Journal of Universal Computer Science, vol. 18, no. 11 (2012), 1501-1522
submitted: 30/11/11, accepted: 15/5/12, appeared: 1/6/12 © J.UCS

Design Choices Underlying the Software as a Service (SaaS) Business Model from the User Perspective: Exploring the Fourth Wave of Outsourcing

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Abstract: Software as a Service (SaaS) can be viewed as the fourth wave of outsourcing. SaaS is a relatively new type of service delivery model in which a service provider delivers its services over the web to many users on a pay per use or period basis. In the scarce literature available, the SaaS business model is almost always analyzed from the perspective of the service provider perspective, and rarely from the user organization. Using the unified business model conceptual framework, two case studies are investigated to understand the design choices underlying the SaaS business model from the user organization perspective. The analyses on the business model dimensions provided insight into the differences between the case studies and helped to identify eight discriminating design choices that are important when designing SaaS business models. These include the (1) SaaS service characteristics, (2) SaaS value source, (3) SaaS user target group, (4) data architecture configuration and tenancy model, (5) SaaS governance and demand/supply management core competencies, (6) cloud deployment model, (7) SaaS integration and provider strategy and the (8) SaaS pricing structure. An appeal is made for more research into the impact of cloud business models.

Keywords: Cloud computing, SaaS, Software as a Service, Business model, Design choices, Sourcing
Categories: H.0, H.1, H.4

1 Introduction

The Software as a Service (SaaS) concept is a relatively new way of software service provisioning based on the concept of delivering software as a service instead of a product [Bennet et al. 2001]. SaaS can be viewed as a particular type of business model (BM) in which a SaaS provider delivers its electronic services over the web to many users on a pay per use or period basis. Many organizations are currently exploring SaaS models and are experimenting with various configurations. There are several variables that are expected to influence SaaS business model arrangements [Stuckenberg et al. 2011].

The term business model was first coined in the late 90s [Timmers 1998] and is a relatively new concept in the management literature as a product of the dotcom era [Keen and Qureshi 2006]. The business model concept is about shaping the relationships between an organizational strategy and internet-based systems [Hedman

and Kalling 2003]. In e-business and e-commerce, a web-based business model is the method of doing business online through which a company generates revenue [Rappa 2002]. There are many classifications of business models, though recently the unified business model has been introduced describing variables shaping business models [Al-Debei and Avison 2010] and this model will be used to analyze our case studies.

There is limited literature about SaaS and scant attention has been given to types of SaaS business models. Furthermore, most SaaS business models have been viewed from the perspective of a service provider [e.g. Heart et al. 2010; Stuckenberg et al. 2011] and hardly from the perspective of the user organization. This perspective is important as there are many more SaaS users than service providers and it is expected that SaaS will influence the shaping of organization's business models as it has been argued that SaaS will change the relationship between buyer and seller [Sääksjärvi et al. 2005]. The goal of this research is to understand the design choices that underlie the SaaS business model from the user organization perspective.

This paper is organized as follows. First, we introduce the SaaS concept and its relationship with cloud computing and also review various business model taxonomies. In section three, we present the research methodology that involves case study research. The case studies are described in section four, while in section five we present the cross-case study analysis and a discussion of the findings. Conclusions are drawn in section six, including some suggestions for future work.

2 Software as a Service Business Model

2.1 SaaS Background

SaaS can be viewed as a logical succession of the Application Service Provider (ASP) model. ASP use can be considered as a type of Information Systems (IS) outsourcing of telecommunication-based application services [Smith and Kumar 2004], using networks to provide online application services on a rental basis [Tao 2001]. The ASP model has its roots in three separate trends, (1) application hosting, (2) selective outsourcing and (3) browser-based computing [Sofiane Tebboune 2003; Tao 2001]. It involves deploying, managing and remotely hosting software applications through centrally located servers [Kern et al. 2002]. ASP is viewed as a way to get cheap access to software, particularly for small and medium sized enterprises (SMEs) [Currie and Seltsikas 2001], but there are also problems reported regarding its security, reliability, lack of bandwidth availability and performance [Ma et al. 2005]. SaaS can be viewed as a logical successor which broadens the focus beyond SMEs, profiting from technology developments that enable access to large amounts of bandwidth everywhere in the world and the rise of cloud computing. SaaS' roots are in the creation of cheap bandwidth, modular applications, service-oriented architectures and cloud computing [Janssen and Joha 2011].

ASP is viewed by some authors as the third wave of IT-outsourcing [Currie and Seltsikas 2001]. The first wave is about handing over IS/IT assets, resources and and/or activities based on a one-to-one relationship between the service provider and customer [Willcocks and Kern 1998]. The second wave was more business focused and involved selective outsourcing [Lacity and Willcocks 1996], while the third wave was the rise of the ASP model. In this light, SaaS can be viewed as the fourth wave of

outsourcing. This fourth wave is more akin to an evolution originating from the ASP model, but revolutionary in the sense of network availability from virtually anywhere in the world and the rise of cloud computing for the low-cost storing and processing of data.

The SaaS concept is a relatively new type of business model for software service provisioning, enabling for the faster implementation of software changes [Bennet et al. 2001] and allowing to get rid of the own installation, control and maintenance of the IT function [Gonçalves and Ballon 2011]. The user organization pays a certain fee for the use of the software to one or more SaaS providers that host and provide access to software applications over a network. This type of sourcing model enables the development of a service only once and provides it to many users. Figure 1 depicts the relationship between the SaaS provider and user organization(s).

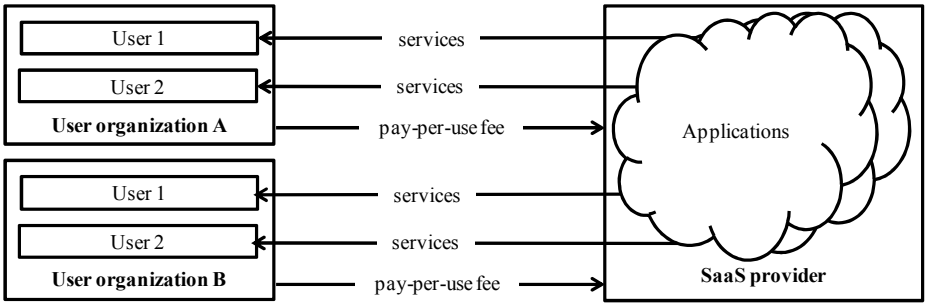

Figure 1: Relationship between the SaaS Provider and User Organization(s)

Private companies in the IT industry are moving to a web service delivery model by exposing network capabilities and combining these with online content and applications [Gonçalves and Ballon 2011], while there are also in the public sector some notable and visible examples of SaaS. In the latter situation the services provided by a SaaS provider are integrated in the website of the governmental agencies responsible for providing the services and the data is communicated to the agency to enable the processing. The governmental agencies will then not have to develop or maintain the services in-house and rely on the SaaS provider. The use of SaaS might provide the opportunity to lower cost, but also to deliver software applications to users over the web, providing a much more flexible experience in terms of time and location of access [Columbus 2000; Gonçalves and Ballon 2011].

2.2 Relationship with Cloud Computing

SaaS and clouds are interrelated as clouds are often viewed as the technical platform to install the software for the SaaS services and ensure aspects like scalability, reliability, speed of response, and so on. As such, SaaS is also sometimes called cloud application services [Zhao et al. 2010]. There is no consensus about a definition of clouds. Generally, clouds offer resources on demand [Rosenthal et al. 2010] from which application services can be accessed over a network [Buyya et al. 2009]. In essence it concerns the pay and use of distributed, low-cost hardware.

Rosenthal et al. [2010] provide a set of features of cloud computing. Janssen and Joha [2010] add two additional characteristics based on the idea that a cloud is a distributed system that is presented as one infrastructure that provides services based on service level agreements. These eight characteristics are:

1. resource outsourcing
2. utility computing
3. large number of (inexpensive) machines
4. automated resource management
5. virtualization
6. parallel computing
7. data access control
8. service level agreements

Like in SaaS, in most clouds charges are paid per use. A cloud consists of large farms of inexpensive servers which are distributed over several locations. The basic idea of the use of clouds is to shift the responsibility to install and maintain hardware and basic computational services away from the user organization to the cloud vendor [Rosenthal et al. 2010]. The cloud vendor should ensure security and data access control mechanisms. In a cloud there is a dedicated pool of hardware and virtualization software that can be used to support a variety of tasks and provide services to the cloud participants.

2.3 SaaS Business Model from the User Organization Perspective

Timmers [1998 p. 4] was one of the first to address the business model concept in his seminal paper about business models for electronic markets. He defines a business model as "an architecture for the product, service and information flows, including a description of the various business actors and their roles, a description of the potential benefits for the various business actors and a description of the sources of revenues"

Afuah and Tucci [2003 p. 4] define a business model as "the method by which a firm builds and uses its resources to offer its customers better value than its competitors and to make money doing so", while Mahadevan [2000] views a business model as three streams that are critical to the business, which include (1) the value stream for the business partners and the buyers, (2) the revenue stream, and (3) the logistical stream. Keen and Qureshi [2006] assert that business models are a vehicle for addressing how to balance value between the customer and the provider. Most of the business model taxonomies are aimed at classifying different types of business models and, essentially, they describe the logic of how value for constituents can be created.

Though there are a large number of business model taxonomies available in the literature [Afuah and Tucci 2000; Amit and Zott 2001; Bouwman and MacInnes 2006; Mahadevan 2000; Osterwalder et al. 2005; Rappa 2002; Timmers 1998; Weill and Vitale 2002], there is no established general classification, and little theoretical base for SaaS business models. Recently, the emphasis has shifted from business model taxonomies to generic models [Zott et al. 2010] and Al-Debei and Avison [2010] have developed a unified business model conceptual framework based on a comprehensive review of the literature. They distinguish four primary business model (BM) dimensions with their respective elements that form an ontological structure describing a business model [Al-Debei and Avison 2010]:

1. The *value proposition*, which is about demonstrating the business logic of value creation through offering products/services that satisfy the needs of their target segments.
2. The *value architecture*, which is an architectural blueprint for an organization allowing the provisioning of products/services in addition to information flows.
3. The *value network*, in which an organization enables transactions through coordination and collaboration among multiple organizations.
4. The *value finance*, a way in which organizations manage issues related to costing and pricing to optimize its revenue creation.

Given that the adopted framework is relatively recent and that it is based on an aggregation of existing work in the field of business models, there are hardly any critical responses to Al-Debei and Avison's unified BM framework as per yet. The unified business model has also never been applied to the SaaS domain before.

Previous research on SaaS business models has mainly focused on either the service provider or on certain specific aspects of the SaaS business model as only one business model taxonomy was used [e.g. Sääksjärvi et al. 2005; Stuckenberg et al. 2011], but no research seems to be available about the design choices underlying the SaaS business model from a user organization perspective. Stuckenberg et al. [2011] argue that in case SaaS is regarded as a disruptive or revolutionary innovation, changes may not only be required to certain individual aspects of a business model, but also to the business models as a whole. As such, it is important to understand the underlying constituents of the SaaS business model in terms of the design choices that user organizations can make when introducing and implementing SaaS.

3 Research Methodology

The research conducted in this paper has a qualitative, exploratory and descriptive research methodology. Our goal is to develop an understanding of the design choices underlying the SaaS business models for user organizations by investigating the SaaS business model design choices. This research takes the recently developed unified business model by Al-Debei and Avison's [2010] as a starting point, and extends and further refines it for SaaS. The unified business model acted as a point of reference for the frequent backtracking and recursion in the research process. This framework helped to identify the design choices in the case studies by considering how each of the constituent elements of the 4 business model dimensions in Al-Debei and Avison's framework applied to the SaaS business models in the case studies, and the design choices that were identified in the case studies were compared and mapped with each of the constituent elements, in that way providing a thorough way to identify all relevant SaaS design choices from the user organization perspective.

A combination of exploratory and qualitative descriptive case study research is taken due to the need to build a theory identifying the design choices that are underlying the SaaS business model. This research is explorative in the sense that new areas (SaaS design choices underlying the business model from a user organization perspective) are identified using case studies and it is qualitatively descriptive in the sense that is described which design choices have been made.

Case research is useful in our situation, since we are dealing with a broad and complex phenomenon, the existing body of knowledge is insufficient to permit the

posing of causal questions and SaaS business models cannot be studied outside the context in which they occur [Yin 1989]. This research can be described as a qualitative case study analysis, as the learning experience is investigated with reference to a specific event, the definition and implementation of a business model for SaaS, in a bounded context [Yin 1989; Creswell 1994]. We investigated two different SaaS case studies, which was thought to be sufficient at the beginning of this research given its exploratory character.

The cases were investigated using reports and documents, especially with regard to the strategy phase prior to the implementation of SaaS and during the SaaS implementation process. The documentation included documents such as internal memos, e-mails, reports and presentations. The two cases were selected to represent one private and one public organization, where the former is an intra-organizational SaaS arrangement spanning the boundaries of only one organization and the latter is inter-organizational, covering multiple organizations. The private sector case study has a more centralized governance structure than the public sector case which is more decentralized. The governance model is often viewed as an important variable influencing the organization [Peterson 2004; Weill and Ross 2005] and might influence the design of business models. The differences between the cases could result in the identification of a broader range of variables affecting the business model design. Given the broad scope of the business model concept, this paper aims to provide a comprehensive overview of the various underlying SaaS business model design choices, thereby trying to find a balance between the breadth and depth of each of the identified relevant topics. In Table 1 the main characteristics of the two case studies are mentioned and these will be further discussed in the next sections.

	Case Study 1	**Case Study 2**
Organizational Sector	Private sector	Public sector
Organizational Scope	Intra-organizational	Inter-organizational
Governance Structure	Centralized/federated	Federated/decentralized
SaaS Services	Human Resources (HR) information systems	Information and Communication Technology (ICT) systems
SaaS Users	Internal employees	Both internal employees as well as citizens and businesses

Table 1: Case Study Characteristics

4 Case Studies Background

4.1 Case study 1: Global Manufacturer

A global manufacturing company experienced problems with creating global Human Resources (HR) management reports. The process was inefficient and slow, resulting in data that was quickly outdated. It was decided to address this issue through the implementation of a Software as a Service model. This would avoid any development

or control and maintenance activities. The SaaS model offered a fast implementation, an easy to maintain system with frequent upgrades and predictable ongoing costs. Furthermore, a robust and well supported HR system could be acquired quickly and efficiently.

Through the implementation of a new global HR management information system, a number of benefits were anticipated at the strategic and operational level. It was expected that the quality of the HR data would improve in such a way that it could also be used for aspects beyond the HR function, such as identification management, delegation of authority and budgeting. Also a structured and consistent way to analyze and report global HR data to the wider business was required, including real-time reporting for business critical information. Further improvements were achieved by the elimination or minimization of double data entry, more standardized and harmonized HR processes, better utilization of HR resources, automated process flows and a reduced number of HR applications.

4.2 Case study 2: Federal Government

The information technology environment of the American federal government used to be characterized by difficult to manage, heterogeneous, duplicative systems with low asset utilization, negatively impacting its ability to serve its citizens. In 2010, a 25-point federal IT reform plan was released to address these issues, in which cloud computing was an important element [Kundra 2010]. A federal cloud computing strategy was created, intended to accelerate the speed to implement cloud computing within the government by requiring agencies to first consider cloud computing options before any new investments might be made [Kundra 2011]. Based on an extensive study and existing case examples, a decision framework was created to support agencies in migrating towards services such as cloud-based SaaS. Participating agencies only pay for the IT resources they consume and are able to increase or decrease their usage to match their requirements and potential budget constraints. They leveraged the underlying capacity of shared IT resources via a network and resources required to support mission critical capabilities could be provided more rapidly and with minimal overhead. Following the publication of this strategy, each agency was required to re-evaluate its technology sourcing strategy to assess the use and implementation of cloud-based technology and application solutions as part of the budget process [Kundra 2011].

5 Cross-case Study Analysis and Discussion

Al-Debei and Avison's [2010] unified business model framework was used to identify the design choices that were important in defining and implementing SaaS business models from a user organization perspective in both case studies. The four BM dimensions of the unified business model consist of different components and these individual components were used to identify the discriminating design variables in the two case studies that are relevant for the way the SaaS business model needs to be defined. Moreover, the design choices that were identified in the case studies were compared with each of the constituent elements, thereby providing a thorough way to identify all relevant choices underlying the design of the SaaS business model. Eight

design choices were identified in the case studies and Table 2 shows how these relate to each of the relevant BM dimensions of Al-Debei and Avison's framework.

BM Dimensions [Al-Debei and Avison 2010]	**BM Components per BM Dimension [Al-Debei and Avison 2010]**	**Identified SaaS BM Design Choices from a User Organization Perspective**
Value proposition	*Product service*	1) SaaS service characteristics
	Intended value element	2) SaaS value source
	Target segment	3) SaaS user target group
Value architecture	*Value configuration*	4) Data architecture configuration and tenancy model
	Core competency	5) SaaS governance and demand/supply management core competencies
	Core resource	
Value network	*Actor*	
	Role	
	Relationship	
	Governance	
	Flow communication	6) Cloud deployment model
	Channel	7) SaaS integration and provider strategy
	Network mode	
Value Finance	*Total cost of ownership*	8) SaaS pricing structure
	Pricing method	
	Revenue structure	

Table 2: Relevant Identified SaaS BM Design Choices from the User Organization Perspective

The identified design choices underlying the SaaS business model within the *value proposition* are the SaaS service characteristics in terms of the complexity and required security, the SaaS value source in terms of the benefits that are sought to be achieved by implementing SaaS, and the SaaS user target group that is making use of the SaaS services. The design choices related to the *value architecture* are the data architecture configuration and tenancy model, and the SaaS governance and demand/supply management core competencies. The *value network* is characterized by the design choices related to the cloud deployment model and the SaaS integration and provider strategy, while the *value finance* dimension is about the SaaS pricing structure, and the way this can be constructed.

In three instances, different BM components as defined by the unified model were combined into one design choice, because of the overlap and the similarities between these respective BM components. This is the case for SaaS governance and demand/supply management core competencies, the SaaS integration and provider strategy and the SaaS pricing structure. Important attributes of IT governance are the roles and responsibilities of the different actors involved [Weill and Ross 2005] and also include the resources and capabilities that are core to the business' future capacity

to exploit and govern the demand and supply of IT successfully [Feeny and Willcocks 1998; Mayer and Salomon 2006]. The SaaS integration and provider strategy depends on the mode of collaboration regarding the service provider network and channels that are used, implying whether multiple service providers are used in an open network or whether a single provider is used in a closed network [Pisano and Verganti 2008]. Both the revenue structure and the total cost of ownership of the SaaS solution from the perspective of the user organization depend on the SaaS pricing structure that is used, and as such, these three BM components have also been combined.

All of the design choices are described from the user organization perspective and were relevant to both case studies, though there were differences in the way these choices were filled in. In the following subsection these eight design choices are further described and discussed.

5.1 SaaS Service Characteristics

In each of the case studies many criteria were defined that the SaaS services needed to meet, including with regard to availability, performance, security, back-up and contingency management, scalability, portability, and architectural compatibility. In both case studies, assessing the risks was a dominant element in the decision process. In case services are complex and cannot easily be separated and in case they require a high security level because of the sensitivity, confidentiality or privacy of the data or because of statutory compliance to laws, regulations, and agency requirements, much more effort is required to ensure that these service requirements are met. In both case studies, additional measures had to be implemented to ensure that the data is authorized, complete, and accurate and data controls and access policies were put in place correctly. Also an appropriate governance model was defined and implemented to ensure that SaaS providers are sufficiently transparent, have the required security and management controls in place, and provide the necessary information to assess and monitor the quality of those controls.

Given the dependency on the SaaS provider, two major dimensions can be identified that not only determine the suitability of SaaS, but also influence the way it needs to be managed. These are (1) the maturity of the SaaS provider and (2) the complexity and required security of the SaaS service as shown in Figure 2. The SaaS provider market is rapidly evolving and while a few SaaS providers have a relatively large number of clients, they are the exception and not the norm. This became apparent during the SaaS provider selection process in the global manufacturing case study. Because of the relative newness of SaaS and the dependency on the SaaS provider, assessing SaaS provider viability and capability is very important. The SaaS providers were thoroughly audited at the financial, management and investor level, and needed to have contingency plans in place to address and account for change in control and potential provider failure. The lower the maturity of the service provider, the higher the risks and more investment is required to manage the vendor and to define back-up and contingency plans.

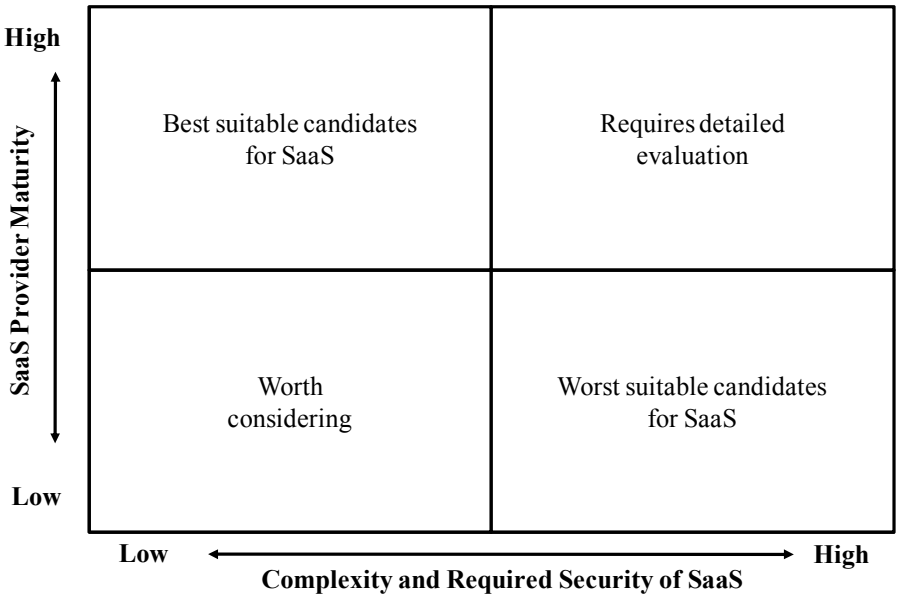

Figure 2: SaaS Provider Maturity vs the Complexity and Required Security of SaaS

5.2 SaaS Value Source

In the global manufacturing case study, there were many different SaaS benefits found including the standardization and consolidation of HR processes, better utilization of HR resources, more flexibility regarding costs and system upgrades, having a best in class HR functionality and a clear user interface. Agreements needed to be made with the SaaS provider about appropriate SLAs and key performance indicators. Furthermore, internal processes needed to be put in place to manage the SaaS provider on these elements. Given the central control over HR, there was almost no possibility for the decentralized business units to deviate from the standards that were set by the corporate policy, though these business units were asked to provide their input regarding their needs and requirements.

In the more decentralized federal government case study however, all participating agencies can prioritize one or more different SaaS value sources and according to their individual requirements, an appropriate SaaS solution will have to be provided. Three value sources were identified in the federal government case [Kundra 2011]: (1) efficiency, (2) agility and (3) innovation. Table 3 provides an overview of the different value source choices in both case studies.

SaaS Value Sources		Clarification of the Value Sources
Case Study 1	Standardization and consolidation	Standardized and harmonized HR processes and reduced number of HR applications
	Better utilization	Elimination or minimization of double data entry and better utilization of HR resources
	Flexibility	Predictable on-going costs, easy to maintain and upgrade system and real-time on-line reporting of business critical HR data
	Better security and functionality	A best in class HR functionality and user interface, automated process flows and ensuring employee data integrity and security
Case Study 2	Efficiency	Higher computer resource utilization, accelerated system consolidation and more efficient tools lowering labor costs and increasing productivity, as well as getting more cost flexibility using pay per use models
	Agility	The ability to upgrade existing services or change the IT capacity very quickly, meeting urgent demands of the users, especially for critical systems and services
	Innovation	Requiring new service functionality regularly, innovation is important, and the services need to be better linked to emerging technologies

Table 3: SaaS Value Sources in Both Case Studies

In the case studies, the choices regarding this dimension influenced how the SaaS services had to be implemented and managed. In the federal government case it was argued that non-mission critical services that have relatively high maintenance or low utilization ratios could benefit more from a solution that increases their efficiency. A solution focused on agility would however be more appropriate for services that are mission critical and require a lot of upgrades. Depending on the defined SaaS value choice, appropriate service level agreements and key metrics need to be defined and agreed upon with the service provider to ensure that the objectives are met.

5.3 SaaS User Target Group

It was found to be important to identify who the users of the SaaS services are. This determines to what degree the services can be standardized and how much customization is required. In the global manufacturing case, the users of the SaaS services were only internal employees, while in the federal government case study there are different user target groups. These include citizens, businesses, but also other public agencies and internal employees, that all require different services. The SaaS services for citizens are wikis, blogs, social networking and agency websites, while employees can access non-core services such as email and virtual desktop services as well as governmental core applications. The choice regarding the SaaS

user target group influences different dimensions, including the security and the individual requirements regarding the functionality of the SaaS services for the federal agencies. The user interface of the SaaS service can range from a standard layout to a customized page for each user group, that even include different forms that comply with different internal process guidelines. In both case studies, the users required a certain degree of customization, and special data fields were created additional to the standard SaaS solution. User authentication is also relevant in this regard as each request must be authenticated to know the user organization to which the user belongs, thereby enabling license checks and usage metering. In both cases the authorization was relevant for the application services, as the applications have different modules to which certain users have access and others not.

5.4 Data Architecture Configuration and Tenancy Model

A main priority for a SaaS service is that the data architecture is both robust and secure enough to satisfy the requirements of the SaaS user, as found in both case studies. In the global manufacturing case study, three distinct approaches for creating data architectures were identified and considered that are also described in the literature [Chong et al. 2006; Domingo et al. 2010]. These approaches are influenced by the question whether a single or multi-tenancy model is preferred, that is whether a database is shared between multiple user organizations or not. The three options are [Chong et al. 2006]:

1. Separate Databases: each user organization or tenant has its own set of data that remains logically isolated from data that belongs to other tenants. This approach tends to lead to higher costs for maintaining equipment and backing up tenant data. Hardware costs are also relatively high, as the number of tenants that can be housed on a given database server is limited by the number of databases supported by the server.
2. Shared Database, Separate Schemas: this approach involves housing multiple tenants in the same database, with each tenant having its own set of tables that are grouped into a schema created specifically for the tenant. This approach offers a moderate degree of logical data isolation and can support a larger number of tenants per database server. A drawback is that tenant data is harder to restore in the event of a failure.
3. Shared Database, Shared Schema: the third approach involves using the same database and the same set of tables to host multiple tenants' data. A given table can include records from multiple tenants stored in any order. This approach has the lowest hardware and backup costs, because it allows one to serve the largest number of tenants per database server. As multiple tenants share the same database tables, this approach may incur additional development effort in the area of security, to ensure that tenants can never access other tenants' data, even in the event of unexpected bugs or attacks.

   Figure 3 visually shows these three options.

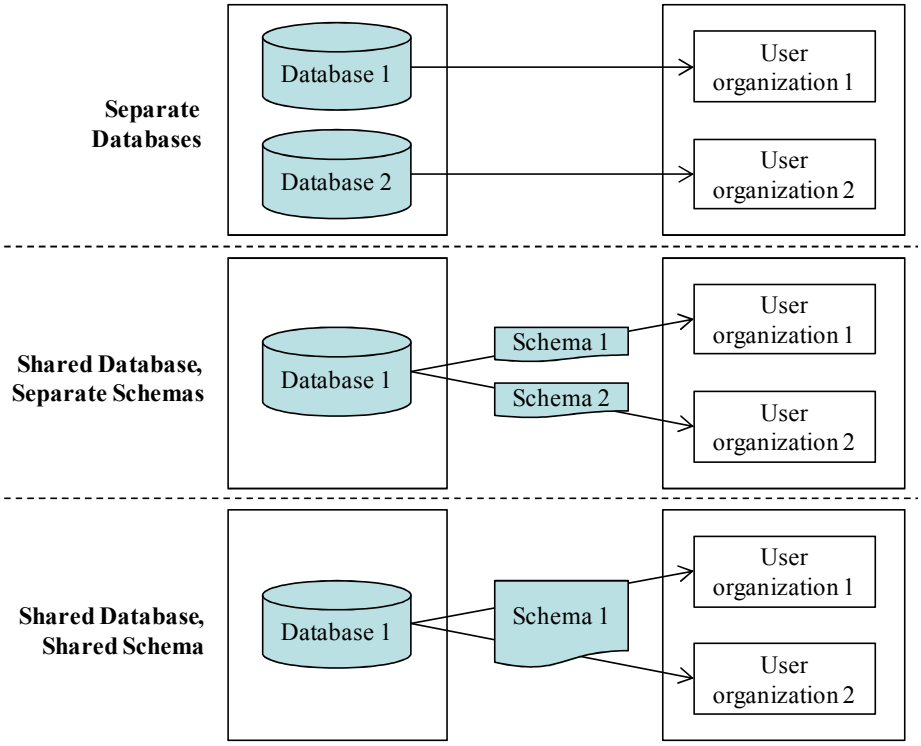

Figure 3: Data Architecture Configuration and Tenancy Model Choices

In the private sector case study, a separate database was chosen, given the privacy and confidentiality of the HR data, while in the government case study the agencies could opt to use a shared database with other federal government organizations, as they have similar architectural and security policies.

Another aspect of the data architecture configuration is the question whether open source standards can be used. In the manufacturing case study, there were disadvantages mentioned such as security issues and specific customized requirements that were thought to be better served by closed source software. In the federal government case study, the agencies were advised to consider and analyze any alternative including proprietary, open source, and mixed source technologies. The rationale was that public agencies should be free of preconceived preferences with regard to how SaaS technologies and applications are developed, licensed or distributed, allowing the federal government to pursue the best strategy to meet its specific needs.

5.5 SaaS Governance and Demand/Supply Management Core Competencies

IT governance refers to the "patterns of authority for key IT activities" [Sambamurthy and Zmud 1999 p. 261] and IT governance mechanisms determine how communication, responsibilities and decision-making structures are formalized [Weill and Ross 2005]. The case studies showed that choices have to be made regarding the way the roles and responsibilities are divided between the user organization and the SaaS service provider, and also the way these organizations interact with each other. Moreover, it is relevant that the user organization has the necessary IT core capabilities, a concept defined by Feeny and Willcocks [1998], which are the necessary IT capabilities that are core to the business's future capacity to manage the demand and supply of IT successfully. In both case studies, several core competencies were required to manage the internal SaaS demand management process and the external SaaS provider(s). These competencies were part of the corporate IT department and they are briefly discussed below:

- SaaS vendor management: SaaS applications can be completely managed by the SaaS vendor and service-level agreements govern the quality, availability, and support commitments that the provider makes to the user. In both case studies the vendor management capability was very important. This includes actively tracking SLAs, staying ahead of emerging security threats, but also monitoring usage rates to ensure charges do not exceed funded amounts. The SaaS provider is able to retrieve information regarding SLA compliance, usage levels, account activity, etc.
- Security management: In both case studies there was a need for a central group involved with security management for identifying, aggregating, and disseminating security, privacy and compliance issues, solutions and processes that could impact the adoption and implementation of SaaS services.
- Standards management: Standards management is required to establish a framework and roadmap to define standards facilitating interoperability, portability and security for SaaS services. This competency was put into place in both case studies.
- Information management: In the federal government case study there is a communications department that has a similar role to the HR department responsible for information management in the manufacturing case study. It developed the communication strategy to update the internal organization about the SaaS initiative regarding new release validations, technical integration, budgeting allocation and system administration. This also includes a help desk for users regarding questions about the SaaS services.

In the government case, there was an operational excellence department, responsible for developing an operational excellence roadmap, and for helping the agencies to implement SaaS solutions. In the global manufacturing case, this competency was including within the IT department in terms of project and program management and operational excellence was something that each individual department was responsible for. Figure 4 shows the common elements of the governance model and core competencies in both of the case studies.

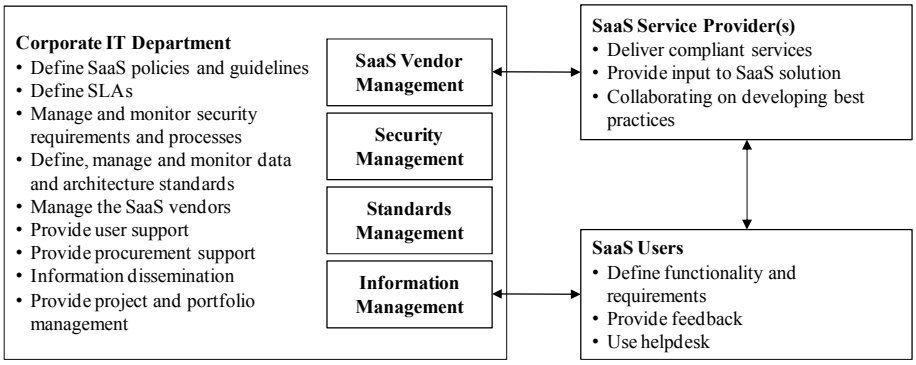

Figure 4: Generic SaaS Governance Model Based on Both Case Studies

5.6 Cloud Deployment Model

The cloud deployment model concerns the specific cloud environment that is used to deliver SaaS services to the users. Four deployment models are generally distinguished in the literature [Dillon et al. 2010; Kundra 2011] and also in the case studies this classification was used:

1. A private cloud is a closed environment for a single organization. This cloud can either be hosted by an external third party (private outsourced cloud) or internally (private in-house cloud).
2. A public cloud is owned by a SaaS service provider that makes it available to the general public.
3. A community cloud is shared by several organizations with common policies, requirements, values and concerns and can either be hosted externally by a third party (outsourced community cloud) or internally by one of the organizations in the community (in-house community cloud).
4. A hybrid cloud consists of combinations of the above cloud models.

In the private sector case study, a private outsourced cloud was used that could only be accessed via a secure intranet connection because of the confidential nature of the HR data. In the federal government case study, a variety of different clouds were used. Private clouds were used for data that is governed by strict privacy rules and federal and regulatory laws, while public clouds were mainly used for services that needed to be accessible to citizens. Given that public sector agencies can be considered to be part of the same organizational entity, certain agencies decided to use a community cloud together as they share a similar view on the requirements of the SaaS services. Such clouds were called government clouds.

Figure 5 shows how these deployment models can be plotted using two dimensions: (1) whether the cloud services are hosted in-house or outsourced to a third party SaaS provider and (2) the degree of strategic vulnerability of the SaaS

service. The more strategically vulnerable the service is, the less likely it is that an organization would prefer to share the cloud with other organizations.

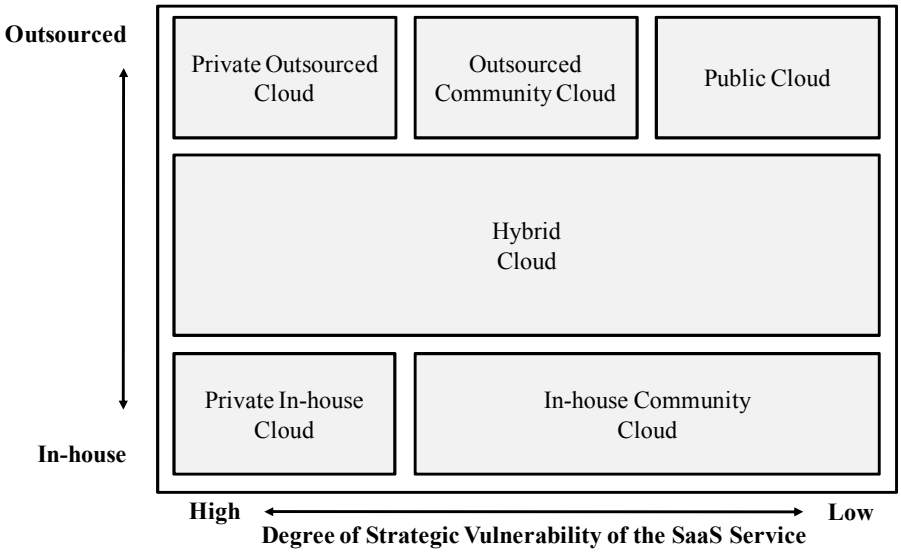

Figure 5: Cloud Deployment Models

5.7 SaaS Integration and Provider Strategy

In the global manufacturing case study, it was decided that they only wanted one service provider to be responsible for the SaaS service delivery. This would result in clear accountability and consistency in terms of the SaaS policy, technology, standards, tools and governance. A selective sourcing strategy would require a mature organization with an effective governance model, skilled talent, and automated processes that are used to coordinate with multiple external parties in an orchestrated way. The SaaS service provider was however allowed to use sub-contractors in case it would not be able to deliver the required services and as such it would function as a SaaS integrator.

In contrast, in the federal government case, agencies are allowed to use multiple SaaS providers, not only to minimize the risk of vendor lock-in and encourage competition among providers, but also because different vendors can provide different capabilities. Especially in case of multiple SaaS providers it was found that organizations will have to ensure that the provided SaaS services are compatible with and can be integrated into their application portfolio. In Figure 6, the three different options regarding the SaaS integration and provider strategy are visualized.

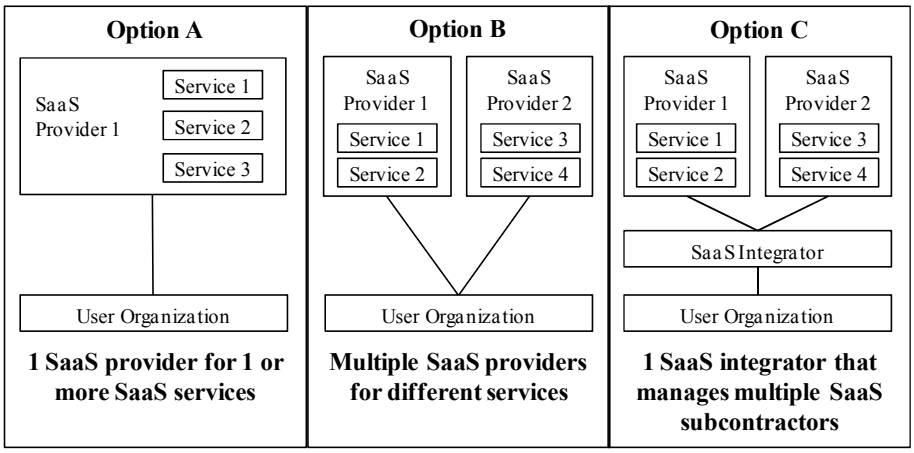

Figure 6: Single or Multiple SaaS Providers

5.8 SaaS Pricing Structure

SaaS applications are typical based on a usage-based or subscription-based model. In a usage-based model the user organization is only billed for the number of service transactions used. In a subscription model the user organization pays a fee per user, per functionality or per period. Combinations are also possible resulting in hybrid pricing models. Various constructions result in a more direct and flexible relationship between the cost and the usage. In the global manufacturing case study, it was acknowledged that a complex pricing model would make it difficult to estimate the future costs prior to the actual usage and therefore it was important for the user that suppliers would follow a transparent and relatively simple pricing model. A distinction between four different cost dimensions was made:

1. One-time implementation costs are those incurred in designing and implementing the new SaaS solution.
2. Expected recurring costs are those charged, e.g. on a monthly basis, based on the scope and volume of services delivered by the provider.
3. Potential additional costs for additional required services or changes in volumes, including daily rates for system integration (by types of roles) for maintenance and implementation.
4. Termination fees in case the services would be terminated.

There were discussions about which metrics or combinations of metrics were most suitable to use, including a fee per used module, per transaction (e.g. a service request), per object created (e.g. invoices), per user in general, or per data storage per user. There were different drawbacks found for the metrics that were discussed, including the inability to predict the numbers for certain metrics, the possible variations within one metric or the impossibility to differentiate, the unsuitability of certain metrics for certain SaaS services and the indirect relationship or correlation between a metric and the SaaS usage. An appropriate SaaS pricing model was found

to be critical to ensure that the relevant incentives are in place for both the user organization and provider.

In the federal government case, the agencies were able to make individual decisions with regard to which pricing model they consider to be most appropriate, as this will depend on the quantity and functionality of the SaaS services and their associated service levels. The SaaS procurement efforts for different agencies with similar needs and security policies were bundled in order to achieve economies of scale and scope.

6 Conclusions

Software as a Service (SaaS) is a relatively new area which can be viewed as the fourth wave of outsourcing. In the relatively little literature available about SaaS business models, the business model is almost always viewed from a service provider perspective and rarely from the perspective of the user organization. This paper fills that gap by identifying the design choices that underlie the SaaS business model from the user organization perspective. Taking this perspective resulted in the identification of eight design choices that underlie the SaaS business model.

Using the unified business model conceptual framework [Al-Debei and Avison 2010], we investigated two case studies, one private company with an intra-organizational SaaS business model and one with a governmental inter-organizational SaaS strategy. By selecting two completely different types of cases, eight discriminating choices that are important in designing SaaS business models from a user organization perspective were identified. These design choices include the:

1. SaaS service characteristics in terms of the complexity and required security, influencing whether a SaaS solution is suitable and how it needs to be designed and managed.
2. SaaS value source in terms of the benefits that are anticipated, influencing the way the SaaS services need to be implemented and monitored.
3. SaaS user target group, influencing to what degree the services can be standardized and how much customization is required.
4. Data architecture configuration and tenancy model, influencing the required level of security and robustness of the SaaS solution and which standards can be used.
5. SaaS governance and demand/supply management core competencies, influencing the way the SaaS delivery model is designed and managed.
6. Cloud deployment model, influencing to what extent the clouds underlying the SaaS services can be outsourced and shared with other organizations.
7. SaaS integration and provider strategy, influencing the way the SaaS provider(s) and application portfolio have to be managed with regard to the SaaS policy, technology, standards, tools and governance.
8. SaaS pricing structure, influencing the power balance with the SaaS service provider(s) and how the costs are charged and managed internally.

The identification of eight design choices confirm that variables influence SaaS business models as suggested by Stuckenberg et al. [2011].

The unified business model conceptual framework was customized and found to be appropriate for analyzing SaaS business models, but some limitations were found in terms of its high level of abstraction, its generic focus and its non-intuitive

definitions of the components. The model applies a high abstraction level to ensure its generic nature. Although the four BM dimensions are mutually exclusive, it is not a mathematical model that provides an impeccable rigor and structure as such. Our case studies show that there can be some relationship between the BM dimensions. Since the constituent elements of the BM dimensions have not been accurately defined, the terms that are used are not always as intuitive. The term 'value proposition' is presented as one of the four business model dimensions, but it is also a very well-known term in its own right. Osterwalder et al. [2005] have created a single reference model in which one of the building blocks is also called 'value proposition', but it has a different context and hierarchical level than the term used in the unified BM framework. We therefore argue that in general the unified model will be useful as a starting point, but further customizing, extending and detailing is necessary to adopt it for a certain domain, as this is essential to really tackle the particular characteristics of a business model.

The analyses show that the business model concept itself is useful to identify key design choices and also that there are other design choices from a user view compared to a service provider view such as the service provider strategy, the reasons for implementing SaaS and the user organization's architectural configuration model for SaaS. All of the design choices were apparent in both case studies, though there were differences in the way these choices were filled in, depending on the case study characteristics. In the federal government case, many agencies and SaaS user target groups are involved and therefore more customization options were available in terms of the value source that agencies would want to give priority, but there are also more opportunities to share platforms and bundle procurement and service provider efforts. In the global manufacturing case study, it only involves one organization with a more centralized governance, where the SaaS services are provided to only one user target group, limiting customization possibilities.

A limitation of this research is that our investigation was restricted to two case studies and we can therefore not rule out the possibility that other design choices will be found when investigating other cases. We therefore recommend to empirically validate the SaaS business model framework from a user organization perspective. It would also be of interest to determine if and how the different design choices affect each other and which design choices are relatively most important.

SaaS models can be seen as a fourth wave of outsourcing and as such, the existing knowledge found in the outsourcing literature should not be neglected and can be used to advance our knowledge of the SaaS model. In further research outsourcing knowledge should be translated to the domain of SaaS, especially with regard to the impact of cloud computing on organizations' business models.

The design choices proposed for classifying SaaS business models show that the generic business model helped as a starting point, but does not show all specific underlying variables. We therefore advocate for the application of the generic business model to specific types of business models such as for SaaS and for other specific domains.

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