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From On-Premise Software to Cloud Services: The Impact of Cloud Computing on Enterprise Software Vendors' Business Models

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Abstract

Cloud computing is an emerging paradigm that allows users to conveniently access computing resources as pay-per-use services. Whereas cloud offerings such as Amazon's Elastic Compute Cloud and Google Apps are rapidly gaining a large user base, enterprise software's migration towards the cloud is still in its infancy. For software vendors the move towardscloud solutions implies profound changes in their value-creation logic. Not only are they forced to deliver fully web-enabled solutions and to replace their license model with service fees, they also need to build the competencies to host and manage business-critical applications for their customers. This motivates our research, which investigates cloud computing's implications for enterprise software vendors' business models. From multiple case studies covering traditional and *pure* cloud providers, we find that moving from on-premise software to cloud services affects all business model components, that is, the customer value proposition, resource base, value configuration, and financial flows. It thus underpins cloud computing's disruptive nature in the enterprise software domain. By deriving two alternative business model configurations, SaaS and SaaS+PaaS, our research synthesizes the strategic choices for enterprise software vendors and provides guidelines for designing viable business models.

Keywords: Cloud computing, Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), business model, Enterprise systems, Enterprise resource planning (ERP), Customer relationship management (CRM), Revenue model

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1 Introduction

Cloud computing is an emerging concept that allows users to conveniently access computing resources as pay-per-use services [4]. As is often the case in a new technology concept's early phases, expectations are high and growth projections are impressive. In 2013, cloud computing is among the top 10 technologies considered strategic for most organizations [22]. Analysts project that the cloud services market will grow from $25.5 billion in 2011 to $159.3 billion by 2020 [47], and expect that almost all computing resources will move towards the cloud. Whereas cloud offerings such as Amazon's Elastic Compute Cloud and Google Apps are rapidly gaining a large user base, enterprise software's migration towards the cloud is still in its infancy.

The relatively slow migration towards cloud solutions in the enterprise software domain can be explained by different factors: Looking at the demand side, business users have more complex information technology (IT) needs than private users, since they use enterprise software, such as enterprise resource planning (ERP) or customer relationship management (CRM) systems, to support their core business operations. Given the business criticality of these systems, companies are more concerned about security and peformance issues [49], but also face significant switching costs when migrating to new technologies. Accordingly, the business user perspective has been extensively investigated in recent studies on cloud adoption drivers and challenges [6], [27] as well as approaches for migrating to the cloud [36]-[37]. However, this slow migration towards cloud enterprise software may also be explained from the supply side, where vendors are reluctant to introduce cloud offerings. For them, cloud computing implies profound changes: Not only does it force them to deliver their solutions via the internet and to replace their software license model with service fees [40]; it also requires them to rework their solutions to become fully web-enabled and to serve multiple customers with the same instance, whereas traditional applications are installed and often extensively customized for a single customer. In terms of competencies and resources, delivering cloud applications implies that software vendors operate data centers and manage applications in addition to their traditional software development activities. Although several authors have emphasized cloud computing's disruptive nature [13], [32], we still lack a systematic analysis of cloud computing's profound impact on software vendors.

This motivates our research, which investigates the shift from on-premise software to cloud services from the perspective of enterprise software vendors. We build on the conceptualization of business models [24], [28], [44], which allow us to systematically explore cloud computing's implications for software vendors' value creation logic. Specifically, we address the following research question: How does cloud computing impact enterprise software vendors' business model configurations, and the interrelated dimensions of customer value proposition, resource base, value configuration, and financial flows? Given our study's explorative nature, we apply a qualitative case study research design to gain detailed insights into enterprise software vendors' business models. Based on primary and secondary data, we systematically analyze four cloud offerings in the areas of ERP and CRM and two of their on-premise counterparts. Using the business model canvas of Osterwalder and Pigneur [44] as analysis framework, we derive two distinct business model configurations – SaaS and SaaS+PaaS (Platform-as-a-Service) – which synthesize the strategic choices for enterprise software vendors. The identified business model configurations provide guidelines for designing viable business models and relativize the strict seperation between SaaS and PaaS in prior literature. Our research thereby complements the few prior studies on cloud-based enterprise software, which focus on revenue and price models [1], [19], [23] or develop cloud offering typologies [34], [40].

The remainder of this paper is structured as follows: Section 2 summarizes prior research into cloud computing and enterprise software in order to identify the research gap. We then present our qualitative research approach and analysis framework. Our case analysis starts by presenting details of selected enterprise software offerings and vendors. Based on these insights, we analyze the key characteristics of cloud-based business models in order to derive two distinct cloud business model configurations. We then elaborate on their characteristics and how they change enterprise software vendors' value creation mechanism. This paper concludes with a summary of the paper's contributions, limitations, and implications.

2 Current State of Research

Drawing on the definition of cloud computing, the following section reviews prior investigations into cloud-based enterprise software. It reveals a strong focus on SaaS as well as cloud adoption and migration from the user perspective, while the debate on cloud computing's implications for software vendors is still in an early stage.

2.1 Defining Cloud Computing

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction [1], [17]. Cloud services are delivered to users through the network, who in return pay for what they use. Resources can be hosted on a public cloud that is accessible by everyone, and shared among multiple users, or on a private cloud, where resources are dedicated to a single company [25]. Perceptions of cloud computing have changed over time. At its outset, cloud

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computing was seen as a successor of grid computing [21] for its abilities to provide scalable computing resources aiming to improve data treatments. Companies provision their IT infrastructure from third-party services (Infrastructure-as-a-Service, IaaS), instead of owning a costly and underutilized rack of servers. Thereby, they can better manage peak loads and can adapt their infrastructure needs accordingly [4]. Nowadays, this infrastructure-centric perspective on cloud computing is complemented by targeted offerings for end users. Traditional client server applications are replaced by Software-as-a-Service (SaaS), which can be easily deployed and used anywhere at any time. Furthermore, Platform-as-a-Service (PaaS) provides a development and deployment environment for software developers.

2.2 Cloud Computing's Impacts on Enterprise Software

Enterprise software comprises all software applications that companies use to support their core business process operations [14], [41], [48], such as enterprise resource planning (ERP), customer relationship management (CRM), or supply chain management (SCM) systems. Cloud computing and SaaS are considered a next step in the history of enterprise software [37], [39], which evolved from custom-built software to packaged business applications and – finally – to an increasing service orientation with application service provisioning (ASP) and now cloud computing [8]. Today, on-premise enterprise software is prevailing, with 90% of manufacturing companies relying on ERP [9]. They are mostly standardized software packages based on an integrated database and consist of several modules aimed at specific business functions. As on-demand software delivery, SaaS presents an alternative to the traditional on-premise software, which requires the user to install and operate software in his or her local IT environment [2]. Compared to ASP, SaaS is designed to serve multiple customers with the so-called multitenant model [35]. Customers' data is isolated from one another, while sharing the same instance of the application. As a result, customers have less possibilities to customize SaaS, unless they have a dedicated installation [7].

Table 1, which summarizes prior research on cloud computing and enterprise software, reveals that previous studies associate enterprise software's move towards the cloud mostly with SaaS and focus on the user perspective.

Table 1: Existing research on enterprise software and cloud computing

Publication	**Focus**	**Research approach based on [45], [51]**	**Perspectives**	
			Customers	**Vendors**
Benlian et al. 2009 [6]	SaaS adoption by firms	Quantitative empirical survey (374 respondents)	X	
Choudhary 2007 [11]	Switch from perpetual software licensing to SaaS and its impact on software quality	Qualitative cross-sectional analysis based on use cases	(X)	X
Ellahi et al. 2011 [17]	Cloud deployment models, issues of moving enterprise applications to the cloud, and the market evolution for enterprise cloud computing	Argumentative deduction	X	
Janssen & Joha 2011 [27]	SaaS doption in public sectors (ministries, public agencies, municipalities)	Qualitative/Quantitative cross-sectional analysis based on interviews	X	
Katzan 2009 [30]	Cloud computing from a business and architecture perspective	Argumentative deduction	X	X
Khajeh-Hosseini et al. 2010 [31]	Research challenges for cloud computing from an enterprise or organizational perspective	Argumentative deduction from research/literature review	X	X
Liao 2010 [34]	SaaS business model for enterprise software	Argumentative deduction	X	X
Luoma et al. 2012 [38]	ASP and SaaS firms' business models	Quantitative empirical survey (163 respondents)	X	X
Leimeister et al. 2010 [33]	Actors, roles, and business aspects of cloud	Argumentative deduction from research/literature review	X	(X)
Loebbecke et al. 2012 [36]	Practical case of cloud computing assessment	Action research	X	
Mangiuc 2011 [39]	Challenges and risks of moving applications to the cloud	Qualitative/Quantitative cross-sectional analysis based on interviews	X	
Marston et al. 2010 [40]	Overview of cloud computing; SWOT (strengths, weaknesses, opportunities, and threats) analysis from a business perspective	Argumentative deduction research	X	(X)

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Given the concerns of companies with using SaaS, they largely focus on the factors that drive SaaS adoption, the associated challenges, and the benefits and disadvantages. The research by Benlian et al. [6] reveals that the attitudes of (future) customers towards adoption and others' opinions matter most when it comes to adopting SaaS solutions. Ellahi et al. [17] identify scalability, availability, cost, and convenience as fundamental factors for cloud computing adoption, while Mangiuc's empirical research [39] identifies costs to move to the cloud, of which security and support are most important. Loebbecke et al. [36] define eight criteria to assess IT services' cloud readiness, among them the low relevance for the company's core business or competitive position, the high availability of existing cloud services, and the low compliance requirements. Other studies explore the benefits of SaaS and find that it not only impacts the IT infrastructure through its absence of infrastructure and installation [27], but also companies' strategy with immediate access to services that certain companies could not afford [40]. SaaS users often benefit faster from new functionalities, since they are available as soon as they are developed [11]. At an operational level, SaaS can reduce small and medium enterprises' (SME) informatization costs [34] and can help turn firms' capital expenses (CAPEX) into operational expenses (OPEX). Nonetheless, SaaS adoption implies new challenges such as the IT department's role, which changes from implementing and operating business applications to managing customer needs and relationships with service providers [31]. At the same time, companies must decide which software to move to the cloud and which cloud alternative to choose [17]. SaaS usage is not without risk, including dependence on third parties [33], along with the reliability and sustainability of service providers to guarantee continuity of services. The loss of control over some IT services can also raise political issues, while questions about access control or security are always crucial [27].

As much as cloud computing impacts customers, it impacts software vendors and requires the same research interest. However, our literature review shows that current research on cloud enterprise systems hardly focuses exclusively on the vendor perspective. With the exception of Luoma et al. [38], the few existing studies are mainly conceptual papers and lack empirical validation.

2.3 Cloud Computing's Implications for Software Vendors

The provision of cloud computing services is most often associated with changes in pricing models and revenue streams for software vendors. Compared to the traditional revenue model for enterprise software with a unique license and recurring maintenance fees, SaaS implies new types of price and revenue models [13], [23]: subscription (customers are charged the same fixed monthly or annual sum for independent usage), free (customers are not charged but cannot use all the functionalities), advertising (customers pay no cost to use the solution, while the vendors earn revenue from advertising), and pay-per-use (customers pay only for actual usage and professional services, and software vendors charge for services such as consulting, support, or installation). Abdat et al. [1] mention only three of the aforementioned revenue streams: subscription-based, usage-based (similar to pay-per-use), and advertising. For PaaS, Eurich et al. [19] analyzed 25 cloud platforms and identify eight revenue stream types, from the perspectives of customers and providers: subscription (fixed installments paid by a cloud-based platform customer for getting access to and using a certain service of the platform), transaction-based (customers are charged based on their platform usage), and revenue sharing (commission for placing and promoting an application paid to the provider), additional platform services (e.g., support, training material), advertisements (screen areas are sold to advertisers), affiliate services (from providing PaaS capabilities to another provider's ecosystem), and admission fees (one-time renumeration to access the platform and download/upgrade an application; customers are charged each time they publish a new version of an application).

To systematically investigate the manifold changes induced by cloud computing, a few researchers have begun to investigate cloud computing and business models. In his paper *Moving from Products to Services* [13], Cusumano explains the general shift in software providers' business models, as software gets cheaper, combined with less costly ways of delivering via the internet, as well as attracting small businesses and leading-edge early adopters. Other studies characterize and distinguish different forms of cloud computing. Among them, Weinhardt et al. [50] designed a cloud business model framework with three subclasses – infrastructure, PaaS, and applications – and further refined them. In their categorization, the subclass applications consist of two different business models: SaaS and on-demand web services. Liao [34] defines two classes of SaaS – enterprise-oriented and customer-oriented – and identifies two service patterns. The first comprises SaaS providers that manage their development teams, sales channels, and business partners to provide end users with SaaS applications as full services. The second comprises service platforms and implies that SaaS providers provide development and deployment tools. This allows third parties to develop SaaS applications that implement a specific business logic to meet particular user requirements.

In their recent study, Luoma et al. [38] derive business model configurations for SaaS based on 12 previous papers. They rely on Osterwalder and Pigneur's canvas [44] for a conceptualization of the business model and its contituitive elements. Based on a sample of 163 Finnish firms, the authors compared SaaS and ASP and identified three SaaS-related business model configurations: enterprise SaaS, pure play SaaS, and self-service SaaS (Table 2). They also find that ASP provides customer-specific solutions and requires much more integration than SaaS, and that both ASP and SaaS have smaller company and transaction sizes than software firms in general.

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Table 2: SaaS business models: Enterprise, pure play, and self-service (based on [38])

		Enterprise SaaS	**Pure play SaaS**	**Self-service SaaS**
Customer-facing elements	*Value proposition*	A mass-customized but complex application that also requires support services	Horizontal, standardized web-native application	A very simple application that is easy to adopt
	Customer segments	Larger enterprises and their IT managers and top executives	SMEs, middle management and end users	Adopted first by end users and individual consumers, then SMEs
	Customer relationships	High-touch, trust-enhancing customer relationships with tailored contracts	Less human contact in deployment required than traditionally, owing to simpler applications	Fully automated self-service; as little interaction with the customer as possible
	Channels	Perform personal sales and employ channel partners	Sales channel is push-oriented, and SaaS firms engage in inbound, high-pressure sales	Outbound and viral marketing used to attract customers to the vendor's home page. Landing page critical in turning prospects into customers
Resource-base and value configuration elements	*Key resources and activities*	Possess domain expertise and utilize an ecosystem of companies as a resource	Both domain expertise (to include best practices into the application) and application development capabilities	Close to zero marginal costs
	Key partners	Use partners to deliver value-adding applications and services	IT service providers for infrastructure and support services	-
Financial elements	*Revenue streams*	Vendors charge an entry fee, recurring fees, and service fees	Small entry fee and a recurring fee	Use of freemium model, ad-based revenues, or small recurring fees
	Cost structures	Have varying marginal costs, owing to the long sales cycles and required support	Initial development costs may be high, but firms aim for minimal marginal costs	-

3 Research Design

While our understanding of the factors that drive customers' adoption of cloud enterprise software is maturing, we still know little about the profound changes for vendors and their ecosystems. This research gap motivates our study. The following section outlines our research objectives and our qualitative research approach. For within-case and cross-case analysis, we rely on one of the existing business model conceptualizations as analysis framework, because it allows us to systematically analyze how a software vendor creates, delivers, and captures value [14], [44].

3.1 Research Objectives and Approach

The few studies on the vendor perspective focus on SaaS as well as the associated revenue and cost models. With the exception of Luoma et al. [38], no study has used established business model conceptualizations to analyze cloud computing's impact on vendors. Another limitation is that existing studies perceive SaaS as providing uniform and simple applications, but do not consider the de facto complexities of enterprise software. The latter is particularly complex in terms of functionality and customization to user needs, and its integration crosses multiple business functions and processes. These particularities explain why recent studies have identified enterprise-oriented applications as a separate cloud solutions category [34], [38] that differs significantly from self-service SaaS offered to private users.

Our research addresses these gaps by investigating how the move from on-premise software to cloud computing changes software vendors' business models in the case of enterprise-oriented applications. Given the profound changes implied by cloud computing, our research is exploratory and takes a holistic focus on the value creation logic [24], [28], [44] of enterprise software vendors. It asks: How does cloud computing impact software vendors' business models, as well as the interrelated dimensions of customer value proposition, resource base, value configuration, and financial flows? In view of our explorative research objective, we opted for a qualitative research design based on case studies. Case study research, which is particularly useful in situations in which a contemporary phenomenon is studied in its natural context [5], [52] fits our research objectives, since it allows us to gain detailed insights into the interrelated business model components and thus analyze how turning towards the

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cloud changes the value creation logic of enterprise software vendors. Case studies have also been used in prior studies for studying real-world business models, and specifically in a recent study on the evolution of software vendor business models over time [3]. We use multiple-case studies, since the knowledge gained from replicated case studies is thought to increase findings' external validity [15], [52]. We also use an analysis framework – described in the following section – to guide our analysis [15] as well as to establish a basic vocabulary and meaningful high-level constructs.

3.2 Case Selection

The selection of software offerings and vendors was driven by theoretical sampling [52]. According to this logic, cases must be selected based on their commonalities and differences, to predict contrasting results and to allow researchers to extract generalizable patterns. Our case selection criteria comprise two dimensions we consider relevant for cloud-based business models (Table 3): (1) the cloud solution's functional scope and (2) the provider types. To allow for variation in the first dimension, we decided to consider two types of enterprise software, ERP and CRM. We selected ERP systems for their comprehensive functional coverage of the main business functions and their high customization level, which would require consequent effort to deliver it as a cloud application. CRM systems have a restricted functional scope on marketing, sales, and service, but have proven to be the most popular business application in the cloud. Related to the second dimension, we picked established software vendors as well as pure cloud services providers. Traditional software vendors allowed us to study the strategies and constraints related to migrating on-premise solutions to the cloud, whereas we expect pure cloud services providers to reveal a more innovative business model. For the traditional software vendors, we chose SAP or Oracle, since they are leaders in the traditional enterprise software market [20], [46] and they both offer on-premise and alternative cloud solutions. By adding them to our sample, we are able to analyze the adjustments they made to their traditional business model when introducing cloud solutions. For the pure cloud services providers, we chose NetSuite and Salesforce owing to their dominance in the cloud-based ERP and CRM solutions market [26], [42]. As a result, our sample allows us to study variations in cloud business models according to functional scope and the different software provider types, but also to compare cloud solutions to traditional on-premise solutions.

Table 3: Case selection criteria and sample analyzed in this study

	Providers	**Criterion 2: Different type of providers**			
		Traditional software vendors with a dual strategy (on-premise and cloud solutions)		**New entrants: Pure cloud service providers**	
Different type of solutions		SAP www.sap.com	Oracle www.oracle.com	NetSuite www.netsuite.com	Salesforce www.salesforce.com
Criterion 1: Functional scope	Enterprise resource planning (ERP)	SAP ERP (on-premise) (Site 5) SAP Business ByDesign (cloud) (Site 6)		NetSuite ERP (cloud) (Site 1)	
	Customer relationship management (CRM)		Oracle Siebel (on-premise) (Site 2) Oracle CRM on demand (cloud) (Site 3)		Salesforce sales on demand (cloud) (Site 4)

3.3 Data Collection

As part of our study, we observed and analyzed the cloud solutions market over more than nine months. We collected information from more than 70 primary and secondary sources, which can be classified across four different categories Appendix A: The first category comprises *product information* provided by the vendors, such as product documentation, white papers, and training material that describe the software offering in detail. The second category concerns *company information* from annual reports and investor publications, which summarize information about vendors' competitive strategies, market development, and financial performance for investors and the general public. *Market insights* from analysts and industry experts represent the third category and includes news articles, market analysis, and research reports. As a fourth category, we collected primary data from interviews with sales representatives as well as implementors and expert users in order to complement missing information and validate our assessments. By collecting rich material from a diversity of sources, we were able to increase the validity of our analysis by means of data triangulation [29], [52]. The information presented in this article represent the current state as of March 2013.

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3.4 Analysis Framework

For within-case and cross-case analysis, we used an analysis framework that allows us to first describe the software vendors and their solutions uniformly and, second, to systematically compare the different elements of their business model. We chose one of the existing business model conceptualizations from the literature as the analysis framework, because it allows us to take a holistic perspective on how an organization creates, delivers, and captures value [14], [44]. A business model is an integrative strategy model that unites finer aspects of strategy, such as resource bases, structure, products, and customer value proposition [24]. It relies on the assumption that these aspects are causally interrelated and need to be managed consistently. Business models have recently attracted much attention from academics and practitioners, who have suggested a wide variety of business model conceptualizations and components. According to Johnson et al. [28], a business model is made up of four interlocking elements that, taken together, create and deliver value: customer value proposition, profit formula, key resources, and key processes. Each of the four elements contains sub-elements, such as revenue model and cost structure for the profit formula element. Kalling and Hedman [24]'s business model proposal comprises customers and competitors, the offering, activities, and organization, resources, and factor market interactions. They explicitly include causal interrelationships and the longitudinal processes by which business models evolve. Based on an ontological analysis of prior business model conceptualizations, Osterwalder et al. [44] designed their business model canvas; it comprises nine interconnected blocks that allow for the integration of disparate strategic perspectives, including the firm's resource bases, organizational configuration, revenue models, and market positioning [1]. Other suggested conceptualizations, such as Chesbrough's business model [10], were not considered useful as analysis frameworks, because they do not provide a structure, but rather a description of business models' functions.

We opted for the business model canvas [44] as analysis framework for the following reasons: First, the business model canvas is comprehensive and comprises most of the other business model frameworks' components. Second, it has been recognized by both practitioners and scholars [18]. Despite its popularity in practice, it is not merely a practitioner framework, but was established based on a systematic ontological analysis of existing business model conceptualizations and empirically validated by experts [43]. Third, the BM canvas was already used in an earlier analysis of SaaS by Luoma et al. [38], which allows us to build on their work and compare our findings.

In our study, we thus rely on the nine interrelated blocks from the business model canvas (Figure 1) to describe a business model. On the customer-facing side, it comprises *customer segments* that are served, a *value proposition* offered to satisfy customer needs, *channels* that are chosen to reach customers, *customer relationships*, which establish the relationship between the value proposition and the customers, and *revenue streams* chosen to perceive financial entries. On the resource base and value configuration side, it contains *key resources* and *key activities* needed to run the business, *key partners*, who are necessary to deliver the value proposition, and – finally – the *cost structure*.

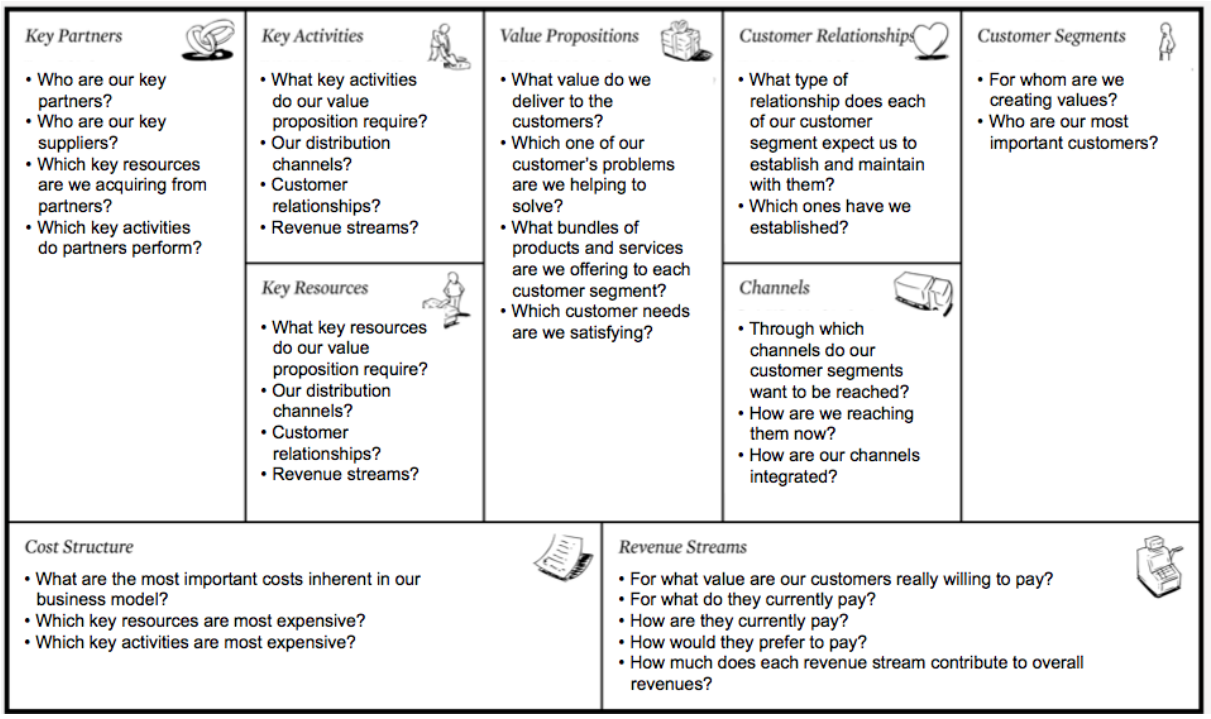

Figure 1: Osterwalder and pigneur's business model canvas [44]

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3.5 Case Analysis

Case analysis started with a detailed content analysis for each software vendor and offering. Two researchers first analyzed the secondary data. They coded this material according to the business model components and used the interviews to collect missing information and to validate assessments. One business canvas per solution was prepared to perform the within-case analysis. For instance, information about NetSuite was analyzed as follows:

- NetSuite's websites as well as market research reports provided us with information related to the products, services, partners, and customers. That information was coded into the various business model components: the customer segment, value proposition, channels, and key partners.

- From the data sheets provided by NetSuite, we gained information related to the number of data centers, their locations, and their capacity. Since NetSuite owns two data centers, they are key resources and require data center operation as key activities; both impact the cost structure. This information was validated by statements from the annual reports and the interviews.

The business model canvas for the individual cases served as the basis for the cross-case analysis and were used to analyze the differences and similarities between the different solutions. We applied pattern matching to generalize the findings and to derive two business model configurations for cloud-based enterprise software.

4 Overview of Enterprise Software Vendors and Their Offerings

To analyze variations in cloud business models and the differences in relation to the traditional software business, our study investigates SAP and Oracle as traditional enterprise software vendors with a dual strategy (on-premise and cloud solutions) and NetSuite and Salesforce as new entrants with a pure cloud strategy. This section introduces the selected enterprise software vendors and their offerings.

4.1 SAP

SAP, which entered the market with SAP R/1 in 1973, is currently the leader in enterprise systems, with approximately 50,000 customers. The most recent version offered is SAP ERP 6, an on-premise solution that is part of the SAP Business Suite. SAP ERP comprises different modules for financials, human capital management, sales and service, procurement and logistics execution, product development, manufacturing, and corporate services. It targets medium and large companies from 25 industry sectors such as automobile, chemicals, industry machinery and components, and life science. SAP's revenue streams mainly derive from licenses and services, notably annual maintenance fees that represents between 18% and 22% of the license costs. SAP has a strong network of approximately 11,000 partners, comprising value-added resellers (VAR), integrators, and software vendors (ISV), who support companies in implementing and integrating SAP ERP, as well as universities (SAP University Alliances Program). In the mid-2000s, SAP introduced SAP Business ByDesign as an ERP solution for small and medium-sized enterprises (10 to 500 employees). Currently, SAP Business ByDesign is available in Europe, certain Asian countries, and the U.S., and provides full ERP functionalities for target industries, including services, sales, distribution, and manufacturing. SAP Business ByDesign leverages cloud capabilities to offer innovative services such as in-memory business intelligence. It is hosted on SAP's own IT infrastructure in Germany and the U.S. The different packages start at $11 per user per month for the employee management solution and go up to $199 for the full solution. SAP also provides a development environment, the SAP Business ByDesign Studio, for extending functionalities and developing add-on applications. The add-ons are sold via the SAP Store, which offers approximately 115 applications (as at March 2013); among the first was a customer chat application from Google. SAP earns 15% on every sale.

4.2 Oracle

Oracle Siebel CRM is an on-premise solution for mid-sized to large companies and was released after Oracle acquired Siebel in 2005. It is used by approximately 5,000 customers. Oracle Siebel CRM solutions are tailored for around 20 industries, including manufacturing, life science, technology, and insurance. This industry specialization seeks to reduce implementation time and effort. Oracle solutions' particularity is that they run on their own technology stack, such as Oracle application servers, but also their own programming languages and databases. To maintain customer relationships, Oracle relies on its partner pool of 30,000 consultants who develop for, sell to, and integrate Oracle solutions directly into companies. Oracle CRM on demand is the SaaS offering derived from Siebel CRM for small to large companies and comprises tailored solutions for specific industries. Oracle's on-demand applications have more than 3.5 million users, and are available as a multitenant or a single-tenant solution. The multitenant solution cost starts at $90, while the single-tenant solution costs $125 per user per month. The solution can also be installed on private clouds for $110 per user per month. Specific transactions such as emails sent or modules such as eCustomer incur additional costs. Oracle CRM on demand offers a mobile version and also

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integrates business analytics based on in-memory technology. Support, consulting, and integration are done by internal consultants and through Oracle's partner pool.

4.3 NetSuite

NetSuite is a pure cloud solution provider and claims to be the enterprise systems leader in the cloud. NetSuite ERP is dedicated to mid-sized to large companies and currently has approximately 10,000 customers. NetSuite ERP's main functionalities are accounting, manufacturing, fulfilling, billing, and payroll. NetSuite ERP is part of a cloud suite that contains modules such as customer relationship management, professional services automation, and business intelligence. NetSuite ERP starts at $399 per company per month, including one full user and 10 limited users. Additional full users are charged $99 per month. NetSuite also provides a platform, SuiteCloud, which is used by a community of 4,000 developers. With tools such as workflow management, application development, and integration services, SuiteCloud helps developers create applications, which are sold through the online store SuiteApp. The latter currently contains 1,000 applications. NetSuite also has a partner network; Accenture is an official reseller, while Yammer! has developed instant messaging services, and Google has integrated its Google Apps. NetSuite has two data centers located in the U.S. – one in Massachusetts and one in California.

4.4 Salesforce

Salesforce is the leader in cloud-based customer relationship management solutions. Its main product, Sales Cloud, is used by more than 100,000 customers, from small to large companies. Sales Cloud targets specific industries such as manufacturing, government, media, and life science. In addition to its main functionalities (e.g., account and contact management, marketing, opportunity management), Sales Cloud offers a separate database (Data.com), which allows customers to manage their clients' data. Sales Cloud is strongly connected to social networks such as Facebook or LinkedIn. Sales Cloud's prices begin at $4 per user per month for contact management only and end at $270 per user per month for the unlimited version. The most popular version costs $125 and contains functionalities to customize workflow and to process analytics. Salesforce provides a platform, Force.com, that is used by a community of 300,000 developers. To access the platform, different packages are proposed, starting at $10 per application per developer. These applications are sold on the AppExchange platform, which contains approximately 1,780 customized applications and more than 1.7 million downloads. Salesforce does not own its infrastructure, but partners with two providers, one in the U.S. and one in Singapore. Salesforce also has a partnership with Google, which provides services that are fully integrated into this platform.

5 Business Model Analysis

Based on the business model canvas, with its nine business model elements [44], we are able to systematically analyze and synthesize the similarities and differences between traditional and cloud-based enterprise software in our case sample. This section presents the findings – from the customer-facing elements (Section 5.1), including the value proposition, customer segments, customer relationships and channels, to the resource base and value configuration elements (Section 5.2), comprising key resources and activities as well as key partners, and – finally – the financial aspects (Section 5.3), as described by the revenue streams and costs. Table 4 summarizes the analysis of the four cloud offerings in the areas of ERP and CRM and two of their on-premise counterparts.

5.1 Customer-facing Elements: Value Proposition, Customer Segments, Customer Relationships, and Channels

In line with the existing research, our empirical analysis reveals that with cloud-based enterprise software, the *value proposition* shifts from on-premise software to software delivery via the internet offered in subscription-based and volume-based price models. Customers can thereby reduce the significant upfront investments as well as the need to maintain and operate the software with its own staff. Interestingly, cloud-based enterprise software's value proposition does not only differ in terms of delivery and pricing model, but also in terms of functional scope compared to on-premise software: whereas the core functionality is more restricted, it goes beyond on-premise enterprise software solutions with functional extensions such as integrated analytics, in-memory technologies, or social media integration. Cloud offerings also facilitate mobile access, either via a web browser or via specific mobile applications designed by software vendors. While on-premise solutions are used by and customized for one company, cloud-based solutions serve multiple customers using a multitenant model. The latter results in economies of scale for the software provider, but also leads to a lower customization level, which means fewer possibilities to align the software to specific customer requirements. To address this issue, we find that within the analyzed software vendors, only Oracle complements its cloud offering with a single-tenant option.

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Table 4: Cases analysis in the nine interrelated business model components
(The information presented in this table represent the current state as at March 2013.)

	Salesforce Sales Cloud	**SAP Business ByDesign**	**Oracle CRM on demand**	**NetSuite ERP**	**SAP ERP**	**Oracle CRM (Siebel)**
Customer segment	Small to large companies (SaaS users): – 100,000 customers – 3 million users 300,000 PaaS developers	Small to medium companies (SaaS users): – 1,000 customers PaaS developers	Small to large companies (SaaS users): – 1,000 customers	Medium to large companies (SaaS users): – 10,000 customers 4,000 PaaS developers	Medium to large companies: – 50,000 customers	Medium to large companies: – 5.6 million users – 4,000 customers
Customer relationships	AppExchange (store) Online support VAR and integrators Account manager Community	SAPStore (store) Online lifecycle services Online support VAR and integrators Account manager	Account manager VAR and integrators Community	SuiteApp (store) Online support VAR and integrators Account manager	Account manager VAR and integrators Position of leader (packaged enterprise applications)	Account manager VAR and integrators Position of leader (CRM on-premise)
Channels	Direct (SaaS users): – salesforce.com – AppExchange – Sales representative Indirect (SaaS users): – ISV/VAR and integrators Direct (developers): – force.com	Direct (SaaS users): – sap.com – SAPStore – Sales representative Indirect (SaaS users): – ISV/VAR and integrators Developers	Direct (SaaS users): – oracle.com – Sales representative Indirect (SaaS users) – ISV/VAR and integrators	Direct (SaaS users): – netsuite.com – Sales representative Indirect (SaaS users): – ISV (30% to 40% of sales) VAR and integrators Developers – Suite Cloud Developer Network	Direct (customers) – Sales representatives – sap.com Indirect (customers) – ISV/VAR and integrators	Direct (customers): – Sales representatives – oracle.com Indirect (customers): – ISV/VAR and integrators
Value proposition	Social CRM in the cloud – Data management Position of leader (cloud CRM) Mobile version Development environment (Force.com) AppExchange (store) – > 1,800 apps – > 1.7 million downloads	ERP in the cloud – Professional services – Sales distribution – Manufacturing *11 countries* *6 languages* Mobile version Development Environment (SAP Business ByDesign Studio) AppStore – > 100 apps	Tailored ERP in the cloud – Automotive – Insurance – Life science – Wealth management – High technology *145 countries* *27 languages* Mobile version	ERP in the cloud – Accounting – Purchasing – Manufacturing – Billing Position of leader (cloud ERP) *15 languages* *170 countries* Development environment (SuiteCloud) SuiteApp (store) – > 250 apps	Customized integrated ERP on-premise, covering 25 industry sectors with modules: – Finance – Human capital management – Sales and service – Procurement and logistics – Product development and manufacturing – Corporate services	Tailored CRM on-premise – Automotive – Insurance – Life science – Wealth management – High technology
Revenue streams	SaaS users ($ per user per month) – $4 Contact management – $25 Group – $65 CRM – $125 Custom CRM – $270 Full version Developers ($ per app per developer) – $10 Light – $25 Enterprise Additional services – Implementation, etc.	SaaS users ($ per user per month) – $11 Employee management – $89 CRM – $149 Standard (services without warehouse) – $199 Full (SCM included) Developers – SAPStore 15% Additional services – Implementation, etc.	SaaS users ($ per user per month) – $90 multitenant – $125 single-tenant – $110 on-premise Additional services – Implementation etc.	Fixed price per company – $399 (one full user and 10 limited users included) – SaaS users ($ per user per month) – From $99 Developers – N/A Additional services – Implementation, etc.	License (according to price lists) Maintenance Implementation services (18% standard, 22% extended)	License (according to price lists) Maintenance Implementation services

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Table 4: Continuation

Key resources	Data center (outsourced) Developers Field operations	Data center – Germany and U.S. Developers System engineers and field operations	Data center – U.S. Developers System engineers and field operations	Data center – U.S. Developers System engineers and field operations	Developers System engineers and field operations	Developers Back/Front office System engineers and field operations
Key activities	Development Sales/Services Training	Development Sales/Services Operations Training	Development Sales/Services Operations Training	Development Sales/Services Operations Training	Development Implementation Sales/Services Training	Development Implementation Sales/Services Training
Key partners	Data center (outsourcing) – Equinix – NTT Services integrated in platform – Google (platform, ads) VAR and integrators	Services integrated in the platform/SAPStore – Google – Accenture – Siemens Enterprise Communication SAP UAP (University) VAR and integrators ISV	Partner pool (30,000) – VAR and integrators – ISV	Accenture (resell) Services – Yammer! – Google VAR and integrators ISV	SAP UAP (university) Technology partners – Oracle – Adobe Hardware partner – HP VAR and integrators ISV	Partner pool (30,000) – VAR and integrators – ISV
Cost structure	Data center (rent) Personnel costs – Developers – Field operations Third-party services	Data center Personnel costs – Developers – Field operations – System engineers Third-party services	Data center Personnel costs – Developers – Field operations – System engineers	Data center Personnel costs – Developers – Field operations Third-party services	Personnel costs – Developers – Field operations Third-party services	Personnel costs – Developers – System engineers – Field operations Third-party services

By offering cloud services, enterprise software vendors have extended their *customer segments* to the small and medium-sized segments. This is underpinned by the fact that traditional software vendors, such as SAP and Oracle, target smaller companies with their cloud offerings, allowing them to benefit from the economies of scale due to the multitenant architecture, while their on-premise solutions target medium and large companies. These new customer segments are addressed in two ways: either with generic packages or tailored industry solutions. In the generic packages, which is the most common, the number of dedicated functional solutions varies with the software vendor in question. For instance, Salesforce offers five different packages, from one single function (contact management), to the full version, while NetSuite ERP offers only one package. In the tailored industry solutions, software vendors define a set of target industries, such as Oracle's on-demand solution, which is tailored for automotive, insurance, life science, and wealth management.

In addition to their SaaS offers, certain software vendors provide a PaaS environment for developers. In doing so, they expand the value propositions of their SaaS solution by opening their platforms to third parties and providing them with tools to develop add-on applications and online stores to sell them to SaaS users. This combined SaaS and platform model could only be observed in a subset of the cases – Salesforce Sales Cloud, SAP Business ByDesign, and NetSuite ERP – but is most successfully implemented by Salesforce Sales Cloud and its platform Force.com. It ultimately results in two customer segments: end users are addressed with the SaaS solution (primary segment), and developers (secondary segment), who access the development environment through PaaS.

In the traditional enterprise software approach, partners in particular integrators, VARs, and ISVs play an important role in maintaining *relationships with customers*. With cloud computing, software vendors attempt to transfer their customer relationships to online channels. First, online stores represent a single entry point for customers who want to purchase software or look for extensions. For instance, AppExchange's Salesforce Store consists of more than 1,780 applications that customers can buy directly. Second, software vendors provide comprehensive online services to guide SaaS customers during the entire lifecycle, that is, from the evaluation phase to the solution's implementation and operation. Customer support is often done online and is included in cloud solutions. SaaS users can contact the helpdesk directly via instant messaging, for instance. In Oracle CRM on demand, users can talk to the technical support at any time. Certain software vendors, such as NetSuite and Salesforce, provide communities to help customers find manuals, discuss with third parties, and exchange experiences. Similarly, with PaaS, developer relationships are also maintained online with tools that help developers publish applications, collaborate, communicate, or find resources.

In traditional enterprise software, indirect *channels* (ISV, VAR, integrators) may represent a large part of overall software sales. Our analysis reveals that cloud software vendors emphasize direct online channels, for instance by offering online subscriptions to users and developers or by searching and installing applications through online stores. Since cloud solutions do not require hardware installation, the subscription process and the implementation may not require external interaction. Thereby, the four analyzed solutions are accessible after completing a registration form. Nevertheless, owing to the business criticality of enterprise software, it is less likely that customers

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will access a cloud service without any direct interaction or the support of service providers to configure and implement the software. As a result, direct channels such as sales representatives, but also indirect channels such as partners, remain important for supporting companies in the evaluation and implementation process. However, their role and influence is declining with the move towards the cloud.

5.2 Resource Base and Value Configuration Elements: Key Resources and Activities, and Key Partners

Whereas traditional software vendors focus on development, sales, and service as *key activities* to deliver packaged software, cloud-based enterprise software requires additional activities and resources to provide and operate their infrastructure. Consequently, cloud providers have built their own data centers and have created dedicated teams for hosting and operations. In addition, dedicated SaaS tenants must be created, maintained, and updated for every customer, which involves significant operational activities. In this regard, it is interesting to observe that traditional software vendors such as Oracle and SAP have not been able to migrate their existing ERP or CRM solutions to the cloud, but are developing specific solutions that are optimized for multitenant operations and web access.
Traditional software vendors have established strong partner networks, notably for customer-facing activities such as sales, software evaluation, and integration at the customer site. While these activities are increasingly transferred to online channels, our analysis reveals that cloud computing introduces new types of *partnerships* that allow software vendors to leverage partner assets and integrate third-party services in their solutions. For instance, social functionalities offered by NetSuite ERP, such as instant messaging, come from Google and Yammer!. For all cloud offerings, partners with hardware, database, or operational expertise such as VMware are strategic to ensure their cloud infrastructure's performance and security. While all software vendors analyzed – with the exception of one, Salesforce – host their own infrastructure, the possibility of outsourcing the infrastructure to partners exists. This underpins the modularity of the cloud computing service model (IaaS, PaaS, and SaaS), which allows service providers to rely on others to provide value-added services. This choice of renting or hosting the infrastructure changes the cost structure of software vendors, as developed below.

5.3 Financial Elements: Revenue Streams and Costs

Software licenses, which are paid upfront, and annual maintenance fees, which typically account for approximately 20% of the initial licenses, are the main *revenue streams* (Table 5) for traditional enterprise software vendors. For their cloud offerings, software vendors adopt subscription models with pay-per-use elements, where prices vary significantly with the services offered. For instance, entry prices for Salesforce start at $4 per user per month for a single functionality, while the *Unlimited* solution costs $270 per user per month. NetSuite ERP charges companies a monthly fee of $399, while each user pays $99 per month. Maintenance contracts for technical support, which are mandatory with on-premise solutions, are not required with cloud solutions, because technical operations are integrated into the cloud offering. Our analysis reveals that cloud solutions' recurring revenues come from both customer segments: end users for SaaS and developers for PaaS. The use of SaaS services is generally proposed through a fixed price per user, while certain advanced functionalities such as customization, or data or transaction volume, are charged separately. This is the case of Salesforce Sales Cloud, which charges additional fees for customers who want to provide portal access to their partners. PaaS customers generally pay depending on the resources consumed (i.e. storage, middleware, or database) and the number of applications being developed. Entry fees for Salesforce developers are $10 per developer per app. Additional revenue sources come from sales provisions for applications and add-ons sold via online stores. For instance, SAP earns 15% on each application sold through its SAPStore.

Table 5: Revenue models observed in our empirical analysis

	Recurrent revenues from users (SaaS)	**Recurrent revenues from developers (PaaS)**
Subscriptions	User and/or company subscriptions Add-on applications from online store	Platform subscriptions
Pay-per-use of cloud services	Functionalities Volume (e.g., quota, transactions, etc.) Customization and extension (e.g., workflow, etc.)	Per application developed Additional development tools Volume (e.g., quota, etc.)
Others	Additional services (e.g., configuration, support, etc.)	Revenue sharing Affiliate services

Although software vendors do not disclose the details of their cost structures, we can identify at least three main cost elements. The first consists of personnel costs, including developers for designing the software and updates, but also sales, service, and marketing personnel. They represent the most important costs in traditional software business. Cloud-based offerings imply additional personnel costs related to the operation of the cloud infrastructure. The second, which concerns only cloud-based offerings, is the infrastructure, including facilities and data centers. Infrastructure costs differ, depending on whether the infrastructure is owned or rented. When the infrastructure is

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owned, significant upfront investments and certain recurrent costs are needed to acquire and run the infrastructure. If the infrastructure is rented, these fixed costs are transferred into variable costs. Among the cloud solutions analyzed, Salesforce is the only company that rents infrastructure. Finally, the last cost components comprise the services from third parties such as licenses for databases or platform environment. For instance, NetSuite ERP relies on Yammer! for its instant messaging functionality, and SAP on Google AppEngine functionalities.

6 A Refined View of Cloud-based Business Models

The within-case and cross-case analysis reveals that cloud computing significantly alters enterprise software vendors' traditional business model, and forces them to transform all their business model components. We were thus able to derive cloud-based business model configurations, which we present and discuss in the following section.

6.1 Cloud-based Business Model Configurations

Table 6 synthesizes the business model configurations for traditional and cloud vendors, which we derived from our analysis. It illustrates that cloud-based business model configurations differ from the traditional model in two primary areas: first, the move from a product vendor towards a service provider, which we denote as *enterprise SaaS*, and second, the creation of enterprise software platforms that extend the SaaS offering, which we denote as *enterprise SaaS+PaaS*. We will elaborate on these two business model configurations.

When moving to *enterprise SaaS*, enterprise software vendors have diversified the customer value proposition, first by offering web-based access to business applications with full functional scope, but also smaller packages with restricted functionalities, such as contact management for Salesforce Sales Cloud and employee management for SAP Business ByDesign. Second, they complement traditional functionalities by leveraging technology advances, in particular web and mobile front ends, integration with social media, and advanced analytics. In addition, they have extended their customer bases, notably to the small and medium-sized segments. With cloud computing, vendors also tend to replace offline customer relationships with online lifecycle services. Although the traditional relationships with integrators and sales representatives remain with cloud solutions, they tend to lose importance. Customers are provided with online subscriptions to purchase enterprise software; online services guide them along the implementation of their cloud solution and train them in using the software. Finally, customers can access online stores to extend their solutions' functionalities with add-ons. Compared to traditional enterprise software, cloud solutions lead to a new revenue model that is challenging for traditional vendors. Instead of paying significant upfront license fees and annual maintenance fees equivalent to approximately 20% of the initial investment, customers pay only for what they use. Therefore, not all revenue streams mentioned in the literature appear in our cloud business model analysis. In contrast to consumer-oriented SaaS, we do not find any free, pure pay-per-use (not based on subscription, but only on volume) or advertising model for enterprise software. Not only revenue streams are impacted while delivering SaaS, but also cost structures and required resources. In addition to the traditional core activities of software development, sales, marketing, and support, software vendors must manage IT infrastructure and operations. The provision of cloud enterprise software is resource and cost-intensive, since it requires data centers and other physical infrastructure as well as operational teams.

Enterprise SaaS+PaaS, as the second business model configuration, which we observe only in a subset of our sample (Salesforce Sales Cloud, Netsuite ERP, SAP Business ByDesign), represents a significant extension of the SaaS model, through the bundling and integration of the core product with third-party offerings. Given the restricted possibilities to provide customized SaaS, we observe – in the case of Salesforce.com – that integrators and implementation partners play a significant role in providing specialized add-on functionalities to niche segments. By providing developers with tools that allow them develop and deploy add-ons, enterprise software vendors are moving from packaged software vendors towards becoming platform providers. A so-called multisided platform, this model requires the involvement of two interdependent groups to grow and to create value [16], [44]: SaaS users and PaaS developers. While PaaS developers pay to develop and sell applications through software vendors' online stores, SaaS users pay for their usage. As a result, each customer segment brings its own revenue stream.

Figure 2 shows the two complementary business model configurations and associated revenue streams: In the case of enterprise SaaS, enterprises consume core business applications on demand and pay subscription-based and other fees according to their use. With the extension to enterprise SaaS+PaaS, additional PaaS capabilities serve developers, who pay to access the platform in order to develop add-ons. These add-ons increase the attractiveness of the core business applications and will be sold to enterprises through the app store. While the earned money out of the sales goes to developers, platform providers host the service and sell add-ons to get part of the earned money.

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Table 6: Business model configurations of enterprise software vendors:
Traditional enterprise software, enterprise SaaS, and enterprise SaaS+PaaS

		On–premise enterprise software	**Enterprise SaaS**	**Enterprise SaaS+PaaS**
Value proposition				
Software functionalities	Core functionalities: integrated processes and data	X	X	X
	Extended functionalities: analytics, social media		X	X
	Add-ons	(X)	X	X
Software delivery	On-premise installation	X		
	Web-based access		X	X
Software customization	Personalization	(X)	X	X
	Configuration	X	(X)	(X)
Services	Implementation	X	(X)	(X)
	Installation hardware and software	X		
	Support and maintenance	X	X	X
Development platform				X
Customer segments				
Users	Medium-sized to large companies	X	(X)	(X)
	Small to medium-sized companies		X	X
Developers				X
Customer relationships				
Account manager		X	(X)	(X)
VAR and integrators (internal and partner)		X	(X)	(X)
Online lifecycle (online store for purchasing software, online support)			X	X
Channels				
Customers	Direct (online)		X	X
	Direct (offline) – own sales and field service	X		
	Indirect (offline) – ISV/VAR and integrators	X	X	X
Developers	Direct (online)			X
Revenue streams				
Entry fees	License	X		
Recurrent fees	Maintenance (support)	X		
	Pay-per-use (business software)		X	X
	Pay-per-use (development platform and resources)			X
	Revenue sharing (online stores)			X
Additional services	Professional services	X	X	X
	Affiliate services			X
Key activities				
Sales		X	X	X
Service and support		X	X	X
Development		X	X	X
Application management			X	X
Infrastructure operations			X	X
Key resources				
Developers		X	X	X
Sales and service staff		X	X	X
Data center and IT operations			X	X
Key partners				
Technology partners (middleware, database)		X	X	X
ISV (add-ons)		X	X	X
VAR and integrators (implementation)		X	X	X
Third-parties' hardware and system operation capabilities (IaaS)			(X)	(X)
Third-parties' integrated components			X	X
PaaS developers				X
Cost structure				
Personnel costs	Developers, sales/service staff	X	X	X
	System engineers		X	X
Infrastructure costs (data center)			X	X
Costs for third-party services (license)			X	X

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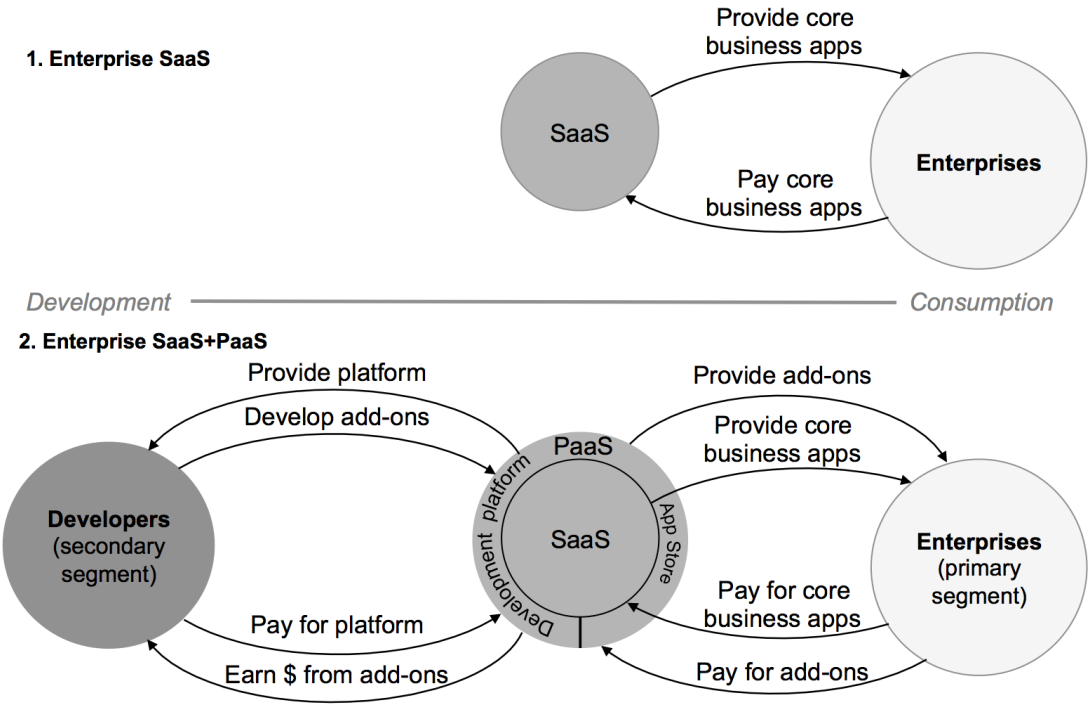

Figure 2: Two complementary business model configurations in cloud-based enterprise software

6.2 Discussion

Our study reveals that the move from on-premise software to cloud services impacts all nine business model elements and synthesizes the specificities of enterprise software vendors' business model. In view of the radical changes in the business model – on the customer-facing side as well as on the resource base and value configuration side – our study confirms that cloud computing has the characteristics of a disruptive technology for the enterprise software market [12], [32]; first, it enables less skilled users to receive the same utility from enterprise software that was previously available only for larger organizations, because services are delivered through a web browser and with recurrent price models. Cloud computing thereby targets customers at the low end of market with modest performance demands, which can benefit from economies of scale to access services. Second, it requires software vendors to build IT infrastructure and the related capabilities in order to operate and maintain cloud solutions. From a financial perspective, this implies significant upfront investments in data centers as well as operating costs, while revenues tend to be very low in early phases after market entry owing to the recurring service fees and the absence of upfront payments. Finally, the move towards cloud-based enterprise software disrupts the existing value networks. The roles in the existing ecosystem [32] – of software developers, ISVs, and service providers – are changing due to the characteristics and online delivery of cloud solutions. While partners have always played important roles in selling and implementing enterprise software, customer relationships rely more intensively on direct online channels in the case of cloud solutions. This change in channel mix in favor of direct and online channels has not been discussed in prior literature, but has a major impact on the evolution of software vendors' ecosystems where ISVs, VARs, and integrators traditionally played an important role [32]. New partners gain importance in the delivery of cloud solutions, and third-party services are integrated into SaaS and PaaS offerings, resulting in a vertically integrated ecosystem of infrastructure and technology providers, add-on developers, and channel partners.

As noted, revenue and price models have been one of the focus areas of prior research. Interestingly, not every option mentioned in the literature (and applied in the context of consumer-oriented cloud services) appear in our cloud business model analysis. From a SaaS perspective, most vendors offer different types of subscription models with some pay-per-use elements, but we do not find any pure pay-per-use (only on volume) or advertising model. From a PaaS perspective, we do not see admission fees, advertising, or fees related to the publication of new application versions. These findings confirm that cloud-based enterprise software is a dedicated category of cloud services that does not share the same revenue and price models as cloud offerings for private users.

Our analysis complements existing research – in particular Luoma et al. [38] (see Table 2): On the one hand, it refines their *enterprise SaaS* business model by a detailed analysis of the nine business model components and their configurations. On the other hand, our findings extend Luoma et al.'s work [38] by adding the *enterprise SaaS+PaaS* business model configuration. Certain cloud providers offer complete cloud platforms for integrating third-party offerings into their core services in addition to delivering mass-customized applications via the internet.

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Their business model evolves into a multisided platform with enterprise users as the primary customer segment and developers as secondary customer segment. By identifying *enterprise SaaS* and *enterprise SaaS+PaaS* as two alternative business model configurations, our research synthesizes the strategic options for enterprise software vendors. We conclude that prior studies on SaaS have a scope that is too narrow and that enterprise software must also be studied as platform business.

7 Conclusion

With its focus on software vendors and their business models, our research fills a gap in the existing studies on cloud-based enterprise software, which mostly focus on cloud adoption from a user perspective. Our findings broaden the prevailing perspective on cloud-based enterprise software as *enterprise SaaS* and identifies the emerging enterprise software platforms (*enterprise SaaS+PaaS)* as additional business model configuration. The following section discusses our research contribution and the implications for practice and research. We conclude by outlining the limitations and suggesting future research opportunities.

7.1 Contribution

The few existing studies on enterprise software either proposed business model categories or analyzed specific mechanisms (such as price revenue models) implied by offering cloud services from a vendor perspective. Our research complements these studies by delineating the detailed implications of moving towards cloud computing on the customer-facing side as well as on the side of resource bases, value configuration, and financials.

Our research relies on a qualitative and systematic approach that analyzes four cloud-based enterprise software offerings and two of their traditional on-premise counterparts based on the nine elements of Osterwalder and Pigneur's business model canvas [44]. Our findings reveal that cloud computing's implications go far beyond migrating on-premise solutions to online software delivery and introducing a pay-per-use model or a subscription revenue model. On the contrary, it impacts all nine business model elements: In the customer-facing elements, cloud offerings comprise new functionalities (i.e. analytics, social media), new customer segments (SME), and new channels and customer relationships, to offer direct access to solutions. Concerning the resource base and value configuration, cloud software providers not only need to develop web-based applications, but also need to provision them as well as operate and maintain the required infrastructure for customers. This implies new activities and resources, unless software vendors rely on an external service (IaaS). Our analysis shows that, to compensate the lack of in-depth customization resulting from the multitenant model, software vendors provide a development platform (PaaS) that allows developers to develop and deploy add-ons that will be installed on cloud-based enterprise software through online stores. In doing so, they complement the SaaS business model with PaaS and thereby evolve into multisided platforms. They address two customer segments – users and developers – with different value propositions. The main contributions of our research are the characteristics of cloud-based business models and two alternative business model configurations: *enterprise SaaS* and *enterprise SaaS+PaaS*.

7.2 Implications

Our study allows researchers and practitioners to better understand how cloud computing shapes value creation for enterprise software and the associated business models.

From a practitioner perspective, our research synthesizes the strategic choices of business software vendors who are moving towards the cloud along two alternative business model configurations: First, they need to decide on their core cloud offerings for end users while setting an appropriate degree of vertical integration. Second, they need to determine whether they restrict themselves to pure SaaS or intend to become platform providers, combining SaaS and PaaS. This choice has several impacts on software vendors' ecosystems, in which developers traditionally act as partners rather than customers that are paying for development platforms. Traditional partners such as VARs and ISVs will increasingly productize their industry-specific and segment-specific knowledge in the form of extensions to core cloud solutions. At the same time, they will have to pay for the development platform and resources, and will share revenues with the core enterprise software vendor. Existing vendors of complementary software will have to decide whether to participate in the development platform to stay in or extend their business.

From an academic perspective, our research relativizes the strict separation of SaaS and PaaS in prior literature. It also confirms the disruptive nature of cloud computing in the area of enterprise software along two business model configurations, *enterprise SaaS* and *enterprise SaaS+PaaS*. We conclude that enterprise software will increasingly become a platform business. As a multisided platform business, cloud-based enterprise software will exhibit significant network effects, as already demonstrated by Salesforce.com. The challenge for enterprise software providers is to reach critical mass to benefit from positive same-side and cross-side network effects: The more SaaS users there are, the more PaaS developers (and integrators) will be attracted by the solution. If there are not enough SaaS users, PaaS developers may switch to another cloud solution. One the other hand, if there are not enough applications in the store, SaaS users may lack specific functionalities or customization of the cloud solution and may also switch to another solution. Clearly, both groups are needed in order to generate attraction and create value.

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7.3 Limitations and Outlook on Future Research

One of the limitations of our study is its qualitative research design, which does not support statistical generalization. However, we were able to collect detailed data from case studies covering different functional scope types as well as vendor types, which allows for analytical generalization. To validate our findings, we encourage more empirical research on the emerging business models for enterprise software. Another limitation, which our study shares with other studies [38], is the fact that software vendors do not share certain business model-related information, among them the detailed cost and revenue breakdown for cloud services. As particularly interesting areas of research, we identify the design and adoption of emerging enterprise software platforms. Since these platforms are transforming the relationships between vendors, VARs, and ISVs, we also find that partnering strategies and the evolution of enterprise software vendor ecosystems deserve more research.

Websites List

Site 1: NetSuite, ERP Software
http://www.netsuite.com/portal/products/netsuite/erp/main.shtml

Site 2: Oracle, Siebel Customer Relationship Management (CRM) Applications
http://www.oracle.com/us/products/applications/siebel/overview/index.html

Site 3: Oracle, CRM On Demand
http://www.oracle.com/us/products/applications/siebel/overview/index.html

Site 4: Salesforce, Sales Cloud: Sales for the Social Enterprise
http://www.oracle.com/us/products/applications/crmondemand/index.html

Site 5: SAP, Overview of ERP Software
http://www54.sap.com/solutions/bp/erp/software/overview.html

Site 6: SAP, Business ByDesign Software
http://www54.sap.com/solutions/tech/cloud/software/business-management-bydesign/overview/index.html

References

[1] N. Abdat, M. Spruit, and M. Bos, Software as a Service and the Pricing Strategy for Vendors. USA: IGI Global, 2010.
[2] R. Accorsi, Business process as a service: chances for remote auditing, in Proceedings of the IEEE 35th Annual Computer Software and Applications Conference Workshops (COMPSACW), Munich, 2011, pp. 398-403.
[3] M. C. Antero, J. Hedman, and S. Henningsson, Evolution of business models: A case study of SAP, in Proceedings of the 21st European Conference on Information Systems, Utrecht, 2013, pp. 1-12.
[4] M. Armbrust, A. Fox, R. Griffith, A. D. Joseph, R. Katz, A. Konwinski, G. Lee, D. Patterson, A. Rabkin, I. Stoica, and M. Zaharia, A view of cloud computing, Communications of the ACM, vol. 53, no. 4, pp. 50-58, 2010.
[5] I. Benbasat, D. K. Goldstein, and M. Mead, The case research strategy in studies of information systems, MIS Quarterly, vol. 11, no. 3, pp. 369-386, 1987.
[6] A. Benlian, T. Hess, and P. Buxmann, Drivers of SaaS-Adoption – An empirical study of different application types, Business & Information Systems Engineering, vol. 1, no. 5, pp. 357-369, 2009.
[7] C.P. Bezemer and A. Zaidman, Multi-Tenant SaaS applications: Maintenance dream or nightmare?, in Proceedings of the Joint ERCIM Workshop on Software Evolution (EVOL) and International Workshop on Principles of Software Evolution (IWPSE), Antwerp, 2010, pp. 88-92.
[8] R. Buyya, C. S. Yeo, S. Venugopal, J. Broberg, and I. Brandic, Cloud computing and emerging IT platforms: vision, hype, and reality for delivering computing as the 5th utility, Future Generation Computer Systems, vol. 25, no. 6, pp. 599-616, 2009.
[9] N. Castellina and K. Prouty. (2012, September) ERP in Manufacturing 2012, Aberdeen Research. [Online]. Available: http://aberdeen.com/Aberdeen-Library/7812/RA-enterprise-resource-planning.aspx.
[10] H. Chesbrough, Business Model Innovation: It's not just about Technology Anymore, Strategy & Leadership, vol. 35, no. 6, pp. 12-17, 2007.
[11] V. Choudhary, Software as a Service: Implications for Investment in Software Development, in Proceedings of the 40th Annual Hawaii International Conference on System Sciences, Waikoloa, 2007, pp. 209a.
[12] C. M. Christensen and M. Overdorf, Meeting the Challenge of Disruptive Change, Harvard Business Review, vol. 78, no. 2, pp. 66-76, 2000.
[13] M. A. Cusumano, The Changing Software Business: Moving from Products to Services, Computer, vol. 41, no. 1, pp. 20-27, 2008.

This paper is available online at
www.jtaer.com
DOI: 10.4067/S0718-18762013000300004

[14] T. H. Davenport, Putting the Enterprise into the Enterprise System, Harvard Business Review, vol. 76, no. 4, pp. 121-131, 1998.
[15] L. Dubé and G. Paré, Rigor in Information Systems Positivist Case Research: Current Practices, Trends, and Recommendations, MIS Quarterly, vol. 27, no. 4, pp. 597–636, Dec. 2003.
[16] N. Eddy. (2012, June) Oracle, SAP, Salesforce Fight for CRM Market Share: IDC. eWeek. [Online]. Available: http://www.eweek.com/c/a/Enterprise-Applications/Oracle-SAP-Salesforce-Fight-for-CRM-Market-Share-IDC-136782/
[17] T. Eisenmann, G. Parker, and M. W. van Alestyne, Strategies for Two-Sided Markets, Harvard Business Review, vol. 84, no. 10, pp. 92-101, 2006.
[18] T. Ellahi, B. Hudzia, H. Li, M. A. Lindner, and P. Robinson, The Enterprise Cloud Computing Paradigm. USA: John Wiley & Sons, 2011.
[19] M. J. Eppler, F. Hoffmann, and S. Bresciani, New Business Models through Collaborative Idea Generation, International Journal of Innovation Management, vol. 15, no. 6, pp. 1323-1341, 2011.
[20] M. Eurich, A. Giessmann, T. Mettler, and K. Stanoevska-Slabeva, Revenue Streams of Cloud-based Platforms: Current State and Future Directions in Proceedings of the Americas Conference On Information Systems 2011, Detroit, Michigan, 2011. [Online]. Available: http://aisel.aisnet.org/amcis2011_submissions/302.
[21] Forbes. (2012, April) Roundup of CRM Forecasts and Market Estimates, 2012. Forbes. [Online]. Available: http://www.forbes.com/sites/louiscolumbus/2012/12/04/roundup-of-crm-forecasts-and-market-estimates-2012/.
[22] I. Foster, Y. Zhao, I. Raicu, and S. Lu, Cloud Computing and Grid Computing 360-Degree Compared, in Proceedings of Grid Computing Environments Workshop 2008, Texas, 2008, pp. 1–10.
[23] Gartner. (2012, November) Gartner: Top 10 Key Technology Trends for 2013. CloudTimes. [Online]. Available: http://cloudtimes.org/2012/11/06/gartner-top-10-key-technology-trends-for-2013/.
[24] A. A. J. Göldi, The Emerging Market for Web-based Enterprise Software, M.S. Thesis, Massachusetts Institute of Technology, Cambridge, USA, 2007.
[25] J. Hedman and T. Kalling, The Business Model Concept: Theoretical Underpinnings and Empirical Illustrations, European Journal of Information Systems, vol. 12, no. 1, pp. 49-59, 2003.
[26] M. Hogan, F. Liu, A. Sokol, and J. Tong, NIST Cloud Computing Standards Roadmap, National Institute of Standards and Technology, Gaithersburg, USA, pp. 10–76, 2011.
[27] M. Janssen and A. Joha, Challenges for Adopting Cloud-Based Software as a Service (SaaS) in the Public Sector in Proceedings of the European Conference on Information Systems 2011, Helsinki, 2011. [Online]. Available: http://aisel.aisnet.org/ecis2011/80.
[28] M. W. Johnson, C. M. Christensen, and H. Kagermann, Reinventing your Business Model, Harvard Business Review, vol. 86, no. 12, pp. 50-59, 2008.
[29] R. B. Johnson, Examining the Validity Structure of Qualitative Research, Education, vol. 118, no. 2, pp. 282-292, 1997.
[30] H. Katzan, Cloud Software Service: Concepts, Technology, Economics, Service Science, vol. 1, no. 4, pp. 256-269, 2009.
[31] A. Khajeh-Hosseini, I. Sommerville, and I. Sriram, Research Challenges for Enterprise Cloud Computing in Proceedings of the ACM Symposium on Cloud Computing, Indiamapolis, 2010, pp. 1-11.
[32] A. Krikos, Cloud Computing as a Disruptive Technology, Cloudbook, vol. 2, no. 2, pp. 1-5, 2011.
[33] S. Leimeister, C. Riedl, M. Böhm, and H. Krcmar, The Business Perspective of Cloud Computing: Actors, Roles, and Value Networks in Proceedings of the European Conference on Information Systems 2010, Pretoria, 2010.
[34] H. Liao, SaaS Business Model for Software Enterprise in Proceedings of the 2nd IEEE International on Information Management and Engineering, 2010, pp. 604-607.
[35] F. Liu, J. Tong, J. Mao, R. Bohn, J. Messina, L. Badger, and D. Leaf, NIST Cloud Computing Reference Architecture, National Institute of Standards and Technology, NIST Special Publication 500-292, Gaithersburg, MA, 2011.
[36] C. Loebbecke, B. Thomas, and T. Ullrich, Assessing Cloud Readiness at Continental AG, MIS Quarterly Executive, vol. 11, no. 1, pp. 11-23, 2012.
[37] E. Luoma and T. Nyberg, Four Scenarios for Adoption of Cloud Computing in China in Proceedings of the European Conference on Information Systems 2011, Helsinki, 2011.
[38] E. Luoma, M. Rönkkö, and P. Tyrväinen, Current Software-as-a-Service Business Models: Evidence from Finland, Software Business, vol. 114, no. 2, pp. 181-194, 2012.
[39] D. M. Mangiuc, Enterprise 2.0–Is The Market Ready?, Journal of Accounting and Management Information Systems, vol. 10, no. 4, pp. 516-534, 2011.
[40] S. Marston, Z. Li, S. Bandyopadhyay, J. Zhang, and A. Ghalsasi, Cloud Computing-The Business Perspective, Decision Support Systems, vol. 51, no. 1, 2011, pp. 176-189.
[41] C. Møller, ERP II: a Conceptual Framework for next-Generation Enterprise Systems?, Journal of Enterprise Information Management, vol. 18, no. 4, 2005, pp. 483-497.
[42] NetSuite (2011, April) Leading Industry Analyst Firm Names NetSuite Fastest Growing Financial Management Vendor - For Third Straight Year. NetSuite. [Online]. Available: http://www.netsuite.com/portal/press/releases/nlpr04-27-11.shtml.
[43] A. Osterwalder, The business model ontology: A proposition in a design science approach, Ph.D. dissertation, Universite de Lausanne, Ecole des Hautes Etudes Commerciales, Lausanne, CH, 2004.
[44] A. Osterwalder and Y. Pigneur, Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. New Jersey: Wiley, 2010.

This paper is available online at
www.jtaer.com
DOI: 10.4067/S0718-18762013000300004

[45] P. Palvia, P. Pinjani, and E. H. Sibley, A profile of information systems research, Information & Management, vol. 44, no. 1, pp. 1-11, 2007.
[46] Panorama Consulting Solutions (2012, July) ERP implementation benchmark: Comparing SAP, Oracle, and Microsoft. ZDNet. [Online]. Available: http://www.zdnet.com/erp-implementation-benchmark-comparing-sap-oracle-and-microsoft-7000000971/.
[47] S. Ried and H. Kisker, Sizing The Cloud, Understanding And Quantifying The Future Of Cloud Computing. Forrester Research, 2011.
[48] F. Robert Jacobs and F. C. T. Weston Jr., Enterprise Resource Planning (ERP) – A Brief History, Journal of Operations Management, vol. 25, no. 2, pp. 357-363, 2007.
[49] J. R. Rymer, J. Staten and C. Wang. (2012, May) Achieve Cloud Economics for Operations and Services, Forrester Research. [Online]. Available: http://www.forrester.com/Achieve+Cloud+Economics+For+Operations+And+Services/fulltext/-/E-RES61602.
[50] C. Weinhardt, A. Anandasivam, B. Blau, N. Borissov, T. Meinl, W. Michalk, and J. Stösser, Cloud Computing – A Classification, Business Models, and Research Directions, Business & Information Systems Engineering, vol. 1, no. 5, pp. 391-399, 2009.
[51] T. Wilde and T. Hess, Forschungsmethoden der Wirtschaf,tsinformatik - Eine empirische Untersuchung, Wirtschaftsinformatik, vol. 49, pp. 280-287, 2007.
[52] R. K. Yin, Case Study Research - Design and Methods, 3rd ed. Sage Publications, 2003.

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Appendix A: Primary and Secondary Sources

Categories		SAP ERP	SAP Business ByDesign	NetSuite ERP	Salesforce Sales Cloud	Oracle CRM (Siebel)	Oracle CRM on demand
Product information by vendor	*Product documentation / information by vendor*	• Website with product documentation on (Site 5) • help.sap.com	• Website with product documentation on (Site 6) • help.sap.com • Reasons to step to the cloud • Security Guide • SAP Store	• Website with product documentation on (Site 1) • Developers and communities • Data Centers	• Website with product documentation on (Site 4) • AppExchange • Force.com • Salesforce Blog	• Website with product documentation on (Site 2) • Oracle Blog	• Website with product documentation on (Site 3) • Oracle Blog
	Detailed training material	• Course curriculum	• Course Curriculum				
General company information	*Annual reports*	1 report		1 report	2 reports	1 report	
Market analyses	*News articles*	1 article	3 articles	3 articles	1 article	2 articles	2 articles
	Product reports by independent analysts / consultants		2 reports	2 reports		3 reports	1 report
	Market research reports	1 report	1 report		1 report	1 report	1 report
Interviews and presentations	*Interviews, workshops, conferences*	• Interview with expert (March 8, 2012)	• Experience exchange (Germany, November 22, 2011) • Product presentation (Switzerland, May 31, 2012)	• Phone interview with sales representative (March 15, 2012)	• Phone interview with sales representative (March 12, 2012) • Workshop with expert users (Germany, February 7, 2013)	• Phone interview, sales representative (March 12, 2012)	

A full list of references is available upon request.