

THE IMPACT OF SOFTWARE AS A SERVICE ON IS AUTHORITY – A CONTINGENCY PERSPECTIVE

Completed Research Paper

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Abstract

For some business applications, using Software as a Service (SaaS) is becoming increasingly popular. However, it is largely unknown how SaaS adoption affects the arrangements between business and IT departments. In this study, we take a contingency approach to investigate how firms allocate authority for SaaS applications. Based on semi-structured interviews with business and IT representatives of companies that have adopted the wide-spread SaaS solution Salesforce CRM, we extend existing contingency theory to propose a set of factors for governance arrangements on the application level. These factors are used in a comparative case study of 4 cases of SaaS adoption to explain why application authority is allocated either to the business or the IT side. The results suggest that in most cases there exist dominant and reinforcing contingencies determining a definite mode of SaaS governance.

Keywords: Software as a Service, IT governance, IS organization design, Contingency approach, Grounded theory, Comparative case studies

Introduction

Software as a Service (SaaS) is changing the enterprise application landscape. In Central Europe, currently about 40 percent of companies use SaaS in at least one area of business applications (Benlian, Hess and Buxmann 2009), in the US even more than 75 percent (CRM Landmark 2011). Market researchers predict that in 2011, 25 percent of new business software purchases will be procured via SaaS and that this share will increase to approximately 34 percent by 2014 (CRM Landmark 2011).

SaaS refers to applications delivered as services over the Internet and is commonly seen as the highest layer of the Cloud Computing stack (Armbrust, Fox, Griffith et al. 2009). SaaS has evolved from earlier web-based deployment models such as application service providing (ASP) and is typically characterized by a highly scalable multi-tenant architecture on the provider side which allows for corresponding economies scale (Cusumano 2010). Compared to traditional on-premises installations, SaaS usage consequently leads to a reduction in a broad range of operational IT tasks in the user organization, such as infrastructure management, application management and application development (Lee, Huynh, Kwok and Pi 2003).

Despite such reductions, however, there are a number of decisions and activities taking place at the interface between IT and the business, that clearly have to remain within the adopting organization. In this context, the concept of IT governance has received high attention as a major complementary resource to achieve IT performance through aligning business and IT (Brown and Magill 1994; Sambamurthy and Zmud 1999; Weill and Ross 2004; Gu, Xue, Ray 2008). An important part of IT governance is determined by the distribution of decision authority between the business and the IT function (Sambamurthy and Zmud 1999). It is commonly recognized that there are three major archetypes of such governance arrangements: centralized, decentralized and federal modes (Sambamurthy and Zmud 1999; Weill and Ross 2004). Thus, the overall question arises whether the deployment of SaaS and the reduction of original IT tasks also leads to a shift in the distribution of IS authority for SaaS applications?

Regarding this question, there exists some anecdotal evidence that with the advent of SaaS the business side takes over stronger IS authority for original IT activities, such as change management and application support (Yanoski 2008), which suggests a rather decentralized governance mode. Yet, other authors take the view, that the IT departments themselves will transform into a central mediator and integrator of external SaaS services in the long run (Gardner 2008), thus adopting a rather centralized SaaS governance mode.

While IS literature provides a considerable body of research that examines factors of SaaS adoption (Xin and Levina 2008; Benlian et al. 2009; Benlian and Hess 2010; Benlian, Koufaris and Hess 2010), few works have been devoted to explore the impact of SaaS adoption on internal IS governance and organization. Therefore, we aim to advance in this domain by formulating the following three research questions:

- How do organizations allocate IS authority for SaaS applications?
- What are the factors that possibly influence this allocation?
- How *should* organizations allocate IS authority for SaaS applications?

To address these questions, this work combines a contingency perspective (Gresov 1989) with a qualitative approach. Based on rich interview data, we apply Grounded Theory to extend an existing contingency model (Sambamurthy and Zmud 1999) by a set of factors for governance arrangements specifically on the application level. Further, we examine the explanatory power of these factors in four comparative cases of SaaS adoption.

Extrapolating the current trends in the SaaS market, our findings may help to better understand the long-term impact of SaaS adoption on user organizations, which is of interest for an academic as well as a practitioner audience. The remainder of the paper is structured as follows: In the next section we review the theoretical foundations regarding SaaS adoption, IT governance and contingency theory. Then, in Section 3 we describe our research approach. Section 4 describes the derived contingency model and applies it in four case studies. Finally, Section 5 concludes by pointing out the limitations and future work.

Theoretical Foundations

In the following, we briefly review existing literature that informs the relationship between SaaS adoption and IS organization, and motivate why the concept of IT governance and a contingency approach are particularly suitable to further explore this relationship.

SaaS Adoption and IS Organization

Software as a Service (SaaS) commonly refers to a delivery model where standard software is hosted at an external provider and is used by multiple tenants over the Internet (Ambrust, Fox, Griffith et al. 2009). It is contrary to traditional IT delivery where the software is typically either operated on the company's own computing infrastructure (on-premises) or hosted on dedicated instances at provider side (Lee et al. 2003). Thus, the distinguishing criterion between the two delivery models is the multi-tenancy capability of the software, rather than the question of internal or external delivery (Cusumano 2010). Economically, SaaS is often characterized by subscription-based pricing models, as opposed to perpetual-use licensing for on-premises software (e.g. Choudhary 2007). However, empirical works show that in practice licensing models for SaaS are almost as diverse as for traditional software offerings (Lehmann et al. 2010).

Several works investigate the decision of firms for adopting SaaS-based enterprise software (e.g. Xin and Levina 2008; Benlian et al. 2009; Benlian et al. 2010). These studies confirm that, inter alia, lower application specificity and smaller firm size are among the main drivers for SaaS deployment (Benlian et al. 2009), while security concerns represent a major barrier (Benlian et al. 2009; Benlian and Hess 2010). Research on SaaS adoption mostly draws on Transaction Cost Theory (TCT) and the Resource Based View (RBV) as theoretical frameworks to explain the phenomenon (Xin and Levina 2008; Benlian et al. 2009). Apart from SaaS adoption, these theoretical frameworks may also provide appropriate constructs regarding the impact of SaaS on IS organization.

With respect to SaaS, TCT essentially states that companies will rather source software as a service if application specificity and uncertainty regarding the outsourcing provider is low. Application specificity in this context has been operationalized by other works as degrees of modularity, customization and integration into the application landscape (Benlian et al. 2009). Thus, from an organizational standpoint, TCT implies that the border of the IS organization using SaaS is defined by the overall degree to which SaaS-based sourcing is performed.

According to the RBV, only resources that are not source of a competitive advantage should be outsourced (Xin and Levina 2008). Resources in this sense may be physical, such as hardware or human capital, or intangible, such as processes, knowledge, or software. Thus, with regard to IS organization, RBV informs that resources related to SaaS-based sourcing remaining in-house, will be those that possess a high strategic value, such as certain knowledge or capabilities. In this context, absorptive capacities have been identified as an important organization-level construct explaining the capability of the employees to assimilate and make use of external information to the advantage of the firm (Cohen and Levinthal 1990; Roberts, Galluch, Dinger and Grover 2011).

While providing important constructs to explain the border between the SaaS provider and the consumer organization, the theoretical frameworks presented hardly shed light on the internal borders, i.e. the arrangements between business and the internal IS organization. In this context, IT governance theory has emerged as an important concept.

IT Governance and Contingency Theory

IT governance is commonly understood as a subset of corporate governance that has evolved from IS strategy (Webb, Pollard and Ridley 2006). The need for IT governance is motivated by Agency Theory (AT), which considers two or more actors (here: business and the IT organization) interacting in an asymmetric relationship. The business (principal) contracts the IT organization (agent) to implement and operate certain IT services. AT provides that certain governance mechanisms (norms) can be established to avoid opportunistic behavior of the agent and thus improve the effectiveness of this relationship.

One of these governance mechanisms refers to the accountability framework. Sambamurthy and Zmud (1999) define this as *the patterns of authority for key IT activities*. These can be allocated either in a centralized or decentralized manner. In a corporate setting, centralization typically correlates with allocating decision rights to the IT department, while decentralization refers to the lines of business. Several approaches have been taken to operationalize IS authority (Brown and Magill 1994; Sambamurthy and Zmud 1999; Weill and Ross 2004). Brown and Magill (1994) discuss the use of a 7-point versus a 5-point scale for assessing the locus of decision authorities. Weill and Ross (2004) present a more sophisticated operationalization by six governance patterns, which essentially combine the horizontal (i.e. business versus IT) with the vertical dimension (i.e. executive versus employee level). In addition, they define five decision domains (IT principles, IT architecture, IT infrastructure strategies, Business application needs, IT investment and prioritization) that these governance patterns can be assigned to.

The distribution of IT decision rights has been found to be a major complementary organizational resource for achieving IT and firm performance (Weill and Ross 2004; Gu et al. 2008). Yet, research shows that there is no single IT governance mode that fits all firms and domains of IT. Rather, the optimal governance mode is determined by a rich set of factors (Brown and Magill 1994; Sambamurthy and Zmud 1999). For example, in terms of IT infrastructure governance a more centralized mode should be adopted by firms with cost or revenue synergies while a more decentralized governance mode fits better to those firms that require local agility (Gu et al. 2008). Therefore a contingency approach appears also particularly useful to explain the mode of governance regarding the domain of SaaS applications.

Contingency theories originally stem from the field of organization theory. They represent a class of behavioral research which recognizes that an organization needs to fit within its environment and context (Fiedler, 1964). Thus, there are different decisions that are optimal depending on the salient forces in each of these situations. The theory of multiple contingencies for IT governance by Sambamurthy and Zmud (1999) is based on Gresov's (1989) conceptualization of fit and misfit in organizational design. It identifies a number of organizational-level contingencies for the overall IT governance mode which may also inform the question of the right mode of governance for SaaS applications.

Research Methodology

Data Acquisition

To explore the factors that determine SaaS authority on an application level, we followed a multiple case study approach and collected data from four companies using a SaaS. The replication logic of this study combined elements of a theoretical replication (i.e. selecting cases expected to yield in different results) with those of a literal replication strategy (i.e. cases producing similar results, see Yin 2002).

First, to ensure comparability of the cases and rule out influences presented by the type of application, we decided to focus on one popular SaaS application. We chose the customer relationship management (CRM) solution from Salesforce.com (SF), as CRM is among the most popular application types for SaaS (Benlian et al. 2009) and SF is one of the market leaders in this segment (CRM Landmark 2011). Then, potential case companies were drawn from a SF customer references site and contacted formally. In this selection we were seeking for differences in context variables such as industry and size to increase the generalizability (Yin 2002). Naturally, the selection also had to follow opportunistic criteria, as not all companies were willing to disclose information on their case. As we had found two cases for each manifestation of IS authority (allocation to the business, respectively to the IT side), we regarded the number of cases as sufficient to deepen into the analysis of contingent factors.

Interviews took place between May and July 2010 and followed a common semi-structured guideline with four main sections: a) introduction, b) company context, c) SaaS adoption, d) organizational impact. To identify peculiarities of SaaS usage, we replicated the questions in part c) and d) regarding an exemplary on-premises solution. In those companies that allocate SF authority mainly on the business side, we interviewed representatives from IT and the business. The overall 6 interviews amounted to more than 6 hours, respectively 67 pages of transcription which were subsequently reviewed by the interviewees. We complemented the interview material with company information from web resources and press clippings. The respective characteristics of the companies, SF usage and interviewee roles are listed in Table 1.

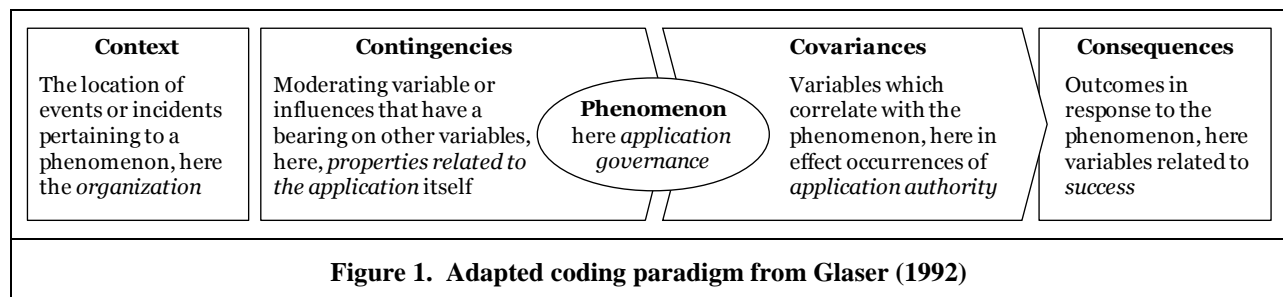
	Case A	Case B	Case C	Case D
Industry	Education	Manufacturing	High-Tech	Pharma
Employees / Revenue ¹	120 / 8 m EUR	600 / 70 m EUR	1,700 / 150 m EUR	10,000 / 650 m EUR
IT employees ¹	10	7	40	400
No. of SF CRM users ¹	30	60	150	860
Implementation time	n/a	1 week	3.5 months	9 months
Interview partners from IT department	Head of IT, reports to CFO (A)	IT-Application Manager SAP (B ₁)	Head of Competence Center CRM (C)	Application Manager (D ₁)
Interview partners from business line	-	Sales Organizer and SF Key User (B ₂)	-	CRM Associate Manager (D ₂)

¹ Figures rounded for anonymity

Data Analysis

We analyzed the interviews using grounded theory, a qualitative research method increasingly employed in IS studies (Matavire and Brown 2008). Grounded theory is contrary to other research methods as it systematically seeks to develop theory rather than verifying or testing it (Glaser and Strauss 1967). We opted for Glaserian grounded theory as it offers a more abstract conceptualization compared to the Straussian approach, which is thought of to be more prescriptive (Niekerk and Roode 2009). Grounded theory originally postulates to conduct research without a priori knowledge. However, given the large theoretical body regarding our research, we took a more analytical approach which allowed us to integrate previous theories during the coding process. This is in line with the most common pattern of using grounded theory in the IS field (Matavire and Brown 2008).

We first analyzed the interview material by performing an open coding using an adapted Glaserian (1992) C-family paradigm with four main categories (context, contingency, covariance and consequences). The resulting 165 codes with total 507 quotations covered a calculatory 47% of the total interview material. As the core phenomenon, the arrangements for SaaS application governance, was clear from the beginning of the study, these text fragments could be directly assigned to the main categories in function of their relationship with the core phenomenon, see Figure 1.



As a second step in open coding, we aggregated these codes iteratively to appropriate mid-level concepts. Codes describing similar activities conducted by different actors (e.g. business or IT) were merged in this step. During this procedure, we also intensively drew on previous theoretical foundations and related work. For example, some categories describing the properties of the mentioned application emerged describing the *complexity to integrate* the SaaS application, the *ease to customize* it and required *training needs* during its introduction. Based on TCT and SaaS adoption literature, these three themes were clustered as proxies for overall *application specificity*. In the sense of a theoretical sampling (Glaser

1992), we also compared the variables of SaaS usage with those regarding typical on-premises applications.

Finally with regard to selective coding, we grouped these mid-level concepts around the core phenomenon and analyzed the type of relationships. Concepts that did not exhibit a logical link to the theme of application governance were discarded from the analysis, for example codes related to *costs* for SaaS/On-premise (31), *privacy and security concerns* (13) and properties of the *SaaS provider* (11). The resulting condensed model comprises 17 variables related to application governance, 5 of which refer to the organization and 12 to the application level, see Figure 2.

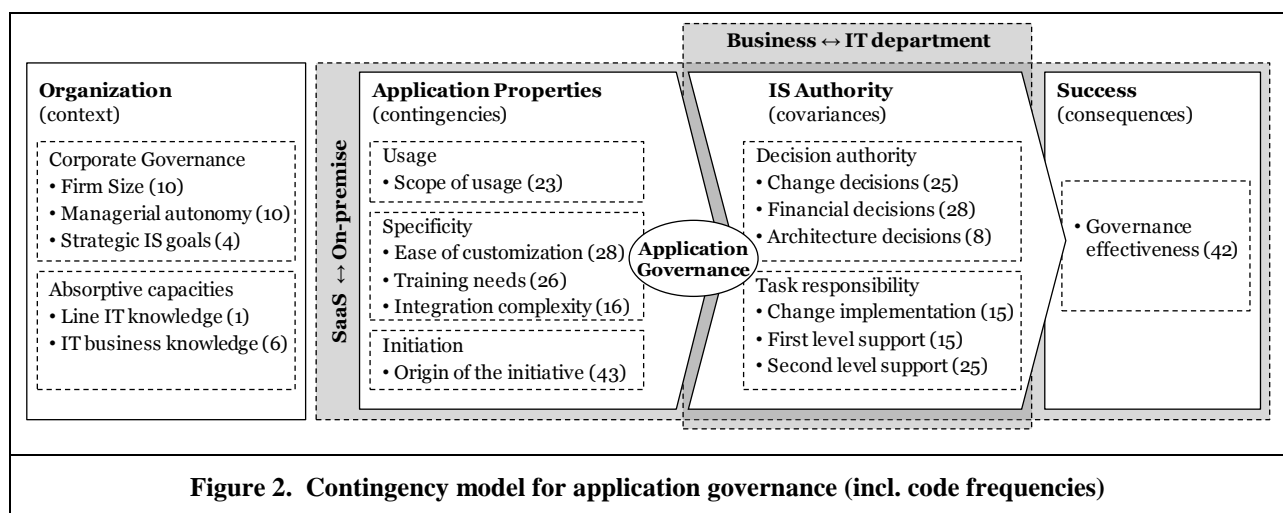
Comparative Case Studies

After deriving the contingency model, we dimensionalized each of the variables on appropriate three-point scales (e.g. high, medium, low) to prepare the case comparison. For the variables of IS authority however, we chose a five-point scale as we perceive that the complex arrangements between business and IT need to be represented with sufficient detail (scale: business, business with IT involvement, Federal/Both, IT with business involvement, IT). Based on the relevant text passages, three authors separately assessed the 17 variables for each of the four cases in a comparative manner. The resulting inter-rater reliability of this assessment accounted for $\kappa=0.35$ measured by a weighted Cohen’s kappa for ordinal measures, which can be regarded as a fair result (Landis and Koch 1979).

After the assessment, the authors discussed the contingency factors that were salient for each case. According to contingency theory (Gresov 1989; Sambamurthy and Zmud 1999), salient forces may either induce an IT- or business-oriented governance mode while weaker forces are not perceived to be decisive for determining the governance allocation. To validate our choice between salient and weaker forces, about half a year after the interviews, we made a second inquiry to the interviewees asking for the precise motivation for installing the respective governance mode. Finally, the case study findings presented here have been cross-checked with our interviewees and passed minor revisions.

Results – A Contingency Model for Application Governance

The derived model saturates the theoretical categories from Figure 1 with variables that describe governance for SaaS applications. Figure 2 depicts the model with code frequencies for each variable. In the following, we will illuminate these variables for each category highlighting theoretical and practical references as well as relevant quotations.



IS Authority

The variables defining *IS authority* are central to the phenomenon as they are expected to correlate with the actual mode of governance (i.e. centralized, federal or decentralized), in other words they operationalize the concept of application governance. These variables refer to activities which are typically not outsourced (Lee et al. 2003), but remain within the company, either on business or IT side. Based on the common distinction between decision and execution, we divided this category into *decision authorities* and *task responsibilities*.

Decision Authorities

The major decision areas regarding SaaS refer to application changes, financials and architecture, which is in line with the general domains for IT decisions (Weill and Ross 2004) as well as with standard IT process models such as the IT Infrastructure Library (ITIL 2007).

Change decision authority refers to the responsibility of choosing which requirements should be implemented by the SaaS application. Such requirements typically refer to changes in data fields or workflows. ITIL suggests that such decisions are to be taken by a Change Advisory Board which represents a central governance body within the Change Management process (ITIL 2007). One of our interviewees (A) states that for on-premise it is typically the IT role of the “Technical System Owner [who] initiates the change process”, while regarding SaaS, in another case (D), there is an “Operational Committee [which] is made up of a representative from each of the business units and the groups in the business unit” to take such decisions, which shows the variance in this variable.

Financial decision authority is a central governance domain in any IT organization (Weill and Ross 2004). Financial decisions regarding an application, such as annual spend for licenses and maintenance as well as singular investments and their prioritization, are usually taken by the organizational unit that owns the application budget. ITIL describes this decision domain in the Financial Management for IT Services process area (ITIL 2007). One participant (case A) emphasizes that SaaS usage leads to a “very high cost transparency to the business” while for in-house applications a number of “hard- and software, support-, upgrade, and backup-related costs accrue to IT costs” which are “not visible for the organization”. Thus, even if the application budget is owned by a certain side of the organization (here IT), business may claim stronger decision authority for financial decisions regarding SaaS, compared to traditional on-premises applications.

Architecture decision authority deals with technical choices including data, technology, and applications to plot a path for migration and integration (Weill and Ross 2004). Regarding a SaaS application, where most of data, technology and application logic is provided externally, this decision domain largely refers to questions of internet connectivity, security, and foremost integration with other applications. One interviewee (B₂) states that through the use of SaaS, fewer capabilities were required for technical integration on business side compared to on-premise applications “since we outsourced this to the SaaS provider”. In contrast, for the on-premise solution, in this case Enterprise Resource Planning, it is always IT to “decide on integration” and “maintain the interfaces”. For comprehensiveness, it may be noted that ITIL disregards architecture management as a dedicated process (ITIL 2007).

Task Responsibilities

Apart from decision authorities, there are a number of key operational activities regarding SaaS applications mainly referring to change management and end-user support. In some cases the SaaS provider carries out these tasks. However, the ultimate responsibility for these activities still needs to be allocated within the client organization.

Change implementation responsibility refers to the operational handling of changes, e.g. implementing customizations or new workflows and is defined in ITIL as part of the ITIL Change Management process (ITIL 2007). Despite the multi-tenant design and an inherently high degree of standardization, SaaS applications typically offer the possibility to perform changes to the system in a web-based manner by authorized administrators (Sun, Zhang, Guo, Sun and Su 2008). Thus, administrators may more likely be located in business. This is the case for interviewee D₂ who states: “I’m more part of the business, but I

just manage Salesforce and [...] there are a lot of changes that we need to do". However, more common appears to be an allocation to IT as it is usually the case for traditional IT applications (Weill and Ross 2004). Interviewee B₂ states: "I would be fine if I could implement minor customizations in the [on-premise ERP] without doing this with IT. This wouldn't be a disadvantage for the company". Finally, even if there are non-trivial changes to the SaaS system, the example demonstrates that this can be handled on the business side "by contracting an external partner [...] who worked without any involvement of the IT department".

Another important domain of IS authority on task level is the responsibility for end-user support (Brown and Magill 1994). We further differentiate between first and second level support. *First level support* refers to the responsibility to provide a central point of contact for users that have an issue with the respective SaaS application. Typical first level support activities include responding to user questions, or to grant access to a specific functionality. In ITIL, this corresponds to the Incident Management, Request Fulfillment and Access Management processes (ITIL 2007). Interviewee C states that "the user sends a ticket to IT support which is routed to the respective Competence Center [...] and then we implement that and close the ticket". In Case D there are "three levels of support, first level which is myself [interviewee D₂] and the other system administrators and there's the second level which is basically IT", thus in this case tickets are first routed to support staff in business.

Second level support is understood as the responsibility for handling issues which cannot be resolved at first level. For a SaaS application, second level requests typically refer to any non-routine technical disturbance. This largely correlates with the Problem Management process defined in ITIL (2007). For SaaS, second level support may involve the IT department for example when "we have someone that can't access the system and on the [provider's] side everything looks absolutely fine." However, we recognize that for SaaS, internal IT may often be bypassed and problems are directed to the provider. Due to a higher degree of standardization, it is easier for the SaaS provider to support heterogeneous client organizations. Interviewee D₁ confirms that by stating "obviously with a SaaS solution, the vendor is much more aware of the integration aspect than he might be with a regular ERP [i.e. on-premises] solution".

Contingency Factors

In order to identify and structure the possible contingencies for the mode of SaaS governance, we distinguish between factors that refer to the organizational context of the firm, and such that relate to properties of the SaaS application itself. Since organization-level influences can be largely derived from IT governance theory (Sambamurthy and Zmud 1999; Weill and Ross 2004), we did not focus on them during the interviews. This is also reflected in the low numbers of related quotations in the interviews (see Figure 2).

Organization-Level Contingencies

Sambamurthy and Zmud (1999) define multiple contingent influences on overall IT governance, out of which two categories are found to be relevant for application governance as well: *corporate governance* and *absorptive capacities*. Regarding corporate governance, IT governance theory informs that *firm size* influences the mode of IT governance (Sambamurthy and Zmud 1999). Smaller firms tend to establish centralized IT departments to better coordinate the interdependencies between business functions. As firms grow, they develop more divisional structures, also calling for a more decentralized IS organization to maintain responsiveness to different lines-of-business (Ein-Dor and Segev 1982). We propose that such influence on IS governance will analogously apply to the narrower context of SaaS governance and include *firm size* into our model, i.e. larger firms will be more likely to allocate decision authority for SaaS applications to the business.

Following this argument, the general degree of *managerial autonomy* (Sambamurthy and Zmud 1999) of the firm is equally expected to explain the mode of SaaS governance. Suppose there are two firms of the same size, then rather the one where business-line managers have greater autonomy would also happen to decentralize IT governance for a SaaS application. Several studies emphasize that such correlation between overall firm governance and IT governance exists (Ein-Dor and Segev 1982; Brown and Magill

1994). Therefore we propose that *managerial autonomy* also influences in the allocation of SaaS authority.

As a third contingency in this category, we aggregate *strategic IS goals*. Strategic goals for the IS organization follow from business goals and have been conceptualized in different ways, e.g. as a trichotomy of IS efficiency, IS comprehensiveness and IS flexibility (Sabherwal and Chan 2001). Weill and Ross (2004) demonstrate that companies defining low costs and standardized business processes as their IT principles would adopt a more centralized IS governance mode, while IS innovation- and growth-oriented companies rather install decentralized decision rights for the IS organization. Thus, we replicate this contingent influence to explain the mode of SaaS governance.

The second category on the organization level captures *absorptive capacities*. Absorptive capacities play an important role from a resource based perspective. Generally, they refer to the knowledge of a firm's employees that facilitates assimilation of external information and its application to desirable ends (Cohen and Levinthal 1990). Related to the question of SaaS governance, absorptive capacities may be particularly relevant regarding the *IT knowledge in business-line organizations* (Brown and Magill 1994; Bassellier, Benbasat and Reich 2003). We propose that business managers and users who are knowledgeable about IT will also be more likely to take over decisions and activities for managing a SaaS application.

Conversely, absorptive capacities can also concern the *business knowledge within the IT department*. We find this particular theme of absorptive capacities largely underrepresented in IT governance research (Roberts et al. 2011), yet an exception may be seen in the work by Armstrong and Sambamurthy (1999) who analyze the influence of the CIO's business knowledge on IT assimilation. The more knowledgeable CIO and IT staff are about business processes, the more responsive may the IT organization react to business demands. Thus we propose that higher *business knowledge within the IT department* may also serve as an explanatory factor for a more centralized SaaS governance.

Application-Level Contingencies

Based on the interview data, we contend that factors on organization level are not sufficient to explain the phenomenon of application governance for SaaS applications. Therefore, we extend the contingency theory on organization-level (Sambamurthy and Zmud 1999) by factors on application level and validate these in the light of related literature. These factors refer to the properties of the SaaS application itself and its implementation. They are divided in the categories *scope*, *application specificity* and *initiative*.

The *scope of application usage* may depend on the type of application (Benlian et al. 2009). The SaaS CRM application subject to the investigation is typically used by employees in the marketing and sales departments, representing only a fraction of the firm. Interviewee A reports "the more departments use this application to manage data about potential customers, the more user requests come up and the more complex [the system] gets," therefore, "a central process was required to control data quality". Thus, if the application is used only by a few employees (e.g. for Engineering or Business Intelligence), it is more likely that these will also be more involved in decisions and activities. In contrast, a company-wide used SaaS application (e.g. for Office applications and Collaboration) would possibly induce a more central mode of application governance.

The following category, *application specificity*, stems from Transaction Cost Theory and has also been identified as one of the major (inverse) drivers of SaaS adoption (Benlian et al. 2009). We propose that specificity may also have a major influence on the induced mode of governance and conceptualize it by the three variables, *ease of customization*, *training needs* and *integration complexity*. Regarding the first, applications differ in their degree of customizability, i.e. the possibility to adapt user interface, data and processes to specific needs (Sun, Zhang, Guo, Sun and Su 2008; Xin and Levina 2008). All interviewed subjects agree that SF CRM is "very easy to handle and fairly easy to implement" due to the fact that "everything is web-based" (here participant C). In contrast, to change something on the example on-premise application, interviewee B₂ reports, he "first need[s] to go to IT, then it will be changed in the test system, then it's carried over to quality assurance and finally with the next release cycle it goes to the production system", which makes the process clearly more time-consuming. Therefore we propose that a lower *ease of customization* may also explain the degree of IT staff involvement in SaaS-related decisions and activities.

The variable *training needs* reflects application specificity from the end user perspective. End user training has been commonly identified as a major success factor in software rollout projects (Nah, Lau and Kuang 2001). Yet, with the increasing popularity of web-based applications such as SaaS, which satisfy new standards of software ergonomics, trainings needs might reduce. Interviewee B₁ states that trainings for introducing the SaaS solution “went faster, easier and it was less manpower needed than in other projects”. B₂ adds congruently from a business perspective that “[he] took over trainings for the colleagues of the foreign subsidiaries and did things, which were not in the job description of a salesperson”. Thus, we propose that lower *training needs* may be a motivation for stronger business involvement in application-related responsibilities and vice versa.

As a third proxy for application specificity we identified the *complexity to integrate* the SaaS application. There are different patterns for integrating a SaaS solution within the enterprise application landscape, e.g. for integrating user accounts, user interface, data and processes (Sun, Zhang, Chen, Zhang, and Liang 2007). Interviewee C reports that his company integrates the SaaS solution via a special buffering database which has been “programmed by the [ERP] team, and therefore they have quite some effort with this”. In contrast to this, company B uses “no bi-directional, but a one-way interface from [ERP] to SF CRM” so that internal IT says they have “almost nothing to do with running SF” (interviewee B₁). Thus, we propose that the degree of *integration complexity* of the SaaS application may help to explain how much central IT involvement is required in managing and deciding about that application.

Finally, another category emerged from the interviews capturing the *origin of the initiative*. IT projects such as introducing a SaaS application may be triggered from line organization or the IT department (Weill and Ross 2004). Interviewee D states that “the business decided that they wanted to go with a hosted system” contrary to case C where the participant opposes “I think the last step came from IT to say, let’s do it”. The concept of project initiation is also used in other domains of IS literature, for example in green IT adoption (Schmidt, Kolbe, and Zarnekow 2010). As such motivation may also be sustained towards the later allocation of IS authority, we propose the *origin of the initiative* as the last factor to explain the mode of application governance.

Table 2. Contingency factors and proposed influence on application governance				
Category	Contingency factor	Induced mode of IS authority		Supporting literature
		IT department	Business org.	
Organization level				
Corporate governance	1. Firm size	Small	Large	Ein-Dor and Segev 1982; Sambamurthy and Zmud 1999
	2. Managerial autonomy	Centralized	Decentralized	Ein-Dor and Segev 1982; Brown and Magill 1994
	3. Strategic IS goals	Efficiency	Growth	Sabherwal and Chan 2001; Weill and Ross 2004
Absorptive capacities	4. Line IT knowledge	Low	High	Brown and Magill 1994; Bassellier et al. 2003
	5. IT business knowledge	High	Low	Armstrong and Sambamurthy 1999
Application level				
Scope	6. Application usage	Company-wide	Single unit	Benlian et al. 2009
Specificity	7. Integration complexity	High	Low	Sun et al. 2007; Benlian et al. 2009
	8. Ease of customization	Low	High	Sun et al. 2008; Xin, Levina 2008
	9. Training needs	High	Low	Nah et al. 2001
Initiative	10. Origin of initiative	IT dept.	Business org.	Weill, Ross 2004; Schmidt et al. 2010

Governance Effectiveness

Several consequences regarding the arrangements for application-level governance emerged from the data. Based on literature we reduced these to a single success variable reflecting different facets of the *governance effectiveness* for the SaaS application. The relatively high number of quotations of this concept (42) reflects a broad conceptualization as well as a high relevance of this variable.

One aspect of governance effectiveness refers to the alignment of business and IT (Brown and Magill 1994; Sabherwal and Chan 2001). For example, Interviewee D₂ states regarding the impact of SaaS: “I thought that there was quite a gap between business and IT rather than thinking we work the same company, [but] we’re all on the same side. And now [after implementing SaaS] business and the IT work together rather than it seems that one is holding over the other.” Another aspect refers to empowerment regarding the roles of business and IT, which results from an improved alignment. In the words of D₂: “I think that [the usage of SaaS] has empowered IT even more. It has given quite a positive outlook for IT from a business perspective.” Independently from this, the IT representative D₁ confirms from his perspective: “One clear thing is that by seeing [...] the SaaS solution, the business is more empowered to use and make sense with [the] application in what obviously the application allows. I think the SaaS application has empowered them to make the changes and give them more freedom.” So apparently in this case, the organization has found a governance arrangement that enables both sides, business and IT, to work together in a mutually satisfactory way.

Nevertheless, we contend that there are also more moderate examples regarding *governance effectiveness*. Regarding the interaction between business and IT, interviewee B₂ states that „the only contact we have with IT is the interface from the [ERP] to SF”. Congruently, the representative from IT (B₁) does not perceive any improvement in the relationship neither in the role of IT nor of business. Quite the contrary, the interviewee negates any empowerment of the business side through the usage of SaaS. We conclude that the satisfaction with the governance arrangements regarding the SaaS application can be regarded as rather moderate in this example.

Drawing on contingency theory, we propose that governance effectiveness describes a positive outcome if there is a fit between the SaaS governance arrangements, the organizational context and the properties of the SaaS application itself. Thus, it may be used as a criterion variable to evaluate the current mode of governance. The contingency factors, their operationalization and the possible influence on the mode of SaaS governance are summarized in Table 2.

Comparative Case Studies

In the following we will present the four cases of SaaS adoption and illustrate occurrences of contingent influences as well as the resulting mode of SaaS governance for each case. We focus on a brief description and outline the contingent forces that were salient in each case.

Case A: Private Educational Institution

The first case is a privately owned educational institution which offers executive and degree programs as well as consulting services to the industry. Central IT, a team of 10 people, understands itself as a service provider to the various business units that are subordinate to the management team. The strategic goals of IT in this institution are rather inclined to support growth and attract new students than to standardize business processes or save costs, which was also one of the motivations to introduce a CRM system.

SF CRM has been introduced in 2006 largely by the initiative of the former Head of IT. Since then it has been used by almost one fourth of staff in multiple business areas mostly for managing communication to clients, students and sponsors. Technically, it is operated as a stand-alone solution, yet a closer integration with the schools website is currently being considered. Due to the inherent properties of SF as an ergonomic and web-based product, ease of customization is considered to be quite high – a fact, which does not differ between the all the observed cases.

Regarding governance mode, SF is paid by IT budget, so that most of the application-related decisions are ultimately taken by IT. Ideas for changes and customization of the system are often placed by business

Table 3. Case comparison and contingent forces				
	Case A	Case B	Case C	Case D
Organization-level contingencies¹				
1. Firm size	Small	Medium	Medium	Large
2. Managerial autonomy	Rather centralized	Rather centralized	Rather centralized	Rather decentralized
3. Strategic IS goals	Growth	Efficiency	Mixed	Growth
4. Line IT knowledge	Medium	Medium	Medium	High
5. IT business knowledge	Medium	Low	High	Medium
Application level contingencies¹				
6. Scope of usage	Multiple Units	Single units	Single units	Single units
7. Integration complexity	Low (Stand-alone)	Medium (One-way)	High (Two-way)	High (Integration layer)
8. Ease of customization ¹	High	High	High	High
9. Training needs	Low	Low	High	Med
10. Origin of initiative	IT dept.	Business org.	IT dept.	Business org.
Decision Authority				
Financial decisions	IT	Business	IT with business	Business
Change decisions	IT with business	Business	IT with business	Business
Architecture dec.	IT	Business with IT	IT	IT with business
Task Responsibility				
First level support	IT	IT	IT	Business with IS
Second level support	IT	Business	IT	IT
Change implement.	IT with business	Business	IT	Business with IT

¹ **Salient contingencies** in bold

through a SF Business System Owner role. User support as well as most of the changes and customizations to the system are provided by the SF Technical System Owner, the counterpart IS role to the Business System Owner. Altogether, application governance in case A is quite IT centric, see Table 3. However, the initial case observation does not provide any indication, whether the chosen mode of SaaS governance is specifically effective or not.

Case B: Medium-sized Manufacturing Firm

Case company B is a medium-sized tool manufacturer with headquarters in Germany and a worldwide sales and distribution network. During the past years of economic crisis, IT budgets and workforce have been drastically cut, so that the remaining 7 IT employees serve almost 100 times more internal clients. One of the major motivations to install responsibility for the CRM system on business side was to disburden the IT organization. This efficiency-orientation is an overall pattern in the IS strategy.

SF CRM is used and governed within the marketing and sales department. It is integrated with the ERP system by a simple one-way interface, which is technically managed by central IT, yet creates few problems. The Sales Organizer and (only) SF Key User reports that his unit has been driving the CRM

rollout when it became clear that ERP- and spreadsheet-based customer databases just did not serve their purpose anymore. System customization, rollout and training only took a minor time period.

Most SF-related decisions are now taken by the SF Key User himself, who also performs most changes and customizations to the system, and contracts external support if necessary. Yet, user issues regarding SF would first end up as usual incidents at the IT help desk, before eventually being routed to the key user for second level processing, see Table 3. The case analysis does not convey the impression that the installed governance mode has particularly contributed to the alignment or empowerment of business and IT (see preceding section).

Case C: Large High-Tech Company

The high-tech manufacturing and services company in case C operates in several European countries and has introduced SF CRM at first with 150 users in one pilot region. For this purpose, a dedicated Competence Center CRM has been created under IT leadership and hired high qualified staff, such as former consultants and university graduates, i.e. people with a comparably high level of absorptive capacities and business process knowledge.

Years before, several unsuccessful attempts to introduce CRM had been undertaken by the business line, until finally the topic was taken care of by central IT. According to the Head of the Competence Center CRM, there was a considerable effort during the rollout for training users and convincing them of the benefits of such system. The fact of having capabilities on IT side to support the SF rollout and consult the dispersed business organization was certainly a determining factor to also allocate the responsibility for the ongoing management of SF to this team.

The current governance structure for the CRM solution exhibits a comparably strong decision authority of the IT department, i.e. the CRM Competence Center team. Operational activities such as first and second level support, as well as change implementation are carried out by this team. Naturally, for main financial decisions, such as the budget process, as well as for decisions on change requests, business management and users are also strongly involved, see Table 3. The Head of Competence Center CRM reports on a clear appreciation of his team as a consultant and business enabler since implementing this specific SaaS CRM solution and the according governance model.

Case D: Global Pharma Services Company

Case D is a globally operating firm with five strategic business units (SBUs) according to different segments of services offered to the biotechnology and pharmaceutical sector. The use of information systems and management of large amounts e.g. of clinical data generally plays a crucial role in pharma services, therefore we classify IS goals as relatively innovation- and growth-oriented compared to the other cases.

This growth-orientation was also one of the major motivations to make a CRM tool available to the business. SF CRM has been introduced as a central solution displacing two prior systems of different SBUs in order to increase transparency across SBUs and leverage cross-sales potential. System introduction and customizing to the specific company requirements took overall about nine months. To manage SF, former CRM system administrators as well as qualified sales staff have been joined to form a new CRM administration team within the business organization. Given the large corporate setting, this relocation allowed to shift CRM authority from IT to business, while still allocating it to a centralized function within the organization.

This team is in charge of most decisions regarding SF, performs changes to the system and provides a single point of contact for SF user requests. If such a request cannot be resolved at the first level (ca. 40% of the cases), it will be passed to the IT application architecture team for second and third level processing. Furthermore, the SF solution is highly integrated with a number of systems (e.g. financial, costing, and clinical systems) via a special integration layer managed by IT. Consequently, architectural decisions and changes to the integration layer require high involvement of central IT, see Table 3. Both, business and IT representative share the view that through the new governance arrangements related to

SaaS, overall IT alignment has improved and both parts of the organization are empowered to perform their new tasks regarding the application.

Case Comparison and Discussion

In the following we will compare the four cases of SaaS adoption, starting with the largest firm. We interpret the four cases by identifying patterns of reinforcing and conflicting contingencies (Gresov 1989; Sambamurthy and Zmud 1999). Therefore we first take a look at the salient contingencies, i.e. those that emerged as most determining forces in each case. According to contingency theory, multiple reinforcing forces, i.e. those influences which induce the same mode of application governance, would lead to a clear shape of IS authority (either centralized to IT or decentralized to business). In contrast, multiple conflicting contingencies, i.e. those that induce a different outcome, would lead to a rather federal mode of application governance. Furthermore, we aggregate the present mode of application governance to a single variable (business, federal, IT). It is worth noting that there is clearly no case of a federal archetype for SaaS governance. Finally, we may compare this as-is characteristics as well as the theoretically induced mode of IT governance with the observed governance effectiveness for each case, see Table 4. The results of this comparison are discussed in the following.

	Case A (Education)	Case B (Manufacturing)	Case C (High-Tech)	Case D (Pharma)
Induced gov. mode	IT with business	Federal (?)	IT	Business
Present gov. mode	IT	Business	IT	Business
Gov. effectiveness	Moderate	Moderate	High	High

For Case D (pharma), the results exhibit multiple reinforcing salient contingencies which clearly induce SaaS authority to be allocated in business. According to the presented contingency model, the comparably large *firm size* and rather growth-oriented *IS goals* are both indicative for a business-oriented mode of application governance. The fact that the company possesses comparably high *IT knowledge* within the SF administration team, which has been achieved by staffing people who eventually had worked in IT before, supports this perception. The present rather business-oriented governance mode exhibits a strong fit to these contingencies. This may justify the relatively high perceived governance effectiveness in this case.

For case C (high-tech), there are two reinforcing contingencies that militate in favor of allocating SaaS authority to IT. These contingencies are given by the comparably high *business knowledge of IT* staff and the fact that the *initiative* has been largely driven by the IT department. We assume that these dominant forces have overruled weaker influences such as *managerial autonomy* and *integration complexity*, thus leading to a present allocation of SaaS authority which is quite IT-centric. The fit between the present arrangement and the theoretically induced is in line with the satisfactory governance effectiveness we experienced in this case. However, in the response to our second inquiry, interviewee C stressed the current necessity to also “develop stronger key users in the regions and business units” and thus to permit more business-orientation even in the present governance mode.

In case B (manufacturing) we find a pair of apparently conflicting contingencies which refer to the *strategic IS focus* on efficiency on the one hand and the strong *initiative* of the business organization on the other. According to governance theory, such conflict induces a federal mode of IS authority (Sambamurthy and Zmud 1999), as a strategic focus on IS efficiency is generally not compatible with a decentralized governance mode (Weill and Ross 2004). However, we may also question the validity of the contingent influence of *strategic IS goals* on the SaaS governance. As SaaS applications are per se standardized and offer according economies of scale on the provider side, there are less reasons to centralize their governance as opposed to on-premises software. Thus, here our model fails to sufficiently

explain the present mode of governance. However, the misfit between induced and present governance mode could also explain the lower governance effectiveness in this case, which was outlined earlier.

Case A (education) exhibits a single dominant contingency related to the *origin of the initiative* from IT. Thus, it is worth interpreting the weaker influences, even if they were not salient from the case. We found a number of contingencies primarily related to *application specificity* as well as rather growth-oriented IT goals speaking for a governance mode that involves more business into SaaS/SF-related decisions. However, we find a quite IS centric present mode of governance. According to contingency theory, the *effectiveness* of this arrangement could be increased if the fit to these contingencies was improved. In fact, this finding was supported by the interviewee's response to our second inquiry. The Head of IT explains that "the solution has been introduced due to the strong engagement of the former Head of IT who did not foresee a proper handover to business", a fact that he now considers as "a weakness in the overall roll-out procedure of the project". Meanwhile, he has divided application authority into functional and technical responsibilities and passed large part of change decision and implementation responsibility to the department for corporate communications, i.e. the business organization.

Conclusion

In this paper we investigated the impact of using Software as a Service (SaaS) on IT governance, defined as the locus of authority for key decisions and task responsibilities related to a SaaS application. Therefore we combined a contingency perspective with a multiple-case approach to explore the factors which influence the mode of SaaS governance. Based on the analysis of rich qualitative data and the review of existing theory, we derived a contingency model for governance arrangements on application level. Finally, we examined the explanatory power of this model in four comparative cases of SaaS adoption.

Findings and Contribution

The results show that for two companies (B, D) there are dominant or even reinforcing contingencies which induce the SaaS application to be governed by business side, while in the other two cases (A, C) there are contingencies that promote a rather IS-centric SaaS governance. Furthermore, we were able to provide narrative evidence that the prevailing governance mode for one case (A) resulted in a certain misfit of SaaS authority which had subsequently been rectified. Getting back to our research question how firms (should) allocate authority for SaaS applications, we contend that there is no appropriate governance form for all cases. The mode of SaaS governance rather depends on certain organizational and application-specific contingencies. In this context, *absorptive capacities* and the *origin of the initiative* have emerged as most determining forces in the four given cases, while a contingent influence of *strategic IS goals* could not be supported. Aligning the mode of governance with organization- and application-related contingencies is expected to positively affect success variables such as governance effectiveness.

Our contribution is threefold. First, we propose a number of factors that extend existing contingency theories (Sambamurthy and Zmud 1999) towards application-level governance. This appears particularly useful, as in today's networked organizations there is no rationale to establish the same governance mode across all business applications (Marks 2008). Second, we illustrate that the often claimed correlation of IS efficiency and a centralized authority does not necessarily hold for SaaS-based applications. This underlines the call for more research on the governance of cloud-based solutions. Finally, we propose a contingency model that can be used by both academics and practitioners to better understand the reasons why a certain mode of governance is chosen for a given SaaS application. We thereby hope to provide impetus and give directions for further research.

Limitations and Future Work

Due to the qualitative case study approach taken in this paper, the obtained results may possess limited generalizability. However, the applied method allowed us to reveal important details about SaaS governance in the considered cases which was required from a theory adaptation and validation standpoint. Further, to ensure comparability of the cases, we only considered SaaS users of the application Salesforce CRM. Not surprisingly, this resulted in a low variance in some of the observed

variables such as *application usage* and *specificity*. Also, we acknowledge a lack of the longitudinal dimension of the data. Focusing on a single point of time may limit the explanatory power of the derived contingency factors, as the narrative evidence regarding case A suggests. SaaS governance is a dynamic construct, so that future studies should consider a longer timeframe to address this issue. Methodologically, the contingency approach assumes exogenous factors and thus largely neglects possible interaction between governance arrangements and the organization. Conceivably, the chosen mode of governance may reversely affect certain organizational level variables such as absorptive capacities. Thus, other approaches such as process theories might seem more appropriate to capture these temporal interaction effects. Finally, given the qualitative nature of the criterion-variable we were unable make any safe assertion about the degree to which a certain misfit is good or bad (Umanath 2003). In a future work, we plan to conduct a large sample investigation with firms using different types of SaaS applications to validate our propositions and measure the effect of SaaS governance fit on appropriate criterion variables.

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