowledge that must be integrated to make informed decision about IT issues (Tiwana, 2009; Vithayathil, 2018; Weill & Ross, 2004a; Winkler & Brown, 2013). According to the notion of specialized knowledge (Grant, 1996) and the classical view of the IT function within IS research (Peppard, 2018), the specialized IT knowledge is inherent in the organization's IT function, whereas the specialized business knowledge of an organization resides in the different business units (Bassellier & Benbasat, 2004; Winkler & Brown, 2013). Drawing upon Grant's (1996) conclusion that central decision making is only feasible in cases where knowledge can be merged to a single point, joint decision-making arrangements between IT function and business units are advantageous for the management of IT use in an organization. This proposition confirms suggested good practices of IT governance arrangements (Weill & Ross, 2004a). Because the limited human mental capacity makes the transfer of knowledge between employees costly, the knowledge-based view of the firm implicates that greater decision authority is assigned to the organizational unit with more relevant knowledge if joint decision-making arrangements are in place (Jensen & Meckling, 1976). This supports prior findings from IT governance research that a higher IT knowledge in a business unit leads to higher participation of the business unit in IT-related decision-making (Brown & Magill, 1994; Sambamurthy & Zmud, 1999). Hence, the extent of pertinent business and IT knowledge required for IT decisions within organizations influence the IT decision authority in organizations.

2.2.7 Technology Acceptance Model

The technology acceptance model (TAM) was developed by Davis (1989) and aimed to measure user acceptance of computers. TAM is an adaption of the theory of reasoned action (TRA) which was introduced by Ajzen & Fishbein (1980) and is another common theory in IS and is frequently used by IS researchers such as Venkatesh et al. (2003) and Benlian & Hess (2011). TRA provides the basics of the behavioural intention which leads to behaviour, and TAM tailors the variables so that it can be applied in more detail towards measuring user acceptance in IS (Venkatesh et al., 2003).

The persistent popularity especially when compared to other theories such as TRA and the ability to explain a substantial part of the variance (40%) (Venkatesh & Davis, 2000) motivated Venkatesh & Davis (2000) to enhance the model. They introduced TAM2, which extends the initial model with seven constructs adding more relevance towards social and cognitive processes (Urbach & Müller, 2012; Venkatesh & Davis, 2000). Other researchers continuously tried to adapt and/or extend the TAM models. However, it was Venkatesh et al. (2003) who, besides other well-known theories, relied heavily on TAM/TAM2 when they introduced the unified theory of acceptance and use of technology (UTAUT). And in 2008, Venkatesh & Bala further developed the TAM model by introducing TAM3, which added three more relations and added several constructs regarding the individual IT adoption and use (Venkatesh & Bala, 2008).

While TAM has been the source of various IS related models and theories, we will only consider TAM, TAM2 and TAM3. Although TAM2 had already been published, Wixom & Todd (2005)

decided to use the original TAM as a base for their model that was used to measure user satisfaction and technology acceptance. Just like many other researchers, Wu (2011) also uses TAM in combination with rough set theory when he analyses the factors for the slow adoption of SaaS in organizations. Bhattacherjee & Park (2014) combine TAM, UTAUT (roots in TAM) and expectation-confirmation theory to determine the factors of end-users migrating from client-hosted computing to cloud computing (Bhattacherjee & Park, 2014). Figure 2-3 illustrates the evolution of TAM (dashed box) via TAM2 (whole model) to TAM3 (bold lines).

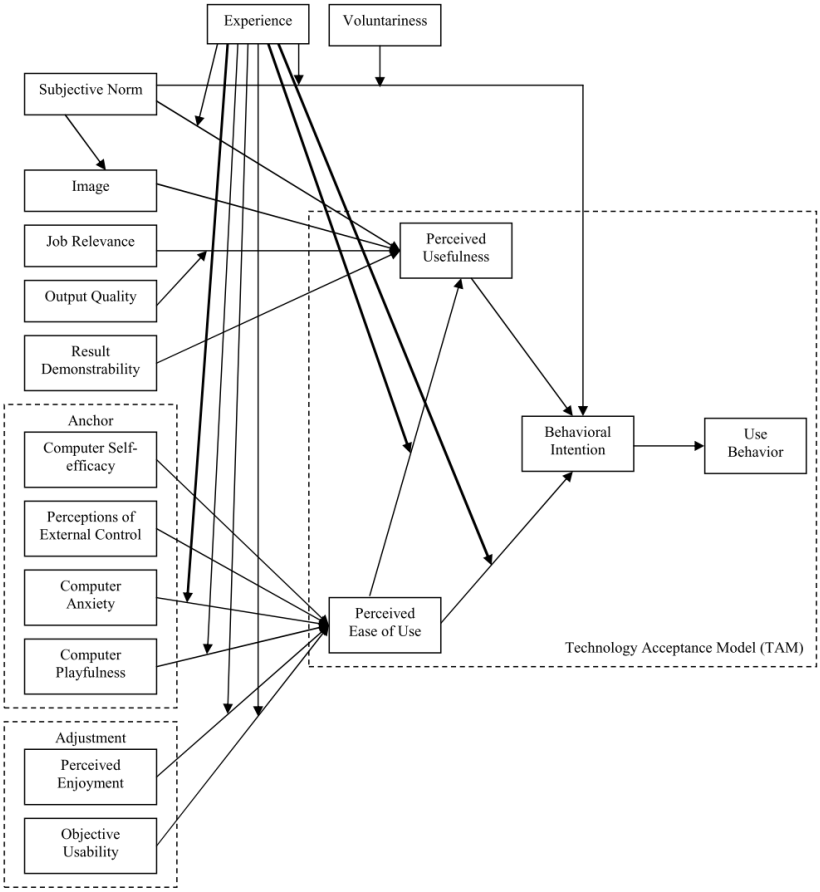


Figure 2-3: TAM3 Model as Introduced by Venkatesh & Bala (2008, p.280)

2.2.8 Theories Towards Research Model

We introduced and analysed seven theories and their latest usage in IS research, especially in the contexts SaaS, IT governance and decision authority. Some of the theories align well, while others are competing because they use different approaches to solve similar challenges. The detailed analysis of the theories gave us a deep understanding of the theories and provided us with the ideal base to choose the best-fitting theories for our research. Table 2-1 presents the choice of theories for the subsequent development of the research model.

Especially for measuring satisfaction, various theories have proven to provide accurate results, and other researchers such as Oktal, Alpu & Yazici (2016) faced a similar challenge when they analysed UTAUT, TAM and the DeLone & McLean IS success model for their own study.

Table 2-1 Theories Towards Research Model

Dropped theories	**Reasoning**
Expectation-Confirmation-Model (ECM)	Various researchers (Fan & Suh, 2014; Hossain & Quaddus, 2012; Tan, Benbasat & Cenfetelli, 2016) have implied that it works best when the unit of analysis is on an individual level, our research aims to analyse organizations as a whole. Furthermore, the model fails to include the shift in IT decision authority as no supporting research could be found.
Technology acceptance model (TAM)	Primarily used to measure acceptance (Davis, 1989) and not adoption. Further alterations to the model (Wixom & Todd, 2005) or combinations with other theories (Wu, 2011) would be more suitable for our usage.
DeLone & McLean IS success model (IS success model)	Various researchers (Liu, Chang & Tsai, 2015; Mueller et al., 2010; Park & Jeong, 2013) have implied that it works best when the unit of analysis is on an individual level, our research aims to analyse organizations as a whole. Furthermore, the model fails to include the shift in IT decision authority as no supporting research could be found.
Applied theories	**Contribution towards research model**
Knowledge-based view of the firm (KBV)	The distribution of knowledge in the organization determines the feasibility of decision-making structures and suggests that in shared governance arrangements the unit with more relevant knowledge possess more decision authority (Grant, 1996; Jensen & Meckling, 1976). This proposition is supported for joint IT decision-making between business units and the IT function (Brown & Magill, 1994; Sambamurthy & Zmud, 1999).
Technology-Organization-Environment (TOE) framework	The technical, organizational and environmental contexts of TOE (Oliver, 1977) are also present in the key concepts of our research, and thus, the TOE framework is the ideal measure for the adoption of innovative technologies (Kuan & Chau, 2001).
Agency Theory (AT)	The agency problem which possibly arises in an agency relationship (Eisenhardt, 1989) is of particular interest for this thesis. The intra-organizational relation between business units and the IT function can be recognized as an agency relationship and thereby AT provides a theoretical lens to explain a business unit's motivation to bypass the organization's IT function (Vithayathil, 2018; Winkler & Brown, 2013).
Socio-Technical-Systems Theory (STS)	STS provides IS research with a more organizational behaviour-related research approach (Kettinger, Teng & Guha, 1997) but can still include the adoption of new technologies and still focus on the social aspects (Allen, 2003; Jede & Teuteberg, 2015; Lu et al., 2011).

After dropping TAM, ECM and the IS success model for the above-mentioned reasons, the remaining theories for our hypothesis development will be the Knowledge-based Theory of the firm, the Technology-Organization-Environment framework, Agency Theory and the Socio-Technical-Systems Theory. The thorough review that was conducted for each of the theories helped us to identify the ones that contribute the most towards our research question.

3 Hypotheses Development

Building upon the introduced theoretical background, this chapter proposes the research model illustrated in Figure 3-1. First, the chapter conceptualises the dependent construct IT decision authority, before the moderating constructs SaaS adoption and IT governance mechanisms are introduced. Next, the derivation of each hypothesis is presented in a dedicated sub-chapter for each independent, respectively mediating, construct. The chapter concludes with a summary of the hypotheses, the applied theoretical perspectives and the supporting literature.

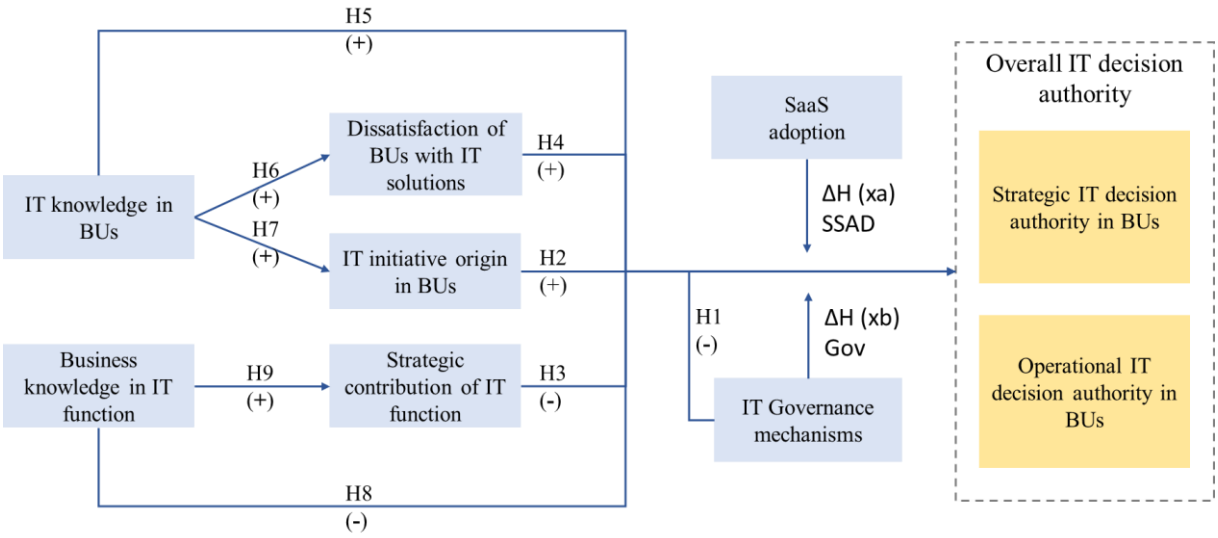


Figure 3-1: Research Model

3.1 IT Decision Authority

To study the allocation of IT decision rights between business units and the IT function, this thesis employs a conceptualization of IT decision authority that recognizes the strategic and operational dimension of IT decisions. Several scholars limit the sum of IT decisions to the strategic dimension (Benaroch & Chernobai, 2017; Dawson et al., 2016; Weill & Ross, 2004a). In contrast, findings from prior research on organizational decision making provide evidence that lower level employees significantly influence top-level executive's decision making through the sum of operational decisions and their knowledge gained from operational task fulfilment (Carter, 1971; Weill & Olson, 1989; Xue, Liang & Boulton, 2008). Hence, a conceptualisation of IT decision authority that covers the strategic and operational dimension appears appropriate to study the underlying research question. Whereas this thesis uses the term of operational IT decision authority, other authors refer to the responsibility for operational IT activities, including operational decisions, as IT task responsibility (Winkler & Benlian, 2012; Winkler & Brown, 2013). The following sub-chapters refer with *overall IT decision authority* in the formulation of hypotheses to an association of the independent constructs with both, the operational and strategic decision types, whereas both are administered as separate constructs in the research model and the subsequent analysis to enable the identification of differences between them.

Table 3-1: IT Decision Types

Strategic IT Decisions		
Decision Type	**Conceptualization**	**Supporting Literature**
Fundamental decisions	Decisions of this type are concerned with the general role of IT for the organization, the expected IT contribution to the overall business strategy and the financing of IT activities.	Guillemette & Paré (2012); Weill & Ross (2004a)
Investment decisions	This decision type covers all decisions which lead to an investment of the organization in IT. The relevant literature reveals a divergent view on what expenditures can be labelled IT investment. However, it is well noted that an integral part of IT investment decisions is the financial frame and the items to be invested in. The prioritization within the IT investment portfolio is another relevant aspect.	Weill & Olson (1989); Weill & Ross (2004a); Winkler & Benlian (2012); Winkler & Brown (2013); Xue, Liang & Boulton (2008)
Architecture decisions	In contrast to decisions which are exclusively relevant for a single system of an organization's IT system landscape, IT architecture decisions are concerned with general and crosscutting issues. IT architecture decisions frame the scope in which system-specific decisions take place. Some scholars handle IT infrastructure decisions separately.	Brown & Magill (1994); Sambamurthy & Zmud (1999); Weill & Ross (2004a); Winkler & Benlian (2012); Winkler & Brown (2013)
Infrastructure decisions	IT Infrastructure related decisions are concerned with basic IT services and components which are typically provided by the (centralized or decentralized) IT function of the organization.	Agarwal & Sambamurthy (2002); Sambamurthy & Zmud (1999); Weill & Ross (2004a)
Change decisions	All decisions which are concerned with changes to existing IT solutions. Changes to existing IT solutions span from minor adjustments to profound changes. Changes may affect other solutions of the organization's IT system landscape and thus can be interwoven with IT architecture decisions.	Peppard (2018); Weill & Ross (2004a); Winkler & Benlian (2012; Winkler & Brown (2013)
Operational IT Decisions		

Decision Type	Conceptualization	Supporting Literature
End User Support	The operational decisions which emerge from end-user IT support activities and troubleshooting (help desk).	Brown & Magill (1994); Winkler & Benlian (2012); Winkler & Brown (2013)
Solution Implementation and Maintenance	The operational decisions which are taken during the implementation of IT solutions (new solutions, changes to existing solutions) and the maintenance of IT solutions.	(Brown & Magill (1994); Winkler & Benlian (2012); Winkler & Brown (2013)
IT vendor management	Organizations typically partner with IT vendors who participate in the implementation and operation of its IT solution. The functional coordination of these vendors is linked to operational IT decisions.	Agarwal & Sambamurthy (2002); Peppard (2018) Vithayathil (2018)
IT Project Management	New IT solutions and changes to existing ones are commonly delivered in project settings. The management of such projects comprises of various tasks but also operational decisions.	Peppard (2018); Sambamurthy & Zmud (1999); Tiwana (2009)

A literature review was conducted to identify relevant aspects of IT decisions for this thesis. The results which are presented in Table 3-1 guided the subsequent hypothesis development of this thesis since the conceptualization of IT decision authority essentially influences the association with independent constructs. For this thesis, we limit the scope of strategic IT decision authority to IT investment, change, infrastructure and architecture decisions, due to the focus of this thesis on SaaS and decision rights allocation. The highly foundational nature, the strong interdependency with the overall business strategy and the typical allocation of the decision authority to the organization's board-level management (Guillemette & Paré, 2012; Weill & Ross, 2004a), make the allocation of fundamental IT decisions highly resilient to change.

3.2 Software-as-a-Service Adoption

While cloud computing offerings have been present since 2006 (Regalado, 2011), SaaS started to gain attention later on but then quickly rose in importance and was coined to be a critical factor for the future usage of IT in companies (Benlian, Hess & Buxmann, 2009; Benlian, Koufaris & Hess, 2011). Nevertheless, critical voices raised their concerns about privacy, reliability and security (Benlian, Hess & Buxmann, 2009; Stieninger et al., 2014). Furthermore, it could be hard for organizations to switch SaaS-vendors at a later point in time, and that would leave them being locked-in to the current provider (Janssen & Joha, 2011). However, the advantages of SaaS in comparison to on-premise installed software are also addressed by various researchers and shown in the following Table 3-2. The provided advantages are amongst the

most mentioned, and all of them are described in more detail, and supporting authors are provided.

Table 3-2: SaaS Advantage Overview

Advantage	Description	Supporting Authors
Flexibility / Agility / Elasticity	Organizations can adopt to new environments and changes rapidly	Benlian & Hess (2011); Benlian, Koufaris & Hess (2011); Bibi, Katsaros & Bozanis (2012); Jede & Teuteberg (2016); Khalil, Fernandez & Fautrero (2016); Marston et al. (2011); Mueller et al. (2010); Seethamraju (2015); Stieninger et al. (2014)
Subscription-based payment model	Organizations only have to pay for what they use	Armbrust et al. (2010); Benlian, Koufaris & Hess (2011); Bibi, Katsaros & Bozanis (2012); Wu (2011)
Higher cost-efficiency	Acquiring already existing software is cheaper than developing/updating it internally	Benlian & Hess (2011); Benlian, Hess & Buxmann (2009); Benlian, Koufaris & Hess (2011); Bibi, Katsaros & Bozanis (2012); Cusumano (2010); Jede & Teuteberg (2016); Seethamraju (2015); Vithayathil (2018)
Scalability	Organizations can require as many licenses/users/instances as needed	(Armbrust et al., 2010; Benlian, Koufaris & Hess, 2011; Bibi, Katsaros & Bozanis, 2012; Khalil, Fernandez & Fautrero, 2016)
Low buy-in	No or little up-front investments for organizations	Armbrust et al. (2010); Bibi, Katsaros & Bozanis (2012); Khalil, Fernandez & Fautrero (2016); Walther et al. (2013)
Operational efficiency	Organizations can focus on their core business instead of having to deal with unrelated (IT-) tasks	Benlian & Hess (2011); Bibi, Katsaros & Bozanis (2012); Low, Chen & Wu (2011); Seethamraju (2015); Wu (2011)
Configurations and customization	Organizations can introduce simple changes through configurations and customizing options	Benlian, Koufaris & Hess (2011); Bibi, Katsaros & Bozanis (2012); Cusumano (2010);

		Seethamraju (2015); Winkler & Brown (2013)
Additional resources	Access to resources and capabilities that would not be available internally	Benlian & Hess (2011); Janssen & Joha (2011); Winkler & Brown (2013)

Most of the above-mentioned advantages and disadvantages can be mapped into the three (technological, organization and environmental) contexts of the TOE framework. Since we are analysing the SaaS adoption on an organizational level and not on an individual level, the model fits our research perfectly. Also, the generic nature and great adaptability of the framework helps us with defining the measurements within the contexts (Seethamraju, 2015). Finally, various IS studies have already applied the TOE framework to measure SaaS adoption (Oliveira et al., 2019; Safari, Safari & Hasanzadeh, 2015; Seethamraju, 2015).

As the SaaS adoption will act as a moderating variable in our research, the detailed hypothesis explanation is provided in the corresponding sub-chapters. The moderating variables affect the strength of the relationship between the dependent and independent variables and are multiplied to determine the impact on them (Creswell, 2014).

3.3 IT Governance Mechanisms

Various scholars claim that the allocation of IT decision authority is less likely to shift from business units to the IT function, or vice versa if there are strong IT governance mechanisms in place (Brown, 1997; Weill & Ross, 2004a; Winkler & Brown, 2013). Similarly, it is suggested that the emergence of shadow IT is less likely in the presence of strong and enforced IT governance policies (György et al., 2012). Formally defined decision-making arrangements such as committees and councils regulate decision authority and enforced technology standards limit the decision freedom of IT-professionals and employees in the business units (Weill & Ross, 2004a). From an agency theory perspective (Eisenhardt, 1989), the motivation of business units to bypass the IT function is grounded in an avoidance of the agency problem, which may arise in an agency relationship with the IT function due to diverse prefernces (Vithayathil, 2018). IT governance mechanisms, however, are introduced to design the agency relationship in a way that both interest, the business unit's (principal) interests are balanced with the IT function's (agent) interests (Winkler & Brown, 2013). Thereby, the IT governance mechanisms can be viewed as a virtual contract between the business units and the IT function (Eisenhardt, 1989). Although, the literature claims that the focus of IT governance is highly centred on the organizational IT function and ensures its role as a participant in IT decision making (Peppard, 2018; Tiwana & Kim, 2015). Thus, we hypothesize that the presence of enforced IT governance mechanisms secures the decision rights of the IT function and reduces the IT decision authority of business units:

Hypothesis 1*: The higher the presence of enforced IT governance mechanisms in the organization, the lower is the overall IT decision authority of business units.*

Due to the claims that the consequences of an increased SaaS adoption change the role of the IT function and influence IT governance arrangements (Gregory et al., 2018; Peppard, 2018; Vithayathil, 2018), we suggest that the degree of SaaS adoption moderates the association of IT governance mechanisms and IT decision authority:

Δ Hypothesis 1a: *The higher the adoption of SaaS in the organization, the weaker is the association of enforced IT governance mechanisms in the organization and decision authority of business units.*

Next to the direct association of IT governance mechanisms with IT decision authority, we hypothesize a moderating effect of IT governance on the association of the IT initiative origin, strategic contribution of the IT function, dissatisfaction of business units with IT, IT knowledge in business units and business knowledge in the IT function with IT decision authority. The reasoning for these differential hypotheses is presented along with the development of the primary hypothesis in the following sub-chapters. In all cases, the differential hypotheses are motivated by the assumption that IT governance mechanisms constitute a virtual contract between the business units and the IT function, and therefore apply Eisenhardt's (1989) propositions regarding the effective governance of agency relationships.

3.4 IT Initiative Origin

IT projects, such as the implementation of SaaS solutions, can be initiated by the business units or the IT function of the organization (Sambamurthy & Zmud, 1999; Weill & Ross, 2004a). Previous studies provide evidence that the initiative origin of an IT implementation project influences the post-implementation allocation of decision rights for a specific application between business units and the IT function (Kopper et al., 2018; Schmidt et al., 2010; Winkler & Brown, 2013). Xue, Liang & Boulton (2008) claim that the initiators of IT investment proposals govern the early stage of the investment decisions and significantly influence the final decisions taken by more senior executives. The IT initiative origin is relevant for the allocation of IT decision authority in two distinct ways. First, the origination phase itself is characterized by various activities which include decisions such as raising investment proposals, information gathering for informed decision making and advisory of more senior executives which are in charge of the final decision (Carter, 1971; Weill & Olson, 1989). Secondly, the actors who lead the early phase of an initiative can directly affect decisions which are later taken by senior executives due to their influential role (Winkler & Brown, 2013; Xue, Liang & Boulton, 2008).

Given this prior academic findings, it is surprising that a number of recognized contributions on IT governance do not cover the decision authority of initiative originators which hold lower management or functional specialist job positions (Benaroch & Chernobai, 2017; Dawson et al., 2016; Weill & Ross, 2004a). Since this thesis considers the operational and strategic dimension of IT decision authority, the above-presented findings on originators' influence on IT decision making motivate the employment of the initiative origin as a construct in the research model. A further relevant finding for this thesis is that IT professionals are only credible to originate IT investment initiatives in case they have a high influence in the organisation, while it is found that even if they do originate an initiative, it is still likely that business units govern the early decision-making process (Xue, Liang & Boulton, 2008). In this regard, agency theory implicates that IT decision authority can be the result of opportunistic behaviour justified in the individual initiative (Winkler & Brown, 2013). To avoid agency problems (Eisenhardt, 1989),

which possibly arise in an agency relationship with the IT function (Vithayathil, 2018), business units could take higher responsibility for IT-related decisions by exploiting their influence as the initiative originators, and therefore we hypothesize:

Hypothesis 2: *The more IT projects are initiated by the business units, the greater is the overall IT decision authority of business units.*

Furthermore, the above presented finding that SaaS applications enable a solution implementation with less involvement of specialized IT employees (Baskerville, 2011; Benlian, Koufaris & Hess, 2011; Gregory et al., 2018; Vithayathil, 2018), suggests a higher association between IT project initiative origin and overall IT decision authority, if the organisation has a high level of SaaS adoption. Although, the study by Winkler & Brown (2013) did not reveal a significant moderating effect of the application delivery type on the supported relationship between initiative origin and application-level governance of a specific system. However, due to the meanwhile notably advanced SaaS adoption of organizations (Kappelman et al., 2018, 2019) and the recent claims that the increased SaaS adoption changes the role of the IT function (Gregory et al., 2018; Peppard, 2018; Vithayathil, 2018), we suggest the following differential hypothesis:

Δ Hypothesis 2a: *The higher the adoption of SaaS in the organization, the stronger is the association of IT project initiative origin in business units and overall IT decision authority of business units.*

In contrast, effectively enforced IT governance mechanisms are likely to secure the strategic decision authority of formally defined key decision-makers in the organization and the operational responsibility of formally defined organizational units (Weill & Ross, 2004a). Thereby, the strong focus of IT governance on the organizational IT function (Peppard, 2018; Tiwana & Kim, 2015) motivates us to hypothesize that IT governance mechanisms negatively moderate the association of IT project initiative origin in business units and overall IT decision authority of business units:

Δ Hypothesis 2b: *The stronger the implemented IT governance mechanisms, the weaker is the association of IT project initiative origin in business units and overall IT decision authority of business units.*

3.5 Strategic Contribution of the IT Function

With the growing use of information technology in organizations the strategic importance of IT for business success increased significantly and changed the role of the IT function (Guillemette & Paré, 2012; Venkatraman, 1997; Westerman, Bonnet & McAfee, 2014). Pure system provider IT functions which are concerned with technical issues only (Guillemette & Paré, 2012) will shrink in size and lose importance under the presence of cloud computing, since they cannot add further value to SaaS-based IT services and cause a direct interaction of business units with SaaS vendors (Vithayathil, 2018). At the same time, IT functions which identify technology-enabled business opportunities and actively design the future IT architecture, such as the partner, technological leader and architecture builder IT function archetypes do (Guillemette & Paré, 2012), will increase their relevance in the organization (Vithayathil, 2018). Furthermore, IT functions which contribute to the organization by developing technology-driven business strategies or by identifying opportunities of technology-use for improved efficiency (Guillemette & Paré, 2012) are likely to have a high influence in the organisation.

In contrast, the simplicity with which modern IT solutions can be implemented by non-IT professionals reduces the need for an involvement of the IT function in new IT initiatives (Gregory et al., 2018; György et al., 2012; Jarrahi et al., 2017). The presence of shadow IT and business-manged IT within organisations supports this assumption (Fürstenau & Rothe, 2014; Kopper et al., 2018; Rentrop & Zimmermann, 2012). Thereby, agency theory implicates that business units bypass the IT function to avoid possible agency problems (Eisenhardt, 1989). However, the strategic importance of the IT function in the organisation may motivate an involvement (Guillemette & Paré, 2012) as well as a high influence of the IT function in the organization (Xue, Liang & Boulton, 2008), which, in turn, can emerge from the strategical importance. A recognized competence of a strategically important IT function such as the management of IT architectures and business process reengineering (Guillemette & Paré, 2012) or relevant knowledge for the management of SaaS vendors (Vithayathil, 2018), is also a possible motivator for an involvement of the IT function. Hence, we hypothesize that a lower strategic contribution of the IT function is associated with a higher degree of IT decision authority in business units:

Hypothesis 3: *The lower the strategic contribution of the IT function in the organization is, the higher is the overall IT decision authority of business units.*

The claim that SaaS applications simplify the implementation of IT solutions (Baskerville, 2011; Benlian, Koufaris & Hess, 2011; Gregory et al., 2018; Vithayathil, 2018), suggests a weaker association between the strategic contribution of the IT function and IT decision authority. The reasoning for this moderating effect is grounded in the circumstance that if the organisation has a high level of SaaS adoption, the knowledge barriers to participating in IT-related decisions are lowered, which reduces the effect of a high decision authority of IT functions due to its strategically important role. The necessity to have the required knowledge for an informant decision and the implication of the knowledge-based view of the firm that greater decision authority is allocated to the party with the most relevant knowledge (Grant, 1996; Jensen & Meckling, 1976) is suggested to shift more IT decision rights towards business units, if the SaaS adoption reduces the required technical knowledge. The effectiveness of IT governance mechanisms (Weill & Ross, 2004a) and the focus of IT governance on the IT function (Peppard, 2018; Tiwana & Kim, 2015) suggest that enforced IT governance mechanisms negatively moderate the association of the IT function's strategic contribution and overall IT decision authority. Therefore, we hypothesize:

Δ Hypothesis 3a: *The higher the adoption of SaaS in the organization, the weaker is the association of the strategic contribution of the IT function in the organization and overall IT decision authority of business units.*

Δ Hypothesis 3b: *The stronger the implemented IT governance mechanisms, the weaker is the association of the strategic contribution of the IT function in the organization and overall IT decision authority of business units.*

3.6 Dissatisfaction with IT

Measuring user satisfaction and technology acceptance has a long history in IS research (Wixom & Todd, 2005). Various theories such as UTAUT (Venkatesh et al., 2003), TAM (Davis, 1989) and the IS success model (DeLone & McLean, 1992) have been developed and were then adapted and extended to suit the newest technological trends. Nevertheless, Jede &

Teuteberg (2016) have used STS to analyse the impact of SaaS in organizations. Since this construct analyses the dissatisfaction of business units with the internal IT function and how that affects IT decision authority, we use STS as well.

The dissatisfaction of employees is partially caused by IT consumerization, and the effects such as the high expectancies when it comes to a slow rate of adoption in official IT functions (Harris, Ives & Junglas, 2012; Jarrahi et al., 2017). To solve this problem, the adoption of SaaS is an option as it allows faster implementation cycles but also causes changes in the IT function (Dillon, Wu & Chang, 2010; Janssen & Joha, 2011). The technical subsystem of STS takes factors such as tools and techniques into consideration for performance measurement in organizations (Kettinger, Teng & Guha, 1997). The current offerings of the internal IT and the competition from SaaS fall into this category of the STS model.

On the other hand, the social system of the STS involves employees from all levels and their skills, attitudes, values and needs as well as the authority structures that are present in the organization (Bostrom & Heinen, 1977). Fürstenau, Rothe & Sandner (2017) argue that current IS research states that the implementation and introduction of shadow IT is driven by individuals and their study reveals that key factors of the increased presence of shadow IT solutions are the lack of business knowledge in the IT, a distant business-IT relationship, cost pressure and non-diversified offerings of the IT function. György et al. (2012) further specify that shadow IT is more user-friendly, cost-efficient and access is easier than internal IT systems, which influences user satisfaction as the internal IT competes against shadow IT, sometimes without even noticing.

Finally, this possible presence of shadow IT solutions in business unites pushes the decentralization of IT and thus, influences the authority of the IT function (Fürstenau, Rothe & Sandner, 2017).Finally, this possible presence of shadow IT solutions in business unites pushes the decentralization of IT and thus, influences the authority of the IT function (Fürstenau, Rothe & Sandner, 2017). STS is a strong theory and is often applied in the context of investigating IT implementations and changes to the IT functions in organizations (Bala & Venkatesh, 2013). Based on that, we therefore hypothesize:

Hypothesis 4: *The higher the dissatisfaction with the provided in-house IT solutions, the greater is the overall IT decision authority of business units.*

Once SaaS solutions have been adopted by an organization, business units will get used to the advantages that are stated by Fürstenau, Rothe & Sandner (2017) and thus, their dissatisfaction will be influenced by further adoption of SaaS solutions. We therefore hypothesize:

Δ Hypothesis 4a: *The higher the adoption of SaaS in the organization, the stronger is the association of dissatisfaction with the provided in-house IT solutions and overall IT decision authority of business units.*

On the other hand, strong governance mechanisms (Weill & Ross, 2004a) prevent business units from getting in touch with other solutions than their internal ones in the first place. Even if they are aware of other solutions, they would have to violate strong and established governance policies to access them. Therefore, we hypothesize:

Δ Hypothesis 4b: *The stronger the implemented IT governance mechanisms, the weaker is the association of dissatisfaction with the provided in-house IT solutions and overall IT decision authority of business units.*

3.7 IT Knowledge in Business Units

The recent advancements in IT such as cloud computing, web 2.0, mobile devices and no-code programming have significantly lowered the knowledge and capital requirements for the implementation of powerful IT solutions so that individuals are able to implement and operate complex IT systems (Baskerville, 2011; Gregory et al., 2018; György et al., 2012). At the same time, IT consumerization fosters the IT knowledge of employees in the business units and thus decreases the gap in IT knowledge between IT and business professionals (Gregory et al., 2018; Leclercq-Vandelannoitte, 2015). Both evolvements go hand-in-hand and question the traditional understanding of the IT function in an organization (Baskerville, 2011; Peppard, 2018) and thus the allocation of IT decision authority between business units and the IT function.

Drawing upon the knowledge-based view of the firm, centralized decision making is a suitable approach if the required knowledge can be merged into a single entity within the organization (Grant, 1996). The limited human mental capacity makes the transfer of knowledge between humans a costly activity, which, in turn, favours the colocation of decision making with the ownership of relevant knowledge needed for an informed decision making (Jensen & Meckling, 1976). Within organizations, the business units typically possess the knowledge about the specific operation and business processes, while the IT function is knowledgeable about IT and its use to solve business problems (Bassellier & Benbasat, 2004). Excellent IT governance decisions require knowledge about business and information technologies, which motivates various organizations to follow a joint IT decision-making approach, where both, the IT function and business units, take decisions together (Weill & Ross, 2004a). In line with the knowledge-based view of the firm and its implications for the allocation of decision authority, research on IT governance claims that business units with a higher IT knowledge take over IT-related decisions to a significantly higher degree (Brown & Magill, 1994; Sambamurthy & Zmud, 1999). Due to these findings, we hypothesize that IT knowledge in business units is associated with higher participation of business units in IT decision-making:

Hypothesis 5: *The higher the IT knowledge in business units, the greater is the overall IT decision authority of business units.*

Thereby, the IT knowledge requirements for business units to participate in IT decision making are found to be lower under the use of SaaS compared to on-premise applications (Winkler & Brown, 2013). This is because the lowered knowledge requirements for the implementation of IT solutions under the use of SaaS (Baskerville, 2011; Benlian, Koufaris & Hess, 2011; Vithayathil, 2018), influences the association, since the entry barrier to participation in IT decision making is lowered in an environment with a high degree of SaaS adoption (Gregory et al., 2018; György et al., 2012; Jarrahi et al., 2017). Consequently, we hypothesize:

Δ Hypothesis 5a: *The higher the adoption of SaaS in the organization, the weaker is the association of IT knowledge in the business units and overall IT decision authority of business units.*

The power of effectively enforced IT governance mechanisms (Weill & Ross, 2004a) and the focus of IT governance on the IT function (Peppard, 2018; Tiwana & Kim, 2015) suggest that the decision authority of the IT function is secured under the presence of strong IT governance mechanisms. Thus, we hypothesize that IT governance mechanisms moderate the association of IT knowledge in the business units and overall IT decision authority:

Δ Hypothesis 5b: *The stronger the implemented IT governance mechanisms, the weaker is the association of IT knowledge in the business units and overall IT decision authority of business units.*

IT consumerization has led to increased expectations of employees towards the functionality of business IT solutions and employees expect the same quality of these functions as they receive through digital technologies in their everyday life (Gregory et al., 2018; Yoo, 2010). Employees also have less patience with slow rates of new technology adoption in the official IT environments (Jarrahi et al., 2017). IT consumerization can thus be considered one of the factors that increase the dissatisfaction of business units with internal IT. We use the STS model to analyse this interplay between the technical system which is represented by the solutions that are introduced through IT consumerization and the current responsibilities of the employees and the social system, which is represented by the employees, their private life, their status as an employee and their dissatisfaction with the internal IT. Therefore, why hypothesize:

Hypothesis 6: *The higher the IT knowledge in business units, the greater is the dissatisfaction with the provided in-house IT solutions.*

Thereby, the findings of shadow IT research suggest that employees take advantage of the lowered capital and knowledge barriers; and proceed to invent their own IT solutions, if they have the required knowledge (Behrens, 2009; György et al., 2012; Kopper et al., 2018; Webb, Schmitz & Teng, 2017). Again, a motivation to bypass the IT function can be explained with the avoidance of possible agency problems (Eisenhardt, 1989) between them and the IT function. The IT function's activities can be hard to verify for the business units which intend to control the appropriate actions of their agent, the IT function, according to their interests (Vithayathil, 2018). Hence, this problematic agency relationship constitutes a motivation for business units to bypass the IT function in the early stages of an IT initiative. This independent IT initiative origin becomes a feasible alternative if the required knowledge is pertinent in the business unit, and therefore we hypothesize that IT knowledge in the business units is associated with a higher IT initiative origin in business units.

Hypothesis 7: *The higher the IT knowledge in business units, the greater is the IT initiative origin in the business units.*

3.8 Business Knowledge in the IT Function

In an organization which has already adopted SaaS solutions, the IT function can act as a middleman between business units and external cloud vendors, and as Vithayathil (2018) points out, this model stands in direct competition with the approach that business units directly interact with cloud vendors. Figure 3-2 illustrates both alternative approaches. Vithayathil (2018) claims that the IT function can only sustain as a middleman in this relationship if it adds further value to the SaaS solutions. He describes that such added value can consist of technical enhancements, customizations of the cloud solution or improved coordination of the cloud vendor if the business is lacking the required technical know-how. Vithayathil (2018) advocates that the IT function needs to have sufficient business knowledge to do so. Various scholars investigated the importance of business knowledge in the IT function (Bassellier & Benbasat, 2004; Lee, Trauth & Farwell, 1995). While business knowledge, such as the understanding of the business strategy and the external business environment, have already been important for IT

professionals long time before the emergence of cloud computing (Bassellier & Benbasat, 2004), under the presence of SaaS, greater importance is attached to this knowledge (Vithayathil, 2018).

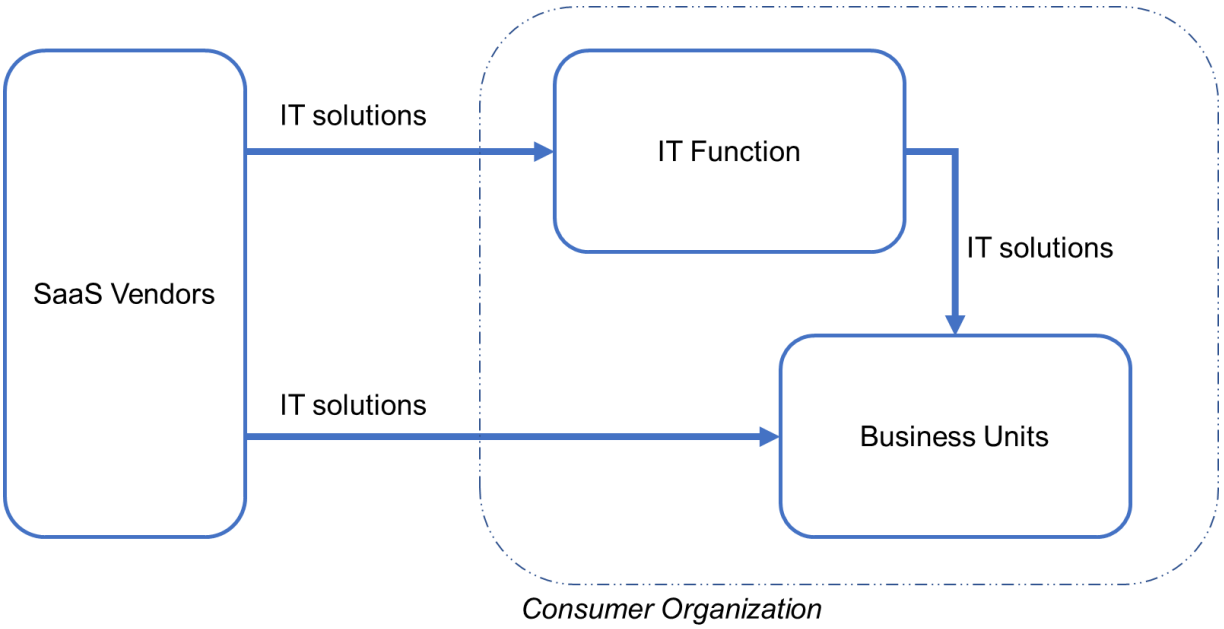


Figure 3-2: IT Services Under the Presence of Cloud Computing (with changes adapted from Vithayathil, 2018, p.640)

From an agency theory perspective (Eisenhardt, 1989), business units will bypass the IT function as an intermediary actor between them and the external vendors if the business value of the consumed SaaS product is not enhanced by the involvement of the IT function (Vithayathil, 2018). Again, this can be explained with the information asymmetry and the possible agent problem in the relationship between the IT function and the business units. Without an obvious added benefit, it can be assumed that business units directly interact with cloud vendors to avoid a further level of information asymmetry and possibly resulting agency problems. Thus, we hypothesize that the business knowledge in the IT function explains the shift of IT decision authority:

Hypothesis 8: *The lower the business knowledge in the IT functions, the higher is the overall IT decision authority of business units.*

In addition to the above-stated hypotheses, the level of SaaS adoption and the presence of IT governance mechanisms moderate this association. In line with Vithayathil's (2018) claim that business knowledge becomes more important for an IT function which aims to secure its decision authority, it is suggested that a high level of SaaS adoption requires an even higher level of business knowledge in the IT function to possess a high decision authority. The power of IT governance mechanisms (Weill & Ross, 2004a) and the focus on the IT function (Peppard, 2018; Tiwana & Kim, 2015) lead to the suggestion that enforced IT governance mechanisms negatively moderate the association of business knowledge in the IT function and overall IT decision authority.

Δ Hypothesis 8a: *The higher the adoption of SaaS in the organization, the stronger is the association of business knowledge in the IT function and overall IT decision authority of business units.*

Δ Hypothesis 8b: *The stronger the implemented IT governance mechanisms, the weaker is the association of business knowledge in the IT function and overall IT decision authority of business units.*

Next to the direct impact of business knowledge in the IT function on IT decision authority allocation, business knowledge also explains the mediating construct strategic contribution of the IT function. Research claims that high business knowledge in the IT function facilitates superior business/IT relationships (Bassellier & Benbasat, 2004), which in turn give IT functions a greater strategic influence in the organization (Xue, Liang & Boulton, 2008). In the light of recent findings that IT consumerization and technological advancements lower the knowledge barriers to the independent implementation of own IT solutions for non-IT employees (Gregory et al., 2018; György et al., 2012; Jarrahi et al., 2017), it needs to be assumed that the IT function's technological know-how becomes less meaningful to ensure a strategic contribution of the IT function. However, if the IT function understands the needs of the business, it can contribute with valuable impulses to strategic decisions (Vithayathil, 2018; Weill & Olson, 1989) or even initiate technology-driven business initiatives itself and consequently establish itself as a strategically influential organizational unit (Guillemette & Paré, 2012). In this case, it can be assumed that business units are willing to establish an agency relationship with the IT function, which takes over the strategic IT management of the organization as an agent for them. IT functions with high business knowledge are in a good position to excel in this role as they combine business and IT knowledge (Bassellier & Benbasat, 2004; Vithayathil, 2018), and therefore the benefits for the business units to employ the IT function as an agent exceed the risks of the agency problem. Therefore, we hypothesize that business knowledge in the IT function is associated with the strategic contribution of the IT function:

Hypothesis 9: *The higher the business knowledge in the IT function, the higher is the strategic contribution of the IT function.*

3.9 Theoretical Perspectives and Hypotheses in Conclusion

The hypotheses of the proposed research model build upon the four distinct theoretical perspectives introduced in the previous chapter, as well as the findings of previous research on related IS concepts. This chapter concludes the hypotheses development with a summary of all proposed hypotheses, their theoretical underpinning and the supporting literature, which is presented in Table 3-3.

Table 3-3: Theoretical Perspectives and Hypotheses

Hypothesis	Theoretical Perspective				Supporting Literature
	AT[1]	KBV[2]	TOE[3]	STS[4]	
H1 GOV -> SDA/ODA	✓				Brown (1997); Eisenhardt (1989); Gregory et al. (2018); György et al. (2012); Peppard (2018); Tiwana & Kim (2015); Vithayathil (2018); Weill & Ross (2004a); Winkler & Benlian (2012); Winkler & Brown (2013)
H2 BUIO -> SDA/ODA	✓				Carter, (1971); Eisenhardt (1989); Kopper et al. (2018); Sambamurthy & Zmud (1999); Schmidt et al. (2010); Vithayathil (2018); Weill & Olson (1989); Weill & Ross (2004a); Winkler & Brown (2013); Xue, Liang & Boulton (2008)
H3 ITSC → SDA/ODA	✓				Eisenhardt (1989); Fürstenau & Rothe (2014); Gregory et al. (2018); Guillemette & Paré (2012); György et al. (2012); Jarrahi et al. (2017); Kopper et al. (2018); Rentrop & Zimmermann (2012); Vithayathil (2018); Westerman, Bonnet & McAfee (2014); Xue, Liang & Boulton (2008)
H4 BUSA → SDA/ODA				✓	Allen (2003); Baxter & Sommerville (2011); Benlian et al. (2018); Bostrom & Heinen (1977); Dillon, Wu & Chang (2010); Fürstenau & Rothe (2014); Jede & Teuteberg (2015); Mumford (2006); Palvia, Sharma & Conrath (2001)
H5 BUIT → SDA/ODA		✓			Baskerville (2011); Bassellier, Benbasat & Reich (2003); Brown & Magill (1994); Grant (1996); Gregory et al. (2018); György et al. (2012); Jensen & Meckling (1976); Leclercq-Vandelannoitte (2015); Peppard (2018); Sambamurthy & Zmud (1999); Weill & Ross (2004a); Winkler & Brown (2013)

H6 BUIT → BUSA				✓	Baskerville (2011); Benlian, Koufaris & Hess (2011); Bostrom & Heinen (1977); Gregory et al. (2018); György et al. (2012); Jarrahi et al. (2017); Winkler & Brown (2013); Yoo (2010)
H7 BUIT → BUIO	✓				Behrens (2009); Eisenhardt (1989); György et al. (2012); Kopper et al. (2018); Vithayathil (2018); Webb, Schmitz & Teng (2017)
H8 ITBK → SDA/ODA	✓				Bassellier & Benbasat (2004); Eisenhardt (1989); Lee, Trauth & Farwell (1995); Vithayathil (2018)
H9 ITBK → ITSC	✓				Bassellier & Benbasat (2004); Gregory et al. (2018); Guillemette & Paré (2012); Vithayathil (2018); Weill & Olson (1989); Xue, Liang & Boulton (2008)
Δ Hypothe-ses GOV	✓				Brown (1997); Eisenhardt (1989); Gregory et al. (2018); György et al. (2012); Peppard (2018); Tiwana & Kim (2015); Weill & Ross (2004a); Winkler & Benlian (2012); Winkler & Brown (2013)
Δ Hypothe-ses SSAD		✓	✓		Armbrust et al. (2010); Baker (2012); Benlian, Hess & Buxmann (2009); Grant (1996); Hart, Ojiabo & Longlife (2017); Janssen & Joha (2011); Jede & Teuteberg (2016); Jensen & Meckling (1976); Kuan & Chau (2001); Low, Chen & Wu (2011); Oliveira & Martins (2011); Palvia, Sharma & Conrath (2001); Tornatzky & Fleischer (1990); Zhu et al. (2004)

[1] Agency Theory (AT)

[2] Knowledge-based View (KBV) of the Firm

[3] Technology-Organization-Environment (TOE) framework

[4] Socio-Technical-Systems (STS)

4 Research Methodology

This thesis uses data of 82 different organizations to test the proposed research model. After the motivation to conduct a cross-sectional survey study, the development of the survey research instrument is outlined in this chapter. Next, the data collection process, as well as the sample characteristics, are illustrated. The chapter concludes with an explanation of the data analysis approach.

4.1 Research Strategy

To test the proposed research model, we conducted a cross-sectional survey among various organizations to empirically collect suitable data about the phenomena of interest. The decision to employ a cross-sectional survey was guided by the following considerations which arise from the characteristics of our suggested research model. First, the proposed research model builds upon a broad theoretical foundation and connects various findings of earlier studies within IS research. Hence, the target of the thesis is to test hypothesized associations between constructs which are not entirely new, but novel within the specific context and composition. It is noted that survey studies are well suited to collect quantitative data which is applicable for theory testing purposes (Bhattacherjee, 2012; Recker, 2013). Second, our literature review revealed that IT decision authority arrangements, in general, are influenced by factors such as company size, industry and number of IT employees (Agarwal & Sambamurthy, 2002; Brown & Magill, 1994; Sambamurthy & Zmud, 1999; Weill & Ross, 2004a; Winkler & Brown, 2013). This circumstance favours a research method which allows the comparison of certain subgroups of the population. Besides a multiple-case study, a survey study allows to perform this (Bhattacherjee, 2012; Recker, 2013). Third, the investigation of the relevant constructs requires a research strategy which is capable of capturing informants' recognition about the peculiarity of an organization's capabilities (level of IT / business knowledge), practices (SaaS adoption, IT initiative origin, governance mechanisms, decision authority) as well as informant's beliefs (business unit dissatisfaction with IT internal solutions) and facts (firm size and industry). It is claimed that a survey study is a suitable research strategy to capture all of them (Bhattacherjee, 2012). Fourth, the capability of survey research to capture data from a relatively large part of the entire population, which allows researchers to generalize findings to other organizations and to test hypotheses objectively (Recker, 2013), suits the posed research question and the proposed research model of this thesis well.

While the above-stated characteristics favour the use of a survey, the relevant shortcomings of this research strategy must be considered. To study the shift of IT decision authority, a longitudinal study seems beneficial. In contrast, cross-sectional survey studies just capture the manifestation of phenomena at a single point of time (Recker, 2013). However, the limited time frame of this thesis does not allow a longitudinal study of IT decision authority. Furthermore, the limitation of survey studies that they do not allow capturing such as a rich picture of an empirical situation as other qualitative research strategies can do (Bhattacherjee, 2012; Recker, 2013), must be considered for interpretation of results. Even though the stated weaknesses of survey studies are adequate, various scholars employed cross-sectional surveys to study related subjects such as application-level IT decision rights allocation (Winkler et al., 2011; Winkler & Brown, 2013), IT governance arrangements (Brown & Magill, 1994; Kappelman et al., 2018;

Sambamurthy & Zmud, 1999) as well as cloud computing adoption and its organizational consequences (Benlian, Hess & Buxmann, 2009; Jede & Teuteberg, 2016; Low, Chen & Wu, 2011). This pre-existing use of survey research allowed this thesis to obtain an insight into how the research strategy performs for related research questions and thus influenced the choice to conduct a cross-sectional survey study. Finally, due to the main phenomenon of interest, the allocation of IT decision authority, the unit of analysis of this thesis are organizations. Since surveys, however, rely on individuals as informants (Bhattacherjee, 2012), it is necessary to ask single persons to participate in the survey on behalf of their organizations. This necessity may lead to a potential respondent bias which needs to be addressed by the careful selection and analysis of control variables (Bhattacherjee, 2012; Recker, 2013).

4.2 Instrument Development

This section first demonstrates the operationalization of the above-introduced constructs into survey items and the development of the scale on which the survey items are measured. Afterwards, the used control variables are presented before the pre-test and a pilot test are illustrated.

4.2.1 Construct Operationalization

To operationalize the constructs of the proposed research model into suitable measurement items, a separate literature review iteration was conducted. Wherever possible, the measurement items are based on prior academic studies. This procedure is recommended by relevant methodology literature (Recker & Rosemann, 2010) and commonly practised in survey-based IS research (e.g. Bassellier & Benbasat, 2004; Benlian, Hess & Buxmann, 2009; Jede & Teuteberg, 2016; Winkler & Brown, 2013).

Table 4-1 presents the survey items to all constructs of the research model, which, in turn, form the measurement model of the thesis. The complete questionnaire, including scale and introductive remarks to the participant, can be found in Appendix A. With the exception of BUIO, all items are derived from previous studies. Thereby, this thesis recognizes two distinct degrees to which prior work guided the item development: Items which are *adopted from* previous studies were applied without changes, respectively adopted with minor changes in the item formulation to assure a consistent terminology throughout the questionnaire. For instance, we decided to refer to the IT function of an organization as such and thus replaced synonyms such as IS function. Items which are *influenced by* previous studies were modified to a notable extent in order to make them applicable to the context of this thesis.

Table 4-1: Constructs and Survey Items

Construct	Item	ID	Source of Item
IT knowledge in business units	Business units have good knowledge about information technologies in general.	BUIT1	Influenced by Bassellier, Benbasat & Reich (2003)
	Business units have good knowledge about the implemented IT solutions they use	BUIT2	

	Business units have good knowledge about the IT budget, IT strategy and IT policies which are relevant to them.	BUIT3	
Business Knowledge in IT	The IT function has good knowledge about the organization's business strategy	ITBK1	Influenced by Bassellier & Benbasat (2004) and Lee, Trauth & Farwell (1995)
	The IT function has good knowledge about the external business environment (e.g. competitive landscape, customer needs, regulations, technologies)	ITBK2	Adopted from (Bassellier & Benbasat, 2004)
	The IT function identifies the best ways to exploit IT solutions to improve business processes and operations	ITBK3	Adopted from Vithayathil (2018)
IT initiative origin in business units	Business units identify opportunities to exploit new technologies.	BUIO1	Influenced by Westerman, Bonnet & McAfee (2014)
	Business units frequently raise ideas for new IT solutions.	BUIO2	Developed for this thesis
	Business units independently provide the business cases for new IT initiatives.	BUIO3	Developed for this thesis
Role of the IT department	The IT function facilitates the transformation of the company at the strategic level	ITSC1	Adopted from Guillemette & Paré (2012)
	The IT function improves productivity by reengineering business processes.	ITSC2	
	The IT function adds value at the organizational level by enhancing organizational agility.	ITSC3	
Dissatisfaction of business units with the internal IT solutions	Business units suggest that service quality and support quality of our internal IT could be more individual, dependable and prompt.	BUSA1	Influenced by Pitt, Watson & Kavan (1995)
	Business units suggest that SaaS providers have the potential to deliver applications at a higher quality, in shorter release cycles and in a more cost-effective manner than our own IT.	BUSA2	Influenced by Benlian & Hess (2011)

	Business units suggest that by adopting SaaS applications, our company can access resources that would not be available internally.	BUSA3	Influenced by Benlian & Hess (2011)
IT governance mechanisms	Technology and process standards are effectively enforced	GOV1	Influenced by Weill & Ross (2004a)
	The accountability for IT-related decisions is clearly defined	GOV2	
	Nonconform behaviour with IT governance policies is discouraged	GOV3	
Software-as-a-Service (SaaS) adoption in the organization	Business units report that SaaS applications add significant value to our company.	SSAD1	Influenced by Wixom & Watson (2001)
	Business units report that SaaS applications in our organization are easy to use and support our processes ideally.	SSAD2	Influenced by Autry et al. (2010)
	Business units report that benefits in savings and optimization outperform the additional risks and threats that come with SaaS applications.	SSAD3	Influenced by Jede & Teuteberg (2016)
Strategic IT decision authority	Who decides on application-level IT budget?	SDA1	Influenced by Sambamurthy & Zmud (1999); Weill & Ross (2004); Winkler et al. (2011); Winkler & Benlian (2012)
	Who decides on IT architecture issues?	SDA2	Adopted from Weill & Ross (2004)
	Who decides on changes to existing IT applications?	SDA3	Influenced by Sambamurthy & Zmud (1999); Weill & Ross (2004); Winkler et al. (2011);

			Winkler & Benlian (2012)
	Who selects new IT applications?	SDA4	Influenced by Sambamurthy & Zmud (1999); Weill & Ross (2004);
Operational IT decision authority	Who manages IT projects?	ODA1	Influenced by Sambamurthy & Zmud (1999); Weill & Ross (2004);
	Who coordinates external software vendors?	ODA2	Influenced by Sambamurthy & Zmud (1999); Weill & Ross (2004);
	Who implements changes to existing IT applications (e.g. customization, visual coding, coding)?	ODA3	Adopted from Winkler & Benlian (2012)
	Who provides IT-application support (formal and informal support)?	ODA4	Influenced by Sambamurthy & Zmud (1999); Winkler et al. (2011); Winkler & Benlian (2012)

4.2.2 Scale Development

The independent variable items are measured on a five-point Likert scale (Bhattacherjee, 2012). Likewise, most items were derived from studies applying a Likert as well. The superior comparability with the results of prior studies motivates the adoption of the scale in this thesis. Furthermore, the finding that five-point Likert scales used in social sciences facilitate data of higher quality compared to similarly popular seven-point Likert scales (Revilla, Saris & Krosnick, 2014), motivates the use of 5 answer categories in this thesis.

The allocation of decision authority is measured on a distinct five-point scale derived from prior literature (Brown & Magill, 1994; Winkler & Brown, 2013). A rating of 1 represents full decision authority in the IT function and a rating of 5 in the business units, while ratings in between indicate forms of shared responsibility.

4.2.3 Control Variables

Control variables are mostly used in quantitative research and are a special kind of independent variable that researchers measure because they might influence dependent variables (Creswell, 2014). Control variables may also influence IT adoption and cloud computing migration intentions (Bhattacherjee & Park, 2014). An early study by Harrison & Rainer Jr. (1992) revealed that, besides others, age, gender and maturity can influence an individual's capability with computers. As for well-known IS research, the most common control variables are: age (Tan, Benbasat & Cenfetelli, 2016; Venkatesh et al., 2003; Webb, Schmitz & Teng, 2017; Wixom & Todd, 2005), gender (Tan, Benbasat & Cenfetelli, 2016; Venkatesh et al., 2003; Webb, Schmitz & Teng, 2017; Wixom & Todd, 2005), maturity/experience (Guillemette & Paré, 2012; Harris, Ives & Junglas, 2012; MacKenzie, Podsakoff & Podsakoff, 2011; Venkatesh et al., 2003) and job position (Alharbi, 2014; MacKenzie, Podsakoff & Podsakoff, 2011; Wixom & Todd, 2005). Based on other IS research in the context of SaaS and IT governance, we motivate the following control variables and scales for our thesis listed in Table 4-2.

Table 4-2: Control Variables

Personal Details		
Variable	**Scale**	**Source**
Gender	Female Male Other (please specify)	Adopted from Jede & Teuteberg (2016)
Age	< 29 years 30 – 39 years 40 – 49 years 50 – 59 years 60+ years	Adopted from Jede & Teuteberg (2016)
Horizontal	Business IT	Adopted from Winkler et al. (2012)
Vertical	Top-Level Management (e.g. CEO, CFO, CIO, CTO, or similar) Medium-Level Management (e.g. Director, Head of a department) Senior Professional (e.g. Team Lead, Project Manager) Professional	Influenced by Wixom & Todd (2005)
Maturity	Number of years	Adopted from Harrison & Rainer Jr. (1992)

Country of organization	Selection of countries	List of all countries covered by the ISO (2019) 3166 standard
Firm Size		
Variable	**Scale**	**Source**
Number of employees	<200 200 – 500 500 – 1'000 1'000 – 5'000 5'000 – 10'000 10'000 – 20'000 20'000 +	Influenced by Winkler et al. (2012)
Number of IT employees	<10; 10 – 50 50 – 100 100 – 200 200 – 500 500+	Influenced by Winkler et al. (2012)
Industry		
Variable	**Scale**	**Source**
Industry	Banking & Insurance Chemicals & Pharma Consumer Goods Electronics & High-tech Energy & Utilities Food & Agriculture Health Care Manufacturing & Automotive Professional Services Public Sector & Education Retail & Wholesale Other	Influenced by Kappelman et al. (2018)

4.2.4 Pre-Test and Pilot Test

Before conducting the actual data collection and launching the survey to the entire target sample, a pre-test and a pilot test were carried out to detect possible problems. Both procedures were guided by the recommendations provided in Bhattacherjee (2012) and Recker (2013).

For the pre-test, the survey items were sent to business and IT professionals who are frequently in touch with IT projects in their current job. Those professionals were asked for feedback regarding the comprehensibility of the applied IS specific terminology, the general item phrasing, the scale, the provided answer options for the control variable section as well as the required time to complete the questionnaire. During this process, the emphasis was put on the self-developed items for this thesis and those items which were influenced by other studies with major changes in phrasing and terminology. As a result, some items were changed in its phrase

structure, whereas the applied terminology received entirely positive feedback and remained without changes. Furthermore, the provided ranges for the questions on firm size and number of IT employees were adjusted by inserting the answer options of 10,000 – 20,000 overall employees, respectively 100-200 IT employees, to better differentiate organizations at the higher end of the scale. Next, feedback on the industry item motivated us to revise the terminology of the provided answer options and to insert the additional industries 'Utilities' as well as 'Electronics & High-tech'. Finally, the feedback confirmed our estimation that the completion of the survey takes around five minutes.

After the above-stated adjustments to the questionnaire, a pilot version was created in an electronic survey tool which was then validated during a pilot test. To ensure proper usability of the online survey interface as well as to test the validity and reliability of the applied items (Bhattacherjee, 2012; MacKenzie, Podsakoff & Podsakoff, 2011; Recker, 2013) the electronic survey was administered to fourteen contacts of our professional network. The informants were asked to participate in the survey and to provide feedback regarding the usability of the electronic questionnaire. We received nine submitted answers which did not reveal any issues with the validity and reliability of the survey items. Although it needs to be noted that the low number of respondents for the pilot test did not reach the ratio of respondents to survey items recommended in the literature (MacKenzie, Podsakoff & Podsakoff, 2011). Regarding the usability of the online questionnaire, no negative feedback was reported. However, the remark of two informants regarding the sequence of the control variable questions at the beginning of the survey motivated us to change the order of the items. To start the questionnaire with the items of the control variables age and gender was perceived as not trustworthy. Subsequently, we started the questionnaire with the items concerning the organizational details before asking of the demographic details of the respondent.

4.3 Data Collection

After the validation and revision of the questionnaire, the final survey was administered to conduct the data collection. The data collection took place between April and May 2019 for a total period of three weeks. The electronic questionnaire (Appendix A) was spread through two distinct channels, each having an own entity in the online survey tool so that the submitted answers can be assigned to the distinct channel. The main purpose of this differentiation is to assure that there is not more than one submitted answer per organization since the unit of analysis of the thesis are organizations. E-Mail and the private instance messenger functions of two professional network platforms (LinkedIn and Xing) belong to the first channel. This channel complies with the self-administered mail survey type demonstrated in the research methodology literature (Bhattacherjee, 2012; Creswell, 2014) and commonly practised within survey-based IS research (Bassellier & Benbasat, 2004; Benlian, Hess & Buxmann, 2009; Jede & Teuteberg, 2016; Winkler & Brown, 2013; Wixom & Watson, 2001). First, we administered the survey over this channel to direct contacts of our professional network. To amplify the reach of the survey, we asked participants of the survey to provide us with further contacts of their professional network, which are suitable informants of the survey. In the literature, this approach is referred to as *snowball sampling* (Bhattacherjee, 2012). In case that no employee of the corresponding organization was already contacted, the prospective informants were invited to participate in the survey as well. The same approach was executed with contacts which could not participate in the survey themselves because another informant at their organization was already

contacted and those which lacked relevant experience with IT decision authority in their organization. In total, we received 79 submitted answers over this channel.

In addition, the survey was spread on publicly accessible areas of two professional network platforms (LinkedIn, Xing) such as newsfeeds and forums. Over this second channel, which provides less control over the participating informants, we received 9 submitted answers. The control variables covering the organization's size, industry and geographical location helped us to ensure that we only received answers of distinct organizations over this channel as well. Two responses had to be dropped because of possible same organization origin. In total, we received 7 usable answers over this channel.

Across both channels, we did not award any price for the completion of the survey to avoid submitted answers of informants who do not have the required knowledge to provide meaningful data or participate with a false intention. In total, we collected data from 86 different organizations. After removing three invalidly submitted answers due to missing values for the dependent construct, 83 completed questionnaires remained. A subsequent screening of the submitted answers for unreliable and implausible values (e.g. answering all questions for all construct with the same score, obvious patterns across the items) led to the loss of one more submission. Consequently, we performed the data analysis and the test of the proposed research model based on 82 submitted answers.

4.4 Sample Characteristics

Based on our data collection, the sample size is 82 in total. The profile of the respondents is presented in Table 4-3. The age of the respondents has great variation, but the major part of them is younger than 40 years old. The distribution of the horizontal position (business vs. IT function) is almost evenly distributed.

Table 4-3: Distribution of Sample Characteristics

Characteristic	**Distribution**					
Gender	Male: 83%				Female: 13%	n.s.: 4%
Age	<29 years: 28%	30-39 yrs: 33%	40-49 yrs: 17%	50-59 yrs: 17%	60+: 2%	n.s.: 2%
Position	Top-Level Mngmt.: 11%	Medium-Level Mngmt.: 24%	Senior-Professional: 43%			Professional: 22%
Function	Business: 44%		IT: 56%			
Maturity	< 2 yrs: 15%	2 – 5 yrs: 5%	5 – 10 yrs: 32%		10+ yrs: 28%	
n.s. : not stated						

As the survey was mostly spread through our own professional networks, the headquarters country of the organizations of our sample shows a strong tendency towards European countries, especially Germany (41%) and Switzerland (41%). For visualization purposes, all other European headquartered organisations (Austria, Bulgaria, Denmark, Italy, Sweden, United Kingdom) have been grouped as *Other EU*, and the United States and Canada were put together (see Figure 4-1). While we managed to receive answers from 10 distinct industries, the manufacturing and automotive industry make up almost one-third of all answers (30%). Other industries such as banking and insurance (14%), electronics and high-tech (11%), others (11%) and professional services (10%) are the further common submissions.

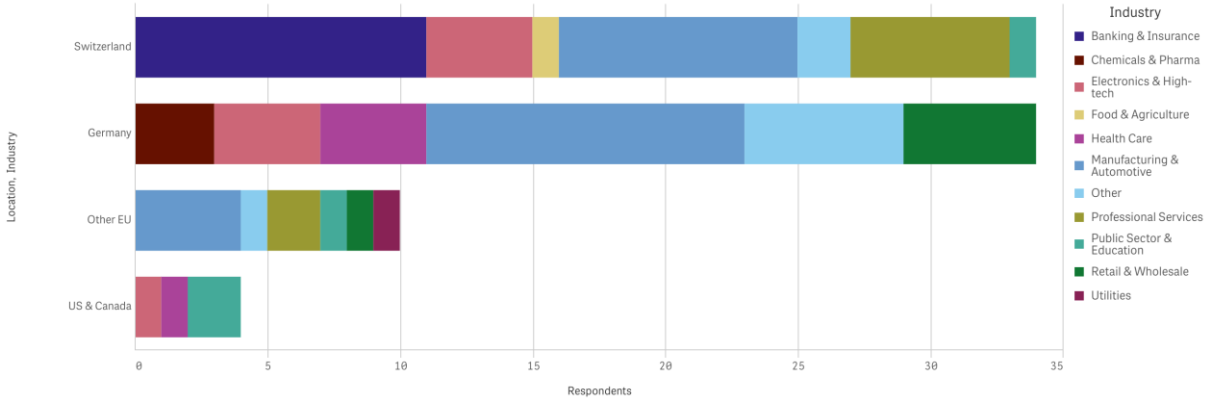


Figure 4-1: Location and Industry of Respondents

Despite the location-wise aggregation, organizations of almost all but one industry-type responded, and great distribution regarding organization size is present in the sample size. More than one-third of the respondents reported that their organizations have more than 10'000 employees. In terms of the vertical job position, senior professionals and medium-level managers accounted for the majority of responses as illustrated in Figure 4-2.

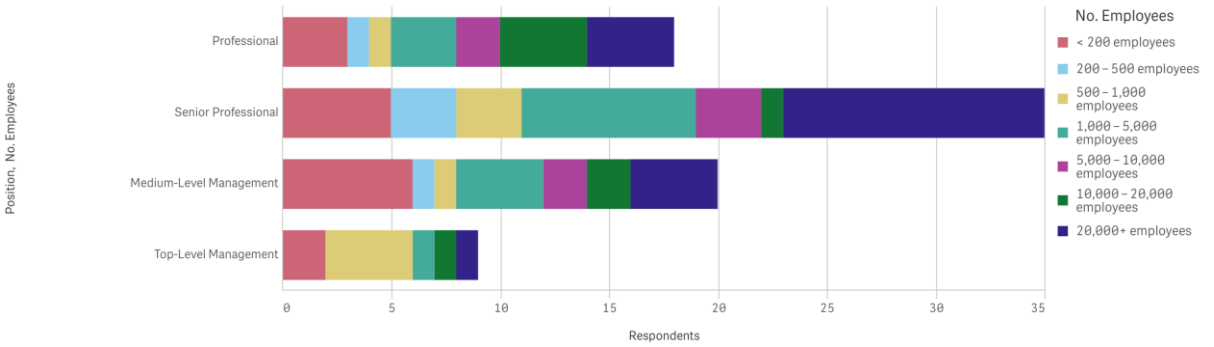


Figure 4-2: Vertical Job Position and Number of Employees

4.5 Data Analysis Approach

This thesis applies partial least squares structural equation modelling (PLS-SEM) to assess the measurement model and to test the research hypotheses. The use of PLS-SEM is motivated by three key characteristics of the collected data and the underlying research model. First, the non-normal distribution of our collected data motivates the use of PLS-SEM. Since the approach

does not make any assumptions based on a normal distribution such as the covariance-based structural equation modelling (CB-SEM), it is suitable for the use with non-normally distrusted data sets (Chin, Marcolin & Newsted, 2003; Hair et al., 2017). Second, the relatively low ratio of a sample size to the collected indicators of this thesis favours the use of PLS-SEM. It is claimed that PLS-SEM provides robust results for smaller sample sizes (Chin, Marcolin & Newsted, 2003; Hair et al., 2017). Third, our use of SaaS adoption and IT governance mechanisms in the organization as a moderating variable and further mediating variables, require the use of a statistical approach that can handle moderating and mediating effects. It is stated that PLS-SEM is a suitable approach to handle structural models with these effects (Hair et al., 2017). Fourth, PLS-SEM is suggested to be especially suitable for the identification of constructs that represent key drivers of a social phenomenon (Hair, Ringle & Sarstedt, 2011), which fits the research question posed in this thesis. Finally, various studies in IS research apply PLS-SEM and highlight its suitability for survey research within this field (Bassellier & Benbasat, 2004; Benlian, Hess & Buxmann, 2009; Jede & Teuteberg, 2016; Webb, Schmitz & Teng, 2017; Winkler & Brown, 2013; Wixom & Watson, 2001). The software tool *SmartPLS* (Ringle, Wende & Becker, 2015) was used to perform the data analysis. Detailed documentation of the employed settings in the software tool can be found in Appendix C.

5 Results

This chapter presents the results of the data analysis, which was conducted by partial least squares structural equation modelling (PLS-SEM). The chapter starts with a presentation of the measurement model assessment. The evaluation suggests satisfactory levels of reliability and validity. The next section lays out the results of a common method bias test, which indicate that the measurement model is not corrupted. Afterwards, the results of the structural model assessment are presented, including evidence regarding the support of the hypotheses proposed in the research model. The chapter concludes with the findings of a subgroup test and limitations of the empirical study which need to be considered. Figure 5-1 illustrates the mapping of the data analysis process to the sub-chapters.

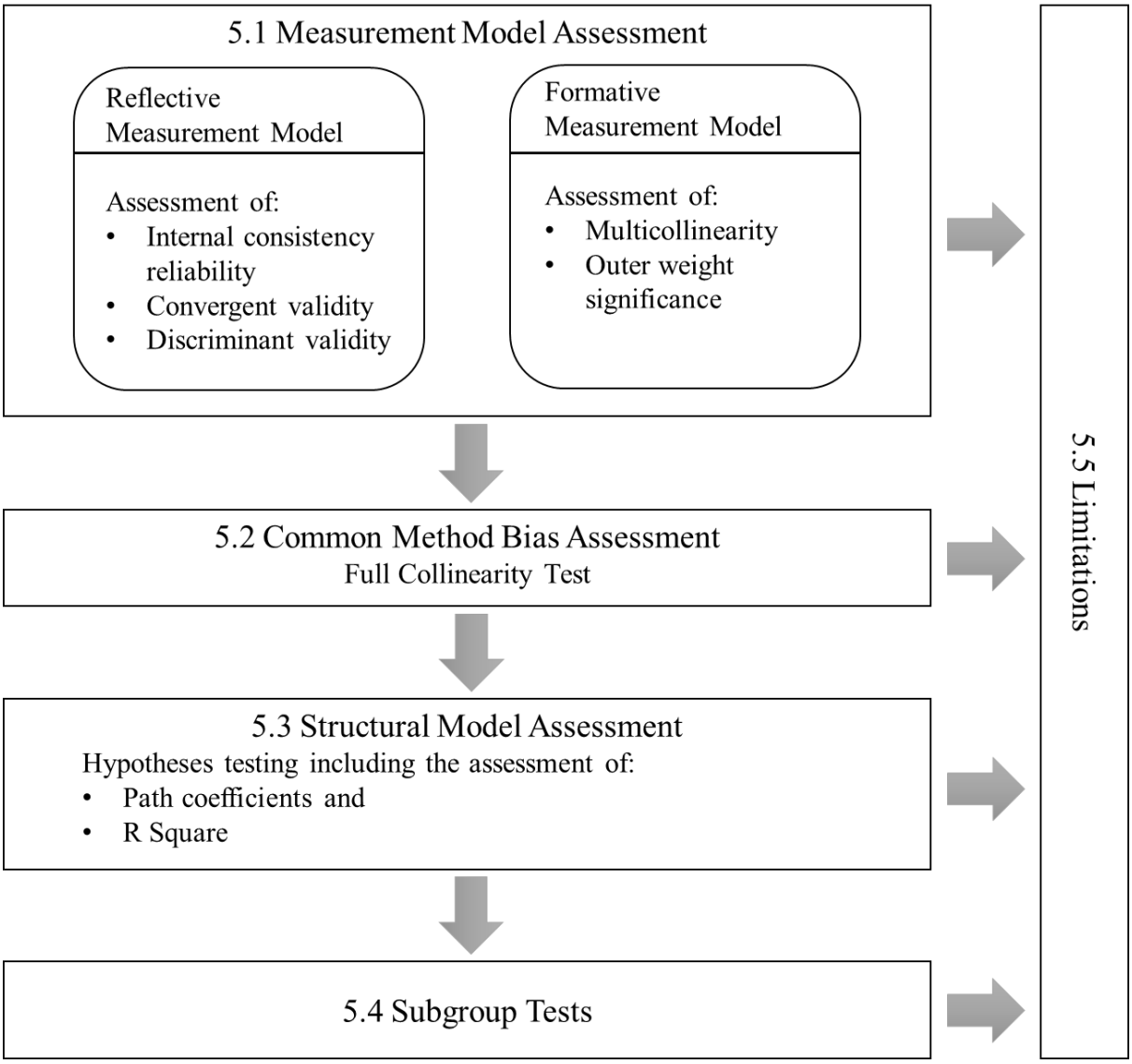


Figure 5-1: Data Analysis Process

5.1 Assessment of Measurement Model

The first conducted activity of the data analysis was the evaluation of the reliability and validity of the employed measurement model. Our proposed research model includes reflective and formative constructs. It is necessary to distinguish between both types of constructs for the assessment of the measurement model (Chin, Marcolin & Newsted, 2003; Hair et al., 2017). The differentiation is commonly practised within IS research which applies PLS-SEM (Bassellier & Benbasat, 2004; Webb, Schmitz & Teng, 2017; Winkler & Brown, 2013; Wixom & Watson, 2001).

5.1.1 Reflective Measurement Model

For this thesis, the internal consistency reliability of the reflective constructs is evaluated by using the composite reliability (CR) measure. Hair, Ringle & Sarstedt (2011) recommend the use of CR for PLS-SEM over the use of Cronbach's Alpha (CA) since CR does not build upon the assumption that all indicators have equal reliability, which CA does. However, many studies in IS use both measures to evaluate the internal consistency reliability (Bassellier & Benbasat, 2004; Benlian, Hess & Buxmann, 2009; Jede & Teuteberg, 2016; Webb, Schmitz & Teng, 2017; Winkler & Brown, 2013; Wixom & Watson, 2001). Therefore, this thesis also states the CA values to assure better comparability with other studies, even though the CR is recognized to be the decisive measure. The convergent validity of the reflective constructs is evaluated by the average variance extracted (AVE) measure, while the discriminant validity of the construct's indicators is evaluated using its outer loadings as well as the Fornell–Larcker criterion. The use of these measures follows the approach suggested by Hair, Ringle & Sarstedt (2011) and is used by various studies in the IS field (Bassellier & Benbasat, 2004; Benlian, Hess & Buxmann, 2009; Jede & Teuteberg, 2016; Webb, Schmitz & Teng, 2017; Winkler & Brown, 2013; Wixom & Watson, 2001). Values exceeding the thresholds of 0.7 for CR are suggested to sufficiently support internal consistency reliability (Hair et al., 2017; Segars, 1997) while the convergent validity is suggested to be given for AVE values over the threshold of 0.5 (Fornell & Larcker, 1981). For the assessment of the internal consistency reliability by the CA measures, the literature states that the 0.7 thresholds should be applied for theory testing, whereas for PLS-SEM models with exploratory character values of 0.6 are recognized to be sufficient as well (Gefen, Straub & Boudreau, 2000). For the assessment of the discriminant validity, the Fornell–Larcker criterion and cross-loadings are two recognized measures (Fornell & Larcker, 1981; Gefen, Straub & Boudreau, 2000; Hair, Ringle & Sarstedt, 2011). Cross loadings indicate sufficient discriminant validity of a construct's indicator if it's outer loading on the related construct is higher than its loading on any other construct in the model (Gefen, Straub & Boudreau, 2000). The Fornell–Larcker criterion is successfully assessed for a construct if the square root of its AVE is greater than the correlation with any other construct (Fornell & Larcker, 1981).

Table 5-1: Reliability Measures, AVE and Squared Intercorrelation of Reflective Construct

	CA[1]	CR[2]	AVE[3]	1. ITBK	2. BUSA	3. GOV	4. BUIO	5. BUIT	6. SSAD	7. ITSC
1. Business Knowledge in IT Function (ITBK)	0.668	0.818	0.602	*0.776**						
2. Dissatisfaction of Business Units with IT (BUSA)	0.704	0.871	0.772	-0.112	*0.878**					
3. IT Governance Mechanisms (GOV)	0.786	0.874	0.697	0.231	0.222	*0.835**				
4. IT Initiative Origin in Business Units (BUIO)	0.641	0.789	0.558	0.019	0.340	0.333	*0.747**			
5. IT Knowledge in Business Units (BUIT)	0.775	0.863	0.678	0.141	0.299	0.508	0.230	*0.824**		
6. SaaS Adoption (SSAD)	0.798	0.878	0.707	0.083	0.402	0.147	0.336	0.123	*0.841**	
7. Strategic Contribution of IT Function (ITSC)	0.794	0.875	0.701	0.488	-0.090	0.173	0.066	0.044	-0.044	*0.837**

* Diagonal elements in italic font present the square root of the construct's AVE for the Fornell–Larcker criterion assessment. The further line values state the intercorrelation with the other constructs.

[1]Cronbach's Alpha (CA) is presented for better comparability with other studies but not used to assess internal consistency reliability

[2]Composite Reliability (CR) values of > 0.7 indicate sufficient internal consistency reliability (Hair et al., 2017; Segars, 1997)

[3]Average Variance Extracted (AVE) values of > 0.5 indicate sufficient convergent validity (Fornell & Larcker, 1981)

A first assessment of the outer loadings of the indicators on their constructs revealed a low loading of 0.35 for the indicator BUSA1 on its related construct BUSA. Hair, Ringle & Sarstedt (2011) recommend dropping indicators with loadings lower than 0.4 if it leads to an increased CR. Likewise, the indicator BUSA1 was dropped, which increased the CR of the BUSA construct from 0.75 to 0.87. Table 5-1 presents the values for CA, CR and AVE as well as the intercorrelation of all reflective constructs and its square root of the AVE after dropping BUSA1. All constructs meet the 0.7 thresholds for the CR, and the 0.5 thresholds for the AVE are met by all constructs. As a result, the internal consistency reliability and convergent validity is suggested to be sufficient. According to the Fornell–Larcker criterion, the discriminant validity is given for all constructs since the square root of the AVE exceeds the intercorrelation with other constructs in each case. The analysis of the indictor's cross-loadings presented in

Table 5-2 reveals no issues with any of the indicators after the dropping of BUSA1. The loading of all indicators is greater for the associated construct than for all other constructs, and all loadings exceed the recommended absolute boundary of 0.4 suggested by Hair, Ringle & Sarstedt (2011) to ensure sufficient discriminant validity. However, it needs to be recognized that BUIO1 loads significantly lower than the other indicators of the construct. A possible cause for this lower loading is the phrasing of the corresponding survey item, in particular, the term "exploit technology" which was adopted from prior literature (Westerman, Bonnet & McAfee, 2014) but might not be conceived the same way by practitioners as it is used in the literature. To conclude, the discriminant validity earlier proven by the Fornell–Larcker criterion can be confirmed by the cross-loading analysis.

Table 5-2: Indicator Cross-Loading Analysis

Construct / Indicator	IT Initiative Origin in Business Units (BUIO)	IT Knowledge in Business Units (BUIT)	Dissatisfaction of Business Units with IT (BUSA)	SaaS Adoption (SSAD)	Business Knowledge in IT Function (ITBK)	IT Governance Mechanisms (GOV)	Strategic Contribution of IT Function (ITSC)
BUIO1	**0.635**	0.223	0.136	0.205	0.192	0.274	0.209
BUIO2	**0.776**	0.041	0.169	0.212	0.052	0.128	0.045
BUIO3	**0.817**	0.231	0.372	0.307	-0.093	0.318	-0.024
BUIT1	0.203	**0.853**	0.234	0.180	0.159	0.413	-0.044
BUIT2	0.111	**0.764**	0.224	0.005	0.134	0.436	0.036
BUIT3	0.220	**0.851**	0.275	0.082	0.075	0.427	0.106
BUSA2	0.249	0.388	**0.885**	0.257	-0.098	0.176	-0.128
BUSA3	0.351	0.132	**0.872**	0.455	-0.100	0.215	-0.027
SSAD1	0.152	0.068	0.307	**0.783**	-0.034	0.020	-0.124
SSAD2	0.236	0.075	0.278	**0.875**	0.123	0.093	-0.036
SSAD3	0.411	0.154	0.423	**0.862**	0.082	0.219	0.013
ITBK1	0.002	0.141	-0.075	-0.054	**0.855**	0.224	0.392
ITBK2	0.008	0.150	0.028	0.275	**0.691**	0.181	0.289
ITBK3	0.031	0.052	-0.184	0.012	**0.772**	0.139	0.435
GOV1	0.188	0.355	0.115	0.113	0.100	**0.833**	0.044
GOV2	0.350	0.453	0.276	0.123	0.290	**0.853**	0.154

GOV3	0.267	0.449	0.137	0.133	0.153	**0.819**	0.218
ITSC1	-0.004	-0.057	-0.063	-0.037	0.394	0.082	**0.819**
ITSC2	0.105	0.058	-0.032	-0.118	0.277	0.107	**0.820**
ITSC3	0.078	0.103	-0.108	0.004	0.494	0.217	**0.872**
Values in boldface present the indicator's highest loading.							

5.1.2 Formative Measurement Model

The assessment of the formative measurement model's discriminant validity by using the same measures and thresholds as for the reflective model is considered to be meaningless (Chin, Marcolin & Newsted, 2003; MacKenzie, Podsakoff & Podsakoff, 2011). The circumstance that indicators of the formative model are considered to be error-free must be considered (Bagozzi & Yi, 1988). Therefore, the assessment of internal consistency reliability and convergent validity is unsuitable for the formative measurement model (Hair et al., 2017). This thesis evaluates the formative measurement model by analysing multicollinearity and the formative indicator's outer weight significance. This approach follows the procedure recommended by Hair, Ringle & Sarstedt (2011).

To assess the collinearity of the indicators, the variance inflation factor (VIF) is a suitable measure frequently applied in IS studies using PLS-SEM (e.g. Schmidt et al., 2010; Webb, Schmitz & Teng, 2017; Winkler & Brown, 2013) and recommended by Hair, Ringle & Sarstedt (2011) and MacKenzie, Podsakoff & Podsakoff (2011). Despite the frequent use of the VIF measure, the literature states different thresholds which indicate potential multicollinearity problems. It is suggested that values below 10.0 (MacKenzie, Podsakoff & Podsakoff, 2011), respectively below 5.0 (Hair, Ringle & Sarstedt, 2011), are suitable to preclude multicollinearity. The formative indicators' outer weight, outer loading and significance are analysed to assess whether the indicator contributes significantly to the corresponding construct (Hair et al., 2017). Thereby, significance at the five per cent level is recognized to be appropriate (Hair et al., 2017). For the assessment of the indicator's contribution to the construct, aspects concerning the theory-based conceptualization of the construct need to be considered (Hair, Ringle & Sarstedt, 2011; MacKenzie, Podsakoff & Podsakoff, 2011).

Table 5-3: Indicator Collinearity Statistics

Indicator	**Variance Inflation Factor (VIF)**
BUIO1	1.550
BUIO2	1.719
BUIO3	1.146
BUSA2	1.420
BUSA3	1.420
ITRO1	1.606
ITRO2	1.945

ITRO3	1.651
ODA1	1.193
ODA2	1.324
ODA3	1.321
ODA4	1.265
SDA1	1.258
SDA2	1.526
SDA3	1.306
SDA4	1.635

Table 5-3 presents the VIF measure for each indicator of a formative construct in the research model. All VIF values are clearly below the lowest suggested threshold of 5.0. With a maximum VIF value of 1.945 (ITRO2), the indicator collinearity statistics provide evidence that the formative measurement model is not affected by multicollinearity issues. To assess the formative indicators' significance, a bootstrapping procedure in *SmartPLS* (Ringle, Wende & Becker, 2015) was carried out with 5,000 samples as a two-tailed test with 82 cases (as recommended by, e.g. Hair, Ringle & Sarstedt, 2011 and commonly practised within IS). The results, which include the outer weights and loadings of the formative indicators as well as the relation of the outer loadings to the standard deviation (*t* values) and corresponding probabilities (*p* values), are stated in Table 5-4. All *t*-values, with the exception of BUIO, meet the 1.96 threshold, which corresponds to five per cent significance level for a two-tailed test (Hair, Ringle & Sarstedt, 2011), and, with exception of BUIO2 and ITSC2, all of these t-values even fulfil the 2.58 threshold corresponding to a one percent significance level. Subsequently, despite BUIO1, all indicators' outer loadings are significant at the five per cent level. The five per cent significance level is suggested to be appropriate by Hair et al. (2017), while they recommend considering the removal of an insignificantly contributing indicator only if its outer loading measures below 0.5. However, since the absolute contribution of BUIO1 shows loading of 0.635, the indicator is kept. In summary, the formative measurement model evaluation suggests that multicollinearity issues are not a problem and that all indicator's, other than BUIO1, have significant weight on their corresponding formative constructs.

Table 5-4: Outer Weights and Significance of Formative Indicators

Indicator	**Outer Weight (Outer Loading)**	***t* Value**	***p* Value**	**Significant at 1% level (5% level)**
BUIO1	0.306 (0.635)	1.428	0.153	*No* (*No*)
BUIO2	0.370 (0.776)	2.293	0.022	*No* (Yes)
BUIO3	0.634 (0.817)	3.316	0.001	Yes
BUSA2	0.584 (0.885)	11.036	0.000	Yes
BUSA3	0.554 (0.872)	9.440	0.000	Yes
ITSC1	0.413 (0.819)	3.765	0.000	Yes

ITSC2	0.265 (0.820)	2.407	0.016	*No* (Yes)
ITSC3	0.510 (0.872)	5.744	0.000	Yes
ODA1	0.436 (0.717)	5.575	0.000	Yes
ODA2	0.344 (0.731)	4.671	0.000	Yes
ODA3	0.265 (0.667)	3.684	0.000	Yes
ODA4	0.374 (0.692)	5.024	0.000	Yes
SDA1	0.411 (0.746)	6.309	0.000	Yes
SDA2	0.306 (0.746)	5.154	0.000	Yes
SDA3	0.271 (0.673)	4.141	0.000	Yes
SDA4	0.352 (0.802)	6.377	0.000	Yes

5.2 Common Method Bias Assessment

In more recent IS research studies which apply survey data it is an established procedure to test the measurement model for a potential common method bias (Jede & Teuteberg, 2016; Webb, Schmitz & Teng, 2017; Winkler & Benlian, 2012). The term common method bias refers to possible variance in the collected data, which is caused by the data collection method instead of the empirical effects the study intends to investigate (Podsakoff et al., 2003). Common method bias is claimed to be a major source of measurement error in behavioural research and can be caused by various effects including social desirability, respondent's moods and item wording (Podsakoff et al., 2003). From the several statistical methods suggested for the assessment of common method bias, this thesis uses the full collinearity assessment approach introduced by Kock (2015) and Kock & Lynn (2012) due to its suitability for the use with PLS-SEM models. The authors provide evidence that VIF values below 3.3 for a full collinearity test of the PLS-SEM model's latent variables indicate a low likelihood of the measurement model being subject to common method bias-variance. The approach is adopted by a variety of studies using PLS-SEM in the IS field (e.g. Guo et al., 2018; Saunders et al., 2017). Table 5-5 presents the results of the full collinearity test of all latent variables. The full collinearity test does not reveal any VIF values above 3.3, with a maximum full collinearity VIF value of 2.11 and a minimum value of 1.33. According to the assessment procedure proposed by Kock (2015), the measurement model of this thesis is unlikely to be contaminated with common method bias-variance.

Table 5-5: Full Collinearity Statistics

Latent Variable	**Full Collinearity VIF**
Business Knowledge in IT Function	1.47
IT Governance Mechanisms	2.01
IT Initiative Origin in Business Units	1.42
IT Knowledge in Business Units	1.66
SaaS Adoption	1.33

Dissatisfaction of Business Units with IT	1.93
Strategic Contribution of IT Function	1.37
Strategic Decision Authority	2.11
Operational Decision Authority	2.09

5.3 Assessment of Structural Model

After analysing the measurement model and concluding that it is satisfactory, the second conducted activity of the data analysis was the evaluation of the strengths of the hypothesized associations between variables as well as measuring the amount of variance that is explained by the independent variables (Wixom & Todd, 2005; Wixom & Watson, 2001). Various IS researchers that rely on PLS-SEM (Bassellier & Benbasat, 2004; Benlian, Hess & Buxmann, 2009; Jede & Teuteberg, 2015; Webb, Schmitz & Teng, 2017; Winkler & Brown, 2013; Wixom & Todd, 2005; Wixom & Watson, 2001) use R-squared (R^2) to measure the explained variance and path coefficients to measure the strength of relationship between the dependent and independent variables (Hair et al., 2017; Jede & Teuteberg, 2015). In combination, the two can be used to assess how well the gathered data support the proposed research model (Wixom & Todd, 2005; Wixom & Watson, 2001). The results are shown in Figure 5-2 and are presented and described in more detail in Chapter 5.3.2.

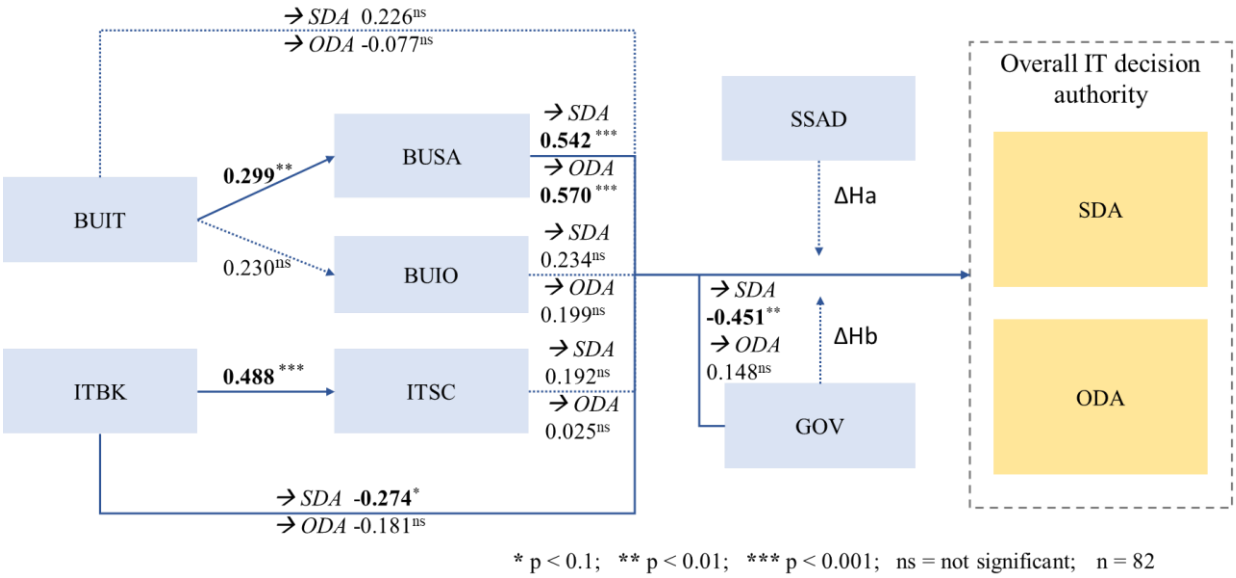


Figure 5-2: PLS Path Coefficients of Structural Model

5.3.1 Assessment Criteria

When analysing the path coefficients, values that are between +1 (strong and positive) and -1 (strong and negative) can be expected, and the closer the values are to .0 the weaker is the relationship between the independent and dependent variables (Hair et al., 2017). Since very low values that are close to 0 are statistically not significant (Hair et al., 2017), researchers set

their levels where they still consider a path coefficient to be significant, with values of 0.10 and 0.20 being common thresholds (Bhattacherjee & Park, 2014; Chin, 1998; Jede & Teuteberg, 2015; Winkler & Brown, 2013; Wixom & Todd, 2005).

The statistical significance is measured by the significance level (Bhattacherjee & Park, 2014) and is calculated by using bootstrapping which should be calculated with at least 5'000 samples (Hair, Ringle & Sarstedt, 2011). PLS-SEM then provides the standard error for each path model coefficient, and the resulting p-values can be used to assess the significance of the relationships in the research model (Hair, Ringle & Sarstedt, 2011). While most IS researchers use the p-values to judge the statistical significance, they tend to use several confidence intervals/significance levels when judging different support levels. The following Table 5-6 provides an overview, starting with the most common level in use.

Table 5-6: Confidence and Significance Levels in IS Research

Confidence level	Significance level	Supporting authors
95%	a = 0.05	(Benlian & Hess, 2011; Benlian, Hess & Buxmann, 2009; Benlian, Koufaris & Hess, 2011; Jede & Teuteberg, 2016; Rana et al., 2015; Walther et al., 2013; Winkler & Brown, 2013; Wixom & Todd, 2005; Wixom & Watson, 2001)
99%	a = 0.01	(Bassellier & Benbasat, 2004; Benlian & Hess, 2011; Benlian, Koufaris & Hess, 2011; Rana et al., 2015; Walther et al., 2013; Winkler & Brown, 2013; Wixom & Todd, 2005; Wixom & Watson, 2001)
99.9%	a = 0.001	(Benlian & Hess, 2011; Rana et al., 2015; Wixom & Todd, 2005; Wixom & Watson, 2001)
90%	a = 0.1	(Rana et al., 2015; Walther et al., 2013; Winkler & Brown, 2013)

Based on this prior research in IS, we motivate our hypotheses to be:

- Strongly supported for path coefficient > 0.3 and p-value < 0.01
- Supported when for coefficient > 0.2 and p-value < 0.05
- Weakly supported for path coefficient > 0.2 and p-value < 0.1

Nevertheless, the most commonly used measurement to judge the structural model is the R^2 (R-squared) value, which is also referred to as the coefficient of determination (Hair et al., 2017). R^2 should be high (Hair, Ringle & Sarstedt, 2011) as it explains the amount of variance that can be explained by the independent variables (Benlian & Hess, 2011; Wixom & Todd, 2005). Depending on the field of study, different results of R^2 are considered high. While a value of 0.2 can be weighed as high in a field such as consumer behaviour research, values of up to 0.75 have to be reached in marketing research for a structural model to be considered substantial (Hair, Ringle & Sarstedt, 2011). This great divergence also applies to the IS field as researchers

have used and motivated a great variation of R^2 values reaching from 0.28 (Bassellier & Benbasat, 2004), to 0.48 (Winkler & Brown, 2013) up to 0.83 (Benlian & Hess, 2011). We will therefore not set a specific level for the R^2 value, but we will use it to analyse and evaluate our structural model.

5.3.2 Hypotheses Testing

The settings for PLS and bootstrapping were applied in the same way as in the formative measurement model. While other IS researchers limit their bootstrapping procedure to calculate the p-values to 1'000 samples (Winkler & Benlian, 2012; Winkler & Brown, 2013) we conformed to the suggestion of 5'000 by Hair et al. (2017) and used by Jede & Teuteberg (2015). Table 5-7 shows the path coefficients and p-values for both, the strategic and operational dimension (where applicable).

Table 5-7: Main Hypothesis Testing

No.	Hypotheses	Dimension	Path coefficient	p-Values
1	Higher presence of IT governance mechanisms – lower IT decision authority of business units (GOV)	Strategic	-0.451	0.010
		Operational	0.148	0.368
2	More IT projects initiated by the business units – greater overall IT decision authority of business units (BUIO)	Strategic	0.234	0.134
		Operational	0.199	0.172
3	Lower the strategic contribution of the IT function – higher IT decision authority of business units (ITSC)	Strategic	0.192	0.227
		Operational	0.025	0.880
4	Higher dissatisfaction with provided in-house IT – greater IT decision authority of business units (BUSA)	Strategic	0.542	0.000
		Operational	0.570	0.000
5	Higher IT knowledge in business units – greater IT decision authority of business units (BUIT)	Strategic	0.226	0.122
		Operational	-0.077	0.537
6	Higher IT knowledge in business units – greater dissatisfaction with provided in-house IT solutions (BUIT - BUSA)		0.299	0.008
7	Higher IT knowledge in business units – more IT projects initiated by business units (BUIT – BUIO)		0.230	0.113

8	Lower business knowledge in the IT functions – higher IT decision authority of business units (ITBK)	Strategic	-0.274	0.075
		Operational	-0.181	0.231
9	Higher business knowledge in the IT functions – higher strategic contributions of IT function (ITBK - ITSC)		0.488	0.000

Before describing the results of the hypotheses, a closer look at the R^2-value of the dependent variables is given. Both R^2-values for the strategic decision authority (0.520) and the operational decision authority (0.513) are above the 0.5 level which means that over 50% of the variance can be explained by the independent variables (Benlian & Hess, 2011; Wixom & Todd, 2005). Although the interpretation of the R^2-values varies between study fields and no limits have been set for IS research, our R^2-values perform well when comparing them to other studies by well-known IS researchers such as Bassellier & Benbasat (2004) , Winkler & Brown (2013) or Wixom & Watson (2001).

Based on the data in Table 5-7 and motivated by other IS researchers (Oktal, Alpu & Yazici, 2016; Webb, Schmitz & Teng, 2017; Winkler & Brown, 2013) we describe the results on a hypothesis-based level:

Hypothesis 1*:* IT governance shows a strong path coefficient in the expected direction (-0.451) for the strategic decision authority and with a p-value of 0.01 is strongly supported. For the operational decision authority, the path coefficient goes weakly into the wrong direction and is not supported on the p-level.

Hypothesis 2*:* Although both path coefficients have the expected direction and fulfil the requirement for support or weak support, the p-value of 0.134 (strategic) and 0.172 (operational) do not confirm any support. Hypothesis 2 is not supported.

Hypothesis 3*:* The association of ITSC goes against the expected direction, and neither the path coefficient nor the required p-values are met. Hypothesis 3 is not supported.

Hypothesis 4*:* The path coefficient of BUSA to the strategic (0.542) and the operational (0.570) decision authority are the highest in the study and the p-values of 0.000 provide proof for strong support.

Hypothesis 5*:* While the strategic path coefficient (0.226) for BUIT meets the requirements for support, the operational path coefficient weakly goes into the wrong direction (-0.077). Both do not fulfil the p-value requirements. Hypothesis 5 is not supported.

Hypothesis 6*:* The association between IT knowledge in business units and an increased dissatisfaction has a strong path coefficient of 0.299, and with a p-value of 0.008, the hypothesis is strongly supported.

Hypothesis 7*:* Although the association between IT knowledge in business units with the initiative origin goes into the right direction, and the path coefficient of 0.230 fulfils the requirement for support, the p-value of 0.113 slightly misses the level to reach weak support.

***Hypothesis 8**:* The association of ITBK with strategic decision authority reaches weak support with a path coefficient of -0.274 and a p-value of 0.075. However, the association to the operational decision authority is not supported as both, path coefficient (-0.181) and p-value (0.231) do not meet the requirements.

***Hypothesis 9**:* The association between business knowledge in the IT and a higher strategic contribution of the IT has a strong path coefficient (0.488) in the right direction, and the p-value of 0.000 fulfils the requirements for strong support.

5.3.3 Differential Hypotheses Testing

Table 5-8 provides the path coefficients and p-values for the differential hypothesis and shows which moderating factors have the highest influence on the relationships between the dependent and independent variables. Based on the research of Winkler & Brown (2013), which also worked with differential hypotheses in *SmartPLS* (Hair et al., 2017), we consider differential hypotheses to be supported for $p < 0.10$ and weakly supported if the p-value is close to the 0.10 level. Based on this criterion, only two differential hypotheses are supported, and one is weakly supported. Since the main hypothesis 3 is not supported, and the operational dimension of the main hypothesis 8 is not supported as well, no differential hypotheses have an influence on our model.

Table 5-8: Path Coefficients and p-Values for Differential Hypotheses

No.	Differential Hypothesis	Dimension	Path coefficient	p-Values
1a	SaaS on IT governance	Strategic	-0.179	0.377
		Operational	-0.044	0.820
2a	SaaS on initiative origin in business units	Strategic	0.075	0.721
		Operational	0.202	0.336
2b	IT governance on initiative origin in business units	Strategic	-0.063	0.612
		Operational	0.097	0.449
3a	SaaS on strategic contribution of IT	Strategic	-0.279	0.250
		Operational	-0.349	0.121 **
3b	IT governance on strategic contribution of IT	Strategic	0.309	0.046 *
		Operational	0.148	0.363
4a	SaaS on dissatisfaction with internal IT	Strategic	-0.109	0.479
		Operational	-0.020	0.887

4b	IT governance on dissatisfaction with internal IT	Strategic	0.143	0.395
		Operational	-0.063	0.698
5a	SaaS on IT knowledge in business units	Strategic	0.172	0.349
		Operational	-0.020	0.901
5b	IT governance on IT knowledge in business units	Strategic	-0.118	0.391
		Operational	0.031	0.822
8a	SaaS on business knowledge in IT	Strategic	0.245	0.233
		Operational	0.431	0.049 *
8b	IT governance on business knowledge in IT	Strategic	-0.132	0.424
		Operational	-0.100	0.549
* supported ($p < 0.10$) ** weakly supported (p close to 0.10) (Winkler & Brown, 2013)				

5.4 Subgroup Tests

According to Qureshi & Compeau (2009), multigroup analysis for PLS is actively used in IS research and the most commonly used approach to measure differences between separate groups in the same study. However, due to our limited sample size and to reach a statistical power of 80% as suggested by Hair et al. (2017), we have to carefully analyse potential sub-groups.

Table 5-9 shows the path coefficients and the corresponding p-values for all relevant control variables. Location and industry are not stated in the table because their nominal value does not correspond with the value they represent. Furthermore, we have to take into consideration that the factors employees, employees in IT, age, vertical position and maturity show a great distribution on a wide scale which negatively influences the ability to reach a statistical power of 80% (Hair et al., 2017).

Table 5-9: Path Coefficients and p-Values for Control Variables

	Function (p-value)	**Horiz. position** (p-value)	**Age** (p-value)	**Employees** (p-value)	**IT-Employees** (p-value)	**Experience** (p-value)	**Gender** (p-value)
BUIO	-0.180 (0.135)	0.130 (0.394)	-0.164 (0.340)	-0.380 (0.116)	0.516 (0.102)	**0.422 (0.003)**	0.113 (0.262)
BUIT	-0.077 (0.525)	-0.005 (0.969)	0.002 (0.988)	**-0.574 (0.014)**	**0.430 (0.067)**	0.122 (0.266)	-0.084 (0.607)
BUSA	**-0.348 (0.001)**	0.093 (0.546)	0.054 (0.747)	-0.117 (0.523)	0.206 (0.224)	0.075 (0.551)	0.156 (0.178)
SSAD	-0.176 (0.077)	-0.209 (0.160)	**-0.363 (0.004)**	-0.154 (0.430)	0.181 (0.325)	**0.300 (0.007)**	0.189 (0.100)
ITBK	**0.321 (0.006)**	-0.090 (0.522)	0.017 (0.906)	-0.040 (0.857)	-0.227 (0.368)	0.157 (0.176)	**0.210 (0.027)**
GOV	-0.198 (0.121)	-0.154 (0.326)	-0.053 (0.810)	-0.348 (0.106)	0.315 (0.154)	-0.003 (0.986)	0.068 (0.563)
ITSC	0.138 (0.342)	0.043 (0.769)	0.153 (0.232)	-0.212 (0.392)	-0.128 (0.642)	-0.144 (0.267)	0.185 (0.093)
ODA	**-0.401 (0.000)**	-0.007 (0.957)	0.041 (0.776)	-0.200 (0.252)	0.255 (0.122)	-0.170 (0.174)	0.046 (0.722)
SDA	**-0.230 (0.069)**	0.167 (0.309)	0.047 (0.811)	-0.303 (0.234)	0.224 (0.446)	0.009 (0.939)	0.083 (0.562)

Bold values indicate statistical significance ($p < 0.10$) and path coefficients that are considered supported for this thesis, as explained in the hypotheses testing.

The table visualizes that the function control variable has four values that show significant influence, which motivates the function control variable as a candidate for subgroup testing. Furthermore, the function also shows a good distribution between its subgroups, which are business (36 respondents) and IT (46 respondents) and almost fulfils the requirements by Hair et al. (2017). By putting the participants into subgroups that are split up by department, it provides the opportunity to analyse the impact of each subgroup on the outcome (Creswell, 2014). According to Vithayathil (2018), information asymmetry often occurs between the two departments, and this could result in notable differences for the two subgroups.

Due to the limitations on the sample size, we were unable to use the built-in Multi-Group Analysis (MGA) functionality that is offered in *SmartPLS*. However, we could still use the data grouping feature and executed the regular PLS-operations and compared the results.

Table 5-10 provides an overview of the differences in the path coefficient in the two subgroups. The table for the path coefficient differences for the differential hypotheses is provided in Appendix B.

Table 5-10: Subgroup Path Coefficient Differences

Hypothesis	IT Function		Business Function		Difference	
	Operational	Strategic	Operational	Strategic	Operational	Strategic
1. GOV	-0.085	-0.416	0.221	-0.514	**0.306**	0.098
2. BUIO	-0.23	-0.074	0.321	0.362	**0.551**	**0.436**
3. ITSC	0.331	-0.031	0.145	0.248	0.186	**0.279**
4. BUSA	0.364	0.404	0.426	0.349	0.062	0.055
5. BUIT	-0.074	0.472	0.229	0.296	**0.303**	0.176
6. BUIT - BUSA	0.383		0.246		0.137	
7. BUIT - BUIO	0.301		0.188		0.113	
8. ITBK	-0.116	-0.401	-0.361	-0.229	**0.245**	0.172
9. ITBK - ITSC	0.459		0.557		0.098	

Bold values indicate a significant difference (> 0.2) in the path coefficients.

5.5 Limitations

Before the discussion of the results, limitations of the reported data need to be recognized. To begin with, considerations regarding the feasibility of the data collection motivated the operationalization of each dependent construct with four survey items and each independent, mediating and moderating construct with three survey items. Although this number of survey items per construct lies well in the realm of other highly recognized studies in IS research (e.g. Bassellier & Benbasat, 2004; Webb, Schmitz & Teng, 2017; Winkler & Brown, 2013), a broader operationalization of the constructs is likely to increase the predictive validity of the measurement model (Diamantopoulos et al., 2012). Second, the low loading of the indicator BUSA1 motivated us to drop this indicator, which lowers the semantic spectrum of the construct's operationalization. This decision might again negatively influence the predictive

validity of BUSA (Diamantopoulos et al., 2012), although dropping the indicator leads to higher reliability of the construct. Third, the BUIO1 indicator does not contribute to the respective construct significantly. Because the indicator's notable absolute contribution (outer loading = 0.635) we followed the recommendations of Hair et al. (2017) and did not remove the indicator from the measurement model, even though keeping the indicator influences the convergent validity of the construct negatively. Fourth, since the survey was mailed to business and IT employees, and they had to report the knowledge of their own organizational unit, respectively of other units, a bias in the answers could be present. They might not only misjudge the capabilities of their own department positively or negatively, but a possible misjudgement of the other departments could also occur because of false expectations and misperception (MacKenzie, Podsakoff & Podsakoff, 2011; Podsakoff et al., 2003). Fifth, the cross-sectional survey research approach of this thesis accounts for the circumstance that the collected data only represents a snapshot of the factors which influence IT decision authority. Especially due to the rapidly evolving SaaS adoption (Kappelman et al., 2018, 2019), a longitudinal study is likely to better capture the relevant dynamics in IT decision authority caused by the increased SaaS usage in the organization (Winkler & Brown, 2013) and exposure of employees with SaaS-based IT solutions in their private life's (Gregory et al., 2018). Finally, the geographic origin of the sample is highly restricted as 82.8% of the answers account for organizations headquartered in Germany and Switzerland. This geographic concentration of the sample causes uncertainty regarding the generalisability of the reported results to organizations of other geographical regions. The finding that culture is a crucial variable in IS research due to its strong influence on IT implementation and usage in organizations (Leidner & Kayworth, 2006) needs to be considered in the light of this limitation.

6 Discussion

This chapter sets the empirical results in relation to the theoretical perspectives applied in the research model and highlights the contributions of this thesis to the body of scientific knowledge. The strongest contributor in our research model is the association between the dissatisfaction with the internal IT solutions and strategic and operational decision authority. Furthermore, a strong positive association can be drawn between the business knowledge in the IT and their strategic contribution. Also, a strong and negative association is present between IT governance implementation and strategic decision authority in business units. The dual outcome of the thesis is reflected by the structure of this chapter, which first states the theoretical implications of our results before the practical implications are presented.

6.1 Theoretical Implications

Based on our research model and the gathered data, we discuss the results and how the hypotheses lead to theoretical implications. First, we are going to address the implications on IT governance, secondly on business knowledge in the IT function, thirdly on the concept of the IT function and finally, on the IT knowledge for business professionals.

6.1.1 IT Governance Research

This thesis contributes to research on IT governance since the distribution of IT decision authority is an intensively investigated topic within this IS research stream. In the earlier period of IT governance research focused on the ideal degree of centralization, respectively decentralization, of an organization's IT function (Brown, 1997; Brown & Magill, 1994; King & Leslie, 1983; Olson & Chervany, 1980). More recent contributions investigate the distribution of IT decision authority between the IT function and business units in general (Agarwal & Sambamurthy, 2002; Dawson et al., 2016; Kopper et al., 2018; Sambamurthy & Zmud, 1999; Tiwana, 2009; Tiwana & Kim, 2015; Weill & Ross, 2004a) but also under the influence of IT consumerization (Gregory et al., 2018; Györy et al., 2012) as well as under the influence of SaaS adoption (Khalil, Fernandez & Fautrero, 2016; Vithayathil, 2018; Winkler et al., 2011; Winkler & Brown, 2013). The reported findings of this thesis contribute to the later research stream. We found strong support for the hypothesized negative association between implemented IT governance mechanisms and strategic IT decision authority in business units. Hence, the claimed strong focus of IT governance on the organization's IT function (Peppard, 2018; Tiwana & Kim, 2015) is supported by this thesis. Furthermore, the claimed effectiveness of IT governance mechanisms, such as the enforcement of process and technology standards or the definition of formal decision-making arrangements (Sambamurthy & Zmud, 1999; Weill & Ross, 2004a) is supported by our findings as well.

In contrast to the strong association between IT governance mechanisms and strategic IT decision authority, the association between IT governance mechanisms and operational IT decision authority has found no support in this thesis. Hence, enforced IT governance mechanisms seem to effectively secure the IT function's strategic decision authority, but do not work in the same way for operational decision authority. This empirical finding corresponds with the conducted literature review, which revealed that a considerable amount of the IT governance literature

limits relevant IT decisions to the strategic dimension (Benaroch & Chernobai, 2017; Dawson et al., 2016; Weill & Ross, 2004a). Due to the claimed strong influence of operational decisions on top-level executive's decision-making through the sum of operational decisions and knowledge gained from operational tasks (Carter, 1971; Weill & Olson, 1989; Xue, Liang & Boulton, 2008), this restriction of IT governance to the strategic decision dimension is questionable.

This thesis could not provide evidence for the hypothesized moderating role of IT governance on the other proposed hypotheses of the research model. In this regard, it needs to be considered that many of the initial hypotheses were also not supported. Thus, this finding does not allow general conclusions about the effectiveness of IT governance mechanisms such as the above discussed direct association of IT governance with strategic IT decision authority does. However, two findings of the differential hypothesis assessment are of high interest. First, the very strong positive association between dissatisfaction of business units with the provided IT solutions and both, strategic and operational, IT decision authority in business units is not moderated by IT governance. Hence, it is evident that IT governance mechanisms are not effective in preventing dissatisfied business units from taking over a higher degree of IT decision authority. This finding corresponds with the claims of shadow IT research that dissatisfaction is a major cause of shadow IT solutions (Behrens, 2009; Györy et al., 2012) and that policies only have limited effect on the restriction of user-driven IT solutions (Rentrop & Zimmermann, 2012). Second, the strong association between IT governance mechanisms and strategic decision authority itself is not moderated by the SaaS adoption of the organization. Accordingly, the degree of SaaS adoption in the organization does not influence the effectiveness of IT governance mechanisms for the retention of strategic IT decision authority.

Following the theory of the knowledge-based view of the firm and its implication that greater decision authority is granted to the organizational unit which possesses more relevant knowledge (Grant, 1996; Jensen & Meckling, 1976), the association of dissatisfaction and IT decision authority implicates that the relevant knowledge for the allocation of IT decision authority comes from another cause than the SaaS adoption within the organization. In fact, IT consumerization and the lowered knowledge barriers for the implementation of IT solutions (Gregory et al., 2018; Györy et al., 2012; Leclercq-Vandelannoitte, 2015; Webb, Schmitz & Teng, 2017) as well as the exposure of employees to SaaS-based IT solutions in private life (Baskerville, 2011; Harris, Ives & Junglas, 2012) are a possible cause for the prevalent IT knowledge among business units which possess great IT decision authority. This goes hand-in-hand with the findings on IT consumerization's transformative impact on IT governance (Gregory et al., 2018).

6.1.2 Business Knowledge of IT Professionals

The findings of this thesis contribute to prior IS research on IT professionals' business competencies. Previous studies suggest that the business knowledge of IT professionals is a key success factor for good relations between the IT function and business units (Bassellier & Benbasat, 2004) and contributes to the alignment of IT and business (Henderson & Venkatraman, 1993). Furthermore, strong business knowledge is required for IT functions, which aspire to proactively support the business (Guillemette & Paré, 2012). The findings of this thesis strongly support this later suggestion as the data shows a strong association between business knowledge in the IT function and the strategic contribution of the IT function. Vithayathil (2018) claims that under the presence of a high SaaS adoption the IT function is

likely to be bypassed by the business units, which instead directly interact with SaaS vendors if the IT function does not have the required business knowledge to add value to the sourced SaaS solutions. The author applies the agent problem (Eisenhardt, 1989) to the relationship between business units and the IT function. This thesis reveals a significant association between business knowledge in the IT function and a lower IT strategic decision authority in business units. This finding supports the applicability of the agency problem to the agency relationship between business units and the IT function, and implicates that business units make use of the IT function as an agent which takes over the IT management of the organization, in case that the IT function has sufficient understanding of the business to fulfil this task. In contrast, IT functions which do not have the required knowledge have less strategic IT decision authority since the potential issues resulting from the agency relationship exceed the benefits for the business units to install them as an agent. In summary, the data suggest the applicability of the agent problem to the relationship between business units and the IT function for the strategic IT decision-making in the organisation. However, the claim of Vithayathil (2018) that under a higher SaaS adoption in the organization the business knowledge in the IT function becomes more important in this agency relationship, is not supported by this thesis. The data shows a notable, however statistical insignificant, moderating effect of SaaS adoption on the association between ITBK and SDA.

6.1.3 Concept of the IT Function

Recent academic contributions claim an inappropriateness of the prevalent concept of the IT function in IS research due to the outdated assumption that the IT function solely accounts for the IT contribution of an organization (Gregory et al., 2018; Kopper et al., 2018; Peppard, 2018). This thesis contributes to these claims in three distinct ways. To start with, the descriptive statistics of the collected data shows a balanced strategic decision authority allocation between business units and the IT, and involvement of the business in operational IT decisions. Likewise, respondents reported a high IT initiative origin in the business units. This supports the claim that the IT contribution in an organization is a joint activity of the business units and the IT function. Next, the finding of this thesis that a higher strategic contribution of the IT function is not associated with a higher decision authority of the IT function, contributes to the claim that IT becomes an integral part of many businesses (Westerman, Bonnet & McAfee, 2014) and that although the IT function possess a great strategic importance, it does not govern the IT contribution in the organization independently (Gregory et al., 2018; Peppard, 2018). Furthermore, this thesis has implications for the call of scholars to recognize the IT contribution of individuals to the organization, which the concept of the IT function does not cover (Baskerville, 2011; Gregory et al., 2018; Peppard, 2018). The notable participation of business units in the operational IT decisions, revealed by the data of this thesis, might be a result of the increased importance of user-driven innovation for the IT contribution in the organization. Moreover, the identified strong association between dissatisfaction of business units and their participation in IT decision-making is a possible motivator for individuals to originate user-driven IT innovation, and therefore constitutes a finding that future research can build upon to further explore the correlation between employees' satisfaction with the provided IT solutions and their IT contribution to the organization.

Furthermore, the strong association of IT governance mechanisms with strategic IT decision authority in the IT function raises the question of whether a high strategic IT decision authority in business units is an intentional organizational design choice. Even though scholars claim the too narrow focus of IT governance on the IT function (Peppard, 2018; Tiwana & Kim, 2015),

accountability frameworks for IT decision authority allow the option that business units are the primary strategic IT decision makers (Brown, 1997; Sambamurthy & Zmud, 1999; Weill & Ross, 2004a). Furthermore, process and technology standards, which are another major IT governance mechanism and limit the decision freedom of business units and the IT function (Weill & Ross, 2004a), do not unilaterally favour a higher IT decision authority in business units. Hence, the presence of a higher strategic IT decision authority of business units under the absence of defined IT decision accountability structures and standards, as suggested by the collected data, appears to be not an actively governed decision-making arrangement and therefore may be an unintentional organizational design choice.

6.1.4 Dissatisfaction

While most of the existing IS research focuses on analysing user satisfaction on an individual basis (Benlian, Koufaris & Hess, 2011; Joshi & Rai, 2000; Liu, Chang & Tsai, 2015; Oktal, Alpu & Yazici, 2016; Wixom & Todd, 2005), our research contributes to the scientific body by using STS to involve the organizational structure in the decision authority context. With the emergence of IT consumerization (Gregory et al., 2018; György et al., 2012) and an increasing adoption of SaaS (Benlian, Hess & Buxmann, 2009; Janssen & Joha, 2011; Safari, Safari & Hasanzadeh, 2015; Wu, 2011), the measurement of (dis-)satisfaction on an organizational level will become increasingly important and the STS model has proven to be an applicable theory.

According to this thesis, dissatisfaction with the internally provided IT is the most important factor which explains a high strategic and operational IT decision authority of business units. This further strengthens the findings of Behrens (2009) and György et al. (2012), which suggest that the emergence of shadow IT is partially based on the dissatisfaction of employees with the internal IT solutions. Because their approach suggests that the dissatisfaction is caused by the missing alignment between business and IT, our thesis further develops their initial claims as our research emphasizes on the strengths of SaaS when compared to the internal IT and on the better resource availability. This leads to a higher engagement of business units in IT decision authority, especially when the internal IT cannot offer the same quality or amount of resources.

6.1.5 IT Knowledge of Business Professionals

The overall results of our thesis suggest that the IT knowledge in business units does not influence the allocation of decision authority. Researchers in the SaaS context support this finding as they argue that a key advantage of SaaS is that applications can be configured and customized without involvement of the IT function or the need for coding (Benlian, Koufaris & Hess, 2011; Bibi, Katsaros & Bozanis, 2012; Cusumano, 2010; Seethamraju, 2015; Winkler & Brown, 2013). Shadow IT research further supports the idea as they state that complex IS solutions can be introduced without a deep understanding of IT (Fürstenau & Rothe, 2014). This could implicate that with the introduction of modern IT solutions, no detailed IT knowledge is needed. However, as mentioned in the limitations part, the perception of IT knowledge can greatly vary between the IT and the business departments. Especially with the emergence of IT consumerization, false expectations of having extensive IT knowledge in business units could be problematic.

Nevertheless, a closer analysis of our subgroup tests reveals that IT professionals report a higher strategic IT decision authority, the higher the IT knowledge in business units is. The higher

allocation of operational decision authority under higher IT knowledge in business units, on the other hand, is not supported. The large differences between the two subgroups further confirm a different perception between the IT function and business units. The largest difference between the two functions is present for the IT initiative origin in business units. While the IT function reports that the more IT initiatives are originated by the business units, the closer is the IT decision authority to the IT function, especially for the strategic decision authority. However, the business units report that the strategic and operational decision authority is closer to them in this case. This large disagreement between the two subgroups additionally explains why the hypothesis was not supported for the overall model.

6.2 Practical Implications

After having drawn the theoretical implications, we are going to present the practical implications that can be drawn from our research. First of all, we are going to discuss the role of the IT function, secondly IT governance mechanisms, thirdly the dissatisfaction with provided IT solutions and lastly, skills and knowledge in the era of SaaS.

6.2.1 Role of the IT Function

The role of the IT function is claimed to change with the further adoption of SaaS by organizations (Vithayathil, 2018) and the trend of IT consumerization which is heavily grounded in the exposure of employees with SaaS products as consumers (Baskerville, 2011; Gregory et al., 2018; Harris, Ives & Junglas, 2012; Leclercq-Vandelannoitte, 2015). The claim of Vithayathil (2018) that IT functions with insufficient business knowledge cannot add value to SaaS-based IT solutions and will, therefore, shrink in importance, is supported by this thesis as it reveals an association between business knowledge in the IT function and the IT function's strategic decisions authority. Hence, organizations should focus on the business knowledge development of their IT function if they desire a strong participation of the IT function in IT decision-making. On the contrary, organizations which pursue a system provider IT function which reactively serves business requirements (Guillemette & Paré, 2012) and mainly focuses on the development, maintenance and support of IT solutions (Venkatraman, 1997), are likely to expect a lower strategic IT decision authority of the IT function with the further emergence of SaaS.

6.2.2 IT Governance Mechanisms

The thesis suggests that strong IT governance mechanisms in the organization secure participation of the IT function in strategic IT decision-making. Therefore, the implementation and enforcement of IT governance mechanisms is a promising way for organizations which wish to prevent a shift of IT decision authority away from its IT function. However, it is recommended that organizations which do so, focus on developing the business knowledge of IT professionals to ensure that the IT function understands the business needs (Bassellier & Benbasat, 2004; Guillemette & Paré, 2012; Sambamurthy & Zmud, 1999). Otherwise, they run the risk of creating a misalignment between business requirements and IT solutions. This undesirable state causes dissatisfaction of the business units with the provided IT solutions (Henderson & Venkatraman, 1993), and in turn is likely to create shadow IT (Behrens, 2009; Rentrop & Zimmermann, 2012). Likewise, this thesis provides evidence that dissatisfaction is a major

motivator for business units to take over strategic and operational IT decision authority, and that even strong IT governance mechanisms are not an effective moderator of this shift.

6.2.3 Dissatisfaction with Provided IT Solutions

The data of this thesis suggests that dissatisfaction of business units with the provided IT solutions is an important driver for a greater overall IT decision authority of business units. Furthermore, this thesis suggests that IT knowledge of business units is positively associated with the dissatisfaction of business units. The IT knowledge of business units is claimed to be leveraged by employees' usage of SaaS-based IT solutions in their private life (Baskerville, 2011; Gregory et al., 2018) and influences their satisfaction with business IT (Harris, Ives & Junglas, 2012; Jarrahi et al., 2017). Hence, the exposure of business professionals with advanced SaaS-based IT solutions is a strong driver for the shift of IT decision authority towards business units.

In contrast, this thesis provides evidence that the SaaS adoption in the company is not a significant factor. Therefore, this thesis implicates that organizations cannot ignore the impact of SaaS on the role of their IT function, even if they do not extensively use SaaS-based IT solutions so far. Through the effect of employees' satisfaction with the provided IT solutions, the presence of SaaS affects the role of IT function. The missing influence of strong governance on the relationship between dissatisfaction and the operational decision authority further strengthens this argument.

6.2.4 Implications for SaaS Providers

Earlier IS research suggests that the missing alignment between business and IT as well as the resulting dissatisfaction of employees are key factors of shadow IT creation (Behrens, 2009; György et al., 2012). However, our thesis suggests that the higher quality, shorter release cycles and the better cost-efficiency of SaaS, compared to the internal IT (indicator BUSA2) and the better availability of resources (indicator BUSA3) are key drivers for the dissatisfaction of business units with their internal IT.

This leads to the implications for SaaS providers that they should focus on product offers which are superior in quality and more flexible to deploy than the services which internal IT functions are able to deliver. Armbrust et al. (2010) support this implication as they state that for cloud computing providers, business continuity and service availability should be the main concerns. Moreover, the allocation of IT decision authority to business units implicates that SaaS providers do not necessarily need to collaborate with internal IT functions.

6.2.5 Skills and Knowledge in the Era of SaaS

Although our thesis does not support the hypothesis that increased IT knowledge in business units is associated with a higher IT decision authority, a closer look at the subgroup tests reveals that among business respondents IT knowledge of the business is associated with a higher IT initiative origin and decision authority in the business units. Respondent bias (Podsakoff et al., 2003) is a possible cause for these subgroup differences. However, another possible explanation of the results is a different perception of IT knowledge among business and IT professionals. The development and maintenance of on-premise IT applications require a broad spectrum of IT knowledge, which usually is pertinent in the IT function, whereas for the use of SaaS it is

sufficient if the cloud vendor has this knowledge (McAfee, 2011; Vithayathil, 2018). Hence, IT and business professionals have a different perception of relevant IT knowledge, since the IT function is frequently in charge of maintaining on-premise legacy applications and needs to possess the required skills for these activities (Westerman, Bonnet & McAfee, 2014), whereas business units are able to implement powerful IT solution based on SaaS with relatively low technical expertise (McAfee, 2011; Vithayathil, 2018). This difference in the required IT knowledge is a possible cause for the reported data, and the divergent perception of relevant IT knowledge is suggested to be a possible source for lack of understanding within organizations in this context.

Independently of the direct association between IT knowledge in business units and IT decision authority, both constructs are strongly associated through dissatisfaction as a mediator, which, in turn, the data reveals as the strongest influence factor of a high IT decision authority in business units. Therefore, the thesis suggests that organizations should leverage the IT knowledge of their business units if they strive to engage the business in IT issues and want to allocate a high IT decision authority to the business. In contrast, the importance of the expressed dissatisfaction with the provided IT solutions leads to the managerial implication that organizations which desire to allocate a high IT decision authority to the IT function, should focus on creating an alignment between the IT and the business requirements to satisfy the business units. Although, the further emerging phenomenon of IT consumerization questions the feasibility of a predominant IT decision authority in the IT function and should be critically noted for the design of future IT decision authority arrangements such as the composition of committees or councils.

7 Conclusion

The emergence of SaaS and the related phenomenon of IT consumerization lead to increasingly indistinct boundaries between business units and the organization's IT function (Baskerville, 2011; Gregory et al., 2018; Harris, Ives & Junglas, 2012; McAfee, 2011). This development challenges the concept of the IT function which controls the entire IT contribution to the organization (Peppard, 2018) and the prevalent assumptions of capital and knowledge requirements for the implementation of IT solutions (Baskerville, 2011; György et al., 2012). Since the allocation of IT decision rights in organizations are based on these premises, the need for IT governance research to explain the influence factors of this phenomenon arises (Kopper et al., 2018; Vithayathil, 2018; Winkler & Brown, 2013). Thereby, the importance of IT decision authority allocation for the successful management of an organization's IT usage (Agarwal & Sambamurthy, 2002; Sambamurthy & Zmud, 1999; Weill & Ross, 2004a) motivated us to pose the following research question:

What factors of Software-as-a-Service influence the allocation of IT decision authority between the IT function and business units?

To address the posed research question this thesis developed a research model which employs constructs suggested by prior research and four theoretical lenses. While subsets of the used constructs have already been applied in earlier academic contributions to address related research questions, the composition of the constructs in this thesis constitutes a new contribution to the body of scientific knowledge. To test the proposed research model, we use data of 82 distinct organizations which were collected throughout three-week-lasting survey research. The thesis applies partial least squares structural equation modelling (PLS-SEM) to analyse the data and test the significance of the hypothesised associations.

The proposed measurement model complies with the thresholds for the reliability and validity measures recommended in the methodology literature (e.g. Fornell & Larcker, 1981; Gefen, Straub & Boudreau, 2000; Hair, Ringle & Sarstedt, 2011; MacKenzie, Podsakoff & Podsakoff, 2011) and commonly applied within IS research (e.g. Bassellier & Benbasat, 2004; Webb, Schmitz & Teng, 2017; Wixom & Watson, 2001). A common method bias assessment (Podsakoff et al., 2003) does not reveal any method-based variance in the collected data. However, the strong concentration of German and Swiss organizations in the sample may limit the generalizability of our reported findings on other populations. The data reveals a strong association between business units' dissatisfaction with the provided IT solutions and the overall IT decision authority of business units as well as between the presence of IT governance mechanisms and the strategic IT decision authority of the IT function. Moreover, the proposed association between business knowledge in the IT function and the strategic contribution of the IT function is strongly supported. The association between the IT knowledge in business units and the business units' dissatisfaction with the provided IT solutions is also strongly supported, and confirms the hypothesized mediating role of dissatisfaction. Furthermore, the data reveals weak support for the association between business knowledge in the IT function and their strategic IT decision authority. In contrast, no evidence is revealed for the moderating effect of IT governance mechanisms and the SaaS adoption of the organization as the differential hypotheses are not significantly supported.

7.1 Contributions

The thesis contributes to prior research on IT governance with two major implications. First, the thesis supports the claimed effectiveness of enforced IT governance mechanisms for the allocation of strategic IT decision authority (Weill & Ross, 2004a) and provides evidence for the strong focus of IT governance mechanisms on the IT function, which recent academic contributions suggest to be inappropriate (Gregory et al., 2018; Peppard, 2018; Tiwana & Kim, 2015). Second, the data suggest that IT governance mechanisms, despite the strong association with strategic IT decision authority of the IT function, cannot moderate the effect that dissatisfied business units take over IT decision authority.

The dissatisfaction of business units with the provided IT solutions is distinctly the strongest influence factor for a high strategic and operational IT decision authority in business units that can be identified in the data. While IT knowledge in business units does not have a direct influence on IT decision authority, it is a strong driver of dissatisfaction and thus, has an indirect influence. SaaS is well recognized as a notable driver for employees' increased expectations on business IT and a driver of shadow IT creation due to the exposure of employees' to powerful SaaS-based IT solutions as consumers in their private life (Gregory et al., 2018; György et al., 2012; Harris, Ives & Junglas, 2012; Jarrahi et al., 2017). Hence, the results of this thesis suggest that also companies with a low degree of SaaS adoption are affected by the impact of SaaS on IT decision authority allocation.

Moreover, the data provides evidence for the high relevance of business knowledge in the IT function. The implications of this thesis contribute to the findings of earlier research that business knowledge in the IT function is a success factor for a proactive and strategically important value creation of the IT function in the organization (Guillemette & Paré, 2012) and for the IT function's ability to add value to SaaS-based IT solutions (Vithayathil, 2018). Likewise, the data of this thesis provides evidence that business knowledge impacts the strategic relevance of the IT function's contribution and its strategic IT decision authority.

7.2 Future Research

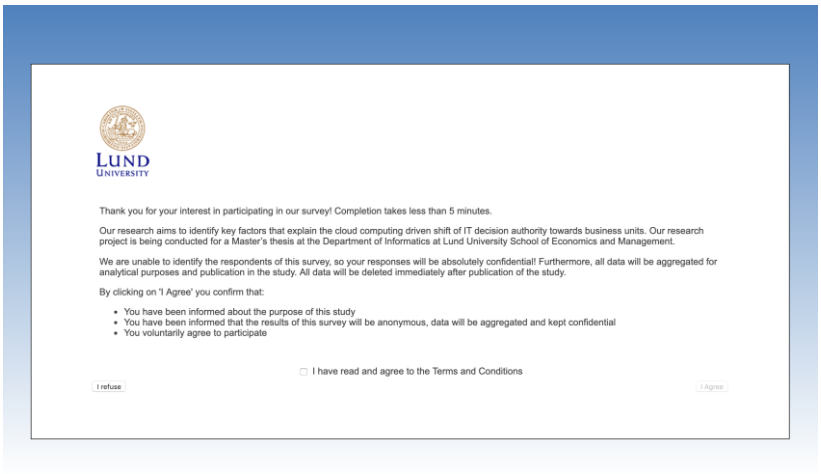
The cross-sectional design of this thesis allowed the identification of major factors which explain the influence of SaaS on the allocation of IT decision authority. The identified factors are, in turn, influenced by the further emergence of SaaS. This leads to the implication that future research should apply a longitudinal research design to capture the dynamics of this influence with the further emergence of SaaS better. Thereby, future research can provide evidence on whether the factors, identified in this thesis, lead to an increasing shift of IT decision authority from the IT function to business units.

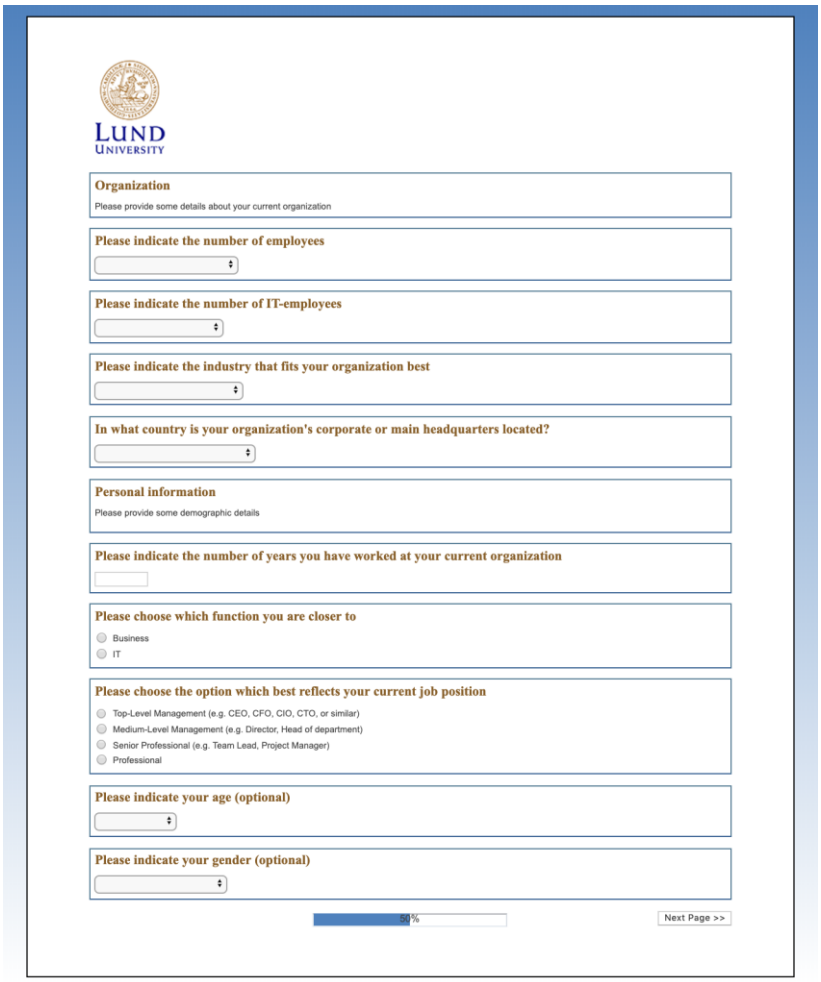
Moreover, the finding of this thesis that the presence of IT governance mechanisms strongly correlates with strategic IT decision authority in business units indicate that a high IT decision authority in business units is not implemented through governance mechanisms. This raises the question of whether a high IT decision authority in business units is a deliberate organizational design choice or the result of opportunistic behaviour. Future research could explore this question and should consider the significant influence of business units' dissatisfaction that was identified in this thesis.

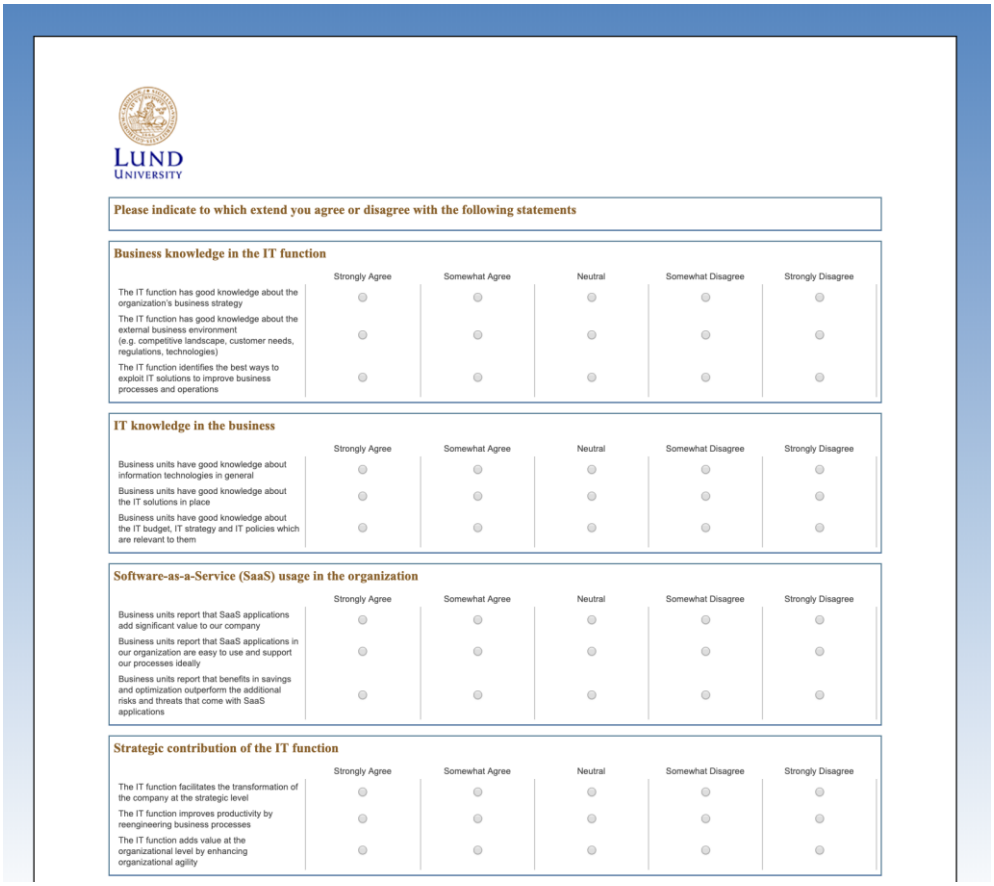
Finally, we suggest that future research should further evolve the TAM3-model, which was introduced by Venkatesh & Bala (2008). The initial TAM-model has already evolved and adapted to changes in technology over time. Correspondingly, the TAM3-model should be adjusted to the technology-driven impact of SaaS and IT consumerization. The current model does not include any factors that take into consideration how users and their perception about IT, perceived ease of use and perceived usefulness is influenced by IT consumerization and SaaS. However, the increased exposure of employees' to IT as consumers leverages their IT knowledge (Gregory et al., 2018; György et al., 2012; Harris, Ives & Junglas, 2012; Jarrahi et al., 2017), and this thesis identified a strong association between IT knowledge and user dissatisfaction. Hence, future research should investigate how the stated factors influence the acceptance of technology and, if applicable, should include them into the model.

Appendix A – Survey Instrument

Electronic Questionnaire







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Please indicate to which extend you agree or disagree with the following statements

Business knowledge in the IT function

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
The IT function has good knowledge about the organization's business strategy	○	○	○	○	○
The IT function has good knowledge about the external business environment (e.g. competitive landscape, customer needs, regulations, technologies)	○	○	○	○	○
The IT function identifies the best ways to exploit IT solutions to improve business processes and operations	○	○	○	○	○

IT knowledge in the business

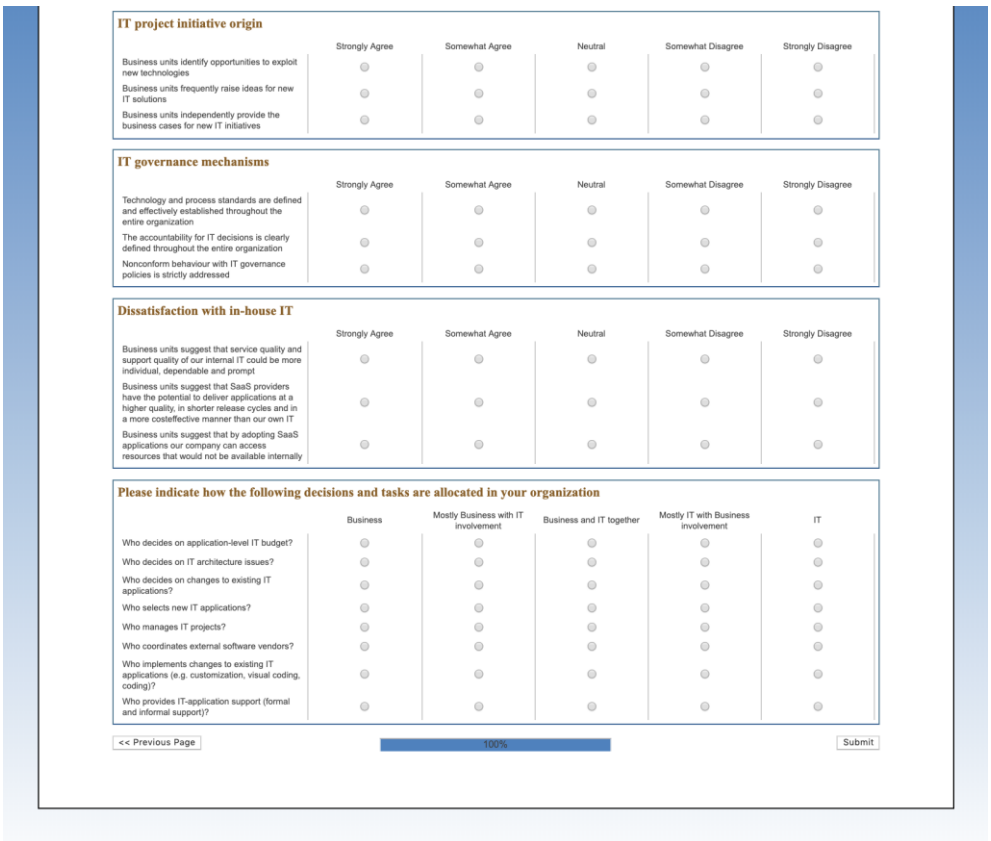
	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
Business units have good knowledge about information technologies in general	○	○	○	○	○
Business units have good knowledge about the IT solutions in place	○	○	○	○	○
Business units have good knowledge about the IT budget, IT strategy and IT policies which are relevant to them	○	○	○	○	○

Software-as-a-Service (SaaS) usage in the organization

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
Business units report that SaaS applications add significant value to our company	○	○	○	○	○
Business units report that SaaS applications in our organization are easy to use and support our processes ideally	○	○	○	○	○
Business units report that benefits in savings and optimization outperform the additional risks and threats that come with SaaS applications	○	○	○	○	○

Strategic contribution of the IT function

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
The IT function facilitates the transformation of the company at the strategic level	○	○	○	○	○
The IT function improves productivity by reengineering business processes	○	○	○	○	○
The IT function adds value at the organizational level by enhancing organizational agility	○	○	○	○	○



IT project initiative origin

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
Business units identify opportunities to exploit new technologies	○	○	○	○	○
Business units frequently raise ideas for new IT solutions	○	○	○	○	○
Business units independently provide the business cases for new IT initiatives	○	○	○	○	○

IT governance mechanisms

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
Technology and process standards are defined and effectively established throughout the entire organization	○	○	○	○	○
The accountability for IT decisions is clearly defined throughout the entire organization	○	○	○	○	○
Nonconform behaviour with IT governance policies is strictly addressed	○	○	○	○	○

Dissatisfaction with in-house IT

	Strongly Agree	Somewhat Agree	Neutral	Somewhat Disagree	Strongly Disagree
Business units suggest that service quality and support quality of our internal IT could be more individual, dependable and prompt	○	○	○	○	○
Business units suggest that SaaS providers have the potential to deliver applications at a higher quality, in shorter release cycles and in a more costeffective manner than our own IT	○	○	○	○	○
Business units suggest that by adopting SaaS applications our company can access resources that would not be available internally	○	○	○	○	○

Please indicate how the following decisions and tasks are allocated in your organization

	Business	Mostly Business with IT involvement	Business and IT together	Mostly IT with Business involvement	IT
Who decides on application-level IT budget?	○	○	○	○	○
Who decides on IT architecture issues?	○	○	○	○	○
Who decides on changes to existing IT applications?	○	○	○	○	○
Who selects new IT applications?	○	○	○	○	○
Who manages IT projects?	○	○	○	○	○
Who coordinates external software vendors?	○	○	○	○	○
Who implements changes to existing IT applications (e.g. customization, visual coding, coding)?	○	○	○	○	○
Who provides IT-application support (formal and informal support)?	○	○	○	○	○

<< Previous Page 100% Submit

Questionnaire Draft

Introduction

Thank you for your interest in participating in our survey! Completion takes less than 5 mins.

Our research aims to identify key factors that explain the cloud computing driven shift of IT decision authority towards business units. Our research project is being conducted for a Master's thesis at the Department of Informatics at Lund University School of Economics and Management.

We are unable to identify the respondents of this survey, so your responses will be absolutely confidential! Furthermore, all data will be aggregated for analytical purposes and publication in the study. All data will be deleted immediately after publication of the study.

By clicking on 'I agree' you confirm that:

- You have been informed about the purpose of this study
- You have been informed that the results of this survey will be anonymous, data will be aggregated and kept confidential
- You voluntarily agree to participate

Survey Items

Please provide some details about your current position and company	
Personal information	
Please indicate your gender	☐ Female ☐ Male ☐ Other If other, please specify [Gender]
Please indicate your age	☐ < 29 years ☐ 30 – 39 years ☐ 40 – 49 years ☐ 50 – 59 years ☐ 60+ years

Please choose which function you are closer to	☐ Business ☐ IT
Please choose the option which best reflects your current position	☐ Top-Level Management (e.g. CEO, CFO, CIO, CTO, or similar) ☐ Medium-Level Management (e.g. Director, Head of department) ☐ Senior Professional (e.g. Team Lead, Project Manager) ☐ Professional
Please indicate the years you have worked at your current organization	[Number of years]
In what country is your organization's corporate or main headquarters located?	[List of countries]
Organization size	
Number of employees	☐ < 200 employees ☐ 200 – 500 employees ☐ 500 – 1,000 employees ☐ 1,000 – 5,000 employees ☐ 5,000 – 10,000 employees ☐ 10,000 – 20,000 employees ☐ 20,000+ employees
Number of IT-employees	☐ < 10 IT-employees ☐ 10 – 50 IT-employees ☐ 50 – 100 IT-employees ☐ 100 – 500 IT-employees ☐ 500+ IT-employees

Industry	
Please indicate the industry that describes your organization best	☐ Banking & Insurance ☐ Chemicals & Pharma ☐ Consumer Goods ☐ Electronics & High-tech ☐ Utilities ☐ Food & Agriculture ☐ Health Care ☐ Manufacturing & Automotive ☐ Professional Services ☐ Public Sector & Education ☐ Retail & Wholesale ☐ Other

Survey questions

Please indicate the degree to which you agree with each of the following statements	**Strongly Agree**	**Some-what Agree**	**Neutral**	**Some-what Dis-agree**	**Strongly Disagree**
IT knowledge in the Business					
Business units have good knowledge about information technologies in general.	☐	☐	☐	☐	☐
Business units have good knowledge about the IT applica-tions in place.	☐	☐	☐	☐	☐
Business units have good knowledge about the IT budget, IT strategy and IT policies which are relevant to them.	☐	☐	☐	☐	☐

Business knowledge in the IT function					
The IT function has good knowledge about the organization's business strategy.	☐	☐	☐	☐	☐
The IT function has good knowledge about the external business environment (e.g. competitive landscape, customer needs, regulations, technologies).	☐	☐	☐	☐	☐
The IT function identifies the best ways to exploit IT solutions to improve business processes and operations.	☐	☐	☐	☐	☐
IT Project initiative origin					
Business units identify opportunities to exploit new technologies.	☐	☐	☐	☐	☐
Business units frequently raise ideas for new IT solutions.	☐	☐	☐	☐	☐
Business units independently provide the business cases for new IT initiatives.	☐	☐	☐	☐	☐
Strategic contribution of the IT function					
The IT function facilitates the transformation of the company at the strategic level.	☐	☐	☐	☐	☐
The IT function improves productivity by reengineering business processes.	☐	☐	☐	☐	☐
The IT function adds value at the organizational level by enhancing organizational agility.	☐	☐	☐	☐	☐
Dissatisfaction with in-house IT					
Business units suggest that service quality and support quality of	☐	☐	☐	☐	☐

our internal IT could be more individual, dependable and prompt.					
Business units suggest that SaaS providers have the potential to deliver applications at a higher quality, in shorter release cycles and in a more cost-effective manner than our own IT.	☐	☐	☐	☐	☐
Business units suggest that by adopting SaaS applications our company can access resources that would not be available internally.	☐	☐	☐	☐	☐
Software-as-a-Service (SaaS) adoption in the organization					
Business units report that SaaS applications add significant value to our company.	☐	☐	☐	☐	☐
Business units report that SaaS applications in our organization are easy to use and support our processes ideally.	☐	☐	☐	☐	☐
Business units report that benefits in savings and optimization outperform the additional risks and threats that come with SaaS applications.	☐	☐	☐	☐	☐
IT Governance mechanisms					
Technology and process standards are defined and effectively established throughout the entire organization.	☐	☐	☐	☐	☐
The accountability for IT decisions is clearly defined throughout the entire organization.	☐	☐	☐	☐	☐
Nonconform behaviour with IT governance policies is strictly addressed.	☐	☐	☐	☐	☐

Please rate where the responsibilities for the following activities lie.	**Business**	**Mostly Business with IT involvement**	**Business and IT together**	**Mostly IT with Business involvement**	**IT**
Who decides on application-level IT budget?	☐	☐	☐	☐	☐
Who decides on IT architecture issues?	☐	☐	☐	☐	☐
Who decides on changes to existing IT applications?	☐	☐	☐	☐	☐
Who selects new IT applications?	☐	☐	☐	☐	☐
Who manages IT projects?	☐	☐	☐	☐	☐
Who coordinates external software vendors?	☐	☐	☐	☐	☐
Who implements changes to existing IT applications (e.g. customization, visual coding, coding)?	☐	☐	☐	☐	☐
Who provides IT-application support (formal and informal support)?	☐	☐	☐	☐	☐

Thank you message

Thank you for filling out this survey! We are very grateful for your participation.

Should you have any questions or feedback, please contact Philipp Gerdsmeier (ph5530ge-s@student.lu.se) or Kevin Wespi (ke1737we-s@student.lu.se).

Appendix B – Supplemental Statistics

Subgroup tests for differential hypotheses

Hy-pothe-sis	IT Function		Business function		Difference	
	Operational	Strategic	Operational	Strategic	Operational	Strategic
1a	0.217	0.017	-0.333	-0.313	0.55	0.33
2a	-0.006	0.105	0.316	0.047	0.322	0.058
2b	-0.047	-0.217	0.299	0.14	0.346	0.357
3a	0.003	-0.058	-0.599	-0.397	0.602	0.339
3b	-0.086	-0.01	0.289	0.346	0.375	0.356
4a	0.277	0.266	0.02	-0.138	0.257	0.404
4b	-0.2	0.016	-0.126	0.034	0.074	0.018
5a	-0.254	-0.427	-0.095	0.183	0.159	0.61
5b	-0.247	0.121	-0.128	-0.236	0.119	0.357
8a	0.124	0.084	0.688	0.298	0.564	0.214
8b	0.581	0.083	-0.01	-0.058	0.591	0.141

Descriptive Statistics

Measure / Construct	Mean	Median	Median - Likert	SDEV
BUIT	3.18293	3	Neutral	0.894
ITBK	3.93089	4	Somewhat Agree	0.634
BUSA	3.39024	4	Somewhat Agree	0.949
BUIO	3.63008	4	Somewhat Agree	0.733
ITSC	3.97154	4	Somewhat Agree	0.786
SSAD	3.54878	4	Somewhat Agree	0.763

GOV	3.47561	3	Neutral	0.964
SDA	2.72866	3	Business and IT together	0.729
ODA	2.03659	2	Mostly Business with IT involvement	0.733

f-square values for hypotheses

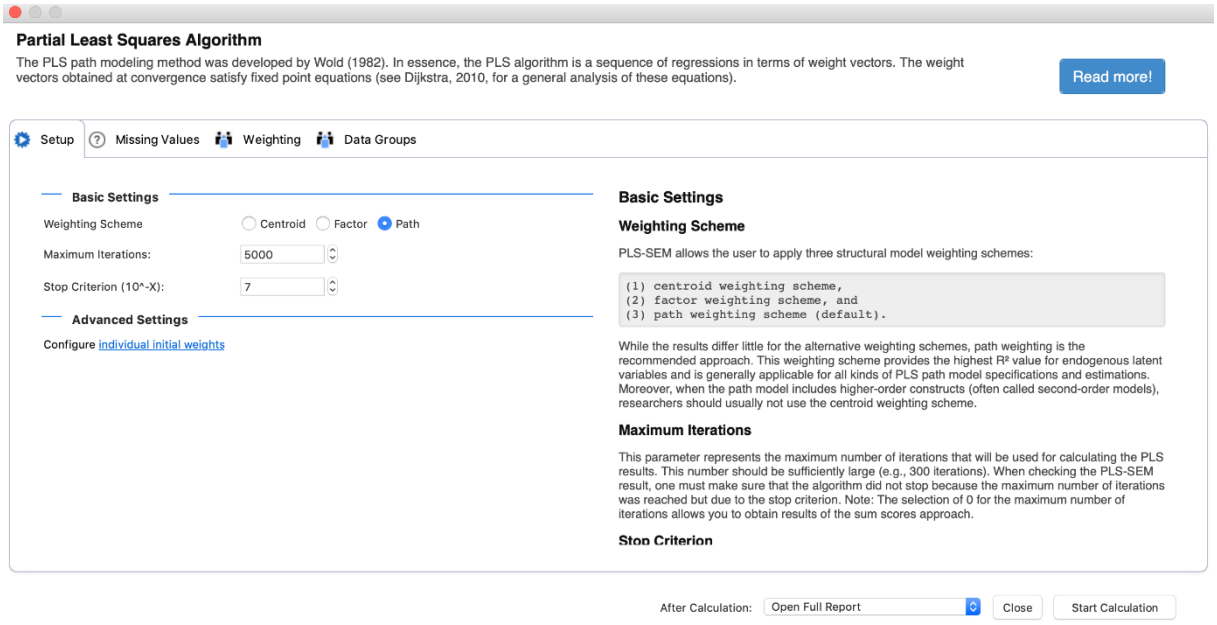
	BUIO	ODA	BUSA	ITSC	SDA
ITBK		0.034		0.313	0.083
GOV		0.021			0.163
BUIO		0.048			0.069
BUIT	0.056	0.007	0.098		0.06
BUSA		0.33			0.304
ITSC		0			0.042

f-square values for differential hypotheses

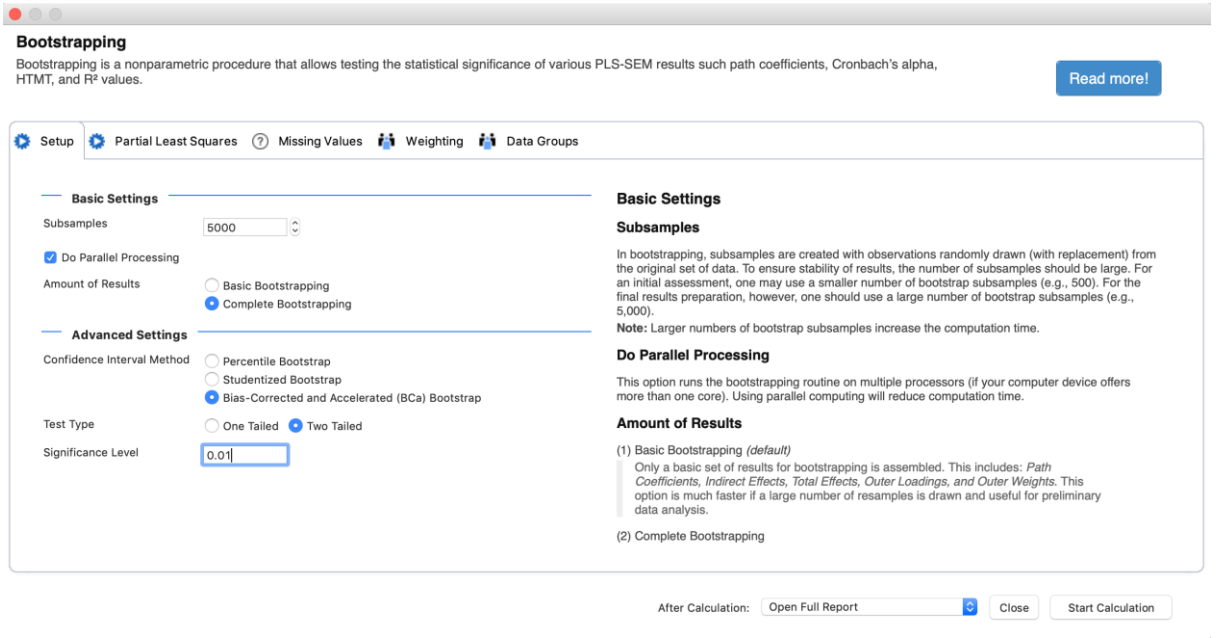
	Operational decision authority	Strategic decision authority
GOV on BUSA	0.004	0.02
GOV on ITBK	0.011	0.02
GOV on BUIT	0.001	0.018
GOV on BUIO	0.019	0.008
GOV on ITSC	0.027	0.12
SSAD on BUIT	0	0.026
SSAD on ITBK	0.109	0.036
SSAD on BUSA	0.001	0.016
SSAD on GOV	0.002	0.027
SSAD on BUIO	0.026	0.004
SSAD on ITSC	0.058	0.038

Appendix C – Data Analysis Settings

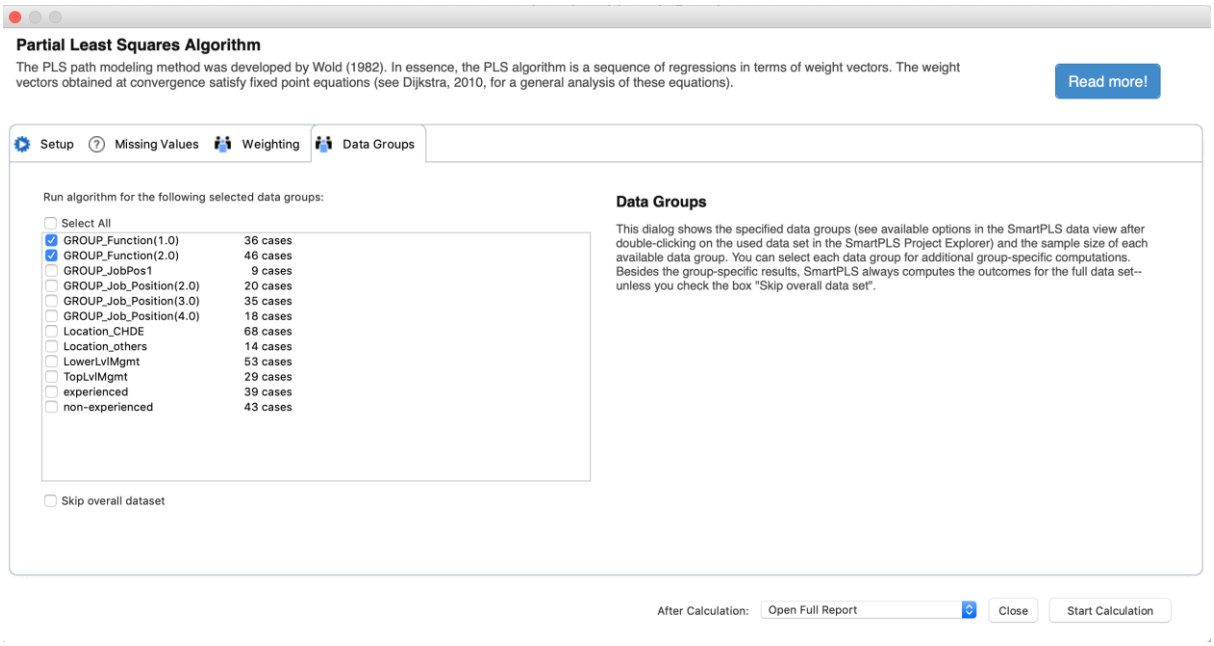
The partial least squares structural equation modelling (PLS-SEM) data analysis was carried out in the software tool *SmartPLS* (Ringle, Wende & Becker, 2015) in version 3.2.8. The thesis chapters 4.5 and 5.1 – 5.4 describe the applied statistical measures and state the major parameter settings for the PLS coefficient and bootstrapping calculation procedures. For a better reproducibility, the following screenshots show the complete settings used for the data analysis.



Partial least square algorithm



Bootstrapping



Partial least squares subgroups

References

Agarwal, R. & Sambamurthy, V. (2002). Principles and Models for Organizing the IT Function, *MIS Quarterly Executive*, [e-journal] vol. 1, Available Online: https://www.researchgate.net/publication/220500634_Principles_and_Models_for_Organizing_the_IT_Function [Accessed 12 March 2019].

Ajzen, I. & Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behavior., [e-book] Englewood Cliffs, N.J. : Prentice-Hall, cop. 1980, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat07147a&AN=lub.224868&site=eds-live&scope=site [Accessed 25 March 2019].

Al-Hujran, O., Al-Lozi, E. M., Al-Debei, M. M. & Maqableh, M. (2018). Challenges of Cloud Computing Adoption from the TOE Framework Perspective, *International Journal of E-Business Research (IJEBR)*, [e-journal] vol. 14, no. 3, pp.77–94, Available Online: https://www.researchgate.net/publication/325951656_Challenges_of_Cloud_Computing_Adoption_From_the_TOE_Framework_Perspective [Accessed 25 April 2019].

Alharbi, S. T. (2014). Trust and Acceptance of Cloud Computing: A Revised UTAUT Model, in *2014 International Conference on Computational Science and Computational Intelligence*, 2014, IEEE, pp.131–134, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edseee&AN=edseee.6822317&site=eds-live&scope=site [Accessed 20 April 2019].

Allen, J. P. (2003). The Evolution of New Mobile Applications: A Sociotechnical Perspective, *International Journal of Electronic Commerce*, [e-journal] vol. 8, no. 1, p.23, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.27751085&site=eds-live&scope=site [Accessed 25 March 2019].

Applegate, L. M., Austin, R. D., McFarlan, F. W. & Applegate, L. M. (2003). Corporate Information Strategy and Management : Text and Cases, McGraw-Hill Irwin.

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I. & Zaharia, M. (2010). A View of Cloud Computing, *Communications of the ACM*, [e-journal] vol. 53, no. 4, pp.50–58, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edselc&AN=edselc.2-52.0-77950347409&site=eds-live&scope=site [Accessed 20 April 2019].

Autry, C. W., Grawe, S. J., Daugherty, P. J. & Richey, R. G. (2010). The Effects of Technological Turbulence and Breadth on Supply Chain Technology Acceptance and Adoption, *Journal of Operations Management*, [e-journal] vol. 28, no. 6, pp.522–536, Available Online: http://dx.doi.org/10.1016/j.jom.2010.03.001 [Accessed 13 April 2019].

Bagozzi, R. P. & Yi, Y. (1988). On the Evaluation of Structural Equation Models, *Journal of the Academy of Marketing Science*, [e-journal] vol. 16, no. 1, pp.74–94, Available Online: http://link.springer.com/10.1007/BF02723327 [Accessed 10 May 2019].

Baker, J. (2012). The Technology–Organization–Environment Framework., *Information Systems Theory*, [e-journal] p.231, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=93942525&site=eds-live&scope=site [Accessed 12 March 2019].

Bala, H. & Venkatesh, V. (2013). Changes in Employees' Job Characteristics during an Enterprise System Implementation: A Latent Growth Modeling Perspective, *MIS Quarterly*, [e-journal] vol. 37, no. 4, pp.1113–1140, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edselc&AN=edselc.2-52.0-84885955840&site=eds-live&scope=site [Accessed 3 May 2019].

Baskerville, R. (2011). Individual Information Systems as a Research Arena, *European Journal of Information Systems*, [e-journal] vol. 20, no. 3, pp.251–254, Available Online: https://www.tandfonline.com/doi/full/10.1057/ejis.2011.8 [Accessed 18 April 2019].

Bassellier, G. & Benbasat, I. (2004). Business Competence of Information Technology Professionals: Conceptual Development and Influence on IT-Business Partnerships, *MIS Quarterly*, [e-journal] vol. 28, no. 4, p.673, Available Online: https://www.jstor.org/stable/10.2307/25148659 [Accessed 2 April 2019].

Bassellier, G., Benbasat, I. & Reich, B. H. (2003). The Influence of Business Managers' IT Competence on Championing IT, *Information Systems Research*, [e-journal] vol. 14, no. 4, pp.317–336, Available Online: http://pubsonline.informs.org/doi/abs/10.1287/isre.14.4.317.24899 [Accessed 29 March 2019].

Baxter, G. & Sommerville, I. (2011). Socio-Technical Systems: From Design Methods to Systems Engineering, *Interacting with Computers*, [e-journal] vol. 23, pp.4–17, Available Online: http://10.0.3.248/j.intcom.2010.07.003 [Accessed 3 December 2018].

Behrens, S. (2009). Shadow Systems, *Communications of the ACM*, [e-journal] vol. 52, no. 2, p.124, Available Online: http://portal.acm.org/citation.cfm?doid=1461928.1461960 [Accessed 23 January 2019].

Benaroch, M. & Chernobai, A. (2017). Operational IT Failures, IT Value Destruction, and Board-Level IT Governance Changes, *MIS Quarterly*, [e-journal] vol. 41, no. 3, pp.729–762, Available Online: https://aisel.aisnet.org/misq/vol41/iss3/6 [Accessed 17 April 2019].

Benlian, A. & Hess, T. (2011). Opportunities and Risks of Software-as-a-Service: Findings from a Survey of IT Executives, *Decision Support Systems*, [e-journal] vol. 52, no. 1, pp.232–246, Available Online: http://dx.doi.org/10.1016/j.dss.2011.07.007 [Accessed 12 March 2019].

Benlian, A., Hess, T. & Buxmann, P. (2009). Drivers of SaaS-Adoption – An Empirical Study of Different Application Types., *Business & Information Systems Engineering*, [e-journal] vol. 1, no. 5, p.357, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=49382542&site=eds-live&scope=site.

Benlian, A., Kettinger, W. J., Sunyaev, A. & Winkler, T. J. (2018). Special Section: The Transformative Value of Cloud Computing: A Decoupling, Platformization, and Recombination Theoretical Framework, *Journal of Management Information Systems*, [e-journal] vol. 35, no. 3, pp.719–739, Available Online: https://www.tandfonline.com/doi/full/10.1080/07421222.2018.1481634 [Accessed 27 March 2019].

Benlian, A., Koufaris, M. & Hess, T. (2011). Service Quality in Software-as-a-Service: Developing the SaaS-Qual Measure and Examining Its Role in Usage Continuance, *Journal of Management Information Systems*, [e-journal] vol. 28, no. 3, pp.85–126, Available Online: https://www.tandfonline.com/doi/full/10.2753/MIS0742-1222280303 [Accessed 3 May 2019].

Bennett, J. (2016). Strategies for the Bring Your Own App Surge - Smarter With Gartner, *Gartner.Com*, Available Online: https://www.gartner.com/smarterwithgartner/bring-your-own-app-strategies/ [Accessed 3 May 2019].

Bharadwaj, S. S. & Lal, P. (2012). Exploring the Impact of Cloud Computing Adoption on Organizational Flexibility: A Client Perspective, *Proceedings of 2012 International Conference on Cloud Computing Technologies, Applications and Management, ICCCTAM 2012*, [e-journal] pp.121–131, Available Online: https://ieeexplore.ieee.org/document/6488085 [Accessed 29 April 2019].

Bhattacherjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model, *MIS Quarterly*, [e-journal] vol. 25, no. 3, pp.351–370, Available Online: http://10.0.9.3/3250921 [Accessed 10 April 2019].

Bhattacherjee, A. (2012). Social Science Research: Principles, Methods, and Practices, 2012, Open Access Textbooks. Book 3., *Open Access Textbooks. Book 3.*, [e-book], Available Online: http://scholarcommons.usf.edu/oa_textbooks/3.

Bhattacherjee, A. & Park, S. C. (2014). Why End-Users Move to the Cloud: A Migration-Theoretic Analysis, *European Journal of Information Systems*, [e-journal] vol. 23, no. 3, pp.357–372, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edswsc&AN=000336477500008&site=eds-live&scope=site [Accessed 25 April 2019].

Bibi, S., Katsaros, D. & Bozanis, P. (2012). Business Application Acquisition: On-Premise or SaaS-Based Solutions?, *IEEE Software, Software, IEEE*, [e-journal] vol. 29, no. 3, p.86, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edseee&AN=edseee.6188600&site=eds-live&scope=site.

Bostrom, R. P. & Heinen, J. S. (1977). MIS Problems and Failures: A Socio-Technical Perspective, Part II: The Application of Socio-Technical Theory, *MIS Quarterly*, [e-journal] vol. 1, no. 4, p.11, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.10.2307.249019&site=eds-live&scope=site.

Brown, C. V. (1997). Examining the Emergence of Hybrid IS Governance Solutions: Evidence

From a Single Case Site, *Information Systems Research*, [e-journal] vol. 8, no. 1, pp.69–94, Available Online: http://pubsonline.informs.org/doi/abs/10.1287/isre.8.1.69 [Accessed 20 April 2019].

Brown, C. V. & Magill, S. L. (1994). Alignment of the IS Functions with the Enterprise: Toward a Model of Antecedents, *MIS Quarterly*, [e-journal] vol. 18, no. 4, p.371, Available Online: https://www.jstor.org/stable/249521?origin=crossref [Accessed 26 March 2019].

Carter, E. E. (1971). The Behavioral Theory of the Firm and Top-Level Corporate Decisions, *Administrative Science Quarterly*, [e-journal] vol. 16, no. 4, p.413, Available Online: https://www.jstor.org/stable/2391762?origin=crossref [Accessed 17 April 2019].

Chin, W. W. (1998). Issues and Opinion on Structural Equation Modeling., *MIS Quarterly*, [e-journal] vol. 22, no. 1, p.1, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=345479&site=eds-live&scope=site [Accessed 1 April 2019].

Chin, W. W., Marcolin, B. L. & Newsted, P. R. (2003). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study, *Information Systems Research*, [e-journal] vol. 14, no. 2, pp.189–217, Available Online: http://pubsonline.informs.org/doi/abs/10.1287/isre.14.2.189.16018 [Accessed 6 May 2019].

Choudhary, V. & Vithayathil, J. (2013). The Impact of Cloud Computing: Should the IT Department Be Organized as a Cost Center or a Profit Center?, *Journal of Management Information Systems*, [e-journal] vol. 30, no. 2, pp.67–100, Available Online: https://www.tandfonline.com/doi/full/10.2753/MIS0742-1222300203 [Accessed 24 May 2019].

Constantinides, P. & Barrett, M. (2015). Information Infrastructure Development and Governance as Collective Action, *Information Systems Research*, [e-journal] vol. 26, no. 1, pp.40–56, Available Online: http://pubsonline.informs.org/doi/10.1287/isre.2014.0542 [Accessed 21 April 2019].

Creswell, J. W. (2014). Research Design : Qualitative, Quantitative, and Mixed Methods Approaches., 4. rev. ed., [e-book] SAGE, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat07147a&AN=lub.5257669&site=eds-live&scope=site [Accessed 9 May 2019].

Cudanov, M., Krivokapic, J. & Krunic, J. (2011). The Influence of Cloud Computing Concept on Organizational Performance and Structure., *Management*, pp.18–25, Available Online: http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=69815435&site=ehost-live [Accessed 25 April 2019].

Cusumano, M. (2010). Technology Strategy and Management: Cloud Computing and SaaS as New Computing Platforms., *Communications of the ACM*, [e-journal] vol. 53, no. 4, pp.27–29, Available Online: http://10.0.4.121/1721654.1721667 [Accessed 2 May 2019].

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of

Information Technology, *MIS Quarterly*, [e-journal] vol. 13, no. 3, p.319, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.10.2307.249008&site=eds-live&scope=site [Accessed 12 March 2019].

Dawson, G. S., Denford, J. S., Williams, C. K., Preston, D. & Desouza, K. C. (2016). An Examination of Effective IT Governance in the Public Sector Using the Legal View of Agency Theory, *Journal of Management Information Systems*, [e-journal] vol. 33, no. 4, pp.1180–1208, Available Online: https://www.tandfonline.com/doi/full/10.1080/07421222.2016.1267533 [Accessed 1 April 2019].

DeLone, W. H. & McLean, E. R. (1992). Information Systems Success: The Quest for the Dependent Variable, *Information Systems Research*, [e-journal] vol. 3, no. 1, p.60, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.23010781&site=eds-live&scope=site [Accessed 12 March 2019].

DeLone, W. & McLean, E. R. (2002). Information Systems Success Revisited, in *Proceedings of the 35th Annual Hawaii International Conference on System Sciences*, 2002, Los Alamitos, CA, USA, USA: IEEE, p.2966, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edseee&AN=edseee.994345&site=eds-live&scope=site [Accessed 12 March 2019].

Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P. & Kaiser, S. (2012). Guidelines for Choosing between Multi-Item and Single-Item Scales for Construct Measurement: A Predictive Validity Perspective, *Journal of the Academy of Marketing Science*, [e-journal] vol. 40, no. 3, pp.434–449, Available Online: http://link.springer.com/10.1007/s11747-011-0300-3 [Accessed 17 May 2019].

Dillon, T., Wu, C. & Chang, E. (2010). Cloud Computing: Issues and Challenges, in *24th IEEE International Conference on Advanced Information Networking and Applications*, 2010, IEEE, pp.27–33, Available Online: http://ieeexplore.ieee.org/document/5474674/ [Accessed 20 March 2019].

Eisenhardt, K. M. (1989). Agency Theory: An Assessment and Review, *Academy of Management Review*, [e-journal] vol. 14, no. 1, pp.57–74, Available Online: http://journals.aom.org/doi/10.5465/amr.1989.4279003 [Accessed 1 April 2019].

Fan, L. & Suh, Y.-H. (2014). Why Do Users Switch to a Disruptive Technology? An Empirical Study Based on Expectation-Disconfirmation Theory, *Information & Management*, [e-journal] vol. 51, no. 2, pp.240–248, Available Online: http://10.0.3.248/j.im.2013.12.004 [Accessed 12 March 2019].

Fornell, C. & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error, *Journal of Marketing Research*, [e-journal] vol. 18, no. 1, p.39, Available Online: https://www.jstor.org/stable/3151312?origin=crossref [Accessed 7 May 2019].

Fürstenau, D. & Rothe, H. (2014). Shadow IT Systems: Discerning the Good and the Evil, 2014, Tel, Available Online: http://aisel.aisnet.org/ecis2014http://aisel.aisnet.org/ecis2014/proceedings/track15/9 [Accessed 15 December 2018].

Fürstenau, D., Rothe, H. & Sandner, M. (2017). Shadow Systems, Risk, and Shifting Power Relations in Organizations, *Communications of the Association for Information Systems*, [e-journal] vol. 41, pp.43–61, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edselc&AN=edselc.2-52.0-85031281423&site=eds-live&scope=site [Accessed 3 April 2019].

Gangwar, H., Date, H. & Ramaswamy, R. (2015). Understanding Determinants of Cloud Computing Adoption Using an Integrated TAM-TOE Model, *Journal of Enterprise Information Management*, [e-journal] vol. 28, no. 1, pp.107–130, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=inh&AN=14857592&site=eds-live&scope=site [Accessed 12 March 2019].

Gefen, D., Straub, D. & Boudreau, M.-C. (2000). Structural Equation Modeling and Regression: Guidelines for Research Practice, *Communications of the Association for Information Systems*, [e-journal] vol. 4, no. 1, Available Online: https://aisel.aisnet.org/cais/vol4/iss1/7 [Accessed 7 May 2019].

Grant, R. M. (1996). Toward a Knowledge-Based Theory of the Firm, *Strategic Management Journal*, [e-journal] vol. 17, pp.109–122, Available Online: http://www.jstor.org.ludwig.lub.lu.se/stable/2486994 [Accessed 12 March 2019].

Gregory, R. W., Kaganer, E., Henfridsson, O. & Ruch, T. J. (2018). IT Consumerization and the Transformation of IT Governance, *MIS Quarterly*, [e-journal] vol. 42, no. 4, pp.1225–1253, Available Online: https://misq.org/it-consumerization-and-the-transformation-of-it-governance.html [Accessed 27 March 2019].

Guillemette, M. G. & Paré, G. (2012). Information Technology and Business-Level Strategy: Toward a New Theory of the Contribution of the IT Function in Organizations, *MIS Quarterly*, [e-journal] vol. 36, no. 2, pp.1–6, Available Online: http://misq.org/toward-a-new-theory-of-the-contribution-of-the-it-function-in-organizations.html [Accessed 12 February 2019].

Guo, Y., Bao, Y., Stuart, B. J. & Le-Nguyen, K. (2018). To Sell or Not to Sell: Exploring Sellers' Trust and Risk of Chargeback Fraud in Cross-Border Electronic Commerce, *Information Systems Journal*, [e-journal] vol. 28, no. 2, pp.359–383, Available Online: http://doi.wiley.com/10.1111/isj.12144 [Accessed 17 May 2019].

György, A., Cleven, A., Uebernickel, F. & Brenner, W. (2012). EXPLORING THE SHADOWS: IT GOVERNANCE APPROACHES TO USER-DRIVEN INNOVATION, in *European Conference on Information Systems Barcelona*, 2012, pp.5–15, Available Online: http://aisel.aisnet.org/ecis2012/222 [Accessed 29 April 2019].

Hair, J. F., Hult, G. T. M., Ringle, C. M. & Sarstedt, M. (2017). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), [e-book], Available Online:

https://us.sagepub.com/en-us/nam/a-primer-on-partial-least-squares-structural-equation-modeling-pls-sem/book244583 [Accessed 6 May 2019].

Hair, J. F., Ringle, C. M. & Sarstedt, M. (2011). PLS-SEM: Indeed a Silver Bullet, *Journal of Marketing Theory and Practice*, [e-journal] vol. 19, no. 2, pp.139–152, Available Online: https://www.tandfonline.com/doi/full/10.2753/MTP1069-6679190202 [Accessed 6 May 2019].

Harkness, W. L., Kettinger, W. J. & Segars, A. H. (1996). Sustaining Process Improvement and Innovation in the Information Services Function: Lessons Learned at the Bose Corporation, *MIS Quarterly*, [e-journal] vol. 20, no. 3, p.349, Available Online: https://www.jstor.org/stable/249661?origin=crossref [Accessed 2 May 2019].

Harris, J., Ives, B. & Junglas, I. (2012). IT Consumerization: When Gadgets Turn into Enterprise IT Tools, *MIS Quarterly Executive*, [e-journal] vol. 11, no. 3, Available Online: http://misqe.org/ojs2/index.php/misqe/article/viewFile/416/313 [Accessed 3 May 2019].

Harrison, A. W. & Rainer Jr., R. K. (1992). The Influence of Individual Differences on Skill in End-User Computing., *Journal of Management Information Systems*, [e-journal] vol. 9, no. 1, pp.93–111, Available Online: http://10.0.4.56/07421222.1992.11517949 [Accessed 12 March 2019].

Hart, O. A., Ojiabo, U. O. & Longlife, E. O. (2017). Integrated Technology-Organization-Environment (T-O-E) Taxonomies for Technology Adoption, *Journal of Enterprise Information Management*, [e-journal] vol. 30, no. 6, p.893, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsemr&AN=edsemr.10.1108.JEIM.03.2016.0079&site=eds-live&scope=site [Accessed 12 March 2019].

Hayes, B. (2008). Cloud Computing, *Communications of the ACM*, [e-journal] vol. 51, no. 7, pp.9–11, Available Online: http://10.0.4.121/1364782.1364786 [Accessed 12 March 2019].

Henderson, J. C. & Venkatraman, N. (1993). Strategic Alignment: Leveraging Information Technology for Transforming Organizations, *IBM SYSTEMS JOURNAL*, [e-journal] vol. 32, no. 1, pp.472–484, Available Online: https://ieeexplore.ieee.org/document/5387096 [Accessed 15 October 2018].

Hossain, M. A. & Quaddus, M. (2012). Expectation–Confirmation Theory in Information System Research: A Review and Analysis., *Information Systems Theory*, [e-journal] p.441, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=93942534&site=eds-live&scope=site [Accessed 2 March 2019].

ISO. (2019). ISO 3166 Country Codes, Available Online: https://www.iso.org/iso-3166-country-codes.html [Accessed 14 May 2019].

Janssen, M. & Joha, A. (2011). Challenges for Adopting Cloud-Based Software as a Service (Saas) in the Public Sector., in *ECIS 2011 Proceedings*, Vol. 80, 2011, Available Online: https://aisel.aisnet.org/ecis2011/80/ [Accessed 7 May 2019].

Jarrahi, M. H., Crowston, K., Bondar, K. & Katzy, B. (2017). A Pragmatic Approach to Managing Enterprise IT Infrastructures in the Era of Consumerization and Individualization of IT, *International Journal of Information Management*, [e-journal] vol. 37, no. 6, pp.566–575, Available Online: https://linkinghub.elsevier.com/retrieve/pii/S0268401217302980 [Accessed 18 April 2019].

Jede, A. & Teuteberg, F. (2015). Looking Behind the Stage : Influence and Effect of Software-As-a-Service on Socio-Technical Elements in Companies, in *Twenty-Third European Conference on Information Systems*, 2015, Available Online: https://aisel.aisnet.org/ecis2015_cr/87/?utm_source=aisel.aisnet.org%2Fecis2015_cr%2F87&utm_medium=PDF&utm_campaign=PDFCoverPages [Accessed 24 February 2019].

Jede, A. & Teuteberg, F. (2016). Understanding Socio-Technical Impacts Arising from Software-as-a-Service Usage in Companies: A Mixed Method Analysis on Individual Level Data, *Business and Information Systems Engineering*, [e-journal] vol. 58, no. 3, pp.161–176, Available Online: http://link.springer.com/10.1007/s12599-016-0429-1 [Accessed 13 February 2019].

Jensen, M. C. & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics*, [e-journal] vol. 3, no. 4, pp.305–360, Available Online: http://linkinghub.elsevier.com/retrieve/pii/0304405X7690026X [Accessed 1 April 2019].

Joshi, K. & Rai, A. (2000). Impact of the Quality of Information Products on Information System Users' Job Satisfaction: An Empirical Investigation., *Information Systems Journal*, [e-journal] vol. 10, no. 4, pp.323–345, Available Online: http://10.0.4.22/j.1365-2575.2000.00087.x [Accessed 12 March 2019].

Kappelman, L., McLean, E., Johnson, V., Torres, R., Snyder, M., Nguyen, Q., Maurer, C. & Alsius, D. (2018). SIM IT Trends Study - 2018, Available Online: https://www.simnet.org/resource/collection/7A70D436-28BA-4E88-B958-C86941C704C3/2017_SIM_IT_Trends_Study_-_Comprehensive_Report_2018_-_18Jan18.pdf [Accessed 24 October 2018].

Kappelman, L., Torres, R., McLean, E., Maurer, C., Johnson, V. & Kim, K. (2019). The 2018 SIM IT Issues and Trends Study, *MIS Quarterly Executive*, [e-journal] vol. 18, no. 1, Available Online: https://aisel.aisnet.org/misqe/vol18/iss1/7/ [Accessed 24 May 2019].

Kettinger, W. J., Teng, J. T. C. & Guha, S. (1997). Business Process Change: A Study of Methodologies, Techniques, and Tools, *MIS Quarterly*, [e-journal] vol. 21, no. 1, p.55, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.10.2307.249742&site=eds-live&scope=site [Accessed 30 March 2019].

Khajeh-Hosseini, A., Greenwood, D. & Sommerville, I. (2010). Cloud Migration: A Case Study of Migrating an Enterprise IT System to IaaS, in *Proceedings - 2010 IEEE 3rd International Conference on Cloud Computing*, 2010, IEEE, pp.450–457, Available Online: https://ieeexplore.ieee.org/document/5557962 [Accessed 12 March 2019].

Khalil, S., Fernandez, V. & Fautrero, V. (2016). Cloud Impact on IT Governance, in *2016 IEEE 18th Conference on Business Informatics (CBI)*, 2016, IEEE, p.255, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edseee&AN=edseee.7780321&site=eds-live&scope=site [Accessed 20 April 2019].

King, J. L. & Leslie, J. (1983). Centralized versus Decentralized Computing: Organizational Considerations and Management Options, *ACM Computing Surveys*, [e-journal] vol. 15, no. 4, pp.319–349, Available Online: http://portal.acm.org/citation.cfm?doid=289.290 [Accessed 20 April 2019].

Kock, N. (2015). Common Method Bias in PLS-SEM, *International Journal of e-Collaboration*, [e-journal] vol. 11, no. 4, pp.1–10, Available Online: http://services.igi-global.com/resolvedoi/resolve.aspx?doi=10.4018/ijec.2015100101 [Accessed 16 May 2019].

Kock, N. & Lynn, G. (2012). Lateral Collinearity and Misleading Results in Variance-Based SEM: An Illustration and Recommendations, *Journal of the Association for Information Systems*, [e-journal] vol. 13, no. 7, Available Online: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2152644 [Accessed 17 May 2019].

Kopper, A., Zimmermann, S., Rentrop, C., Westner, M. & Regensburg, O. (2018). Business-Managed It: A Conceptual Framework and Empirical Illustration, in *ECIS 2018, At Portsmouth, UK*, 2018, Available Online: http://ecis2018.eu/wp-content/uploads/2018/09/1447-doc.pdf [Accessed 13 February 2019].

Kuan, K. K. Y. & Chau, P. Y. K. (2001). A Perception-Based Model for EDI Adoption in Small Businesses Using a Technology-Organization-Environment Framework, *Information and Management*, [e-journal] vol. 38, no. 8, pp.507–521, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edselc&AN=edselc.2-52.0-0035479369&site=eds-live&scope=site [Accessed 25 March 2019].

Lamb, R. & Kling, R. (2003). Reconceptualizing Users as Social Actors in Information Systems Research, *MIS Quarterly*, [e-journal] vol. 27, no. 2, p.197, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.10.2307.30036529&site=eds-live&scope=site [Accessed 25 February 2019].

Lankton, N. K., McKnight, D. H., Wright, R. T. & Thatcher, J. B. (2016). Using Expectation Disconfirmation Theory and Polynomial Modeling to Understand Trust in Technology, *Informations Systems Research*, [e-journal] vol. 27, no. 1, pp.197–213, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edswss&AN=000375600200012&site=eds-live&scope=site [Accessed 25 March 2019].

Leclercq-Vandelannoitte, A. (2015). Managing BYOD: How Do Organizations Incorporate User-Driven IT Innovations?, *Information Technology & People*, [e-journal] vol. 28, no. 1, pp.2–33, Available Online: http://www.emeraldinsight.com/doi/10.1108/ITP-11-2012-0129 [Accessed 18 April 2019].

Lee, D. M. S., Trauth, E. M. & Farwell, D. (1995). Critical Skills and Knowledge Requirements

of IS Professionals: A Joint Academic/Industry Investigation, *MIS Quarterly*, [e-journal] vol. 19, no. 3, p.313, Available Online: https://www.jstor.org/stable/249598?origin=crossref [Accessed 4 April 2019].

Leidner & Kayworth. (2006). Review: A Review of Culture in Information Systems Research: Toward a Theory of Information Technology Culture Conflict, *MIS Quarterly*, [e-journal] vol. 30, no. 2, p.357, Available Online: https://www.jstor.org/stable/10.2307/25148735 [Accessed 17 May 2019].

Liu, J. W., Chang, J. Y. T. & Tsai, J. C. A. (2015). Does Perceived Value Mediate the Relationship between Service Traits and Client Satisfaction in the Software-as-a-Service (SaaS)?, *Open Journal of Social Sciences*, [e-journal] vol. 03, no. 07, pp.159–165, Available Online: https://www.researchgate.net/publication/281892398_Does_Perceived_Value_Mediate_the_Relationship_between_Service_Traits_and_Client_Satisfaction_in_the_Software-as-a-Service_SaaS [Accessed 25 March 2019].

Low, C., Chen, Y. & Wu, M. (2011). Understanding the Determinants of Cloud Computing Adoption, *Industrial Management and Data Systems*, [e-journal] vol. 111, no. 7, pp.1006–1023, Available Online: https://www.emeraldinsight.com/doi/full/10.1108/02635571111161262 [Accessed 28 March 2019].

Lu, Y., Xiang, C., Wang, B. & Wang, X. (2011). What Affects Information Systems Development Team Performance? An Exploratory Study from the Perspective of Combined Socio-Technical Theory and Coordination Theory, *Computers in Human Behavior*, [e-journal] vol. 27, no. 2, pp.811–822, Available Online: http://dx.doi.org/10.1016/j.chb.2010.11.006 [Accessed 25 March 2019].

Luftman, J. & Derksen, B. (2012). Key Issues for IT Executives 2012: Doing More with Less., *MIS Quarterly Executive*, [e-journal] vol. 11, no. 4, pp.207–218, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=83863564&site=eds-live&scope=site [Accessed 3 May 2019].

MacKenzie, Podsakoff & Podsakoff. (2011). Construct Measurement and Validation Procedures in MIS and Behavioral Research: Integrating New and Existing Techniques, *MIS Quarterly*, [e-journal] vol. 35, no. 2, p.293, Available Online: https://www.jstor.org/stable/10.2307/23044045 [Accessed 6 May 2019].

Magunduni, J. & Chigona, W. (2018). Revisiting Shadow IT Research: What We Already Know, What We Still Need to Know, and How Do We Get There?, in *2018 Conference on Information Communications Technology and Society (ICTAS)*, March 2018, IEEE, pp.1–6, Available Online: https://ieeexplore.ieee.org/document/8368735/ [Accessed 25 March 2019].

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J. & Ghalsasi, A. (2011). Cloud Computing — The Business Perspective, *Decision Support Systems*, [e-journal] vol. 51, no. 1, pp.176–189, Available Online: https://www.sciencedirect.com/science/article/pii/S0167923610002393?via%3Dihub [Accessed 26 March 2019].

McAfee, A. (2011). What Every CEO Needs to Know about the Cloud, *Harvard Business Review*, [e-journal] vol. 89, no. 11, Available Online: https://hbr.org/2011/11/what-every-ceo-needs-to-know-about-the-cloud [Accessed 26 March 2019].

Mell, P. & Grance, T. (2010). The NIST Definition of Cloud Computing., *Communications of the ACM*, [e-journal] vol. 53, no. 6, p.50, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=51189663&site=eds-live&scope=site [Accessed 25 March 2019].

Miyachi, C. (2018). What Is "Cloud"? It Is Time to Update the NIST Definition?, *IEEE Cloud Computing*, [e-journal] vol. 05, no. 3, p.6, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edseee&AN=edseee.8383652&site=eds-live&scope=site [Accessed 12 April 2019].

Mueller, B., Viering, G., Legner, C. & Riempp, G. (2010). Understanding the Economic Potential of Service-Oriented Architecture, *Journal of Management Information Systems*, [e-journal] vol. 26, no. 4, pp.145–180, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edselc&AN=edselc.2-52.0-77951272957&site=eds-live&scope=site [Accessed 25 March 2019].

Mumford, E. (2006). The Story of Socio-Technical Design: Reflections on Its Successes, Failures and Potential., *Information Systems Journal*, [e-journal] vol. 16, no. 4, pp.317–342, Available Online: http://10.0.4.87/j.1365-2575.2006.00221.x [Accessed 24 April 2019].

Oktal, O., Alpu, O. & Yazici, B. (2016). Measurement of Internal User Satisfaction and Acceptance of the E-Justice System in Turkey, *Journal of Information Management*, [e-journal] vol. 68, no. 6, pp.716–735, Available Online: https://www.emeraldinsight.com/doi/full/10.1108/AJIM-04-2016-0048 [Accessed 20 April 2019].

Oliveira, T. & Martins, M. F. (2011). Literature Review of Information Technology Adoption Models at Firm Level., *Electronic Journal of Information Systems Evaluation*, [e-journal] vol. 14, no. 1, pp.110–121, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=65267826&site=eds-live&scope=site [Accessed 20 April 2019].

Oliveira, T., Martins, R., Sarker, S., Thomas, M. & Popovič, A. (2019). Understanding SaaS Adoption: The Moderating Impact of the Environment Context, *International Journal of Information Management*, [e-journal] vol. 49, pp.1–12, Available Online: https://doi.org/10.1016/j.ijinfomgt.2019.02.009 [Accessed 13 April 2019].

Oliver, R. L. (1977). Effect of Expectation and Disconfirmation on Postexposure Product Evaluations: An Alternative Interpretation, *Journal of Applied Psychology*, [e-journal] vol. 62, no. 4, pp.480–486, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=pdh&AN=1978-13415-001&site=eds-live&scope=site [Accessed 20 April 2019].

Olson, M. H. & Chervany, N. L. (1980). The Relationship between Organizational

Characteristics and the Structure of the Information Services Function, *MIS Quarterly*, [e-journal] vol. 4, no. 2, p.57, Available Online: https://www.jstor.org/stable/249337?origin=crossref [Accessed 20 April 2019].

Orlikowski, W. J. (1992). The Duality of Technology: Rethinking the Concept of Technology in Organizations, *Organization Science*, [e-journal] vol. 3, no. 3, pp.398–427, Available Online: http://pubsonline.informs.org/doi/abs/10.1287/orsc.3.3.398 [Accessed 3 May 2019].

Palvia, S. C., Sharma, R. S. & Conrath, D. W. (2001). A Socio-Technical Framework for Quality Assessment of Computer Information Systems, *Industrial Management & Data Systems*, [e-journal] vol. 101, no. 5, p.237, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsemr&AN=edsemr.10.1108.02635570110394635&site=eds-live&scope=site [Accessed 23 April 2019].

Park, J. & Jeong, H.-Y. (2013). The QoS-Based MCDM System for SaaS ERP Applications with Social Network., *Journal of Supercomputing*, [e-journal] vol. 66, no. 2, pp.614–632, Available Online: http://10.0.3.239/s11227-012-0832-4 [Accessed 10 April 2019].

Peppard, J. (2018). Rethinking the Concept of the IS Organization, *Information Systems Journal*, [e-journal] vol. 28, no. 1, pp.76–103, Available Online: http://doi.wiley.com/10.1111/isj.12122 [Accessed 26 March 2019].

Pitt, L. F., Watson, R. T. & Kavan, C. B. (1995). Service Quality: A Measure of Information Systems Effectiveness, *MIS Quarterly*, [e-journal] vol. 19, no. 2, p.173, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.10.2307.249687&site=eds-live&scope=site [Accessed 20 April 2019].

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y. & Podsakoff, N. P. (2003). Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies., *Journal of Applied Psychology*, [e-journal] vol. 88, no. 5, pp.879–903, Available Online: http://doi.apa.org/getdoi.cfm?doi=10.1037/0021-9010.88.5.879 [Accessed 16 May 2019].

Qureshi, I. & Compeau, D. (2009). Assessing Between-Group Differences in Information Systems Research: A Comparison of Covariance- and Component-Based SEM, *MIS Quarterly*, [e-journal] vol. 33, no. 1, p.197, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.20650285&site=eds-live&scope=site [Accessed 23 April 2019].

Rana, N. P., Dwivedi, Y. K., Williams, M. D. & Weerakkody, V. (2015). Investigating Success of an E-Government Initiative: Validation of an Integrated IS Success Model, *Information Systems Frontiers*, [e-journal] vol. 17, no. 1, pp.127–142, Available Online: https://doi.org/10.1007/s10796-014-9504-7 [Accessed 20 April 2019].

Recker, J. (2013). Scientific Research in Information Systems, *Springer*.

Recker, J. & Rosemann, M. (2010). A Measurement Instrument for Process Modeling Research: Development, Test and Procedural Model, *Scandinavian Journal of Information*

Systems, [e-journal] vol. 22, no. 2, Available Online: https://aisel.aisnet.org/sjis/vol22/iss2/1 [Accessed 14 May 2019].

Regalado, A. (2011). Who Coined 'Cloud Computing'?, *MIT Technology Review*, Available Online: https://www.technologyreview.com/s/425970/who-coined-cloud-computing/ [Accessed 18 April 2019].

Rentrop, C. & Zimmermann, S. (2012). Shadow IT: Management and Control of Unofficial IT, in *Roceedings of the 6th International Conference on Digital Society (ICDS), Valencia, Spain*, 2012, Available Online: https://www.researchgate.net/publication/263052582_Shadow_IT_Management_and_Control_of_unofficial_IT [Accessed 3 December 2018].

Revilla, M. A., Saris, W. E. & Krosnick, J. A. (2014). Choosing the Number of Categories in Agree–Disagree Scales, *Sociological Methods & Research*, [e-journal] vol. 43, no. 1, pp.73–97, Available Online: http://journals.sagepub.com/doi/10.1177/0049124113509605 [Accessed 2 April 2019].

Ringle, C. M., Wende, S. & Becker, J.-M. (2015). SmartPLS 3.

Rockart, J. F. & Flannery, L. S. (1983). The Management of End User Computing, *Communications of the ACM*, [e-journal] vol. 26, no. 10, pp.776–784, Available Online: http://portal.acm.org/citation.cfm?doid=358413.358429 [Accessed 3 May 2019].

Safari, F., Safari, N. & Hasanzadeh, A. (2015). The Adoption of Software-as-a-Service (SaaS): Ranking the Determinants., *Journal of Enterprise Information Management*, [e-journal] vol. 28, no. 3, pp.400–422, Available Online: http://10.0.4.84/JEIM-02-2014-0017 [Accessed 20 April 2019].

Sambamurthy, V. & Zmud, R. W. (1999). Arrangements for Information Technology Governance: A Theory of Multiple Contingencies, *MIS Quarterly*, [e-journal] vol. 23, no. 2, p.261, Available Online: https://www.jstor.org/stable/249754?origin=crossref [Accessed 26 March 2019].

Saunders, C., Wiener, M., Klett, S. & Sprenger, S. (2017). The Impact of Mental Representations on ICT-Related Overload in the Use of Mobile Phones, *Journal of Management Information Systems*, [e-journal] vol. 34, no. 3, pp.803–825, Available Online: https://www.tandfonline.com/doi/full/10.1080/07421222.2017.1373010 [Accessed 17 May 2019].

Schmidt, N.-H., Erek, K., Kolbe, L. M. & Zarnekow, R. (2010). Predictors of Green IT Adoption: Implications from an Empirical Investigation, in *Proceedings of the 16th Americas Conference on Information Systems (AMCIS 2010)*, 2010, pp.1–11, Available Online: http://aisel.aisnet.org/amcis2010/367 [Accessed 12 April 2019].

Seethamraju, R. (2015). Adoption of Software as a Service (SaaS) Enterprise Resource Planning (ERP) Systems in Small and Medium Sized Enterprises (SMEs), *Information Systems Frontiers*, [e-journal] vol. 17, no. 3, pp.475–492, Available Online: https://doi.org/10.1007/s10796-014-9506-5 [Accessed 23 April 2019].

Segars, A. H. (1997). Assessing the Unidimensionality of Measurement: A Paradigm and

Illustration within the Context of Information Systems Research, *Omega*, [e-journal] vol. 25, no. 1, pp.107–121, Available Online: https://doi.org/10.1016/S0305-0483(96)00051-5 [Accessed 10 May 2019].

Silic, M., Silic, D. & Oblakovic, G. (2016). Influence of Shadow IT on Innovation in Organizations, *Complex Systems Informatics and Modeling Quarterly*, [e-journal] no. 8, pp.68–80, Available Online: https://ssrn.com/abstract=2932988 [Accessed 15 December 2018].

Society for Information Management. (2019). IT Trends Study - Society for Information Management, Available Online: https://www.simnet.org/members/group_content_view.asp?group=140286&id=442564 [Accessed 24 May 2019].

Stieninger, M., Nedbal, D., Wetzlinger, W., Wagner, G. & Erskine, M. A. (2014). Impacts on the Organizational Adoption of Cloud Computing: A Reconceptualization of Influencing Factors, *Procedia Technology*, [e-journal] vol. 16, pp.85–93, Available Online: http://linkinghub.elsevier.com/retrieve/pii/S2212017314002989 [Accessed 12 April 2019].

Tan, C.-W., Benbasat, I. & Cenfetelli, R. T. (2016). An Exploratory Study of the Formation and Impact of Electronic Service Failures, *MIS Quarterly*, [e-journal] vol. 40, no. 1, pp.1–29, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edselc&AN=edselc.2-52.0-84961843704&site=eds-live&scope=site [Accessed 12 April 2019].

Thong, J. Y. L. (1999). An Integrated Model of Information Systems Adoption in Small Businesses, *Journal of Management Information Systems*, [e-journal] vol. 15, no. 4, p.187, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.40398410&site=eds-live&scope=site [Accessed 18 April 2019].

Tiwana, A. (2009). Governance-Knowledge Fit in Systems Development Projects, *Information Systems Research*, [e-journal] vol. 20, no. 2, pp.180–197, Available Online: http://pubsonline.informs.org/doi/abs/10.1287/isre.1070.0164 [Accessed 14 May 2019].

Tiwana, A. & Kim, S. K. (2015). Discriminating IT Governance, *Information Systems Research*, [e-journal] vol. 26, no. 4, pp.656–674, Available Online: http://pubsonline.informs.org/doi/10.1287/isre.2015.0591 [Accessed 20 April 2019].

Tiwana, A., Konsynski, B. & Venkatraman, N. (2013). Special Issue: Information Technology and Organizational Governance: The IT Governance Cube, *Journal of Management Information Systems*, [e-journal] vol. 30, no. 3, pp.7–12, Available Online: https://www.tandfonline.com/doi/full/10.2753/MIS0742-1222300301 [Accessed 20 April 2019].

Tornatzky, L. G. & Fleischer, M. (1990). The Processes of Technological Innovation. Issues in Organization and Management Series, *Lexington Books*, Vol. 10, Lexington Books.

Urbach, N. & Müller, B. (2012). The Updated DeLone and McLean Model of Information

Systems Success., *Information Systems Theory*, [e-journal] p.1, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edb&AN=93942514&site=eds-live&scope=site [Accessed 12 April 2019].

Venkatesh, V. & Bala, H. (2008). Technology Acceptance Model 3 and a Research Agenda on Interventions., *Decision Sciences*, [e-journal] vol. 39, no. 2, pp.273–315, Available Online: http://10.0.4.87/j.1540-5915.2008.00192.x [Accessed 27 March 2019].

Venkatesh, V. & Davis, F. D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies., *Management Science*, [e-journal] vol. 46, no. 2, p.186, Available Online: http://10.0.5.7/mnsc.46.2.186.11926 [Accessed 27 March 2019].

Venkatesh, V. & Goyal, S. (2010). Expectation Disconfirmation and Technology Adoption: Polynomial Modeling and Response Surface Analysis, *MIS Quarterly*, [e-journal] vol. 34, no. SPEC. ISSUE 2, pp.281–303, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edselc&AN=edselc.2-52.0-77957037816&site=eds-live&scope=site [Accessed 27 March 2019].

Venkatesh, V., Morris, M. G., Davis, G. B. & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View, *MIS Quarterly*, [e-journal] vol. 27, no. 3, p.425, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.10.2307.30036540&site=eds-live&scope=site [Accessed 27 March 2019].

Venkatraman, N. (1997). Beyond Outsourcing: Managing IT Resources as a Value Center, *Sloan management review*, [e-journal] vol. 38, no. 3, Available Online: https://sloanreview.mit.edu/article/beyond-outsourcing-managing-it-resources-as-a-value-center/ [Accessed 2 May 2019].

Vithayathil, J. (2018). Will Cloud Computing Make the Information Technology (IT) Department Obsolete?, *Information Systems Journal*, [e-journal] vol. 28, no. 4, pp.634–649, Available Online: http://doi.wiley.com/10.1111/isj.12151 [Accessed 1 April 2019].

Walther, S., Sarker, S., Sedera, D. & Eymann, T. (2013). Exploring Subscription Renewal Intention Of Operational Cloud Enterprise Systems-A Socio-Technical Approach., in *Proceedings of the 21st European Conference on Information Systems*, 2013, p.25, Available Online: https://aisel.aisnet.org/ecis2013_cr/25 [Accessed 23 March 2019].

Webb, K. J., Schmitz, K. W. & Teng, J. T. C. (2017). Capturing the Complexity of Malleable IT Use: Adaptive Structuration Theory for Individuals, *MIS Quarterly*, vol. 40, no. 3, pp.663–686.

Weill, P. & Olson, M. H. (1989). Managing Investment in Information Technology: Mini Case Examples and Implications, *MIS Quarterly*, [e-journal] vol. 13, no. 1, p.3, Available Online: https://www.jstor.org/stable/248694?origin=crossref [Accessed 17 April 2019].

Weill, P. & Ross, J. W. (2004a). IT Governance : How Top Performers Manage IT Decision Rights for Superior Results, [e-book] Harvard Business School Press, Available Online: http://eds.a.ebscohost.com.ludwig.lub.lu.se/eds/detail/detail?vid=22&sid=07cb9aaf-0f4f-

4625-82c7-3f0610c15a37%40sessionmgr4006&bdata=JnNpdGU9ZWRzLWxpdmUmc2NvcGU9c2l0ZQ%3D%3D [Accessed 1 April 2019].

Weill, P. & Ross, J. W. (2004b). IT Governance on One Page, *SSRN Electronic Journal*, [e-journal], Available Online: http://www.ssrn.com/abstract=664612 [Accessed 1 April 2019].

Wernerfelt, B. (1984). A Resource-Based View of the Firm, *Strategic Management Journal*, [e-journal] vol. 5, no. 2, pp.171–180, Available Online: http://doi.wiley.com/10.1002/smj.4250050207 [Accessed 27 April 2019].

Westerman, G., Bonnet, D. & McAfee, A. (2014). Leading Digital : Turning Technology into Business Transformation.

Winkler, T. J. & Benlian, A. (2012). The Dual Role of IS Specifity in Governing Software as a Service, in *Thirty Third International Conference on Information Systems*, 2012, Orlando, pp.11–24, Available Online: https://www.researchgate.net/publication/254404727_The_Dual_Role_of_IS_Specificity_in_Governing_Software_as_a_Service/citation/download [Accessed 4 March 2019].

Winkler, T. J. & Brown, C. V. (2013). Horizontal Allocation of Decision Rights for On-Premise Applications and Software-as-a-Service, *Journal of Management Information Systems*, [e-journal] vol. 30, no. 3, pp.13–48, Available Online: http://www.tandfonline.com/doi/full/10.2753/MIS0742-1222300302 [Accessed 4 March 2019].

Winkler, T. J., Goebel, C., Benlian, A., Bidault, F. & Günther, O. (2011). The Impact of Software as a Service on IS Authority - A Contingency Perspective, in *International Conference on Information Systems*, 2011, pp.1–17, Available Online: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.670.3342&rep=rep1&type=pdf [Accessed 4 March 2019].

Winkler, T. J., Goebel, C., Bidault, F. & Günther, O. (2012). INFORMATION TECHNOLOGY AND BUSINESS PRACTICES IN GERMANY: RESULTS FROM THE 2011 BIT SURVEY, in *The UCLA Anderson Business and Information Technologies (BIT) Project*, [e-book] WORLD SCIENTIFIC, pp.81–114, Available Online: http://www.worldscientific.com/doi/abs/10.1142/9789814390880_0005 [Accessed 12 April 2019].

Wixom, B. H. & Todd, P. A. (2005). A Theoretical Integration of User Satisfaction and Technology Acceptance, *Information Systems Research*, [e-journal] vol. 16, no. 1, pp.85–102, Available Online: http://www.jstor.org/stable/23015766 [Accessed 15 March 2019].

Wixom, B. H. & Watson, H. J. (2001). An Empirical Investigation of the Factors Affecting Data Warehousing Success, *MIS Quarterly*, [e-journal] vol. 25, no. 1, p.17, Available Online: http://ludwig.lub.lu.se/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=edsjsr&AN=edsjsr.10.2307.3250957&site=eds-live&scope=site [Accessed 15 March 2019].

Wu, W.-W. (2011). Mining Significant Factors Affecting the Adoption of SaaS Using the Rough Set Approach, *The Journal of Systems & Software*, [e-journal] vol. 84, no. 3, pp.435–441, Available Online: http://10.0.3.248/j.jss.2010.11.890 [Accessed 19 March 2019].

Xue, Liang & Boulton. (2008). Information Technology Governance in Information Technology Investment Decision Processes: The Impact of Investment Characteristics, External Environment, and Internal Context, *MIS Quarterly*, [e-journal] vol. 32, no. 1, p.67, Available Online: https://www.jstor.org/stable/10.2307/25148829 [Accessed 16 April 2019].

Yoo. (2010). Computing in Everyday Life: A Call for Research on Experiential Computing, *MIS Quarterly*, [e-journal] vol. 34, no. 2, p.213, Available Online: https://www.jstor.org/stable/10.2307/20721425 [Accessed 3 May 2019].

Zhu, K., Kraemer, K. L., Xu, S. & Dedrick, J. (2004). Information Technology Payoff in E-Business Environments: An International Perspective on Value Creation of E-Business in the Financial Services Industry, *Journal of Management Information Systems*, [e-journal] vol. 21, no. 1, pp.17–54, Available Online: http://www.jstor.org/stable/40398783 [Accessed 15 March 2019].

Zimmermann, S., Rentrop, C. & Felden, C. (2014). Managing Shadow IT Instances – A Method to Control Autonomous IT Solutions in the Business Departments, in *AMCIS 2014 Proceedings*, 2 June 2014, Available Online: https://aisel.aisnet.org/amcis2014/StrategicUse/GeneralPresentations/12 [Accessed 1 April 2019].