MASTER THESIS

Master of Science in Business Administration

SOFTWARE VENDORS' SERVICE INFUSION:

A GENERIC VALUE NETWORK OF CLOUD-BASED ENTERPRISE SOFTWARE

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Executive Summary

Cloud Computing is rapidly gaining ground in the enterprise software market, which influences the way enterprise software is developed, distributed and implemented at the client's place. Traditionally, enterprise software has been distributed and implemented on-premise through a network of partners and other actors in protracted rollout projects. Hence, Cloud Computing does affect not only the vendors' business models but also other stakeholders of the business ecosystem. This present work aims to find out how the value network of enterprise software solutions changes as a consequence of shifting from on-premise to Cloud-based technology.

In order to create a theoretical base, this present thesis reviews the theoretical literature of servitization, Cloud Computing, enterprise software, value creation logic, value networks of on-premise enterprise software, and value networks of general Cloud Computing. Furthermore, this work uses a multi-method qualitative study. Therefore, a multiple case study analyses of three cases (Microsoft Dynamics AX, SAP S/4HANA, and Salesforce Sales Cloud) is conducted. The value network role activity analysis by Kijl, Nieuwenhuis, Hermens, and Vollenbroek-Hutten (2010) is applied to analyze the value networks of the cases. In a second step, a survey in the form of semi-structured interviews with fifteen experts is performed. The outcome of the empirical research is a generic value network for Cloud-based enterprise software. The generic value network illustrates the value created by each actor and the interaction of the actors. It contributes to the literature by identifying relevant roles, actors, and activities in the value network of Cloud Computing. Even though the literature provides a profound basis, this research delivers valuable findings and opens new aspects. Moreover, the generic value network can be used by practitioners in order analyze the changing business ecosystem. Practitioners can then transform specific competencies into value propositions with market potential to customers and other stakeholders of the value network. This is demonstrated in the approach at a practical example of a Value-Added Reseller of Microsoft Dynamics AX.

Keywords: Business ecosystem, Cloud Computing, Cloud-based enterprise software, Servitization, Value network

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API	Application programming interface
BI	Business Intelligence
BPM	Business process management
B2B	Business-to-Business
B2C	Business-to-Consumer
CAGR	Compound annual growth rate
Capex	Capital expenditure
CMS	Content management system
CRM	Customer relationship management
DSE	Microsoft Dynamics Service Engineers
EDI	Electronic data interchange
ERP	Enterprise resource planning
GD logic	Goods dominant logic
IaaS	Infrastructure as a Service
ICT	Information and Communications Technology
IS	Information systems
IT	Information Technology
LCS	Microsoft Dynamics Lifecycle Services
NIST	National Institute of Standards and Technology
Opex	Operational expenditure
PaaS	Platform as a Service
SaaS	Software as a Service
SCM	Supply Chain Management
SD logic	Service dominant logic
SLA	Service level agreement
SME	Small to medium enterprises

Chapter 1: Problem Statement

This chapter introduces the purpose and relevance of the present thesis. Therefore, the main research question and sub-questions are defined, which gives the reader an overview of the objectives and the scope of the investigations as well as a structure of this research.

1.1. Introduction

The Information Technology (IT) market is evolving continuously, characterized by the needs and possibilities of cost reduction, more agile and efficient business processes, resource sharing, economies of scale, and value creation (Chou, 2015). Regarding this, the emerging Cloud Computing technology offers remedy by providing computer resources (e.g. networks, servers, storage, applications, and services) as a service via the internet (Świątek, Stelmach, Prusiewicz, & Juszczyszyn, 2012). Cloud Computing enables users to apply the computer resources without worrying about technical issues such as installation, updates, operating systems, or memory capacity (Ojala & Tyrväinen, 2011). By providing Software as a Service (SaaS), Platform as a Service (PaaS), and/or Infrastructure as a Service (IaaS) Cloud Computing promises advantages in terms of flexible cost structure, scalability, and efficiency (Sultan, 2014). Recent literature claims that the model of Cloud-based services is related to the concept of servitization. However, servitization respectively service infusion is predominantly known in the manufacturing industry. It describes the introduction of new services around core products in order to obtain competitive advantage (Grönroos, 2015; Lay, 2014; Vandermerwe & Rada, 1988). The importance of introducing product and service offerings based on customers' needs has been discussed extensively in academic research and industrial practice (Neely, 2007). According to this, Wise and Baumgartner (1999) call attention to change the manufacturing strategy concerning the vertical integration by *"moving downstream into distribution channels"* (p.137) in order to stay truly competitive.

The emerging Cloud Computing technology is considered to be a disruptive innovation which infuses services into the IT industry (DaSilva, Trkman, Desouza, & Lindič, 2013; Pussep, Schief, & Buxmann, 2013; Sultan, 2014). Due to Cloud Computing the way computing resources are *"invented, developed, deployed, scaled, updated, maintained and paid for"* (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011, p. 1) is drastically changing (Mell & Grance, 2011). In fact, more and more software and hardware solutions are transferred to Cloud-based technology (EMC, 2016; Pussep et al., 2013). Moreover, the big players of Enterprise Resource Planning (ERP) systems such as Oracle, Sage, SAP, and Microsoft offer their ERP now also in a Cloud-based environment (Chen, Liang, & Hsu, 2015; Johansson & Ruivo, 2013). This implies not only a change in utilizing computing resources for customers but also a profound shift in the value creation logic of vendors and their partners' business model (Boillat & Legner, 2013; Marston et al., 2011). Hitherto, traditional enterprise software vendors have distributed their software solutions through partners such as Value-Added Resellers (VAR) to their customers (Hedman & Xiao, 2016; Rebsdorf & Hedman, 2014). The

VAR’s activities typically include selling, installation, technical consulting, training, modification, customization of the software at the clients’ organization (Sarker, Sarker, Sahaym, & Bjørn-Andersen, 2012). A VAR has personal contact with the end-customers and possesses industry-specific expertise. Thus, the role of the VAR is important for customer’s satisfaction and respectively for the overall success of the product (Boillat & Legner, 2013). In the past, many enterprise software vendors (e.g. Microsoft, SAP, Oracle) have introduced partner programs in order to reinforce the relationship to their partners (Hedman & Xiao, 2016).

With service infusion through Cloud Computing, the traditional way of delivering software to the end customers is changing. There is nothing to resell, technically install and no opportunity to provide any kind of logistics anymore (Hedman & Xiao, 2016). The delivery of Cloud service is clearly different from the delivery of traditional IT systems, which means the transition from a goods-dominant logic (GD logic) to a service-dominant logic (SD logic) (Ojala & Tyrväinen, 2011; Vargo & Lusch, 2004a). Regarding this, scholars have mainly focused on adopting Cloud Computing technologies, economic benefits of users, the business model evolution of software vendors and the changing value creation logic through value networks from a rather broad perspective (see e.g. Boillat & Legner, 2013; T. Li, He, & Zhang, 2015; Mohammed, Altmann, & Hwang, 2009; Ojala & Helander, 2014). However, the characteristics of enterprise software such as complexity, high level of dependency, high data volume, and security comprise a special case (Kees, 2015). As on-premise enterprise software rollouts at a client’s organization traditionally include several actors in an ecosystem (e.g. VAR and consultancy firms), Cloud Computing seems to disrupt this ecosystem by providing the solution remotely as a service (Ojala & Helander, 2014). Nevertheless, enterprise software solutions still need to solve complex problems and function in a convoluted organization which cannot be ignored. Conclusively, the value network of Cloud-based enterprise software is not sufficiently investigated.

Little is known about the impact of Cloud Computing on the relationship between enterprise software vendors and business partners as well as about the value creation logic. Although researchers have mentioned the change of the actors’ relevance in the value chain of enterprise software, there is no clear answer regarding the future role of the of those actors (Boillat & Legner, 2013). Therefore, this work aims to analyze the changing value network of the enterprise software industry through Cloud Computing. Based on the value network theory, the value networks of three different cases of Cloud-based enterprise software solutions will be analyzed (Microsoft Dynamics AX, SAP S/4HANA, and Salesforce Sales Cloud). The results present more insights on the value network as well as on value-added activities of the actors in the ecosystem. Furthermore, interviews with experts in the field of Cloud Computing and enterprise software will be conducted to gain more in-depth insights on the evolving IT industry.

1.2. Research questions and statement of structure

The introduction demonstrates the current situation of the drastically changing ecosystem of enterprise software. In this respect, the following research question emerges:

Main research question: ***How does the value network of enterprise software solution change as a consequence of shifting from on-premise to Cloud-based technology?***

To answer the main research question the following sub-questions appear:

(1) *What does the shift from on-premise enterprise software to Cloud-based enterprise software mean?*

The first sub-question aims to elaborate on the meaning of the *shift* from products to services in the IT industry by examining literature about servitization (chapter 2.2.1.) and Cloud Computing (chapter 2.2.2.). As literature about servitization already sufficiently discusses the infusion of services into manufacturing industries, this work focuses on Cloud Computing in the context of servitization, which is an upcoming research topic in the information system (IS) literature (chapter 2.2.3.). Furthermore, this thesis explains how enterprise software technologies differentiate from other software solutions (chapter 2.3.) as well as why the introduction of Cloud-based enterprise software is going to disrupt the traditional enterprise software ecosystem (chapter 2.3.3.). Therefore, definitions and characteristics of servitization, Cloud Computing, and enterprise software are declared according to theoretical and current literature. Furthermore, an overview of benefits and concerns of Cloud Computing is provided.

(2) *Which roles, actors, and activities exist in a value network of on-premise enterprise software solutions?*

The second sub-question contributes to the main research question by identifying the traditional value network of enterprise software solutions which includes roles, actors, and activities. To answer sub-question 2, literature about value creation (chapter 2.4.1.), value networks and ecosystems (chapter 2.4.2.), and value networks of enterprise software solutions (chapter 2.4.3.) are reviewed and presented in this thesis. Answering the sub-question creates an understanding of the value network of a traditional on-premise software solution. Insights of on-premise software solutions are necessary to be able to compare the old value network with the empirical findings of this research.

(3) *Which roles, actors, and activities exist in a value network of Cloud Computing solutions?*

As there is already literature about Cloud Computing value networks in general (chapter 2.4.4.), this question aims to find out which roles, actors, and activities can be expected in the case of Cloud Computing. The identified value network characteristics (such as specific Cloud Computing roles e.g.: Cloud Provider) are then transferred and compared to the developed value network of Cloud-based enterprise software.

(4) *Which roles, actors, and activities emerge, disappear, and/or change in a value network of Cloud-based enterprise software solutions?*

The last sub-question aims to identify how the value network of traditional enterprise software is influenced by the shift to Cloud-based technology. Therefore, results from a multiple case analysis (chapter 4.1. and 4.2.), as well as expert interviews (chapter 4.3.), will lead to a generic value network of Cloud-based enterprise software solutions, pointing out relevant activities of actors and interactions (chapter 4.4.). This generic value network contributes to the IS literature and can be used for developing new business models and value propositions in the field of Cloud-based enterprise software.

In a practical example of a Dutch VAR (in the following D-VAR)[1], new value propositions are developed in the approach based on the outcome of the research. D-VAR initiated this research because it considers the movement of software vendors to the Cloud as a fundamental change in the industry. Furthermore, D-VAR supports the research by providing information, industry insights, and other resources, which also demonstrates the practical significance of this investigation.

This paper is structured in five chapters. The first chapter introduces this present thesis. The second chapter provides the literature review about the core topics servitization, Cloud computing, enterprise software, and value networks. The methodology of the research is described in the third chapter. The analysis of multiple cases and insights from the expert interviews are shown in chapter 4. The conclusion and discussion are summarized in the fifth chapter of this thesis.

1.3. Significance of the research

This paper aims to address both researchers and practitioners. Therefore, this research contributes to the IS literature, especially the scientific investigation of the Cloud Computing technology and enterprise software, by developing a generic value network for Cloud-based enterprise software. Furthermore, this research seeks to contribute to the literature by 1) examining how the ecosystem/ value network of on-premise enterprise software changes due to Cloud Computing approaches, 2) identifying roles, actors, and activities in a Cloud-based enterprise software value network, 3) enhancing existing value network models of Cloud Computing through the generic value network, and 4) relating Cloud Computing to servitization, especially to the SD logic.

The results will help practitioners to understand the changing environment and customer requirements in the enterprise software segment as well as develop new customer value propositions and business models. Due to the rapidly changing industry, especially with regards to competition and customer demands, new challenges continue to emerge. Stakeholders need to understand how the ecosystem is going to change in order to adopt the new technology and transform their competencies into new value

[1] In order to keep this work public, the name of the Dutch VAR is anonymized.

propositions for customers and other stakeholders. Thus, actors can use the generic value network derived from this thesis in order to create new value propositions and capabilities to stay competitive in the changing environment. For software vendors, Cloud Computing represents a new business territory that requires different approaches. However, traditional software vendors will benefit from the research at hand by understanding the ecosystem of Cloud-based enterprise software and reinforcing the relationship between relevant actors. Furthermore, VARs and other traditional partners are served with relevant findings regarding the structure of the Cloud-based value networks, as well as new customer requirements due to the shift from on-premise to Cloud Computing solutions. Moreover, this present work provides potential Cloud Computing consumers with relevant information regarding characteristics of enterprise software in a public, private, and hybrid Cloud environments. Hence, this present research contributes to practice and literature, which enhances its significance.

Chapter 2: Literature Review

This chapter provides answers to the first three sub-questions. Firstly, the approach how the literature review was conducted is introduced. Secondly, the service infusion in the IT industry is explained based on Cloud Computing. Therefore, literature about servitization and Cloud Computing is presented and set into relation with each other. Thirdly, the term enterprise software is illustrated. Moreover, it is explained how enterprise software differentiates from other software applications. Fourthly, the meaning of value and value networks, especially in the context of on-premise enterprise software and Cloud Computing, is described by referring to fundamental and current literature.

2.1. Planning the literature review

In order to get insights and guidance for this research, a reflective analysis and review of existing academic literature is required (Tranfield, Denyer, & Smart, 2003). Denyer and Tranfield (2009) and Wolfswinkel, Furtmueller, and Wilderom (2013) identified similar approaches for a systematic literature review. This review was performed according to the five stages: (1) define, (2) search, (3) select, (4) analyze, and (5) present the literature. Firstly, the research scope, inclusion, and exclusion were formulated to answer the research question adequately. Hence, only academic articles, textbooks and conference paper of the most recent literature over the past ten years were used, except older fundamental related literature. Articles having a highly technical perspective on Cloud Computing and articles focusing only on business to consumer markets were excluded. Secondly, the search of the literature was mainly conducted through internet databases such as Google Scholar, Scopus, and EBSCOhost Research Databases. Thirdly, the selection of the most appropriate literature is based on several keywords and their combination (e.g. Cloud Computing, Servitization, Service Infusion, Servitization of the IT industry, Enterprise software [ERP, CRM, etc.], Value-Creation Logic, Software Vendors, Value Network, and Business ecosystem). Furthermore, the abstracts and introductions were analyzed as well as the forward and backward citations checks were conducted. Fourthly, the relevant sets of literature were analyzed by highlighting all relevant information, generating categories and subcategories and finding relationships between them. The content was structured into ‘Definitions and characteristics’ including subcategories of ‘Servitization’, ‘Cloud Computing’, ‘Enterprise software’, and ‘Value creation logic’; ‘Cloud Computing as a form of servitization’; ‘Value-creation logic of software vendors’; and ‘Value-creation logic of Cloud Computing’.

2.2. The service infusion in the IT industry

The following chapters introduce the meaning of servitization and how Cloud Computing is related to the service infusion of the IT sector. Therefore, the essential literature of servitization and Cloud Computing is presented and contextualized.

2.2.1. Servitization

In order to elaborate further on the term *servitization* or *service infusion,* it is important to know the characteristics of a service. According to Grönroos (2015), a service is a *process*, which consists of a series of intangible activities. Services typically include interactions between the customer and service employees. Additionally, a service includes physical goods and/or systems of the service provider. The characteristics of a service compared to products can be summarized through the following properties (Vargo & Lusch, 2004b):

- *intangibility* (lack of tactile quality of goods),
- *heterogeneity* (no standardization possible),
- *inseparability* (simultaneous production and consumption), and
- *perishability* (no storage possible).

2.2.1.1. Definition of servitization

The term servitization was mentioned for the first time in the paper of Vandermerwe and Rada (1988) who provided a description of the phenomenon:

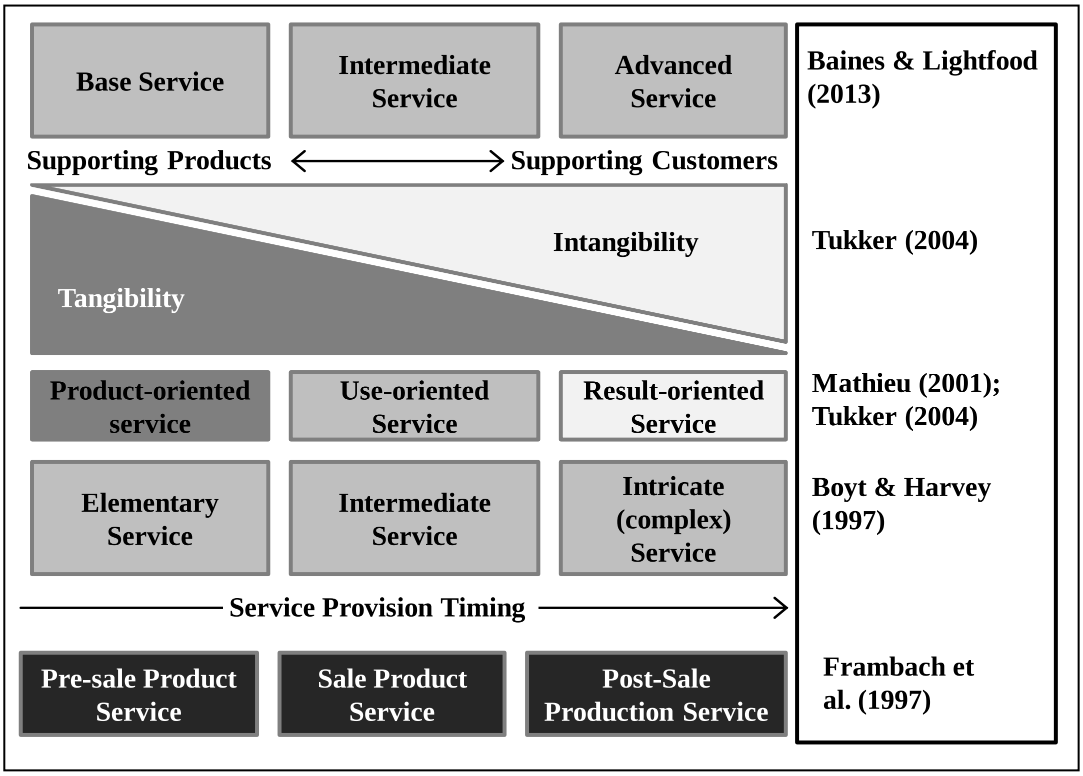
> *"(...) managers looking at their customers' needs as a whole, moving from the old and outdated focus on goods or services to integrated "bundles" or systems, as they are sometimes referred to, with services in the lead role" (p. 314)*

With this introduction, servitization or service infusion is seen as a synonym for the movement towards customer-focused offerings, which include the combination of goods, services, support, self-service and knowledge in an integrated package (Alvizos & Angelis, 2010; Lay, 2014; Vandermerwe & Rada, 1988).

Two different research streams can be identified focusing on the various aspects of servitization: servitization as a *trend* and servitization as a *strategy* (Alvizos & Angelis, 2010). The article of Wise and Baumgartner (1999) claims that there is a need for manufacturing firms to 'go downstream' within the supply chain in order to create new profit compulsion. This *trend* describes the efforts of firms to introduce services into their product offerings to gain competitive advantages (Neely, Benedettini, & Visnjic, 2011). The *strategy* aspect describes the long-term plan to transform the business from goods driven towards a service driven company. The main aim is to offer a holistic solution by providing integrated solutions that focus on customers' needs (Ahamed, Inohara, & Kamoshida, 2013; Neely et al., 2011). With this strategy, firms can stand out from their competitors and achieve a competitive advantage (Ahamed et al., 2013). The development of such offering bundles shapes the strategy of firms and their relationship to the customers (Vandermerwe & Rada, 1988).

Literature offers several classification schemes of servitization. Frambach, Wels-Lips, and Guendlach (1997) distinguish between the points in time of the service provision in relation to the sales of the product: *presale product services, sale product services*, and *postsale production services*. The typology according to Boyt and Harvey (1997) includes six indicating characteristics of a service (essentiality, replacement rate, complexity, credence property, personal delivery, and risk level) that classifies the service into *intricate (complex) service, intermediate service*, and *elementary service*. According to Mathieu (2001) and Tukker (2004), service offerings can vary its level of tangibility or the degree to which a service is related to a product. The main service categories include *product-oriented services* (e.g. spare parts), *use-oriented services* (e.g. pay per use, leasing), and *result-oriented services* (e.g. activity management/outsourcing, pay per service unit, and functional results). Later, the *use-oriented services category* was extended with further service models such as leasing, sharing, renting and pooling of products (Lay, 2014). Baines and Lightfoot (2013a) state that leading adopters of servitization apply the classification *base services, intermediate services,* and *advanced services*. Customers, who receive *base services,* want to own and repair their products (or assets) by themselves. Thus, they only rely on services such as supplying the good, spare parts, and warranty. In contrast, *intermediate services* are for customers who prefer to maintain some minor issues on their own (e.g. frequent oil and filter changes), but they want the manufacturer to take care of significant repair work and restoration. Examples of services offered could be scheduled maintenance, operator training, condition monitoring, or technical help-desk. *Advanced services* target customers who contract for capability offered through their use of a product, while the manufacturer takes care of everything else. Those services are defined by an outcome focused on capability delivered through the performance of the product and can contain customer support agreements, risk and reward sharing contracts, revenue-through-use contracts. According to Baines and Lightfoot (2013a), *advanced services* combine goods and services in order to offer a solution crucial to the customers' core business processes. *"These features: (1) performance incentives (i.e. penalties if the product fails to perform in service); (2) revenue payments structured around product usage (e.g. power-by-the-hour); and (3) long-term contractual agreements (i.e. five, ten, and fifteen years durations are common)"* (Baines & Lightfoot, 2013b, p. 2). Figure 1 illustrates all the classifications of servitization mentioned in this section.

Figure 1: Servitization Classification (Based on Tukker, 2004)



2.2.1.2. Drivers of servitization

According to Roy et al. (2009), *financial drivers*, *growth*, and *innovation* are the main motivations for companies to switch to a service-driven strategy. Higher profit margins and a steady income are the main *financial drivers*. Services are expected to gain higher margins than product sales for certain industries (e.g. automotive industry) (Roy et al., 2009). Additionally, product and service sales are countercyclical because service income typically follows production sales. Hence, service sales can make a considerable contribution to a steadier income. Due to the characteristics of services, it is harder to imitate them and therefore services represent a more sustainable competitive advantage (Roy et al., 2009). Furthermore, the intensified customer relationship through services can disclose important insights in customers' needs which can foster *innovation* and *growth* (Grönroos, 2015).

Baines and Lightfoot (2013a) elaborate drivers of servitization from various perspectives, namely: *economic perspective*, *environmental perspective*, *market and social perspective*, and *knowledge perspective*. The *economic perspective* focuses on the relocation of production to low-cost economies and servitization as an alternative strategy by exploiting the installed base of products through added services. As there are global concerns about consumption and resource efficiency, the *environmental perspective* indicates servitization as a positive impact on environmental sustainability by enabling dematerialization. The *market and social perspective* identifies products as creators of platforms for new services (e.g. Android Smartphone, Playstore platform and Apps), whereas desires for ownership and hyper-consumption can challenge servitization. The *knowledge perspective* focuses on the companies' increasing awareness of value co-creation with customers and differences between services and manufacturing operations. Furthermore, companies are more and more aware of how to deliver efficient product-centric services and the potential for sustainable business models through product-centric services. The perspectives by Baines and Lightfoot are also in line with the rationales of Neely (2012). While economic drivers and sustainability drivers equal the economic perspective and environmental perspective of Baines and Lightfoot, the market drivers focus on customer's needs such as seeking for flexibility, risk sharing and focusing on core competencies (Baines & Lightfoot, 2013a; Nieuwenhuis, 2015).

2.2.1.3. The transition from a good dominant logic into a service dominant logic

With the emergence of the phenomenon of servitization Vargo and Lusch (2004a) highlighted the shift from a GD logic into an SD logic (Lay, 2014). According to Vargo and Lusch (2004a), the GD logic focuses on the exchange of operand resources (e.g. raw materials), whereas SD logic focuses on the action of operant resources (e.g. knowledge and skills). In SD logic, Vargo and Lusch distinguish between service and services. Service is defined as the utilization of competencies for the benefit of another party (i.e. customer or partner). The definition of services was grounded mainly in the activity of marketing (Vargo & Lusch, 2008). Understanding that the clients rather buy the service capabilities and, therefore, the need to develop collaborations with customers resulted from the business-to-business (B2B) marketing. Later Vargo and Lusch (2008) provided the ten foundational premises of SD logic that are cited in Table 1.

Table 1: The ten foundational premises of SD logic (Vargo & Lusch, 2008, p. 7)

(Nr.) Foundational premise	*Author's Explanation of Foundational premises*
1. Service is the fundamental basis of exchange	The application of operant resources (knowledge and skills), "service," as defined in SD logic, is the basis for all exchange. Service is exchanged for service.
2. Indirect exchange masks the fundamental basis of exchange	Because service is provided through complex combinations of goods, money, and institutions, the service basis of exchange is not always apparent.
3. Goods are a distribution mechanism for service provision	Goods (both durable and non-durable) derive their value from use – the service they provide
4. Operant resources are the fundamental source of competitive advantage	The comparative ability to cause desired change drives competition.
5. All economies are service economies	Service (singular) is only now becoming more apparent with increased specialization and outsourcing.
6. The customer is always a co-creator of value	Implies value creation is interactional.
7. The enterprise cannot deliver value, but only offer value propositions	Enterprises can offer their applied resources for value creation and collaboratively (interactively) create value following acceptance of value propositions, but cannot create and/or deliver value independently.
8. A service-centered view is inherently customer oriented and relational	Because service is defined in terms of customer-determined benefit and co-created it is inherently customer oriented and relational.

9. All social and economics actors are resource integrators	Implies the context of value creation is networks of networks (resource integrators)
10. Value is always uniquely and phenomenologically determined by the beneficiary	Value is idiosyncratic, experiential, contextual, and meaning-laden.

The SD logic is a way of reflecting how the economic world works rather than a theory (Vargo, 2011). The essence of the SD logic is that all exchange is based on service. The goods are involved as tools for the delivery and application of resources. The beneficial application of operant resources results in value, which is co-created through the combined efforts of employees, firms, customers, and stakeholders (Vargo & Lusch, 2008; Wu, Li, & Che, 2015). *"According to S–D logic, only the customer can assess value and always co-creates value. Stated alternatively, value is not obtained in the economic exchange of market offerings but rather through their use and within a context"* (Lusch, Vargo, & Tanniru, 2010, p. 21). Cloud Computing can be seen as an illustrative example of IT (supplier of software tools). Customers do not obtain value from acquiring software but from using software tools for business purposes. This is the basic principle for e.g. SaaS in which remote access to software via the internet allows service to be provided on demand (Lusch et al., 2010).

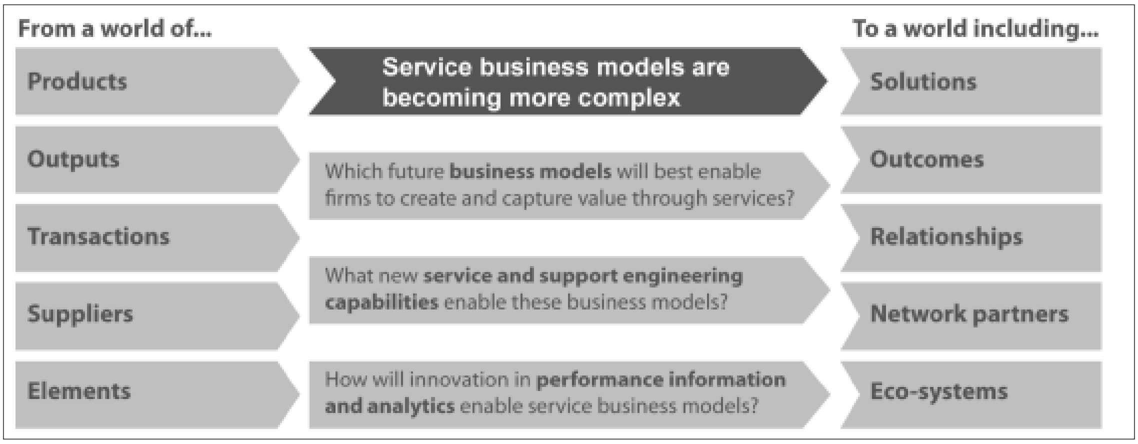
In the article 'Value co-creation in service logic: A critical analysis' by Christian Grönroos (2011), the author criticizes that when all types of resources are used as service and transmit a service, it is a service logic rather than a logic dominated by service. Hence, all kinds of resources aim to provide service which supports or assists to customers' practices. Consequently, "*(...) when adopting a service perspective on business according to which all kinds of resources are used as service, the traditional distinction between goods and services or service as activities is not meaningful"* (Grönroos, 2011, p. 284). Moreover, Grönroos (2011) claims that it is more appropriate to distinguish between *"goods as outputs of production processes and services or service activities as interactive processes that lead to an outcome"* (p. 284) as well as goods production and service production. Furthermore, the author criticizes the statement 'the customer is always a co-creator of value' and investigated the creation of value more precisely. According to Grönroos (2011), the customer creates value independently in the first place, while the provider offers value facilitation by developing, designing, manufacturing and delivering resources required by the customer. With the interaction between the provider and the customer, the value is co-created and the provider becomes a co-creator of value. In order to understand the complexity of value creation and the opportunities offered to business and marketing by adopting the service logic, one has to take into account the interaction construct between the service provider and customer. Moreover, the author provides reformulations of the premises of SD logic (see Grönroos, 2011, p. 293). In line with Grönroos' critique of SD logic, Campbell, O'Driscoll, and Saren (2013) argue that operant resources do not act alone. In fact, operant resources are conjunct with operand, material resources. Furthermore, to view operant resources as superior to operand resources leads to under-valued and underdeveloped meaning of the interrelationship between the two types of resources.

2.2.1.4. The transformation into a service business

According to literature, the infusion of services into the business of a manufacturing firm can be challenging. According to Gebauer, Fleisch, and Friedli (2005), merely investing into service extension increases the costs and service offering, but corresponding returns fail to appear. The limitation of servitization was described with the term *service paradox* (Gebauer et al., 2005). The *service paradox* illustrates that just adding services to the core product offering is not a sustainable servitization strategy (Neely et al., 2011).

Scholars have investigated the obstacles of transferring from product value creation to service value creation. Neely (2008) has clustered challenges of servitization into the three categories *shifting mindsets*, *timescales*, and *business model and customer offering*. The call for *shifting the mindsets* is directed to the sales and marketing department as well as the end-customer (shifting from selling/ owning products to service contracts, switching from transactional to relational marketing). The t*imescale* is about the handling of contractual problems by developing long-term service relationships including the evaluation of long-term risks. The category *business model and customer offering* leads to customer-oriented solutions by understanding the clients' needs, the creation of new service related capabilities and the promotion of a service culture. Furthermore, Neely et al. (2011) highlighted that service business models are becoming more complex by shifting from a world of products to the world including solutions (see Figure 2). Overall, literature provides very similar descriptions of servitization challenges with different wordings (see e.g. Hou & Neely, 2013; Lerch, 2014; Nudurupati, Lascelles, Yip, & Chan, 2013; Saccani & Perona, 2014).

Figure 2: Describing the shift to services (Neely et al., 2011, p. 3)



Grönroos (2015) critically elucidates the transformation into a service business and highlights the ineffectiveness of a step by step approach. According to Grönroos (2015), the only option to maintain a sustainable competitive advantage is the adoption of a service perspective by strategically transforming into a service business. However, a service-focused mission, service business-based strategies, and a service culture need to be developed and applied in the entire firm. The author clearly warns of adopting service logic only in some departments successively:

> *"This is servitization (...) without reaching the ultimate goal, a true service business. To achieve a sustainable competitive advantage the entire firm, including its manufacturing part and service part, has to adopt a service logic and become a service business where the manufacturing and service operations are integrating into one business."* (Grönroos, 2015, p. 468).

Consequently, an organization has to offer customers value-supporting processes which include a set of resources (physical products, services, people, systems, and information). In interactions with customers' resources, the supplier encourages clients' processes. By doing this, the value is created in the customer's business process *"(...) in the form of a better revenue-generating capacity over time, lower costs of being a customer over time (lower relationship costs), or both, and eventually improved profits"* (Grönroos, 2015, p. 469). Additionally, Grönroos (2015) emphasizes the importance of interlinked and synchronized processes between supplier and customer. The processes on both sides need to be linked so that the supplier's activities match with the requirements of the associated process in order to create value on the customer's side. Therefore, the supplier and customer need to function together, share information and possibly do joint planning (Grönroos, 2015).

2.2.2. Cloud Computing

The fast-growing Cloud Computing technology is going to establish itself in the IT industry and business. It promises reliable software, hardware, and infrastructure provided as a service via the internet and remote data centers (Armbrust et al., 2009; Hashem et al., 2015; Hoberg, Wollersheim, & Krcmar, 2012). Those services have become an effective way to execute complex comprehensive computing tasks and cover a variety of IT functions from computation and storage to database and application services (H. Liu, 2013). This model enables users to apply the computer resources without worrying about technical issues such as installation, updates, version requirements, operating systems, or memory capacity (Ojala & Tyrväinen, 2011). Therefore, Cloud Computing is not only a relevant technology for commercial organizations but also for scientific applications (Hashem et al., 2015). Due to the lack of available computing facilities in local servers, decreased capital costs and the growing volume of data more and more scientific applications for wide-ranging experiments are deployed in the Cloud (Nepal & Pandey, 2015; Sadooghi et al., 2015). Table 2 indicates the research streams of Cloud Computing (Hoberg et al., 2012; Yang & Tate, 2012).

Table 2: Research streams of Cloud Computing (Based on Hoberg et al., 2012; Yang & Tate, 2012)

Topics	*Sample of subtopics / research questions*
Adoption	Cloud adoption of SMEs, Return on Investment (ROI), the benefit of adoption, tools for buy-or-lease storage decision; What are the determinants of Cloud adoption?
Business Issues/ Impact	Cost, legal issues, ethical issues, governance, pricing, privacy, trust; What is the organizational impact of Cloud services?
Characteristics	Technical realization, definition, cultural change; What are the characteristics of Cloud computing?
Conceptualizing	Foundational, predictions, definition, key features, benefits and obstacles, potential implications; What are economic prospects of Cloud Computing?
Domains and Applications	e-Government, education, mobile computing, open source, e-Science; What are fields of applications of Cloud Computing?

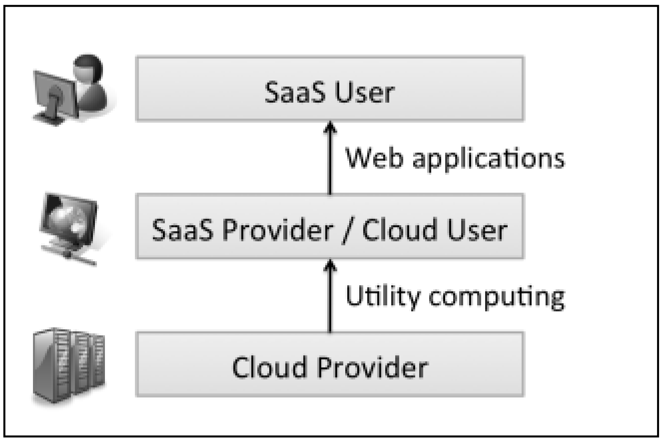
2.2.2.1. Definition of Cloud Computing

Cloud Computing is able to shape the way towards a newly designed IT hardware which can be supplied via a service model (Armbrust et al., 2009). It utilizes the resources virtualization approach to deliver on-demand IT services (Software, Hardware, and Infrastructure) via the Internet (Chou, 2015). The National Institute of Standards and Technology (NIST) provide an often cited definition of Cloud Computing:

> "*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"* (Mell & Grance, 2011, p. 2)

Several research papers provide their own definition of Cloud Computing, but the definition of NIST can be seen as the most compact and encompassing approach. It includes several aspects such as the different service categories and essential characteristics. However, Armbrust et al. (2009) highlights the differences between 'the Cloud', which includes the data center's hardware and software, and the actual service 'SaaS'. The Cloud is managed by the *Cloud Provider* and is delivered to the *Cloud User*. This service is called *Utility Computing*; popular services of *Utility Computing* are Amazon Web Services, Google AppEngine, and Microsoft Azure. The *Cloud User* or *SaaS Provider* offers web applications via the Cloud to the *SaaS User*. Thus, according to Armbrust et al. (2009), Cloud Computing is the sum of *Utility Computing* and *SaaS*. An overview of the definition of Armbrust et al. (2009) is illustrated in Figure 3Figure 3.

Figure 3: Overview of Cloud Computing according to Armbrust et al. (2009, p. 5)



One can criticize that the differentiation of *Cloud Provider, SaaS Provider,* and *SaaS User* is not always that simple (e.g. Microsoft Azure provides the infrastructure and web application). Therefore, NIST goes beyond a general definition of Cloud Computing by differentiating between categories of services (Mell & Grance, 2011):

- ***Software as a Service (SaaS):*** The provider's application runs on a Cloud-based infrastructure which is accessible from several end-user devices through a client interface (e.g. web browser) or program interface via an application programming interface (API) (e.g. Google Docs, Gmail, Salesforce.com. and Online Payroll). The consumer does not manage the Cloud infrastructure except for specific application configuration settings. Examples for SaaS are the application for document management, collaboration, content management, billing, sales, and human resources. *"SaaS consumers can be billed based on the number of end users, the time of use, the network bandwidth consumed, the amount of data stored or duration of stored data." (F. Liu et al., 2011, p. 6)*

- ***Platform as a Service (PaaS):*** The consumer uses the platform for running, testing, or offering applications using programming languages, libraries, tools and other services supported by the provider (e.g. Google Apps Engine, Force platform, and Microsoft Azure). The consumer does not manage the Cloud's infrastructure except for specific deployed applications and configuration settings for the environment. Examples for PaaS are services concerning development and testing, integration, application deployment, databases, and business intelligence. "*PaaS consumers can be billed according to, processing, database storage and network resources consumed by the PaaS application, and the duration of the platform usage."* (F. Liu et al., 2011, p. 6)

- ***Infrastructure as a Service (IaaS):*** Storage, networks, processing, and other fundamental computing resources can be used to run arbitrary software (i.e. operating systems and applications). Popular IaaS providers are e.g. Amazon's EC2 and Flexiscale (Hashem et al., 2015). The consumer does not manage the Cloud infrastructure but controls storage, deployed applications, operating systems, and selected configurations of network settings. Examples for IaaS are services for platform hosting, computing, backup and recovery, and storage. *"IaaS consumers (...) are billed according to the amount or duration of the resources consumed, such as CPU hours used by virtual computers, volume and duration of data stored, network bandwidth consumed, number of IP addresses used for certain intervals."* (F. Liu et al., 2011, p. 6)

Besides the Cloud Computing categories, the NIST differentiates between several deployment models (Mell & Grance, 2011):

- ***Public Cloud:*** Cloud infrastructure is available for the general public and is managed by an organization selling Cloud services (e.g. Amazon Web Services, Microsoft Azure, etc.). The Cloud exists on the premises of the *Cloud Provider*.

- ***Private Cloud:*** Cloud infrastructure is mostly based on internal data centers of a certain venture and thus provisioned for a single organization. A private Cloud may be managed and operated by the organization (on-site private Cloud), a third party (outsourced private Cloud), or some combination of them. According to Armbrust et al. (2009) and Chen et al. (2015), the term Cloud Computing normally does not include private Clouds, because it particularly refers to data centers of an organization that are not made available to the public.

- ***Community Cloud:*** Cloud infrastructure is provisioned by a conglomerate of organizations with shared interests (e.g. Universities). It may exist on-premise or off-premises, and it may be owned and managed by one or more community members or a third party Cloud Provider.

- ***Hybrid Cloud:*** A composition of two or more bounded Cloud infrastructures (private, community, or public). The Cloud infrastructures remain separate entities but are bounded by standardized technology that allows data and application portability.

According to NIST, a Cloud infrastructure enables five essential characteristics (Mell & Grance, 2011):

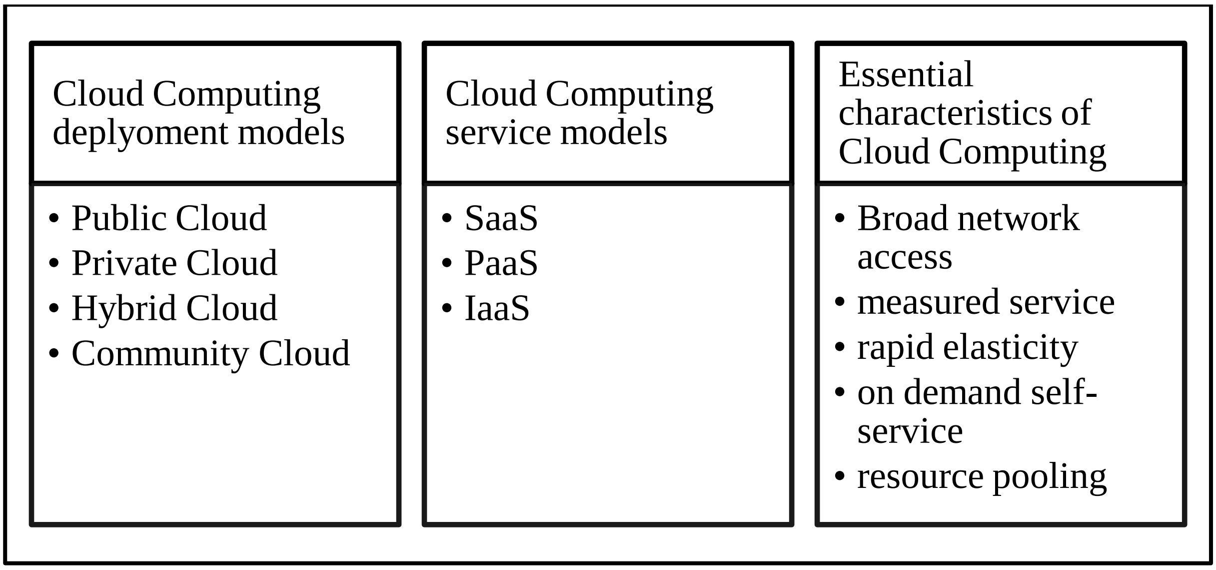
- ***On-demand self-service:*** Without requiring human interaction with each service provider a consumer can automatically obtain as much computing capabilities as needed.
- ***Broad network access:*** The computing resources are available via the network and accessed through standards by mixed thin or thick client platforms (e.g. mobile phones and workstations).
- ***Resource pooling:*** In order to serve multiple consumers the provider's computing resources are shared including different physical and virtual resources which are dynamically assigned according to consumer demand. However, except for some specification at a higher level of

abstraction, such as country, state, or data center, the customer generally has no control or information over the exact location of the resources (location independence).

- ***Rapid elasticity:*** Capabilities can be elastically obtained and released to scale rapidly outward and inward appropriate to demand. From the customer perspective, the available capabilities often appear to be unlimited and can be gained at any time.
- ***Measured service:*** Cloud systems optimize resource usage by leveraging the capabilities suitable for the type of service (e.g. storage, processing, bandwidth, and active user accounts). The service is monitored which enables transparency for both the provider and consumer.

Figure 4 summarizes the essential elements of Cloud Computing according to NIST.

Figure 4: Essential elements of Cloud Computing according to NIST



2.2.2.2. Benefits and concerns of Cloud Computing

Benefits and concerns regarding Cloud Computing are well documented in the literature. According to Sultan (2014), advantages of Cloud Computing can be categorized into *cost and efficiency* and *environmental factors*. Regarding *cost and efficiency* Sultan (2014) highlights the access to the latest technology in terms of software and hardware at affordable costs on a pay-as-you-go basis. Researchers particularly mention startups, small to medium enterprises (SMEs), and educational establishments as especially interested in Cloud-based software solutions (see e.g. Garverick, 2014; Marston et al., 2011; Sultan, 2011; Sultan, 2014). Nevertheless, the *cost and efficiency* aspect of Cloud Computing is controversially discussed in the literature. Investigations have shown that in the long term SaaS can be more expensive to operate than buying and running on-premise infrastructure due to the acquisition and on-going costs that are related to volume of storage, CPU units, RAM, and network bandwidth (see e.g. Garg, Versteeg, & Buyya, 2013; Mastelic et al., 2015). In that regard, Cloud Computing provider follow different pricing models e.g. Amazon Cloud offers small units (Virtual Machines) at a *"lower cost than Rackspace but the amount of data storage, bandwidth, and* *compute units are quite different between two providers"* (Garg et al., 2013, p. 1015) Based on this literature review one can notice that there is no general answer to the *cost and efficiency* aspect, as it depends on the customer's situation and case (e.g. the existing infrastructure, the kind of service, the volume of data, the term of payment). In the case of a leading emergency and hospital medicine management company in the US (Schumacher Group) it takes a three-year return on investment (ROI) period to break even (Brooks, 2010). Schmacher's CTO assumes that the average lifecycle of data center hardware is three years, at this point, companies will just continue to pay operational costs instead of reinvest capital into new hardware (Brooks, 2010).

Sultan (2014) and Chou (2015) highlight, besides economic benefits, also *environmental benefits* improving environmental sustainability by reducing companies' electricity consumption which entails minor carbon footprints. From 1990 until today, the global power consumption increased by 100 percent from 10.000 TWh (1 TWh = 1 billion kWh) to 20.000 TWh and is estimated to increase to 40.000 TWh by 2040 (EIA, 2013). Therefore, *"the European Commission pointed out energy efficiency as the most cost effective way for achieving long-term energy and climate goals"* (Mastelic et al., 2015, p. 3). On a regional level, the EU Energy Using Products Directives intend to decrease the environmental impact caused during the whole product life-cycle of a very wide range of goods (Sultan, 2014). Information and Communications Technology (ICT) has been discovered as one of the major energy consumers through manufacture, use, and disposal (Advisory-Group, 2008; Lefèvre & Pierson, 2009). Thus, efficient ICT is recognized as an important instrument for achieving the European Commission's goals (EU, 2010). Researchers assume that the total energy consumption will decrease due to centralized computing resources through Cloud Computing. Recently, in their quantitative research Schniederjans and Hales (2016) found evidence that Cloud Computing not only significantly improves collaboration within the supply chain and economic performance, but also environmental performance. Thus, Cloud Computing creates benefits for our society by contributing to the green IT movement (Chou, 2015). More precisely, Williams and Tang (2013) indicated with their research that *"Cloud Computing was more energy efficient for software services that use high levels of processing, storage, or those that require constant uptime but relatively low data transfer sizes"(p. 6).* One can recognize that Cloud Computing is in line with the environmental perspective and sustainability drivers of servitization.

An overview of benefits and concerns as well as their related literature are collected in Table 3 which were extended based on the research of Chauhan and Jaiswal (2015).

Table 3: Overview of benefits and concerns (Based on Chauhan & Jaiswal, 2015)

Category	*Characteristics of Cloud Services*	*Examples from literature*
Benefits	Economic benefit (capital expenditure (Capex) change to operational expenditure (Opex) / no investment into assets)	Armbrust et al. (2010); Boillat and Legner (2013); Catteddu and Hogben (2009); Lin and Chen (2012); Marston et al. (2011)

	Reduction in maintenance cost	Lin and Chen (2012); Peng and Gala (2014); Sahandi, Alkhalil, and Opara-Martins (2013)
	Scalability and dynamic provision of resources	Armbrust et al. (2010); Boillat and Legner (2013); Catteddu and Hogben (2009); Lin and Chen (2012); Marston et al. (2011)
	Elimination of depreciation cost	Armbrust et al. (2010)
	Fast availability of new technology	Armbrust et al. (2010); Choudhary (2007); Sultan (2014); Weng and Hung (2014)
	Transfer of risk	Armbrust et al. (2010)
	Delivered independent of location	Marston et al. (2011)
	On demand service	Armbrust et al. (2010); Boillat and Legner (2013); Lin and Chen (2012); Marston et al. (2011); Mell and Grance (2011)
	Lowers barriers to innovation	Marston et al. (2011)
	Development of new applications, for e.g. mobile interactive applications, or business analytics that use vast amount of computer resources	Marston et al. (2011)
	Mobility and Flexibility	Al-Johani and Youssef (2013); Hayes (2008); Peng and Gala (2014)
	Agile development environment (PaaS)	Lin and Chen (2012)
	System speed and performance	Peng and Gala (2014)
	Increasing computing capacity and IT efficiency	Sahandi et al. (2013)
	A much greener way of managing IT	Chou (2015); Sahandi et al. (2013); Schniederjans and Hales (2016); Sultan (2014)
	Improvement of collaboration within the supply chain	Schniederjans and Hales (2016)
	Business continuity, regular backups, and disaster management	Sahandi et al. (2013)
Concerns	Security concerns	Catteddu and Hogben (2009); DaSilva et al. (2013); Garg et al. (2013); Garverick (2014); Lin and Chen (2012); Pussep et al. (2013); Rittinghouse and Ransome (2016); Sahandi et al. (2013)
	Policy and organizational risks (e.g. vendor and data lock-in, loss of governance, intra-Clouds migration)	Catteddu and Hogben (2009); Grubisic (2014); Lin and Chen (2012); Rittinghouse and Ransome (2016); Sahandi et al. (2013)
	Technical risks (e.g. data leakage, loss of data)	Catteddu and Hogben (2009); Lin and Chen (2012)
	Legal risks (e.g. data protection and software licensing)	Catteddu and Hogben (2009); Low, Chen, and Wu (2011)
	Unexpected system downtime (unavailability of services)	Sahandi et al. (2013)
	Compatibility with existing values	Low et al. (2011)
	Complexity	Low et al. (2011)
	Lack of internal staff expertise	Sahandi et al. (2013)
	Uncontrolled variable cost	Sahandi et al. (2013)
	Cost and difficulty of migration (e.g. legacy systems)	Sahandi et al. (2013)
	Technology has not been proven	Sahandi et al. (2013)

2.2.3. Cloud Computing as the service infusion in the IT industry

Cloud Computing represents the servitization of the IT sector (Sultan, 2014; Wu et al., 2015). However, the introduction of services is nothing new for ICT. For example, the strategic realignment of IBM in the 1980s and 1990s constitutes the endeavor to follow the SD logic. During that time, IBM faced many challenges such as loss of revenue, crashing stock price, a loss of control of the personal computer business, and the changing mainframe industry. IBM had started as a hardware production company and reinvented itself as a provider of business solutions by moving down the value chain (Ahamed et al., 2013). These solutions include customer focused packages containing both goods and services (e.g. implementation services, enterprise software, financing, and consulting) (Ahamed et al., 2013). Down to the present day, IBM has always successfully reinvented their strategy by adding more and more solution packages involving value-adding services to their business portfolio (Maney, Hamm, & O'Brien, 2011). Nevertheless, the emergence of Cloud Computing in the IT industry represents a new paradigm of servitization (Sultan, 2014).

According to the presented definition in chapter 2.2.1.1., servitization generates new business models which result in new income and creates value for the customer. This is realized by providing pure services (realized through a company’s knowledge, skills, and capabilities) or a mixture of products and services, whereas, Cloud Computing is a physical product transformed into a service (Sultan, 2014). This is also in line with Qing and Chun (2010) who argue that Cloud Computing rather transforms software, hardware, and infrastructure into services provided over the internet. According to Vargo and Lusch’s foundational premises of SD logic, services are not seen as an alternative to physical products. Furthermore, the SD logic focuses on the action of operant resources (e.g. knowledge and skills), whereas, Cloud Computing is about providing physical resources as a service to the customer. Additionally, in contrast to the focus on output (Neely et al., 2011), in the SD logic, the value is co-created with the customer. Cloud Computing, therefore, does not fully reflect the core assumptions of the SD logic. In fact, the literature criticizes the limited relevance of the SD logic only for managerial activities especially for marketing (Sultan, 2014; Vargo & Lusch, 2006). Nevertheless, the consumption-based pricing model that comes with SaaS, PaaS, or IaaS results in a collaborative process with the customer, which is in the broadest sense the core idea of SD logic (Leimeister, Winkler, & Xiao, 2016). According to Leimeister et al. (2016), the collaboration of providers, customers, and partners results in value creation and co-creation for the whole ecosystem which is also in line with the SD logic (Vargo & Lusch, 2008). Furthermore, the provider of Cloud Computing services built ecosystems (especially in the case of PaaS) that is in line with the description by Neely et al. (2011) (see Figure 2). Moreover, Cloud Computing not only transforms the physical product into a service but also enables new benefits for both provider and customer (see Table 3).

By screening Cloud Computing with the meaning of servitization, one can recognize that Cloud Computing represents a special case of service infusion. In contrast to traditional servitization that adds services to an existing physical product, Cloud Computing transforms a whole physical product into a service. Vargo (2011) has already adjusted that the SD logic is rather a way of reflecting how the economic world works than a theory. Although the SD logic follows several contradicting approaches, Cloud Computing fulfills the core ideas of being service centric. However, the SD logic needs to be expanded with the upcoming possibilities enabled by Cloud Computing. Considering the critique of SD logic by Grönroos (2011) (see chapter 2.2.1.3.), the distinction between operand and operant resources as well as service and services becomes inappropriate. Moreover, the provider acts as a value facilitator by offering resources of any kind which fits more sufficient Cloud Computing. However, one needs to take into account that Grönroos rather focus on SD logic than on servitization.

2.3. Enterprise software

This section describes why enterprise software differentiates into other software products. Moreover, it will be explained why the Cloud-based enterprise software is a special case and needs more investigation. Therefore, the term enterprise software is defined, its characteristics are presented, and the meaning of Cloud-based enterprise software is illustrated. However, the description's focus is rather on the functionality of enterprise software than on technical construction.

2.3.1. Definition of enterprise software

The term enterprise software does not stand for a single software solution. It describes a collection of business software applications, tools for modeling organizational processes, and development tools. By providing business logic functionality, those software solutions aim to solve enterprise-wide problems as well as improve productivity and efficiency in order to gain a significant competitive advantage. Therewith, enterprise software aims rather a Business-to-Business (B2B) market than a Business-to-Consumer market (B2C), because there is no benefit to purchase such a product in a private setting. Vendors offered mainly standalone solutions for single functions in the past. Nowadays, vendors often sell a solution platform, which might contain several modules, for multiple functionalities. The research article of Boillat and Legner (2013) provides a general definition of enterprise software:

> *"Enterprise software comprises all software applications that companies use to support their core business process operations, such as enterprise resource planning (ERP), customer relationship management (CRM), or supply chain management (SCM) systems"* (Boillat & Legner, 2013, p. 41).

Another aspect is the huge amount of data that is created through the business processes and needs to be stored in and used by the enterprise software applications. This aspect is the focus of the following definition:

> *"Enterprise applications are about the display, manipulation, and storage of large amounts of often complex data and the support or automation of business processes with that data"* (Fowler, 2002, p. 6).

Similar to the different business functions and processes of a company, there are several industry standards of enterprise software types that are listed in Table 4 (Kees, 2015). Each type represents an autonomous system, but often the interaction between several systems is reasonable and necessary (Beal, 2013). Therefore, many enterprise solutions provide interfaces to enable connection to other enterprise software. This is possible through e.g. Lightweight Directory Access Protocol (LDAP) which is an open industry standard application protocol for accessing *directory services* in a network. *Directory services* allow the sharing of information about users, services, systems, and applications throughout a network (Beal, 2013). This is why functions of enterprise software may overlap as well as software vendors offer packages including several systems.

Table 4: Types of enterprise software solutions

Enterprise Software Types	*Description*
Accounting software	The tasks of this system are the recording and processing of accounting transactions within functional modules (e.g. accounts payable, payroll, accounts receivable and trial balance) (Moscove, Simkin, & Bagranoff, 1998).
Business Intelligence (BI)/ Analytics	*"BI is a broad category of applications, technologies, and processes for gathering, storing, accessing, and analyzing data to help business users make better decisions"* (Watson, 2009, p. 491). This technology emerged in the 1970s as *Decision Support Systems* and evolved to *Business Intelligence* (in the 1990s) due to improving the efficiency of data storage and compute power. The term *analytics* came up in the year 2010 and means data analysis applications. It uses intelligent algorithms (e.g. machine learning, neural networks) to analyze data (Watson, 2014). The 'output' of such a system is typically presented to the user through a report or dashboard.
Business process management (BPM)	According to Gartner, BPM is *"the discipline of managing processes (rather than tasks) as the means for improving business performance outcomes and operational agility. Processes span organizational boundaries, linking together people, information flows, systems and other assets to create and deliver value to customers and constituents."* (Gartner, 2014). BPM activities traditionally follow a BPM life-cycle (process design, modeling, execution, monitoring, and optimization) that aims the continuous improvement of business processes (Scheer & Nüttgens, 2000).
Content management system (CMS)	According to Hagenhoff (2014), CMS is a software application that supports the content management of e.g. websites. Typically, CMS includes three different modules: *editorial system* (editing and managing the content) (1), *content repository* (storing the content) (2), and *publishing system* (publishing the content) (3) (Hagenhoff, 2014).
Customer relationship management (CRM)	The CRM approach focuses on establishing, maintaining, and enhancing long-term customer relationships following the relationship marketing theory (Morgan & Hunt, 1994). *"CRM technology is a suite of information technology-based solutions designed to support the customer relationship management process"* (Jayachandran, Sharma, Kaufman, & Raman, 2005, p. 3). Therefore, the system compiles information about customers from different communication channels such as email, social media, websites, and telephone. By using a CRM

	system, sales and marketing departments can efficiently organize their activities and drive sales growth (Jayachandran et al., 2005).
Enterprise resource planning (ERP)	ERP provides a historical and often real-time view of core business processes. According to Umble, Haft, and Umble (2003), ERP provides two major benefits: *"(1) a unified enterprise view of the business that encompasses all functions and departments; and (2) an enterprise database where all business transactions are entered, recorded, processed, monitored, and reported"* (pp.241). An ERP system is a highly complex information system and typically consists of several modules which can be customized depending on the user's requirements. Therefore, the implementation process is a challenging and high-cost proposition that places enormous demands on corporate time and resources. In fact, many ERP implementations have not achieved predetermined corporate goals and, therefore, have been classified as failures (Umble et al., 2003). Umble et al. (2003) highlighted nine critical factors for successful ERP implementation (see p. 244). ERP modules fulfill different functions and can be classified into the categories *Financials*, *Human Resources*, *Operations & Logistics, and Sales & Marketing* that are divided into many sub-categories (e.g. asset accounting, personal planning, inventory management, order management). However, to efficiently implement and run a module, a high level of expertise is needed, which is often sourced from third-party providers (Boillat & Legner, 2013).
Master data management	According to Kees (2015), a master data management system represents a common data source of all enterprise software solutions within a firm. It contains the critical data of an organization such as reference data (business objects for transactions) and analytical data (for decision making). This system assures that data (e.g. data about a customer serviced by several production lines) stays consistent for several systems. Therefore, the system collects, matches, consolidates, deletes duplicates, checks the quality, and distributes the data throughout an organization. By doing that, a master data management system aims to provide a 'trusted single version of the truth' that is the base of the user's decisions (Kees, 2015).
Supply chain management (SCM)	SCM software comprises tools used to support supply chain transactions, manage supplier relationships, and control related business processes. This includes e.g. customer requirement processing, inventory management, supplier management and sourcing, goods receipt, warehouse management, and purchase order processing (Tanner, Wölfle, Schubert, & Quade, 2008). Moreover, an important aspect of SCM software is the ability to sufficiently balance the supply and the demand of the product to avoid production shortage or production surplus. Therefore, SCM optimizes business processes and uses consumption analysis to plan future needs (Jüttner, 2005). Additionally, SCM can improve the order handling through communication systems, such as electronic data interchange (EDI), that convey requirements more rapidly to the supplier (Monczka, Handfield, Giunipero, & Patterson, 2015).

There is a high demand for business software solutions due to ever evolving business requirements and technology, which results in an increasing number of enterprise software vendors. According to an annual survey of Pang (2016), the worldwide top five enterprise software vendors measured on their product revenues in 2015 were Microsoft (14 percent market share), Oracle (9 percent market share), IBM (7 percent market share), SAP (6 percent market share), and EMC (4 percent market share). In that regard, it should be mentioned that the listing by Pang (2016) also includes revenues from platform and infrastructure products related to enterprise software, which make up $127 billion USD (e.g. databases and information management systems, middleware and development tools, storage and security software, and virtual machines) (Pang, 2016). In 2015, the global spending for enterprise software was approximate $343.5 billion USD, which is expected to grow in 2016 by 7.0 percent to $367.5 billion USD (Gartner, 2016). As many companies upgrade their core functionalities, the global spending on enterprise software is also anticipated to grow in the next five years. This rising trend can mostly be explained by the replacing, modernizing, and functionally expanding of current applications with Cloud-based technology (Sudip, 2016). Recently, especially Big Data, respectively Business Intelligence, has created an awareness of its potential in many industries such as automobile insurance, telecommunications, manufacturing distribution and retail, and transportation and logistics (Pang, 2016). Nevertheless, CRM exceeds all enterprise software types in projected revenue growth, showing a compound annual growth rate (CAGR) of 15.1 percent from 2012 to 2017 (Loten, 2015).

2.3.2. Characteristics of enterprise software

The literature review has shown that research on characteristics of enterprise software is rather rare. Kees (2015) indicates enterprise software by using the morphological method according to Zwicky. However, one can criticize that the author's morphological scheme for enterprise software rather describes several classifications than characteristics of enterprise software (e.g. maturity, target group, technology, dissemination). For this research, it is important to highlight the complexity and requirements for such a technological system. Therefore, this chapter mainly derives characteristics of enterprise software based on the description of its functionality and range of application which contributes to the IS literature.

As the previous chapter (2.3.1.) has already explained enterprise software includes the handling of a high volume of business-related data. Therefore, enterprise software demands excessive data storage. Additionally, enterprise software is affiliated with fundamental business processes, which shows a high dependency of organizations on such a system. This dependency affects several business levels of a company like the strategic decision making process (e.g. sales growth reports) and the daily business processes (e.g. purchasing, order processing). Therefore, the enterprise software application needs to be especially reliable and available. As the data is critical regarding running the business and business secrets, both IT security measurements (i.e. data, hardware, software, user access, and sabotage) as well as maintenance concepts need to be established. In addition to that, each company follows its own processes depending on its industry, business model, and company size. This is why many enterprise software systems provide preconfigured best practices and are customizable to support clients' processes. Often those applications are interconnected with other applications or systems in which interfaces often follow an industry standard or can be developed using an open standard (e.g. LDAP to directory services). In contrast to a single-user application which is executed on a user's personal computer, enterprise software is hosted on servers and supplies simultaneous access to a variable number of users via a network.

As this overview of characteristics of enterprise software shows, many aspects have to be taken into account, which require deep knowledge and expertise regarding technology, applying the software, business processes, and industry standards. Thus, the implementation of enterprise software is often realized through the expertise from specialized third-party providers. Many Value-added Resellers are specialized in the implementation and technical support of enterprise software and possess valuable knowledge and skills. Therefore, the distribution of such a complex software solution is traditionally realized through VARs (Hedman & Xiao, 2016; Rebsdorf & Hedman, 2014). The VAR's activities regarding on-premise enterprise software typically include selling, installation, technical consulting, training, modification, and customization of the software at the clients' organization (Sarker et al., 2012). A VAR has personal contact with the end-customers and possesses industry-specific expertise. Thus, the role of the VAR is important for the customers' satisfaction and respectively for the overall success of the product (Boillat & Legner, 2013). This is why in the past many enterprise software vendors (e.g. Microsoft, SAP, Oracle) introduced partner programs to reinforce the relationship to their partners (Hedman & Xiao, 2016).

2.3.3. Cloud-based enterprise software

Cloud computing is considered to be a further evolutional step in the history of enterprise software (Luoma & Nyberg, 2011). While on-premise enterprise software is prevailing, which requires the firm to install and operate the enterprise software in its local IT environment; Cloud-based enterprise software presents an aspiring alternative. Enterprise software vendors advertise their Cloud-based products to fulfill the same functionality as the on-premise product but differentiate in the sourcing approach. Prior research on Cloud Computing and enterprise software has increasingly investigated and focused on SaaS and the user's perspective (Boillat & Legner, 2013). Moreover, Cloud-based technology significantly raises the forecasts of the enterprise software market growth (Loten, 2015; Pang, 2016; Sudip, 2016). Cloud-based enterprise software removes the need and cost of retaining specific technical expertise in-house and reduces deflection from an enterprise's main focus. Furthermore, it provides controlled IT budgeting (Catteddu & Hogben, 2009). Together with Cloud Computing, the possibility of enterprise mobility solutions emerges, which enables access to enterprise software applications from everywhere via mobile devices such as smartphones and tablets (Kietzmann et al., 2013). In fact, more and more software and hardware solutions are transferred to and offered by a Cloud-based technology (EMC, 2016; Pussep et al., 2013). Moreover, the big players of ERP such as Oracle, Sage, SAP, and Microsoft now also offer their ERP in a Cloud-based model (Chen et al., 2015; Johansson & Ruivo, 2013). Furthermore, SAP recently acquired the high-tech startup Altiscale for approx. $125 million USD to enhance its Cloud-based BI portfolio (Diercks, 2016). While Salesforce.com was the first company that provided CRM as SaaS, many traditional on-premise CRM vendors have moved into the Cloud-based technology through acquisitions of SMEs (e.g. Oracle acquired RightNow in 2011 and SAP incorporated SuccessFactors in 2011) (Kram, 2016).

Both, Cloud-based accounting software and SCM software adoption are growing and expected to build the majority of such software solutions in the future (Loten, 2015; Pang, 2016).

The impact of Cloud Computing on adopting organizations has been discussed extensively in recent research (see Chauhan & Jaiswal, 2015). Scholars agree that the emerging Cloud technology affects the way how software is distributed to customers, whereas most of the research focuses on the vendor's perspective (Boillat & Legner, 2013; Hedman & Xiao, 2016; Ojala & Helander, 2014; Rebsdorf & Hedman, 2014). As on-premise enterprise software rollouts at a client's organization traditionally include several actors in an ecosystem (e.g. VAR and consultancy firms), Cloud Computing seems to disrupt this ecosystem by providing the solution remotely as a service (Ojala & Helander, 2014). Nevertheless, enterprise software functionalities still need to solve complex problems and function in a convoluted organization which cannot be ignored. Hitherto, the value network, especially the role of the partner or VAR, of Cloud-based enterprise software is not sufficiently investigated.

2.4. Value networks of on-premise enterprise software and Cloud Computing

This part aims to explain what value networks of both on-premise enterprise software and general Cloud Computing solutions include. Therefore, a definition of value is introduced. Furthermore, the concept of value and value creation are related to Cloud Computing. Afterward, the meaning of ecosystems and value networks are elaborated. As a next step, recent literature about value networks of on-premise enterprise software value networks is presented. Research related to value networks of Cloud Computing solutions closes the literature review.

2.4.1. Definition and the creation of value

The concept of value can be seen as trade-offs between benefits and costs (Bowman & Ambrosini, 2000). A product or a service is usually purchased because its purchaser expects a benefit by receiving it. The benefit can be understood in monetary terms, but also in non-monetary terms e.g. competence, social rewards, and market position. For instance, the benefit of IT in organizations can be seen in the achieved time saving, cost reduction, and decision-support function by utilizing computing power in the workplace (Chou, 2015). However, the benefit of receiving a product or service depends on the customers' valuation and perception that can differentiate to other potential customers. In fact, the customer also faces costs for purchasing the good or service which can also be monetary (i.e. the price) and non-monetary (e.g. time, energy, effort). However, one can differentiate between *absolute value* and *differential value* (Ojala & Helander, 2014). *Absolute value* means the value attributed to the benefits connected to the product or service reduced by the costs incurred in using the product. The *differential value* perspective includes the end customer's own expectations and other possible solutions for the end customer's problems. Thus, *differential value* offers a context-based view on value by looking at the value perceiver as well as other available solutions that could fulfill the needs

(Ojala & Helander, 2014). According to the SD logic, goods derive their value through use (value-in-use) and not through the investment amount (value-in-exchange) (Vargo & Lusch, 2008). Vargo and Lusch (2008) differentiate between *operand* and *operant resources* in respect of SD logic. *Operand resources* are static resources (e.g. raw materials, parts) that need to be transformed to create value. In contrast, *operant resources* represent all intangible resources such as knowledge and capabilities that are used for the value creation process. Those operant resources represent the competitive advantage of a company. In the context of value networks, the value is created and received by actors of the value network (Walter, Ritter, & Gemünden, 2001).Each actor needs to create value and capture value if the actor wants to build a long-term and successful value network (Ojala & Helander, 2014).

Chou (2015) investigates the value created through Cloud Computing. The author proposed a Cloud Computing value creation model which consists of the four components: *awareness*, *translation*, *comprehension*, and *Cloud Computing value creation*. The components *awareness*, *translation*, and *comprehension* are about understanding the characteristics, identifying risks and costs as well as clarifying contracting issues and audit standards of Cloud Computing. The value of Cloud Computing is influenced by the activities of the components mentioned above as well as the trust into the Cloud Computing provider. Chou (2015) highlights, besides economic benefits (e.g. better resource utilization, increased flexibility, access to new technology), the additional value through enhancing environmental sustainability by reducing the use of hardware and network devices as well as electricity in organizations. Therefore, Cloud Computing creates social value in our society by contributing to the green IT movement (Chou, 2015).

The value chain described by Porter (1985) is both, a concept and a tool that has been used for the last 40 years to analyze and understand industries. Porter illustrates the value chain as a system of interlinked independent activities. Moreover, the linkages of a value chain represent how a single activity affects other activities in respect of cost or effectiveness, which reveal a novel source of competitive advantage through value chain optimization. Furthermore, Porter distinguishes between *primary activities* (e.g. Marketing and Sales, Operations) and *support activities* (e.g. Human Resource Management, Technology Development). Products gain value by sequentially passing all value-adding activities of the chain (Porter, 1985). Traditionally, strategists apply the value chain analysis to detect gaps between the firm's performance and competitors' performance (Peppard & Rylander, 2006). The value chain concept by Porter (1985) was also applied to the Cloud Computing technology (see Mohammed et al., 2009; chapter 2.4.4.).

The relevant literature claims that Porter's approach represents rather a physical and sequential process on a firm-level, whereas nowadays many industries exhibit strong co-operative behavior and operate in supply chains even on a global level (Nielsen, 1988; Peppard & Rylander, 2006). There are two most important aspects of co-operating with other firms in a supply chain: (1) focusing on the firm's main competencies (functional unbundling) and (2) saving costs (geographical unbundling)

(Elms & Low, 2013). As Adam Smith has already illustrated through the famous example of the pin makers, specialization boosts productivity; in fact, the downsides of splitting up tasks are higher coordination effort and the risk of depending on suppliers (Elms & Low, 2013). Latter aspect has recently been demonstrated by Volkswagen's (VW) production stop because two suppliers refused to supply assembly parts (Look & Rauwald, 2016). Nowadays, communication and organizational technologies (e.g. EDI) support the coordination process within the supply chain. In order to reduce costs, firms seek globally for lowest cost locations by considering, among other aspects, wages, capital costs, transmission and transportation costs, increased risk, and managerial time (Elms & Low, 2013). By looking at the IT industry, one can clearly detect the global ecosystem and interaction of multiple actors. Hardware devices (e.g. semiconductor units, screens) are mainly produced by suppliers located in South Korea and Taiwan (Samsung, Foxconn, LG Electronics), whereas a lot of software development is provided by companies located in the US (Microsoft, IBM, Oracle) (National Research Council (U.S.). Policy and Global Affairs, 2012). As already mentioned, the global interaction of multiple stakeholders in the Cloud Computing technology can also face customers' resistance. For instance, a SaaS provider sources its infrastructure from a cost-effective Cloud Provider whose servers are located somewhere outside the EU with minor data protection regulations. Research has shown that SaaS users are aware of data security and privacy aspects and would like to have control of where data is stored (Catteddu & Hogben, 2009; DaSilva et al., 2013; Garg et al., 2013).

Moreover, inter-firm relationships, which generate relational benefits, play a significant role in strategic performance (Madhavan, Koka, & Prescott, 1998). The linkage between inter-organizational relationships and value creation has been explored through several theories such as dependence theory (Pfeffer & Salancik, 2003), transaction cost economics (Williamson, 1985), transactional value analysis (Dyer, 1997), resource-based view (Tyler, 2001; Wernerfelt, 1995), marketing channel theory (Frazier, 1983), information processing theory (Hult, Ketchen, & Slater, 2004), and social capital theory (Granovetter, 1985; Jones, Hesterly, & Borgatti, 1997). However, the central proposition is that the investment of organizations in relational-specific assets, the combination of resources through governance mechanisms, and the engagement in knowledge exchange leads to a more efficient value creation (Krause, Handfield, & Tyler, 2007).

Porter's value chain model has been reviewed in this thesis, as it is perceived as grounded theory in the value creation logic. However, literature which investigates the value creation logic of Cloud Computing more and more focuses on value networks and business ecosystems (Böhm, Koleva, Leimeister, Riedl, & Krcmar, 2010; Li, 2009; Ojala & Helander, 2014; Ojala & Tyrväinen, 2011). In contrast to the Porter's more linear value chain model, the value network concept co-creates value by the combination of interrelated actors within a network. Cloud-based services consist of several roles, actors, and activities that interact with each other in order to provide the service. Therefore, literature has to be reviewed in respect of business ecosystems and value networks.

2.4.2. Business ecosystems and value networks

In order to understand how organizations create value around a technology at the clients' site, one needs to analyze the business ecosystem. The business ecosystem perspective focuses on three main characteristics: the *platform*, *symbiosis*, and *co-evolution* (Li, 2009). In 1993, Moore (1993) introduced the business ecosystem concept as a network of opposing and collaborating actors from distinct sectors who are involved in the provisioning of services or products around a specific *platform*. The *platform* is often provided by a single firm and it includes services, tools, and technologies that are used by stakeholders involved in the *platform* (e.g. the PaaS technology Microsoft Azure as the platform and a software developer as a stakeholder) (Li, 2009). The stakeholders within an ecosystem gain a certain level of *symbiosis*, as competition is usually stronger between distinct ecosystems than within the ecosystem (Ehrenhard, Kijl, & Nieuwenhuis, 2014). A group of firms together *evolves* over a period of time, thus, creating additional value by adding complementary products and services to the core platform (Ehrenhard et al., 2014). A business ecosystem can be analyzed by looking at the value network concept that describes and analyzes a platform-based product or service offering (Ehrenhard et al., 2014; Kijl et al., 2010; Peppard & Rylander, 2006). According to Peppard and Rylander (2006), a value network is a *"set of relatively autonomous units that can be managed independently, but operate together in a framework of common principles and service level agreements (SLAs)"* (p.132). In a network relationships are essential to the firms' competitive advantage; also the structure of the network is decisive for industry performance and evolution (Madhavan et al., 1998; Peppard & Rylander, 2006). Lusch et al. (2010) focuses on value networks and SCM from the SD logic perspective and defined value networks as:

> *"A value network is a spontaneously sensing and responding spatial and temporal structure of largely loosely coupled value proposing social and economic actors interacting through institutions and technology to: (1) co-produce service offerings, (2) exchange service offerings, and (3) co-create value."* (p. 20)

Furthermore, Lusch et al. (2010) explains that a supply chain can be seen as a sub-part of a value network that consists of *strong ties* and *weak ties*. While *strong ties* traditionally characterize very structured and rigid networks (e.g. all actors operate and build knowledge on a single platform or technology), *weak ties* enable apparently unrelated organizational networks to become a fluid, agile, and adaptable macro-structure (Lusch et al., 2010). Scholars found out that in knowledge-rich and turbulent environments *strong ties* are not sufficient due to over-commitment to specialized assets and technologies (Achrol & Kotler, 1999). Furthermore, firms constantly need to be agile and adaptive in a spontaneously sensing and responding network in order to survive and ensure organization growth, especially in today's complex and global value networks (Flint & Mentzer, 2006). According to Lusch et al. (2010), a firm's ability to learn, to adapt, and to change is crucial in order to transform specialized competencies into value propositions with market potential to customers and other stakeholders of the value network.

> *"To accomplish this, however, firms must recognize and act on value creation in the context of networks (...). Since these value creation networks are constantly changing the firm must constantly learn to serve in a value network"* (Lusch et al., 2010, p. 21).

The analysis of value networks determines the viability of multi-actor services (Kijl et al., 2010). Various actors with specific agreed roles, activities, and resources are key elements of a value-creating system that builds the value network (Ehrenhard et al., 2014; Möller & Svahn, 2006). Thus, a value network can be seen as design or subset of a business ecosystem (Ehrenhard et al., 2014).

The statements regarding business ecosystems and value networks can be perfectly related to the current enterprise software ecosystem. As a specific enterprise software solution represents a technology platform, many stakeholders of its ecosystem such as VARs and other partners are apparently facing a fundamental change of the platform's technology due to Cloud Computing. Many stakeholders follow a single platform strategy, gained competencies, and built value-added products or services based on the platform technology which characterize a network of strong ties. With the emerging Cloud Computing technology, stakeholders need to adopt the new technology and transform their competencies into new value propositions for customers and other stakeholders (Lusch et al., 2010). Therefore, stakeholders need to understand how the ecosystem is going to change, which is the purpose of this work.

2.4.3. Value creation logic in the case of on-premise enterprise software

Literature about the value creation logic in the case of on-premise enterprise software is rather rare. Furthermore, the literature review has shown that most studies related to enterprise software value creation focus on how a software vendor develops or directly delivers the product to the client's organization. Sarker et al. (2012) argues that most researchers assume a one-way transfer of the software from the vendor straight to the customer; ignoring that: *"in many contexts, the business model involves vendors selling, extending, and delivering packaged software through partners, who contribute to value addition for the customer firms"* (p. 318). This is why Kohli and Grover (2008) highlight that studies within the IS discipline should rather focus on value co-creation instead of only on IT value as vendors interact with partners in the context of development, sales, customization, implementation, and maintenance. Traditional enterprise software vendors distribute their software solutions through VARs to their customers (Hedman & Xiao, 2016; Rebsdorf & Hedman, 2014). In literature, most frequently used terms are VAR, sales partner, indirect / external sales channels, sales distributor, and sales agency.

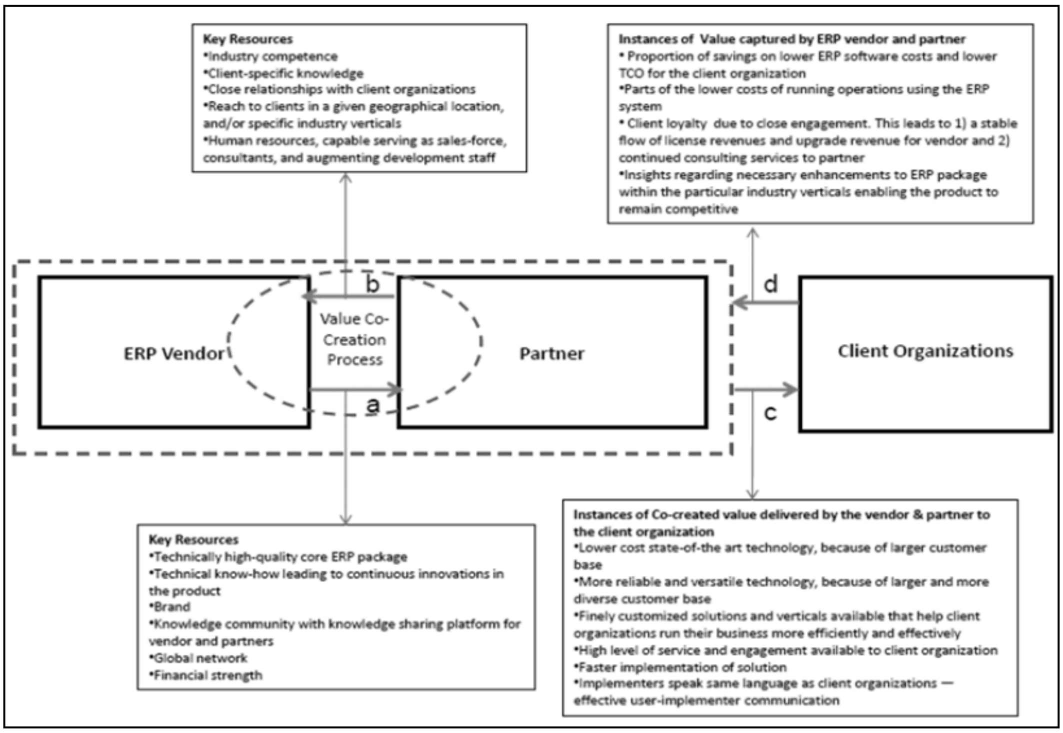
> "*There are two main reasons for firms to have chosen to outsource certain aspects of their sales function (usually to smaller accounts in more fragmented markets) to VARs: (1) it allows*

the direct sales force to concentrate on the larger accounts; and (2) VARs more often have a much more intimate knowledge of these markets and can penetrate them much more successfully than a direct sales person can." (Parvinen & Niu, 2010, p. 34)

Sarker et al. (2012) empirically developed an understanding of co-creation in the context of B2B partnership especially in the case of ERP technology. As co-creation involves a symbiotic relationship between a vendor and its primary partners; whereas, the partners typically customize and co-produce products or services (Kohli & Grover, 2008; Sarker et al., 2012). According to Sarker et al. (2012), by bringing together resources from at least two stakeholders, the value co-creation through B2B alliances is affected by three factors: *alliance governance mechanisms, collective strength,* and *power/politics-enabling conditions. Alliance governance mechanisms* refer to several mechanisms that facilitate required coordination between partners such as contractual provisions (intellectual property rights), and goodwill and trust (Gulati, Lavie, & Singh, 2009; Reuer & Arino, 2007). *Collective strength* is determined by the importance of the capabilities of the alliance partners as well as the ability to create, transfer, and utilize knowledge. Especially in the case of enterprise software functionality, reliability, and other characteristics of the technology itself play a key role in the implementation process (Sambamurthy & Zmud, 1999). *Power/politics-enabling conditions* are about the conflicting interests of a relationship; while *power* refers to the ability to manipulate the behavior of others, *politics* is about using authority to change goals and directions within an organization (Sarker et al., 2012). The value co-created through the alliance is affected by the mentioned factors (Sarker et al., 2012). Based on a case study approach, Sarker et al. (2012) provide an overview of value co-creation and activities within the ERP vendor-partner alliance, which is illustrated in Figure 5.

According to Sarker et al. (2012), the partner of the ERP ecosystem contributes to the relationship between vendor and partner with its competencies and knowledge related to the industry and the client. As the partner stays in direct contact with the customer, he is responsible for managing the business with the client, such as selling the product, implementing the software at the client's place, developing and maintaining the customer relationship, and placing measures to develop new business opportunities. Moreover, the partner traditionally customizes the ERP software, as well as he consults the client in most issues so that the solution suits sufficiently to the customer's processes. The partner's human resources can be seen as augmented development staff for the vendor. The partner has some influence on the development due to the knowledge of customers' demand and feedback. The vendor provides the technically high-quality core ERP package and uses its technical knowledge to improve the software. Furthermore, the ERP vendor often provides a knowledge sharing platform for the vendor and partners to build a knowledge community for enhancing the relationships between partners (Sarker et al., 2012).

Figure 5: Value co-creation by the ERP vendor–partner alliance (Sarker et al., 2012, p. 329)



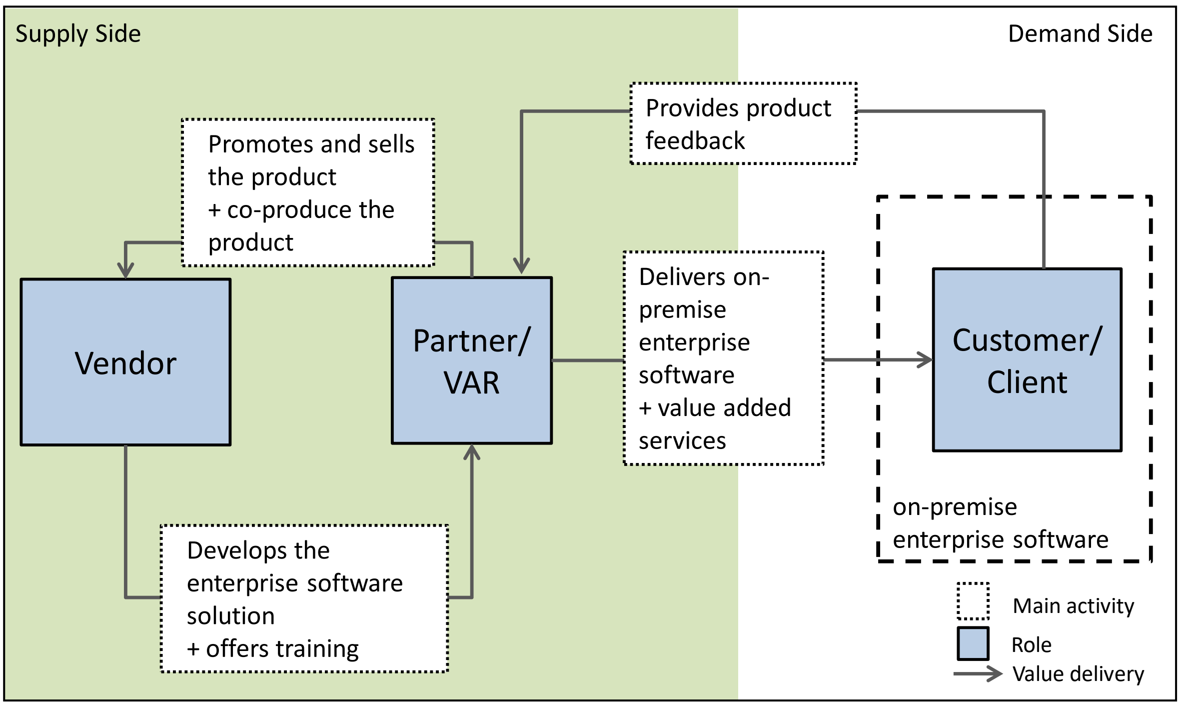
Sarker et al. (2012) does not clearly define what kind of partner is described in his research. However, Piturro (1999) differentiates between consultant and VAR. While the VAR is bound contractually to a software vendor, *”their advice as consultants may be colored by close ties to particular suppliers”* (Piturro, 1999, p. 44). Furthermore, she states that the VAR also offers tailored training to the client. Consultants are more independent than VARs but, in fact, *“many are more familiar with one vendor’s products than with others’, and some get advertising subsidies or referral fees through vendors”* (Piturro, 1999, p. 44). Table 5 contains an overview of on-premise enterprise software value network by listing roles, actors, and activities which are found in the literature review. Furthermore, Figure 6 contains an overview of the value network which illustrates the main activities of the actors of the value network (Kohli & Grover, 2008; Piturro, 1999; Sarker et al., 2012; Simpson, Siguaw, & Baker, 2001; von Arb, 1998).

Table 5: On-premise enterprise software roles, actors, and activities

Roles	*Actors*	*Activities*
Partner	Consultants/ VAR	Selling and promoting the vendor’s product Customer Relationship Management Customizing on-premise enterprise software Consulting (business processes & technical) Co-producing product (using customers’ feedback, industry competencies) Developing value-added products or service Offering project management Implementation at the client’s place) Conducting Training

		Offering troubleshooting and update support Providing technical support Offering technical and organ. integration Offering maintenance service
Client/ Customer	Organization or a department of a company	Running local infrastructure and managing related responsibilities (e.g. maintenance, security, and expansion of storage and CPU) Providing sufficient IT staff for hosting and supporting the solution (e.g. fist-level help desk support) Running the software on-premise: System administration (e.g. network administration, backup and recovery management), user administration (e.g. manage system privileges), database administration (e.g. data backup), release planning (e.g. cost-benefit analysis, analysis of hardware requirements, analysis of system changes through new releases), and sending feedback to the reseller
Vendor	Enterprise software vendor	Providing the enterprise software package Continuously innovating the software Developing a knowledge community (knowledge sharing platform) Marketing activities Offering product training to partners Relationship/ Partnership Management

Figure 6: Value network of on-premise enterprise software



2.4.4. Value creation logic in the case of Cloud Computing

The article of Mohammed et al. (2009) offers a Cloud value chain reference model, which is based on Porter's value chain analysis. The Cloud value chain reference model differentiates between the following services of Cloud Computing. (1) *Primary services* are basic services for the development of any Cloud-based service. Those services can be clustered into hardware service, middleware service, software services, and data & content Service. (2) *Cloud-oriented support services* include all activities which are necessary to enable and ensure a sufficient utilization for the client. Such services are typically financial management services (e.g. accounting, billing, payment and SLA management systems), consultant services, and Cloud-oriented value-added services. (3) *Business-oriented support services* represent all non-technical business services such as supplier analysis, consultant services, and other value-added services. According to Mohammed et al. (2009), Cloud Computing value is to be delivered due to consistent process implementation within these services (Chou, 2015). The model by Mohammed et al. (2009) provides valuable insights into emerging services in the Cloud Computing technology as well as what kind of value is created, but the model ignores that the value is created by multiple actors in a value network.

From a value network perspective, several analyses on Cloud Computing detect numerous stakeholders in the network. According to Marston et al. (2011), a Cloud Computing business network includes (1) *Consumers, (2) Providers, (3) Enablers, and (4) Regulators*. (1) The *Consumers* are subscribers, who use the provider's service on an operational expense bases ("pay-per-use service"). Moreover, the role of the C*onsumer* is to ensure that the purchased service supports the firm's processes. Furthermore, Cloud Computing helps the customer's IT department to focus on developing innovative organization-specific applications. However, researchers observed resistance of IT departments regarding Cloud Computing adoption, because the new technology reduces the operational and strategic relevance of the department (Boillat & Legner, 2013; DaSilva et al., 2013; Sultan, 2014). (2) *Providers* own and operate Cloud Computing systems. Their task is to maintain the system and the software used in the Cloud as well as the pricing of the Cloud service. (3) *Enablers* sell products and services that ease the delivery, adoption and operation of Cloud Computing. Especially in the case of hybrid Cloud Computing, the *Enablers* play a significant role by building and maintaining the infrastructure of the hybrid system. Furthermore, *Enablers* can create added value by providing additional software (e.g. migration software) and services (e.g. consulting). Industry reports and articles propose a high demand in consultation through *Enablers* regarding Cloud Computing implementation, especially IS policy, IT security, and risk management (EMC, 2016; Marston et al., 2011; Pussep et al., 2013). (4) The *Regulator* indirectly adds value to the network. *Regulators* can be seen as a sovereign government body or an international entity, which controls Cloud Computing adoption through laws and policies. In fact, Cloud Computing is still facing legal issues on data security and privacy concerns by handing over data to a third-party service provider, whose location could be in a country with different local laws. *"Though Cloud computing provides a flexible solution for shared resources, software, and information, it also poses additional privacy challenges to consumers using the Clouds"* (F. Liu et al., 2011, p. 17). Researchers and practitioners claim that *Regulators,* respectively policymakers, need to develop international security and privacy standards, as well as clarify those legal issues to unleash the full potential of Cloud Computing (Eldred, Adams, & Good, 2015).

The NIST Cloud Computing reference architecture provides a rather generic view on Cloud computing, without differentiating between B2B and B2C cases (F. Liu et al., 2011). However, it detects different scenarios of how Cloud Computing can be provided to the consumer. For instance, the Cloud Consumer does not necessarily have to purchase the service directly from the Cloud Provider; instead, the consumer also can contact a Cloud Broker. Five major roles are defined by the reference architecture of NIST: (1) *Cloud Consumer*, (2) *Cloud Provider*, (3) *Cloud Carrier*, (4) *Cloud Auditor*, and (5) *Cloud Broker*. While (1) *Cloud Consumer*, (2) *Cloud Provider* describe similar roles as in the previous model, F. Liu et al. (2011) takes the Cloud Computing service models (SaaS, PaaS, and IaaS) into account which affect the actors and their activities. SaaS can be purchased by an organization that provides access to the service to its members, software application administrator who configures the application for end-users, or an end-user, who directly uses the service. PaaS is typically used by application developers, application testers, application deployers, and application administrators. The main activities for PaaS users are to design and implement applications, test application in Cloud-based environments, publish application into the Cloud, and configure and monitor the application's performances. IaaS supports the creation, installation, management and monitoring for IT operations, which is interesting especially for developers, system administrators, and IT managers. (2) The SaaS provider *"deploys, configures, maintains and updates the operation of the software applications on a Cloud infrastructure so that the services are provisioned at the expected service levels to Cloud Consumers" (F. Liu et al., 2011, p. 7).* In contrast, the *Cloud Provider* of PaaS manages the components of the platform e.g. databases, runtime software execution stack, and other middleware components. IaaS providers acquire the physical computing resources needed for the service e.g. servers, networks, storage and hosting infrastructure. The major activities of *Cloud Provider* are clustered into five major areas: service deployment, service orchestration, Cloud services management, security, and privacy (see Table 6). (3) The *Cloud Carrier* ensures the connectivity and transport of Cloud services between consumers and providers. The access to consumers is provided through the network, telecommunication, and other access devices. In order to ensure services in compliance with SLAs between *Cloud Provider* and *consumer*, the *Cloud Provider* sets up an SLA with the *Cloud Carrier*, too. (4) The *Cloud Auditor* can conduct an independent assessment of Cloud services (e.g. performance, security controls, privacy impact). *"Audits are performed to verify conformance to standards through review of objective evidence"* (F. Liu et al., 2011, p. 8). (5) If the integration of Cloud services becomes too complex for Cloud Consumers, the *Cloud Broker* manages the utilization, performance, and delivery of Cloud services and negotiates between the *Cloud Provider* and *Cloud Consumer*. By improving the capability and providing value-added services (e.g. managed access, identity management, performance reporting, and enhanced security) the *Cloud Broker* enhances the given service (Service Intermediation). The *Cloud Broker* can also combine and integrate multiple services into one or more new services (service aggregation or service arbitrage). More technical details are explained in-depth in the publications of NIST (see e.g. F. Liu et al., 2011).

Böhm et al. (2010) introduced a value network of Cloud Computing using the e^3-value method (Gordijn & Akkermans, 2001). They distinguish different roles in a Cloud Computing value network, namely: a*pplication provider* (offers the Cloud-based application), t*echnical platform provider* (offers an operating environment to develop, run and test applications), m*arket platform* (brings customers and service providers together), i*nfrastructure provider* (provides virtual hardware, network connections, and virtual storage to its clients), c*onsultant* (knows the consumer and market in order to advise the consumer on appropriate Cloud solutions), a*ggregator* (ensures that the several Cloud services work together sufficiently), i*ntegrator* (migrates pre-existing on-premises data into the Cloud, as well as integrating Cloud-based solutions into the existing IT landscape), and c*onsumer* (receives the services from the value network and pays for the value-adding activities). While most roles can be related to previous roles from other researchers, Böhm et al. (2010) introduces the new role *market platform.* Figure 7 illustrates the e^3-value model of Cloud Computing. The figure shows the different roles as well as their relationship and value exchanges. The value is created by delivering services throughout the network that are valuable for the receiver who pays money in return. The exchange of value is illustrated through value ports and links among the actors. *"In this way value is added with each step along a path in the value network until the Consumer receives the service that fulfils his needs"* (Böhm et al., 2010, p. 8). As the figure shows, the providers of any service and the market platform are pooled together as a composite Cloud Computing service. This reflects how the consumer might perceive the service, as he is not aware, or interested in how the service is deployed. The receivers of the Cloud-based service (Aggregator, Consumer, Integrator) can purchase the service directly from one of the providers or use the market platform. Furthermore, the model shows that providers also perceive services from one another.

Table 6 contains all roles, actors, and activities of the value network of Cloud Computing which are derived and summarized from several research papers (see e.g. Böhm et al., 2010; Boillat & Legner, 2013; F. Liu et al., 2011; Marston et al., 2011; Mohammed et al., 2009). Table 6 is the first overview of roles, actors, and activities merged from several findings from literature about the value network of Cloud Computing. Thus, Table 6 contributes to the IS literature.

Figure 7: e³-value model of Cloud Computing (Böhm et al., 2010, p. 8)

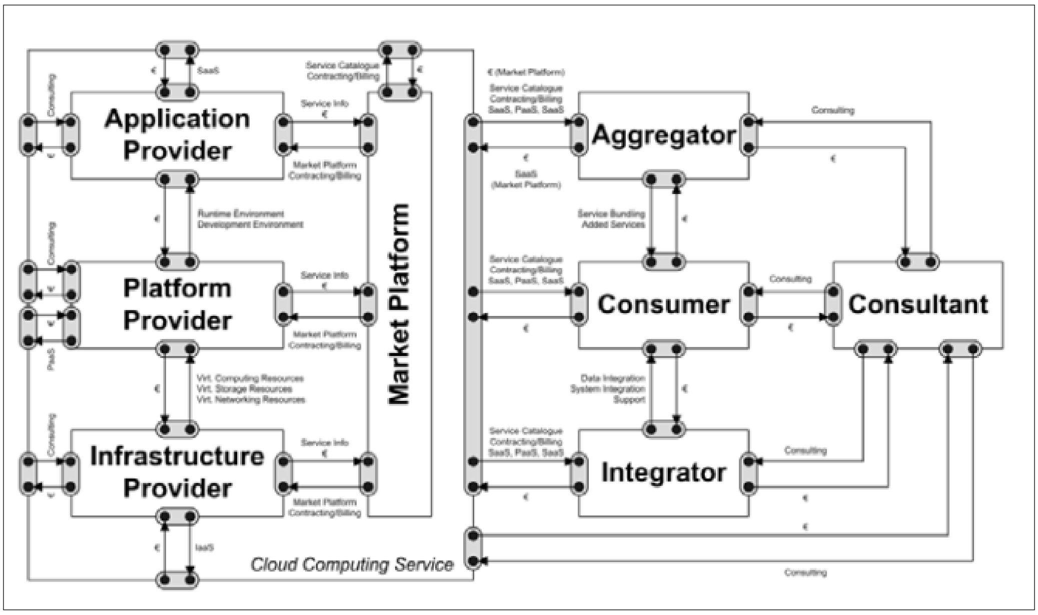


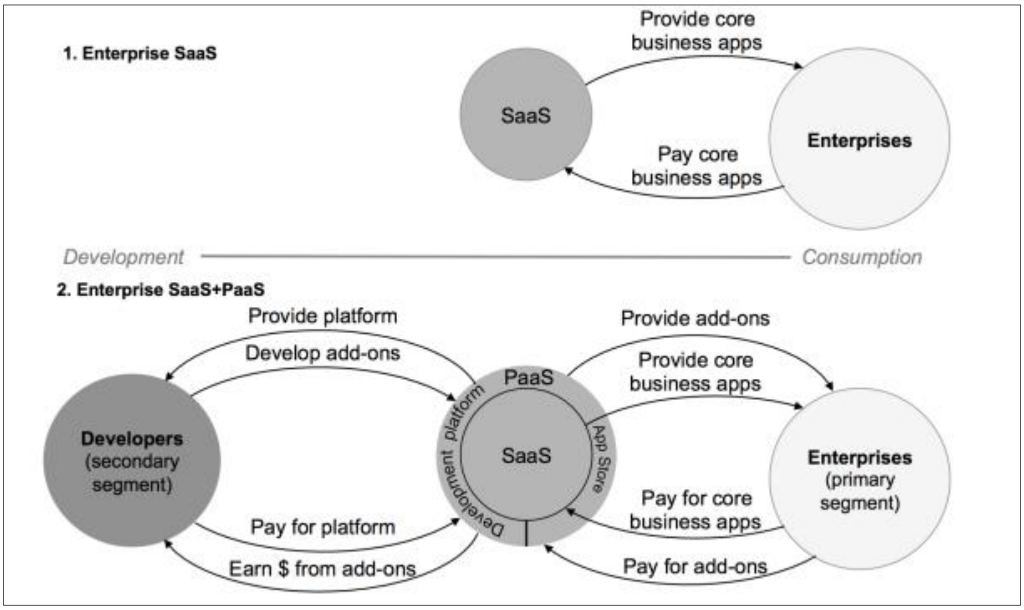
Table 6: Overview of value network of Cloud Computing

Roles	*Actors*	*Activities*
Cloud Consumer	**In general**: person/ organization/ subscribers/ clients/ customer	Using the service (pay-per-use) from a Cloud Provider Ensuring that the purchased service supports the firm's processes Setting up contracts with the Cloud Provider Setting up Service Level Agreements (SLAs) to specify technical performance requirements (quality of service, security, legal remedies for performance failures) Comparing different Cloud Providers' services
	SaaS: organization, end-user, software application administrator	Providing organization's members with service access Configuring the SaaS for end-users (software application administrator)
	PaaS: application developer, tester, deployer, administrator	Designing and implementing application software in the Cloud-based environment Publishing applications into the Cloud Configuring and monitoring application performance on a platform
	IaaS: system developers, administrators	Creating, installing, managing and monitoring services for IT infrastructure operations
Cloud Provider **SaaS =** Application Provider **PaaS =** Technical Platform Provider	A person, organization, or entity that offers SaaS, PaaS, or IaaS e.g. an enterprise software vendor or an IT department	**In general:** Operating Cloud Computing system Maintaining the system and the software used in the Cloud Making a service available for interested parties Acquiring and managing the computing infrastructure required for providing the services
		Service Deployment: Building a Cloud infrastructure based on the deployment models: public, private, community, and hybrid Cloud. Private Cloud and community Cloud can be both on the organization's premises (on-site Cloud) or hosted

IaaS = Infrastructure Provider		by another company (outsourced Cloud)
		Service Orchestration: Defining interfaces for Cloud Consumers to access the computing services Providing and managing access to the physical computing resources via software abstraction (including e.g. virtual machines, virtual data storage, hypervisors) Managing all physical computing resources (e.g. networks, storage components)
		Cloud Services Management: Performing all service-related functions to provide the main Cloud service <u>Business Support</u> (Inventory, Accounting & Billing, Reporting & Auditing, Pricing & Rating Management) <u>Provisioning/ Configuration</u> (Rapid Provisioning, Monitoring & Reporting, Metering, SLA Management) <u>Portability/ Interoperability</u> (Data Portability, Copy Data To-From, Service Interoperability, Unified Management Interface, System Portability)
		Security: Authentication, availability, authorization, confidentiality, identity management, audit, security monitoring, integrity, incident response, and security policy management
		Privacy: Protect personal information and personally identifiable information in the Cloud
(Regulator)	Government body or policy makers	Enabling Cloud Computing adoption through laws and policies
Cloud Carrier	Network and telecommunication carriers or transport agents	Providing connectivity and transport of Cloud services between consumers and providers Manage and monitor consistency with SLA through dedicated and secure connections between consumers and providers
Enabler/ Cloud Broker/ Consultant/ Service Aggregator	A person, organization, or entity: business partner of Cloud Provider, VAR, consultancy	Selling products and services that ease the delivery, adoption and operation of Cloud Computing Building and maintaining the infrastructure at the client's place of a hybrid Cloud Computing system Managing the use, performance and delivery of Cloud services through Cloud Providers Negotiating between Cloud Providers and Cloud Consumers <u>Service Intermediation:</u> Enhancing the Cloud service through additional value-added services or improving some specific capability (e.g. enhanced security, identity management, performance reporting) <u>Service Aggregation:</u> Combining and integrating multiple services into one or more new services (data integration, ensuring secure data movement) <u>Service Arbitrage:</u> Evaluating and selecting appropriate Cloud services
Cloud Auditor	Consultancy, specialized company	Conducting an independent assessment of Cloud services (e.g. performance, security controls, privacy impact)
Market Platform Provider	Third party consultancy, specialized company, VAR, software vendor	Providing a platform for Cloud Providers to advertise and distribute their Cloud-based products Bringing together consumers and providers Offering additional services (SLA contracting or billing)

Boillat and Legner (2013) investigate the differences between software vendors' business models more thoroughly by looking at different deployment models (SaaS and PaaS) in the case of enterprise software. While SaaS is equal to the value network of Marston et al. (2011), the value network of PaaS offers additional roles of value creation. Developers and other software vendors can use the platform to offer their own content or additional software, which add more value to the core service. The authors suggested a business model called *Enterprise SaaS+PaaS* in which the core enterprise software is provided together with a platform for value-adding content of the partners (e.g. 'SAP Business ByDesign' and the platform 'SAP Store' with 115 additional applications in 2013). This business model is illustrated in Figure 8. However, Boillat and Legner (2013) propose Cloud Computing as a technology that offers new profitable value-adding activities, also for traditional partners that is in line with other scholars (Beimborn, Miletzki, & Wenzel, 2011; Hedman & Xiao, 2016; Rebsdorf & Hedman, 2014).

Figure 8: Enterprise SaaS+PaaS (Boillat & Legner, 2013, p. 53)



Nevertheless, longitudinal investigations of Cloud Computing value networks - especially in cases of PaaS - have shown that the network changes over time (Ojala & Tyrväinen, 2011). Ojala and Helander (2014) observe that partners of the value network of a PaaS provider in the gaming and movie industry have disappeared by integrating the former partners' activities into the platform service. In this regard, Hedman and Xiao (2016) analyze in a single case study the challenges of an ERP software vendor moving to a Cloud-based ERP solution. They have found out that the role of the pre-existing partners is relevant for the distribution of the new service because the partners possess a broad customer base. However, in a later stage, the vendor aims to offer replacing services via the internet e.g. customer training and support.

Chapter 3: Methodology

This chapter provides a description of the methodology selected for this study. Therefore, the research strategy and design are introduced, followed by reliability and validity considerations. Furthermore, this chapter describes important issues regarding the data collection technique.

3.1. Research approach and research strategy

The research subject is to investigate how the value network of an enterprise software solution changes as a consequence of shifting from on-premise to Cloud-based technology. Saunders, Lewis, and Thornhill (2009) distinguish between the deductive and the inductive research approach. While the deductive approach starts with an already existing theory and collects data based on the theory in a second step, the inductive approach firstly gathers data and formulates the theory based on the data. In order to deliver appropriate results, this work follows an inductive approach. According to Creswell (2008), it is preferable to choose an inductive approach, if the topic is new and there is few existing literature. As Cloud-based enterprise software is currently emerging and literature is rare, the inductive research approach is more suitable. In general, research on Cloud Computing value networks already exists but as enterprise software represents a very special case, more investigation towards Cloud-based enterprise software value networks is necessary.

According to Saunders et al. (2009), the purpose of research can be categorized into *exploratory*, *descriptive*, and *explanatory* research. The *exploratory* research is used to find out *"what is happening; to seek new insights; to ask questions and to assess phenomena in a new light"* (Robson, 2002, p. 59). *Explanatory* research establishes causal relationships between variables by studying a situation or a problem. A *descriptive* study portrays a profile of a person, event, or situation and is mostly the precursor for either an explorative or an explanatory research. The purpose of this work is an *exploratory research*, which is useful to clarify the understanding of the emerging change of the ecosystem in the enterprise software industry. Furthermore, the *descriptive* part of this research is the illustration of the current situation and related topics which is conducted in the literature review (chapter 2). The *descriptive* part of this research explains the meaning of the shift from on-premise to Cloud-based enterprise software by looking at the concept of servitization, Cloud Computing, enterprise software, and the value creation logic. Whereas, the *exploratory part* aims to find out more about the consequences for the value network of enterprise software caused by the shift from on-premise to Cloud-based technology.

Another aspect of the methodology is the research strategy. Although no strategy outperforms the others, some strategies might be more appropriate. In general, the research question, the subject of the study, prior knowledge, the personal philosophy, and the available resources for conducting the research determine the research strategy (Saunders et al., 2009). The strategy of this thesis follows a *two-step qualitative approach* including a *holistic multiple case study approach* and a *survey* *approach*. Case study research fits the research subject since it leads to detailed insights into the interrelated actors in a value network and how Cloud Computing changes the value network of enterprise software (Boillat & Legner, 2013). The case study approach has been used in prior studies for elaborating on real-world value networks (e.g. Ojala & Tyrväinen, 2011). By using multiple cases the findings' external validity or generalization is thought to increase (Saunders et al., 2009). The time horizon of research can be a cross-sectional time frame (snapshot of time) or a longitudinal time horizon, which is an investigation over an extended period (Saunders et al., 2009). As there are time restrictions, this research follows the *cross-sectional approach*.

In a second step, the findings of the case analysis are enriched by data from a *survey approach*. The survey strategy is well-known in business and management research and can be used for either quantitative or qualitative data collection. The quantitative approach aims at collecting numerical data through questionnaires, whereas, the qualitative approach gathers non-numerical data (Saunders et al., 2009). The qualitative data include text, audio, and video (Longhurst, 2010). This study follows a *qualitative approach* in order to gain as many new insights as possible. This is in line with Saeed, Juell-Skielse, and Uppström (2012) who state that regarding the exploratory research one should use qualitative methods to understand the motives, actions, reasons, and beliefs of the participants better. More precisely, this work applies *one to one semi-structured telephone interviews* with experts from several business organizations. Semi-structured interviews are non-standardized interviews, in which the researcher has a list of themes and questions to be covered, but gives freedom to the interviewee to elaborate on some topics more than on others (Saunders et al., 2009). Furthermore, the interviewer is allowed to ask the interviewee to explain or build on his/her responses which adds significance and depth to the data obtained. As the interviewees have different business positions, focal points, and experience, the interview process should be kept rather flexible. Moreover, semi-structured interviews are beneficial for gathering different experiences, emotions, and opinions.

The choice of applying more than one data collection technique and analysis procedure is increasingly advocated within business and management research (Curran & Blackburn, 2000). By using the case study approach and the survey approach this work represents a *multi-method qualitative study* (Saunders et al., 2009). According to Saunders et al. (2009), multi-method qualitative studies are beneficial regarding triangulation, complementarity, and 'solving the puzzle'. Applying multiple collection methods can corroborate research findings within a study which relates to triangulation. Furthermore, through the multi-method qualitative study different aspects of an investigation can be dovetailed to ensure complementarity. 'Solving the puzzle' refers to the case when one method reveals unexplainable results which can be explained through an alternative data collection method. Furthermore, researchers already have applied the multi-method qualitative strategy for analyzing value networks (e.g. Ehrenhard et al., 2014).

3.2. Research design

The research design represents the itinerary of the conducted research and, therefore, has to be grounded and well-thought out. To answer the main research question sufficiently (*How does the value network of an enterprise software solution change as a consequence of shifting from on-premise to Cloud-based technology?),* certain information about value networks of Cloud-based enterprise software needs to be collected. The sub-questions one to three are answered following the descriptive approach through the literature review. Due to that, the shift from on-premise to Cloud-based enterprise software is elaborated and related to servitization. Furthermore, characteristics of enterprise software, as well as Cloud Computing, are derived from the literature. Moreover, the value networks of on-premise enterprise software and Cloud Computing are illustrated based on recent research. Together with the insights from literature and the findings from the empirical research, this work can present differences in value networks between on-premise enterprise software, general Cloud Computing and Cloud-based enterprise software.

The fourth sub-question initiates the explorative part of this thesis. Therefore, a holistic multiple case study analysis of three cases is conducted which provides valuable information from real live examples of Cloud-based enterprise software value networks. *"The rationale for using multiple cases focuses upon the need to establish whether the findings of the first case occur in other cases and, as a consequence, the need to generalize from these findings"* (Saunders et al., 2009, pp. 146-147). Based on that, roles, actors, and activities are defined as well as their relational constellation. In order to process the analysis in a structured way, this study follows the value network role activity analysis by Kijl et al. (2010), which can be done in both a qualitative and a quantitative way. Previous researchers used other approaches such as the Network Value Analysis (NVA) by Peppard and Rylander (2006). However, the value network role activity analysis focuses more on actors and their activities, which is necessary for this research. Furthermore, previous research has shown that the value network role activity analysis can be sufficiently combined with insights from interviews (Ehrenhard et al., 2014). This is why this study prefers the value network role activity analysis. Nevertheless, this study does not investigate on financial streams related to value delivery, as well as the calculation of expected benefits and costs. However, by using this approach, further research can easily build on this study, e.g. applying the quantitative abstract cost benefit model introduced by Kijl et al. (2010). External factors such as market or technology developments and regulation may influence value networks but are not a part of them (Ehrenhard et al., 2014).

In a second step, the findings of the case analysis are refined and extended by insides derived from fifteen semi-structured interviews with experts from business organizations in the field of enterprise software and Cloud Computing. All experts are employed by private business organizations, which are stakeholders of the traditional value network of enterprise software solutions (vendor, partner/VAR, and customer). The information derived from expert interviews contribute to a holistic view on the

Cloud-based enterprise software business ecosystem. Based on both, the case analysis and the interviews, this work derives a generic value network tailored for Cloud-based enterprise software. Together with the literature review and the empirical study, the change of value networks of enterprise software solutions as a consequence of shifting from on-premise to Cloud-based technology can be demonstrated. Based on that, value propositions for vendors' partners and VARs will be derived in the approach in the case of D-VAR.

3.3. Data collection and data analysis

3.3.1. Holistic multiple case study

The selection of the cases is driven by theoretical sampling (Eisenhardt & Graebner, 2007). According to the theoretical sampling, the selection of cases is based on their commonalities and differences in order to predict contradictory results and to extract generalizable patterns (Boillat & Legner, 2013; Saunders et al., 2009). All dimensions which are considered are listed in Table 7. Additional issues that need to be considered are free available information and the access to the case specific experts.

Table 7: Case study selection criteria

Dimension	*Case 1: Microsoft Dynamics AX*	*Case 2: SAP S/4HANA*	*Case 3: Salesforce Sales Cloud*
Functional scope	ERP	ERP	CRM
Traditional on-premise enterprise software vendor	Yes	Yes	No
Market launch / maturity	March 2016	February 2015	1999
Possible deployment models	Public, private, hybrid, and on-premise (2017)	Public, private, hybrid and on-premise	In general, public; but depending on project scope, also on-premise is possible
Scenario	Cloud hosted by Microsoft in a public Cloud environment	Cloud hosted by partner in a private Cloud environment	Cloud hosted by Salesforce in a public Cloud environment
Service models of the scenario	SaaS + PaaS (Azure)	SaaS	SaaS + PaaS (Force.com)

To get crucial insights for the cases, secondary data from the literature, documentaries, product information, websites, reports, and other available materials have been collected. Furthermore, primary data are collected via semi-structured interviews with business partners to increase the validity of analysis using data triangulation (Saunders et al., 2009). *"Triangulation refers to the use of different data collection techniques within one study in order to ensure that the data are telling you what you think they are telling you"* (Saunders et al., 2009, p. 146). The responses will be transcribed and structured to capture the words.

To develop the value network, the following steps are conducted following the value network role activity analysis for each case. First, the characteristics and functions of the Cloud-based enterprise software solution are briefly summarized. Second, all main activities are identified and listed in a table. Third, all main activities and actors are allocated to roles of the value network. Roles are defined as abstract names for organizations executing some activities. Fourth, the value network structure of the underlying Cloud-based enterprise software solution is outlined in terms of illustration. Last, the value network analysis of the individual cases serve as the basis of the cross-case analysis and is used to discover similarities and differences between the cases.

Unfortunately, the collection of information about the product’s value networks is connected to some issues. As Microsoft Dynamics AX has been released recently, information about the constellation of roles in the value network is rather unclear. The amount of documents and reports are rare; thus, the research relies more on information provided by the D-VAR. The SAP S/4HANA case is more based on secondary data. After multiple requests regarding interviews through different channels, SAP rejected the inquiry and referred to its communication policy which says that external researchers are not supported through interviews or other information. Thus, the content of present work is validated through the information of partners. In contrast, Salesforce Sales Cloud is a more mature and established product which enhances the availability of information about the service delivery model. Furthermore, Salesforce communicates more transparently its business model by clearly communicating differences of e.g. product editions, prices, subscription requirements, and revenue sharing with partners. The content is validated through the information of a Salesforce partner.

3.3.2. Survey

As already has been mentioned before, the insights from the holistic multiple case study are enhanced through *one to one semi-structured telephone interviews* with experts. In this research, fifteen experts with different focuses on technology solutions and job roles are interviewed. Most of the interviewees are gathered through networking events, IT exhibitions, and job fairs located in Germany. As people on such exhibitions like to share their contact details, it is very effective to get to know contact persons of firms with business operations of the research topic. After a verbal agreement, the research topic is briefly described in an email together with the request of interviewing an appropriate expert of the company. It is worthwhile mentioning that most of the contact persons forwarded the request to the adequate teams within their company which shows the practical relevance of the research topic. In the next step, an appointment is made with the expert to conduct the interview. Most of the companies possess international business operations which explain the international focus of the experts. The companies are located in Germany; nevertheless, the insights are internationally relevant, rather than limited to just one country. As promised to the interviewee, the interviews are made anonymous. Thus, the companies name as well as the interview transcripts cannot be published. However, one can say that the findings result from renowned companies which are co-creators of innovative technology in the field of enterprise software solutions. An overview of interview participants is listed in Table 8.

Table 8: Overview of interviews with experts

No. of Expert	***Job role***	***Organization's main business area***	***Organization's role in value network***	***Key competence of expert***
E 1	Director Senior Manager, project acquisition, and business development	IT consulting and professional advice, Banking and insurance sector	VAR of e.g. Oracle and SAP, but main role is consultant, Enabler, Cloud Provider	ERP, BI
E 2	Senior Account Manager	Engineering and IT services, SMEs and large corporations	Independent consultant	ERP, CRM, Cloud-based services
E 3	Project Manager	IT consulting, IT infrastructure and middleware, Cloud Computing, mobility, big data	Cloud Provider, Enabler	Technical know-how regarding middleware infrastructures, technical implementation
E 4	Business Development Executive for Cloud Service Provider	Cloud Computing Services	Partner of SAP, Cloud Provider	Business development, Cloud-based services
E 5	Account Manager	IT Services, personnel placement of IT professionals	Independent consultant and provider of IT services	ERP, CRM
E 6	Managing Director Corporate Development	Outsourcing of IT services, Consulting, system integration, system management	Partner of SAP, Microsoft, system house, VAR, consultant	SAP and Microsoft solutions, business development, Cloud-based services
E 7	Junior Partner	IT consulting of SAP or Salesforce software solutions	Partner of SAP and Salesforce, VAR, consultant	CRM, Salesforce solutions
E 8	Developer	Cloud ecosystem development for financial services	Cloud Provider / Application Provider	Cloud-based SAP products
E 9	Project Manager, business development	Cloud-based services, financial service industries	Cloud Provider	Transformation from on-premise solution into Cloud-based services
E 10	Key Account Manager	IT infrastructure and Cloud-based services	Partner of SAP and Salesforce, VAR, technical consultant	Technical know-how regarding on-premise and Cloud-based enterprise software solutions
E 11	Head of IT Department	Company: Sustainable heating systems, Organization: internal IT service provider	Cloud Consumer and internal Cloud Provider	Technical know-how regarding on-premise and Cloud-based enterprise software
E 12	Consultant	EDI Solutions for	IT consultant	Technical know-how

		ERP, CRM, and SCM solutions		regarding EDI solutions and customizing
E 13	Partner	BI: banking and insurance sector	Independent consultant	ERP, Big Data / BI
E 14	CEO	IT infrastructure for SMEs	Technology provider	Technical know-how regarding middleware infrastructures, technical implementation
E 15	Subject specialist infrastructure management	IT infrastructure management	Technology provider	Migration management

In consideration of the interviewee's preferences, the interviews are conducted either in German or in English. Before the interview phase starts, the questions have been tested regarding their understandability and relevance through a simulated interview. Testing is helpful for reshaping the introduction of the topic and the questions again. According to Saunders et al. (2009), participating in interviews is time-consuming and therefore many candidates reject an involvement. Therefore, the interviews are conducted via a telephone call to reduce time spent on traveling. On average, the interview time does not exceed one hour, whereby the minimum interview time has been 35 minutes. Before the interview starts, the web presence of the company is screened regarding Cloud-based product or service portfolio to prepare additional questions to sufficiently gain more insights from the interview. Therewith, the researcher assimilates the same language as the company represents on the website (Myers & Newman, 2007). This also helps to develop a relationship with the interviewee who gets the impression that the researcher is interested in the company's business activities (Myers & Newman, 2007; Saunders et al., 2009). At the beginning of each interview, the researcher introduces himself and thanks for the opportunity to ask questions. Then the interviewee briefly explains his or her job role and responsibilities within the company. After that, the research topic is briefly introduced to the interviewee in order to make sure that the interviewee is aligned with the topic. It is made clear to the respondent that neither the company's name nor his or her name will be published. According to Saunders et al. (2009), anonymity prevents subject or participant bias. The expert is then allowed to freely discuss the topic, whereas, according to the semi-structured interview approach, a list of pre-defined topics helps to cover most of the aspects. The list includes the following questions:

- Which software vendors are business partners of COMPANY?
- How does COMPANY cooperate with those software vendors today?
- Is Cloud Computing already a topic for COMPANY and business partners?
- Which role does COMPANY play by looking at the value network of the enterprise software solution?
- What are traditional activities of COMPANY in this value network?
- Which of those activities disappear considering Cloud-based technology in the value network?

- Which new activities emerge due to Cloud Computing in the value network?
- Which insights can be derived from COMPANY's customers regarding Cloud-based enterprise software?
- Where does COMPANY stand or want to be positioned concerning Cloud Computing?
- Are there already strategic actions / measures regarding Cloud Computing?

In order to analyze the output created by the interviewee, the responses are recorded and then transcribed. The data from interviews are unstructured and therefore need to be structured to analyze them (Saunders et al., 2009). As suggested by Saunders et al. (2009), each interview is transcribed into a separate Microsoft Word document and saved with a consistent name. This helps to organize a logical structure. Additionally, within each document, all questions and responses during the interview are described. The interviews are abbreviated with E followed by the particular number of the interview (1-15), which is in line with the suggestions of Saunders et al. (2009). Furthermore, this work follows the approach for analyzing data by Miles and Huberman (1994). Therefore, the interviews' most important statements are summarized to draw valuable conclusions and simplify the data. Furthermore, to display the data, a matrix is used which is created with Microsoft Excel. In the spreadsheet, each row is assigned to one of the aspects discussed with the interviewees, whereas, the columns are allocated to the experts. As a result, the condensed statements can be filled into the corresponding cell that structures the text. By means of data display, the researcher is able to analyze the well-structured data and draw conclusions. According to Saunders et al. (2009), the book by Miles and Huberman (1994) is a framework for the reduction, the display and the verification of data which enables the researchers to analyze and conclude their empirical studies.

3.4. Scientific quality

According to the literature, validity and reliability are key aspects which researchers need to be aware of in all kind of research (Saunders et al., 2009). However, the literature claims that validity and reliability are treated differently, as for a qualitative research there is no intention to apply a quantitative measure of validity and reliability (Golafshani, 2003; Maxwell, 1992). Moreover, researchers need to take into account that *"the way to achieve validity and reliability of a research get affected from the qualitative researchers' perspectives which are to eliminate bias and increase the researcher's truthfulness of a proposition about some social phenomenon using triangulation"* (Golafshani, 2003, p. 604). As this research follows a multi-method qualitative study (multiple case study and semi-structured interviews) with several sources (primary and secondary sources), triangulation, complementarity, and external validity are served sufficiently. However, by applying qualitative research, the bias issues have to be discussed as well as other pitfalls of interviews.

3.4.1. Validity

"Validity is concerned with whether the findings are really about what they appear to be about" (Saunders et al., 2009, p. 157). According to literature, there are two major forms of validity: *internal validity* and *external validity* (Golafshani, 2003; Saunders et al., 2009). In respect of qualitative research, internal validity refers to *"the extent to which research findings are a true reflection or representation of reality rather than being the effects of extraneous variables"* (Brink, 1993, p. 35). Whereas, external validity addresses the extent to which such representations of reality are legitimately transferable across groups (Brink, 1993).

Due to the research design, which applies two methods and uses several sources, the present work is less sensitive to validity. In the first step, the case studies are selected via theoretical sampling and analyzed based on interviews with representatives of the underlying business ecosystem. Also, secondary data from literature, documentaries, product information, websites, reports, and other available materials are collected to validate the findings from the interviews (internal validity). According to the theoretical sampling, the selection of cases is based on their commonalities and differences in order to predict contradictory results and to extract generalizable patterns (Boillat & Legner, 2013; Saunders et al., 2009). In the second step, findings from one case are compared with other cases and it is elaborated whether findings are interchangeable (external validity). Finally, the findings from the multiple-case study are validated with the results of the semi-structured interviews (external validity).

Threats of validity for qualitative research can be categorized into *history, testing, instrumentation, morality, and maturation* (Saunders et al., 2009). The threat of *history* refers to the effect on findings through events which have just happened before the interview (e.g. product launch, major product recall, scandals). For instance, the opinion of a customer changes after a product recall. In fact, Microsoft launched the Cloud-based ERP product Microsoft Dynamics AX together with the start of this research. However, the product was not launched out of the blue and the vendors usually communicate their strategic orientation to their partners. One can recognize that experts are aware of the emerging Cloud-based technology and are not surprised by this event. However, this research has selected a diverse sample of cases to illustrate possible value networks of Cloud-based enterprise software. Thus, this threat to validity does not influence the overall results of this research. *Testing* refers to the threat that participants might change their behavior if they think a specific outcome is desired. This research is sensitive to this threat of validity, as participants do not want their firm or business model to look bad e.g. in respect of innovative technology. As participants are interviewed at one point in time, changing certain behavior is not applicable to this research design. *Instrumentation* refers to better performance during the testing period due to instructions or instrumentation. As there is only one interview with the participants, a testing period does not exist, which means that there is no possibility to change performance or behavior in a second contact. The threat of *morality* refers to participants dropping out of studies. As this study does not follow a longitudinal research approach, the threat of participants dropping out of studies is not applicable. *Maturation* refers to the threat that due to external events the behavior of participants might change. As this study follows cross-sectional investigations, data is collected at a particular point in time. The possibility that findings change over a period is not applicable.

3.4.2. Reliability

Reliability is the appropriate collection of data processed through the right techniques to gain consistent findings (Saunders et al., 2009). In respect of qualitative research, this refers to whether alternative researchers would produce similar information (Silverman, 2013). Nevertheless, findings derived from semi-structured interviews are not intended to be repeatable as they represent reality at a time they were collected (Saunders et al., 2009). The strength of using this non-standardized method results from the flexibility which is needed to explore the complexity of the topic. In return, the repetition of this research by others at another time would not be feasible. However, the analysis of each case is conducted in a similar process, using the value network role activity analysis by Kijl et al. (2010) in a qualitative way. Furthermore, the analysis of the semi-structured interview is conducted according to Miles and Huberman (1994). The reasons underpinning the choice of research design, strategy and methods are noted in the chapters 3.1., 3.2., and 3.3.

However, reliability issues include several threats which need to be discussed in qualitative research. Firstly, the *participant error* means that participants can react differently to questions due to varying at different moments in time (Saunders et al., 2009). For instance, the enthusiasm of employees fluctuates during different days in the workweek. To control this threat, a more a time which is more likely to agree with is selected. Furthermore, the appointment is made by verifying the calendar of both parties in order to find appropriate time slots with sufficient available time to avoid upcoming stress for the interviewee. Secondly, the *participant bias* is about participants who are influenced by the opinion of others and thereby not being realistic (e.g. supervisor). This threat is reduced by making the interviews anonymous and conducting only one to one interviews via telephone. This helps the participant to feel less judged which results in truthful answers. Thirdly, the *observer error* refers to the threat that observers differ in the way they ask questions and in return receive different answers. This research is less sensitive to this menace, as the same interviewer interviews all experts in the same way. Furthermore, the researcher prepared a checklist with topics to make sure that all issues are covered in each interview (Saunders et al., 2009). Finally, the *observer bias* means that different researcher might interpret the data differently which results in different outcomes. If data is analyzed, according to Miles and Huberman (1994) only by one researcher, it reduces the threat of different interpretations.

3.4.3. Bias and other pitfalls of interviews

Myers and Newman (2007) claim that most academic publications in the IS literature only point out a number of interviews and the background of the interviewees. As there are problems and pitfalls when applying interviews in research, researchers need to be aware of those risks. The bias and pitfalls are summarized in this chapter, whereas counteractive measures have been already stated in the chapters 3.2. and 3.3. Saunders et al. (2009) detects *interviewer bias* and *elite bias.* The *interviewer bias* occurs through the interviewer's non-verbal and verbal behavior which in return influences the responses of the interviewee. Furthermore, the researcher might try to influence the interviewee with his or her own beliefs by formulating targeted questions. Myers and Newman (2007) suggest that researchers should introduce themselves at the beginning of each interview and clarify the purpose of the interview to overcome the observer bias. Furthermore, by using the right language the researcher minimize the social dissonance. Additionally, researchers have to be aware of the need of various opinions as this is a benefit of qualitative research. The *elite bias* should be prevented by asking not only the, for example, chief executives or other high-level decision-makers of an organization. As Table 8 shows, this study includes experts from different decision-making levels. As bias issues and pitfalls are important for this study, the guideline by Myers and Newman (2007) is followed to prevent those risks. The generalizability of the results received from interview data is often discussed in the literature because the qualitative data from interviews are not statistically generalizable (Saunders et al., 2009).

Chapter 4: Results

This chapter presents the results of the multiple case analysis and semi-structured interviews. Firstly, each case is introduced, and the results of the analysis of the value network are presented (chapter 4.1.). Secondly, a cross-case conclusion is provided by this work in chapter 4.2. Thirdly, results of the semi-structured interviews are stated in chapter 4.3. Finally, a generic value network of Cloud-based enterprise software is derived from the findings of the empirical research (chapter 4.4.).

4.1. Case Analysis

4.1.1. Case 1: Microsoft Dynamics AX

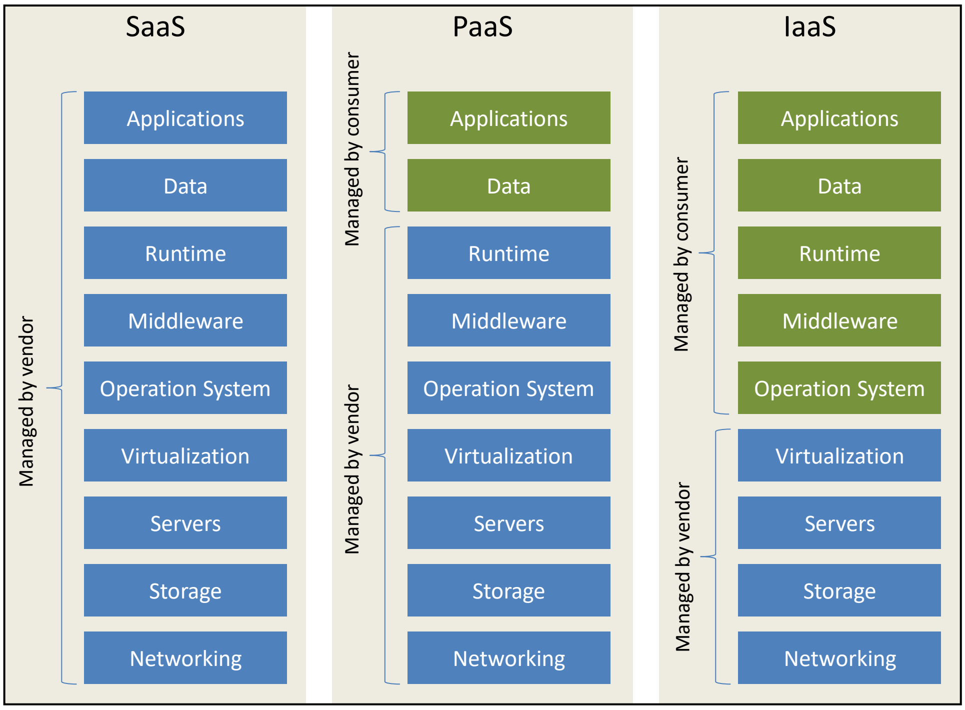
This chapter contains the analysis of the value network of Microsoft Dynamics AX. Therefore, Microsoft and the Dynamics AX technology are introduced. Furthermore, the value network is explained in detail in chapter 4.1.1.2. However, as there are several scenarios possible, this case focuses on the scenario where Microsoft provides the Cloud-based ERP service to the customer through a public Cloud.

4.1.1.1. Description of Microsoft Dynamics AX

Microsoft Corporation was founded in 1975 and is an international software and hardware company headquartered in the US. The company operates in several segments: computing and gaming hardware, phone hardware, devices and consumer licensing, and commercial licensing (Microsoft Corporation, 2016a). In 2015, Microsoft's revenue was $93.58 billion USD which is a revenue growth of 7.3 percent compared to 2014. Dynamics AX is one of Microsoft's ERP products. Microsoft offers several other ERP products targeting different customer segments. Dynamics AX differs from other Microsoft ERP products as it provides solutions for mid-sized to large companies. In 1998, IBM and Danish Damgaard Data originally developed and released the software as IBM Axapta. After IBM had left the project, Damgaard Data merged with Navision Software A/S to form NavisionDamgaard, Microsoft acquired the company for $1.4 billion USD. In 2006 the software version Axapta 3.0 was replaced by Dynamics AX 4.0. Since 2011, the latest on-premise software version Dynamics AX 2012 is available. In March 2016, Microsoft released the latest version with the simplified name Microsoft Dynamics AX which is available in 137 markets and in 40 languages (Microsoft Corporation, 2016d).

Microsoft Dynamics AX comes with five pre-configured industry solutions: services, public sector, retail, distribution, and manufacturing (Microsoft Corporation, 2016c). The new version significantly differs from the previous version as it has been developed to operate on Microsoft's Cloud Computing market platform Microsoft Azure. Thus, in order to understand the value network of Dynamics AX, it is crucial to comprehend the open Cloud-based platform Microsoft Azure. The platform enables building, deploying, and managing applications across a global network of data centers which are operated by Microsoft. The platform offers SaaS, PaaS, and IaaS. Moreover, Azure Services Platform provides clients access to several online tools, frameworks, and services to run their operation systems (e.g. Live, .Net, SQL, and SharePoint) (Fender, 2016; Marston et al., 2011). Those tools, frameworks, and services include both Microsoft-specific and third-party solutions. The platform builds the backbone of all Cloud-based applications in Microsoft's business ecosystems (Marston et al., 2011). Furthermore, Azure distributes also Cloud-based services of non-Microsoft developers. Microsoft's data centers follow certified industry standards and even provide 'Data Trustee Models' that ensures that Cloud Computing storage is only located in the country in which customers are headquartered. However, although Dynamics AX was optimized to run on Azure technology, it can operate on-premise, as a hosting solution by a Microsoft partner, in a public Cloud, in a private Cloud, or in a hybrid Cloud (Microsoft Corporation, 2016b). For a hosting solution by a partner, Microsoft grants licenses to partners (Cloud Solution Provider Partner). Agreements are generally structured with a three-year term, and partners are billed monthly based on consumption. Companies with high restrictions regarding compliance and data sovereignty will be able to run Dynamics AX on-premise by using Microsoft Azure Stack which will be released in 2017. Customers are provided with production, sandbox and developer environments to test extensions of the system in use. Additionally, solutions developed by partners can be integrated into the Cloud-based Dynamics AX. Figure 9 shows the responsibilities of Microsoft and the consumer regarding the different service models.

Figure 9: Microsoft Azure service models and responsibilities (Based on Fender, 2016)



Microsoft does not employ its own sales teams for selling Microsoft Dynamics products to the end-consumer. Instead, the company manages a global network consisting thousands of partners distributing the Dynamics products to clients. Microsoft's Dynamics-Partners are independently certified experts that provide industry expertise and process know-how in combination with the Dynamics products. Based on the Dynamics technology, partners develop industry specific products and services which are tailored to the customer's needs. Many partners also offer packaged solutions that are 'ready to go' and set up in a short time (Microsoft Corporation, 2016b).

The Microsoft Dynamics Lifecycle Services (LCS) has been initiated to help organizations to improve the quality of customers' Dynamics AX implementations by standardizing the implementation process. LCS is a collaborative workspace based on Azure in which clients and partners deploy, manage, monitor, and diagnose the ERP service (Fender, 2016). LCS tools help customers for instance to standardize process flows, deploy developer/test or production environments, or report incidents to the Microsoft support team. By standardizing processes and operations across the organizations, Microsoft wants customers to stick more to the standardized product than developing and customizing own solutions. The idea bases on a simple fact: the more a customer uses standardized Dynamics AX solutions, the fewer problems occur when updating or upgrading the software. As Microsoft is responsible for running the software flawlessly in the Cloud, standardized software optimizes the maintainability. In return, this reduces costs by minimizing affordable time to develop and test the product. Currently, the LCS also aims to prepare and transform customers' on-premise version 'Dynamics AX 2012 R3' into a Cloud-based ERP based on Microsoft Azure (Fender, 2016).

4.1.1.2. Value network analysis of Microsoft Dynamics AX

The value network of Microsoft's ERP solution Dynamics AX includes several roles, namely: (1) *Application Provider*, (2) *Infrastructure Provider*, (3) *Service/ Market Platform Provider*, (4) *Partner*, (5) *Cloud Consumer*, (6) *Collaboration Platform Provider*, (7) *Service Engineer*, and (8) *External Developer*.

(1) As Microsoft develops and steadily improves the Dynamics AX functionalities, it acts as the *Application Provider* in this value network. (2) The *Infrastructure Provider* is represented by Microsoft which manages the infrastructure that is needed to run the Dynamics AX service system. Moreover, Microsoft provides the LCS which builds an important communication interface between partner, customer and Microsoft's provided services. (3) Microsoft Azure is the platform which is provided by the *Service/ Market Platform Provider* in this value network. Generally, the role of the *Service/ Market Platform Provider* plays Microsoft but recent announcements show that also third-party provider can offer this PaaS (Fadilpasic, 2016). Azure offers not only Microsoft's services but also partners and other independent developers can distribute their Cloud-based products. Moreover, Azure provides SaaS, PaaS, IaaS and all Cloud-based services of Microsoft. (4) *Partners* are licensed companies that offer customer-tailored services for Dynamics AX on Azure. The services and prices will vary by Dynamics Partner depending on the level of services provided. *Partners* can support customer-specific activities regarding the application (e.g. customization and monitoring) and user/data management (e.g. security and identity configuration). The offered services of the *Partner* depend on the customer's demand for support. From Microsoft's perspective *Partner* and *Consumers* build a symbiotic alliance which collaboratively uses its services (5) *Consumers* procure Dynamic AX

either via a Dynamics Enterprise Agreement from Microsoft or through a Cloud Solution Provider *Partner*. The *Consumer* focuses on the application and the user/data management. Depending on the *Consumer's* resources and know-how, *Partners* can support and give advice regarding occurring concerns. Customers consuming the Cloud-based ERP service will experience three layers of service delivery: LCS, Microsoft Dynamics Service Engineers, and Customer-specific activities by the *Partner*. (6) Microsoft plays the role of the *Collaboration Platform Provider* where *Consumers* together with *Partners* utilize a best practice driven set of services that help automate application lifecycle management (LCS). By providing customers with tools to deploy, manage, monitor, and diagnose the ERP service, it spans across the service lifecycle from discovery and definition to the development and operation of the service. Hence, LCS provides a single access point for *Consumers* and *Partners* to manage all applied services due to the integrated LCS. (7) *Service Engineers* in the case of Microsoft Dynamics AX are Microsoft Dynamics Service Engineers (DSE) which deploy, update, and manage the customer's production environment. Neither the *Consumer* nor the *Partner* has access to the production environment. Thus, modifications of the system are made in the development and test environment and are deployed by the DSE. DSE also maintains the SLA of the service by actively monitoring and servicing the application platform for the customer. (8) *External Developers* are non-Microsoft independent companies which use the *Market / Service Platform* Azure in order to develop and distribute value-added software. The main activities of the actors in the value network are listed in Table 9, and the value network is illustrated in Figure 10.

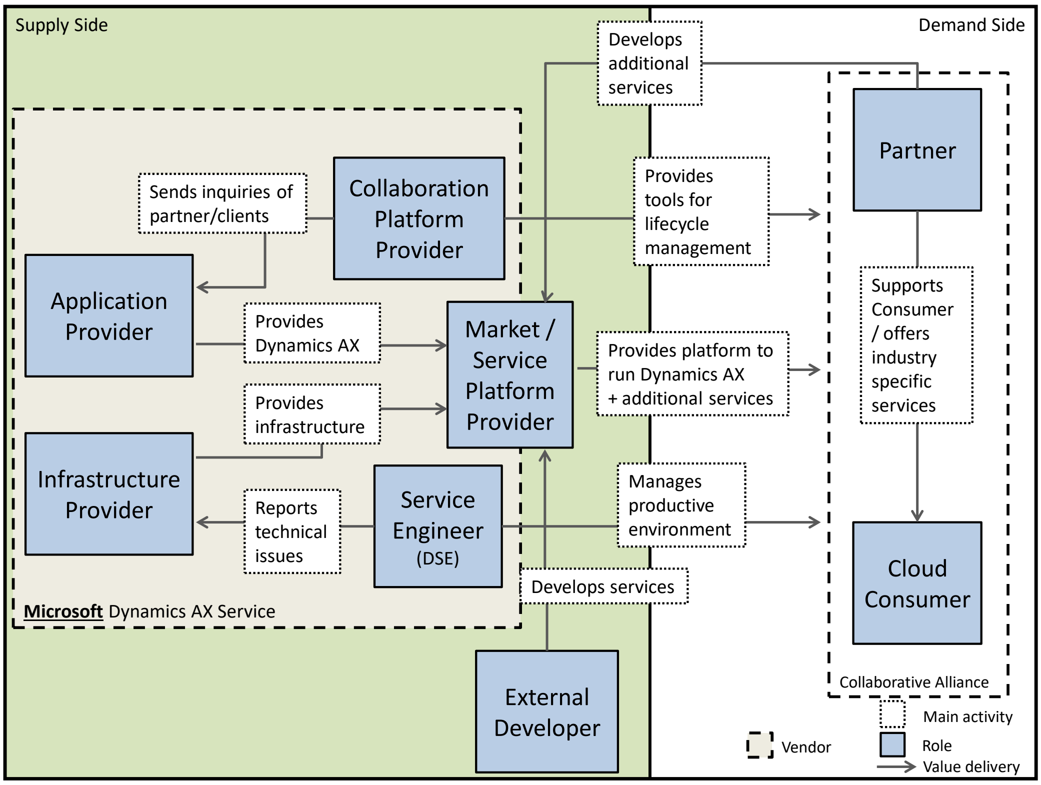
Table 9: Roles, actors, and activities of Dynamics AX

Roles	***Actors***	***Activities***
Application Provider	Microsoft	Develop Microsoft Dynamics AX functionalities Steadily improve functionalities of the service Provide updates and upgrades Integrate feedback and fix functional issues
Infrastructure Provider	Microsoft	Storage and database capacity management High availability and disaster recovery Platform security Infrastructure capacity, scale up and down Infrastructure Management and deployment Data center networking, Power & Cooling Backup database Determine a disaster recovery plan Execute scheduled updates to the infrastructure (operating system updates)
Market / Service Platform Provider (Azure)	Microsoft or third-party provider	Provide a platform to deploy Dynamics AX Provide a platform for other Microsoft or third-parties to advertise and distribute their Cloud-based products
Partner	Microsoft's certified partners	Sells the product to the Consumer Package their own tools, products, and services, and combine them into one monthly or annual customer bill

		Applies industry know-how and provides own solutions to customers Upgrading on-premise Dynamics AX 2012 R3: - Applying the LCS together with the client to move the system into the Cloud - Advising regarding license requirements and networks and domains (site-on-site VPN connection) Support Consumer regarding Application: - Define and test business processes - Develop and test customizations - Monitoring of development and test instances (no productive instances) Support customer regarding Users/data: - Security configuration - Identity management
Cloud Consumer	Organizations/ subscribers/ clients/ customers	Purchase service either through Dynamics Enterprise Agreement or Cloud Solution Provider Applying the LCS to manage the services in use **Evaluate whether a Partner is needed to apply management of the system in the following scenarios:** Provisioning of environments: - Size projected load in LCS sizing estimator and request deployment of the specific environment(s) Updates to application: - Download update from LCS and define, develop, test the update and provide code update package back to Microsoft (LCS) - Request deployment of update to the production environment Scale up and down: - Add additional users, storage, and instances - Scheduling usage peaks with the LCS usage profiler - Report any significant performance issues impacting business - Monitor production, sandbox, and development environment - Manage sandbox, development and test environment Security/Remote access: - Provide access for users and partners to LCS project and environments - Provide LCS project access for sandbox, development and related monitoring and updates
Collaborative Platform Provider (LCS)	Microsoft	Provide a platform for automating application lifecycle management for consumers or partners (Project Managers, Business Analysts, Developers, IT Administrators) Provide customers with the tooling to deploy, manage, monitor, and diagnose the ERP service
Service Engineer	Microsoft Dynamics Service Engineers (DSE)	Deploy, update, and administer the customer's production environment Maintain the SLA of the service by actively monitoring and servicing the application platform for the customer

		Application Platform: - Diagnostics, patches, updates, hotfixes, and upgrades - Networking management - 24/7 application monitoring and support - Create code and data backup for production deployments before applying any updates - In case of any failure, roll back environment to code and data back-up - Provide database backup as per customer request - Pro-actively manage the resources needed for the service - Investigate and troubleshoot issues in cooperation with customer - Provide LCS project access for production deployment, remote access, monitoring and updates - Monitor production, sandbox, and development environment 24/7 using Monitoring and diagnosis tools in LCS - Notify customer pro-actively in case of issues
External Developer	Non-Microsoft independent developer	Use Microsoft Azure to develop and distribute value-added solutions to consumer

Figure 10: Value network of Microsoft Dynamics AX



4.1.2. Case 2: SAP S/4HANA

This chapter contains the analysis of the value network of SAP S/4HANA. SAP, as well as the S/4HANA technology, are introduced and the value network is analyzed. This case focuses on the scenario where a partner provides S/4HANA to the customer in a private Cloud which is called a 'Partner Managed Cloud'.

4.1.2.1. Description of SAP S/4HANA

The company SAP was founded 1972 in Germany. In 2015, SAP had approx. 77,000 employees and generated revenue of €20.8 billion EUR. As measured by revenue, SAP is the biggest European software vendor. SAP's main product is the on-premise enterprise software SAP R/3 or SAP ERP. The company's portfolio also contains several enterprise software solutions such as SAP CRM, SAP SCM as well as industry solutions like SAP for Banking, SAP for Retail, SAP for Healthcare. In November 2010, the new technology SAP HANA, which is the short for 'high performance analytical appliance', was released by SAP. SAP HANA is a development platform which uses In-Memory-Technology. In-Memory-Technology combines software and hardware and utilizes primary memory (RAM) to process high volumes of data. This technology was original developed for BI and Analytics applications of SAP (SAP Business Warehouse). Nowadays, SAP HANA technology has become an open platform and builds the fundament of all new generation products of SAP. SAP S/4 HANA is the short for 'SAP Business Suite 4 SAP HANA' and provides Cloud-based ERP which transforms SAP from an on-premise software vendor into a Cloud-based service provider (Schreiner, 2015). S/4HANA can be deployed on-premise, as a Cloud service, or as a hybrid solution. As SAP's strategy focuses on extending its Cloud Computing services, SAP S/4HANA represents the new platform for achieving its strategic goals (Strehlitz, 2016). In 2015, SAP's revenue of Cloud Computing subscriptions and support increased compared to the previous year by 110 percent to approx. €2.3 billion EUR (SAP SE, 2016). The Cloud-based ERP solution is offered either in a public Cloud or a private Cloud. The SAP S/4HANA Cloud is a public Cloud which is deployed by globally available SAP data centers. The Cloud edition offers a quarterly innovation cycle through innovation packages (Wagner & Mathäß, 2016). In order to prevent technical issues regarding the frequent innovation cycles, customization is not intended. The public Cloud edition is designed for companies which need standardized Cloud integration offerings that cover the core business processes (Gellaw, 2016). *"Based on the built-in functionalities of the guided configuration the customer (optionally supported by consulting and implementation partners) implements his business scenarios and business processes"* (Wagner & Mathäß, 2016, p. 18). Furthermore, it covers specific business scenarios: finance, accounting, controlling, procurement, sales, manufacturing, plant maintenance, project system, and product lifecycle management (Gellaw, 2016). S/4HANA in a private Cloud is provided either by SAP or SAP partners (Partner Managed Cloud). The private Cloud environment is realized through SAP HANA Enterprise Cloud (Gellaw, 2016). The managed private Cloud is especially interesting for SAP's partners who host the Cloud-based ERP system (Drilling, 2015). Additionally, SAP HANA Enterprise Cloud provides a platform which enables partners and customers to build tailored applications. Non-SAP solutions, as well as new developed capabilities, can be integrated using APIs (Gellaw, 2016). Partners can develop their services and provide their industry specific solutions and unique features to their customers. According to Hasso Plattner, co-founder of SAP, the on-premise edition is still necessary due to legal requirements especially in the Healthcare industry (Drilling, 2015).

4.1.2.2. Value network analysis of SAP S/4HANA

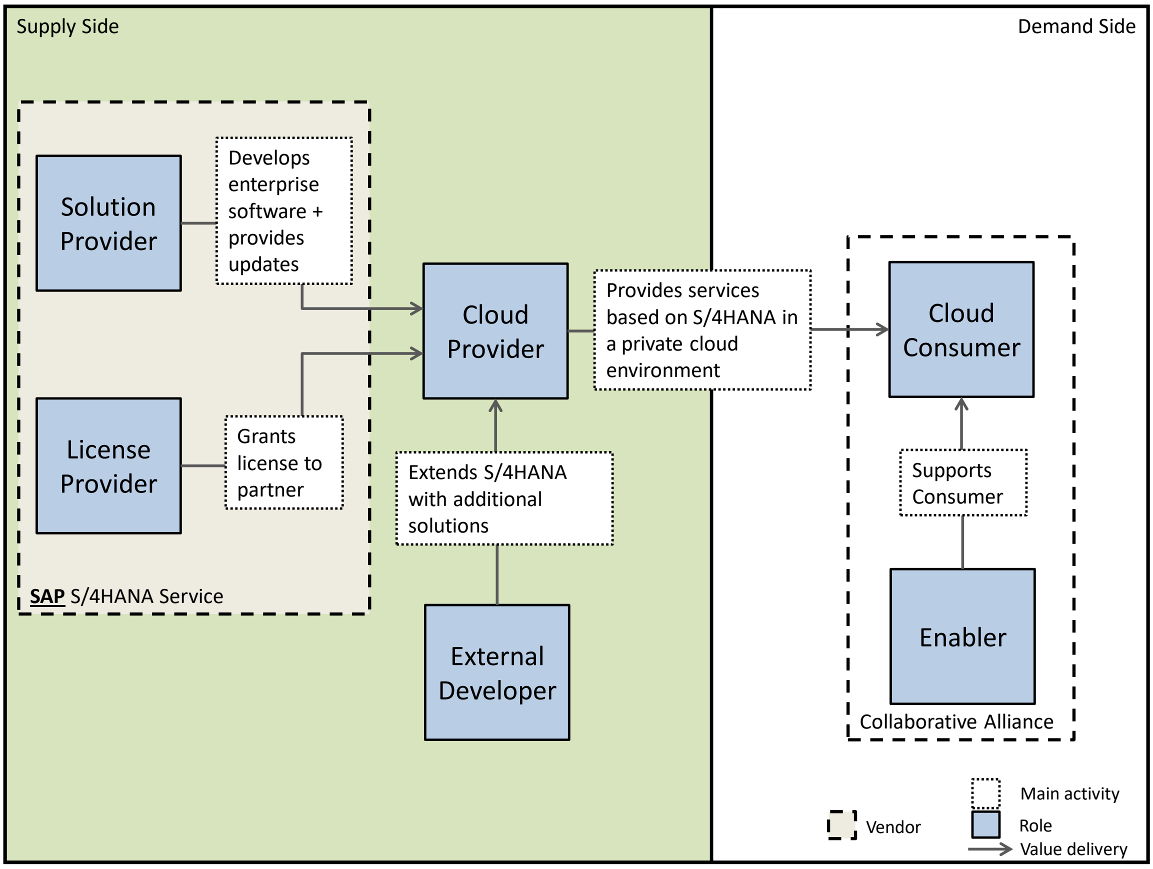
As already mentioned the elaboration of the value network focuses on the scenario where a SAP partner hosts the ERP solution in a private Cloud and delivers the subscription in the form of packaged and managed services. However, this scenario includes three sub-scenarios depending on the starting point of the customer: New Customer, Non-SAP HANA Customer, or SAP HANA Customer. By analyzing the value network of SAP S/4HANA provided through SAP Partner Managed Cloud, following roles can be detected: (1) *License Provider*, (2) *Partner Managed Cloud Provider*, (3) *Enabler*, (4) *Cloud Consumer*, (5) *Solution Provider*, and (6) *External Developer*.

(1) The *License Provider* owns the right to grant licenses for deploying and providing SAP S/4HANA in a Cloud environment. In this case, SAP grants SAP partners to host solutions based on SAP HANA technology in a private Cloud. (2) The *Partner Managed Cloud Provider* is the SAP partner who hosts the Cloud environment on his infrastructure. The SAP partner is allowed to extend the SAP S/4HANA solution with industrial specific applications. Thus, based on the partner's competencies, the partner can develop services including unique technological features and services such as SaaS, PaaS, or IaaS. For instance, services can include migration, implementation, and other support. As the private Cloud environment is tailored to the consumer's requirements, the partner can support the customization, modification, and testing process. (3) The *Enabler* supports the consumer in the whole implementation process depending on the consumer's capabilities. Support includes e.g. the calculation of the total cost of ownership, analysis of solutions available, selection of the right provider, or building and maintaining the infrastructure for a hybrid Cloud. The role of the *Enabler* is played either by the SAP partner or by an independent consultant. (4) The *Cloud Consumer* is the client of the *Partner Managed Cloud Provider* and uses the provided service. The clients need to analyze the activities related to procuring the private Cloud service to identify which support is necessary by partners or consultants. (5) SAP not only grants licenses to partners but also acts as a *Solution Provider* by developing the enterprise software S/4HANA further. The *Solution Provider* improves S/4HANA regarding security, performance, functionality, and interaction with other applications. Furthermore, this role provides updates and upgrade packages to the *Partner Managed Cloud Provider* who deploys S/4HANA according to the license agreements. (6) *External Developers* are non-SAP developers who offer value-adding software which extend the core functionalities of the enterprise software. Those solutions can be included in the service provided by the *Partner Managed Cloud Provider*. Roles, actors, and activities are described in detail in Table 10, and the value network is illustrated in Figure 11.

Table 10: Roles, actors, and activities of SAP S/4HANA

Roles	*Actors*	*Activities*
License Provider	SAP	Grant term license to partner for providing SAP solutions to customers Align together with partner on customer solution and territory
Partner Managed Cloud Provider	SAP partner (SAP HANA Partner Managed Cloud / private Cloud hosting)	Offer packaged solutions to potential customers including e.g. migration, implementation, and support Develop terms, conditions for subscription-based software pricing together with a sales team to position the service Build extensions for SAP S/4HANA technology tailored to an industry or solution that can be reused by several consumers Offer SaaS, PaaS, or/and IaaS Build specific extensions of SAP S/4HANA according to customer needs Responsible for system maintenance; includes execution of patches and released upgrades, employing IT staff, investing in infrastructure Control over speed of innovation and planned downtimes according to SLA with customers Give feedback to License Provider and Solution Provider Consider also non-SAP extensions for the provided service Scenario A: New Customer Deploy new installation with standardized best practices processes Scenario B: Non-SAP HANA Customer Upgrade the customer's system to latest enhancement package Migrate database from any DB to SAP HANA Deploy exchange innovation /SAP S/4HANA Core Implement customers Cloud system Scenario C: SAP HANA Customer Deploy one-step procedure to move to SAP S/4HANA Core Implement customers Cloud system
Enabler	SAP partner, independent consultant	Supports Cloud Consumer according to customer’s know-how e.g. implement highly individual requirements for business processes and customization, migration of master and transactional data, connect Cloud solution into existing other application in use
Cloud Consumer	Customer of partner/ organization	Analyze and identify appropriate service provider Conclude the contract with partner Collaborate with partners or consultants Migrate transactional and master data Implement and customize individual requirements of business processes
Solution Provider	SAP	Develop further the enterprise software S/4HANA regarding security, performance, functionality, and interaction with other applications Provide updates and upgrade packages to the *Cloud Provider*
External Developer	Non-SAP developer	Offer value-adding software which extends the functionality of SAP S/4HANA and solves a specific problem

Figure 11: Value network of SAP S/4HANA



4.1.3. Case 3: Salesforce Sales Cloud

This chapter contains the analysis of the value network of Salesforce. The SaaS Sales Cloud technology is introduced and the value network is analyzed. This case focuses on the scenario where Salesforce provides the Sales Cloud to the customer in a public Cloud environment.

4.1.3.1. Description of Salesforce Sales Cloud

Salesforce was the first company which provided enterprise software through a Cloud environment and still continues its leadership position (Kram, 2016). Thus, Salesforce reinvented the CRM software market by shifting the on-premise CRM into the Cloud (Salesforce, 2016b). In 1999, as probably the very first Cloud-based enterprise software, the CRM solution Sales Cloud was introduced which is used by over 100,000 customers, from small to large companies, today (Boillat & Legner, 2013). Salesforce is one of the fastest-growing businesses in the software industry and created more than $5 billion USD revenue in 2015 (Salesforce, 2016b). Salesforce's most prominent product is Sales Cloud, but there are also other Cloud-based solutions supporting marketing, services, analytics, and communities. Main functionalities of Sales Cloud are account and contact management, partner management, sales prognoses, and opportunity management. The scope of functionalities depends on the subscribed Sales Cloud edition. The editions start from basic functionalities (SalesforceIQ CRM

Starter) for 25 EUR per user per month and go up to special featured functionalities, customer support and development and testing environments for customization (Lightning Unlimited) for 300 EUR per user per month. Sales Cloud offers standardized best practice processes which cover most of the customers' requirements; thus, further development is only necessary for specialized industries and distribution processes. The Cloud-based CRM solution can be purchased through a minimum one-year subscription. Additionally, Salesforce provides an open market platform, Force.com, for external parties such as customers or vendors to develop add-ons (Cusumano, 2010; Marston et al., 2011). Force.com is a PaaS environment which operates the applications and provides several developer tools and methods. More than 300,000 developers subscribed for using Force.com (Boillat & Legner, 2013). The developed applications are distributed through the market platform AppExchange which offers more than 3,000 applications (Salesforce, 2016a). AppExchange applications are web-based applications or components that interoperate with the Force.com platform (Salesforce, 2016c). Salesforce works with own data centers as well as with third-party infrastructure providers to supply public Cloud offerings to their clients. Due to the fast growing customer base, Amazon Web Services was recently named as a preferred public Cloud Provider for the SaaS solutions. Still, Salesforce runs and develops its data centers but due to the rapid global growth Salesforce need to utilize third-party providers' infrastructure (Harris, 2016). Furthermore, Salesforce certifies partners who support the implementation, customization and training of Sales Cloud at the client's place (Salesforce, 2016c). Partners have access to the Foce.com platform, webinars, training workshops, and communities around specific business functions, product areas, and industries (Salesforce, 2016d). Salesforce introduced a standardized revenue sharing model which says that 25 percent of net income through licensing belongs to the partner.

4.1.3.2. Value network analysis of Salesforce Sales Cloud

By analyzing the value network of Salesforce Sales Cloud as a public Cloud service, following roles can be defined: (1) *Application Provider*, (2) *Platform Provider*, (3) *Infrastructure Provider*, (4) *Market Platform Provider*, (5) *Partners*, and (6) *Cloud Consumer*, and (7) *External developer*.

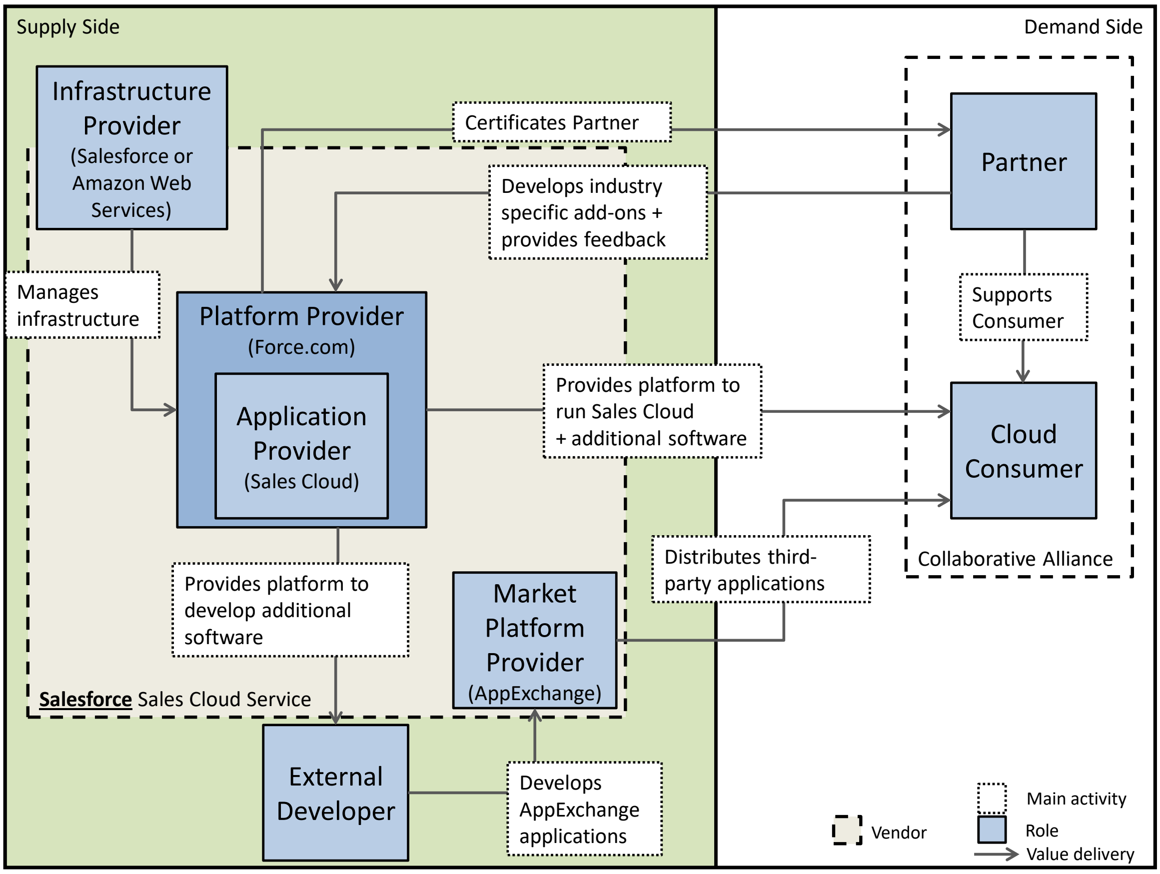
(1) *Application Provider* is Salesforce which provides Sales Cloud in a SaaS manner. Additionally, Salesforce acts like a (2) *Platform Provider* in the form of Force.com by offering environments to operate, customize, and test the Sales Cloud application and develop other value-added software services. The PaaS model offers tools, development, and test environments, and other components to build an application for Force.com (3) The *Infrastructure Provider* is either Salesforce or a third-party provider that takes care of infrastructure management. Recently, Amazon's service Amazon Web Services was announced as a preferred *Infrastructure Provider*. In order to offer and distribute third-party applications that have been developed on Force.com, Salesforce developed a Market Platform called AppExchange and, thus, acts as a (4) *Market Platform Provider*. (5) *Partners* play a crucial role as they support the customer in implementing the service. This does not only include technical

assistance, such as the integration in existing infrastructure but also help in applying new business processes at the client's organization. (6) *Cloud Consumer* uses the provided service and relies on *Partner's* know-how to successfully integrate the service into the business processes. (7) The *External Developer* creates new software which solves specific problems or offers business-critical features. The content created by *External Developers* is distributed through the Market Platform AppExchange. Main roles, actors, and activities are summarized in Table 11, as well as the value network is illustrated in Figure 12.

Table 11: Roles, actors, and activities of Salesforce Sales Cloud

Roles	***Actors***	***Activities***
Application Provider	Salesforce	Provide the Cloud-based CRM Sales Cloud in a SaaS manner Develop further the service according to customers' needs and technical advances
Platform Provider	Salesforce (Force.com)	Offer platform with tools, development environments, test environments, and methods to create value-added software Offer platform to operate Sales Cloud, partner applications, and third-party applications
Infrastructure Provider	Salesforce data centers, Amazon Web services, and other third-party providers	Provide and maintain infrastructure Storage and database capacity management High availability and disaster recovery Infrastructure capacity, scale up and down Infrastructure Management and deployment Data center networking, Power & Cooling Backup database Determine a disaster recovery plan
Market Platform (AppExchange) Provider	Salesforce	Offer platform (AppExchange) which distributes third-party provider AppExchange applications Review submitted AppExchange application of an external developer or partner Develop and update AppExchange listing
Partners	By Salesforce approved and certified person or companies	Sell the service to clients Offer implementation, integration and customer development services Collaborate with Salesforce employees e.g. giving feedback about customers' challenges Review, test and install AppExchange applications Support customer regarding customer's business processes and Salesforce standardized best practices approaches
Cloud Consumer	Company that has purchased Salesforce's services	Conclude the contract Application Provider Collaborate with partners or consultants Implement and customize individual requirements of business processes Analyze which best practices processes from the application can be adopted
External Developer	Non-Salesforce developer	Offer value-adding software which extends the functionality of Sales Cloud and solves a specific problem

Figure 12: Value network of Salesforce Sales Cloud



4.2. Cross-case conclusion

All presented cases show value networks containing at least the vendor, partner, external developer, and consumer. While the vendor and the partner can act in different roles, external developers and consumers follow mainly the same activities in each case. The vendor can serve as an all-round solution provider such as Microsoft in case 1 where it provides the core application but also manages the infrastructure and offers SaaS, PaaS, or IaaS solutions through Microsoft Azure. Similar to that is the case 3, except that Salesforce also relies on third-party services such as Amazons Web Services. In contrast, case 2 shows that vendors do not necessarily have to provide the core application's functionalities to consumers; instead, vendors act as License Providers and hand over the role of the Cloud Provider to partners. Thus, partners play a crucial role either as a provider of the core functionalities of the product (case 2) or as a supporter of the consumer regarding the implementation of the product (case 1 and 3). The consumer collaborates with third-parties (partner or enabler) to compensate the lack of knowledge and purchase expertise and resources to accomplish the implementation project. Microsoft even provides a collaboration platform where partners and customers can jointly manage the lifecycle process of applications in use. The Cloud-based enterprise applications presented in the cases offer possibilities to extend its functionalities through additional applications. Thus, actors of the value network can add value to the core application by developing and running their add-ons via PaaS. Thus, PaaS offers a platform to extend the main offering with value-added services which is also in line with the business model Enterprise SaaS+PaaS stated by Boillat and Legner (2013) (see chapter 2.4.4.). The market platform is the distribution channel for such value-added services. Although SAP offers the market platform SAP Store and the SAP HANA Cloud Platform, these platforms contain rather fewer content for the Cloud-based ERP solution S/4HANA compared to Salesforce and Microsoft. However, interviews with SAP partners have shown that SAP currently works at high pressure to extend their add-on portfolio. Furthermore, the SAP case is about a partner managed private Cloud which focuses on individualized customer requirements; thus, the SAP Store does not play a main role.

When enterprise software is provided in a public Cloud (case 1 and 3), functionalities rather base on standardized and best practice approaches. As many virtual instances of customers have to be hosted by the vendor, modified applications will enormously increase maintenance cost. For example, after an update or upgrade of the system, the Cloud Provider has to test whether the customers' services are still operating correctly. If each virtual machine would follow different approaches, the Cloud Provider could not ensure error-free operating which equals an infringement of the SLA. Nevertheless, the public Cloud services are to some extent customizable which still ensures error-free functionality even after major updates or other events. However, in return, this has consequences for consumers as well as partners and other consultative companies. While on-premise solutions used to be modified and customized regarding the customer's processes, Cloud-based enterprise software dominates with best practices processes which need to be adopted by the consumer. Therefore, consumers need advice regarding business process management in order to sufficiently implement organizational processes that harmonize with best practices of the vendor. Whereas, the partner managed private Cloud (case 2) adjusts itself to the requirements of the consumer and shows a high level of customization and modification possibilities. In this case, partners create value for their customers, on the one hand, by hosting the infrastructure needed for the service, and on the contrary, by supporting the customer regarding the implementation, development, and modification of the enterprise software. Certainly, this depends on the expertise and resources of the partner.

The Microsoft Dynamics AX case represents an extraordinary value network with Collaboration Platform and Service Engineer. The Collaboration Platform Provider supports customers and their partners to follow more standardized solutions according to LCS. This is in line with the best practices approach of Microsoft Dynamics AX. Also, the Service Engineer role in the Microsoft case represents a unique constellation. As the Service Engineer provides services all around the productive environment of the consumer, a continuous service can be guaranteed. As the case of Microsoft is rather new, future will show whether this constellation proves useful.

The cases indicate that the shift from on-premise to Cloud Computing does not mean that roles, actors and value-added activities related to IT just disappear. Instead, the activities appear no longer at the client's place but in someone else’s activity field. From the customer’s perspective, Cloud Computing means a shift of complexity from his on-premise infrastructure to the vendor or the partner. Also, consumers need to analyze whether best practices fit their current or future business model. If this is not the case, a private hosted environment or on-premise might be the more appropriate deployment model.

4.3. Expert interviews

The interviews have shown that traditional on-premise vendors such as Microsoft and SAP enormously intensify marketing activities regarding Cloud-based enterprise software. Interview partners recognize a turning point where vendors now start to relocate their strategic focus on becoming a Cloud Computing service provider. Furthermore, vendors encourage partners and external developers to shift additional software solution into the Cloud by using the vendors’ Cloud-based development platforms. In fact, experts acknowledge that their organizations already test in-house products on Cloud-based platforms to offer both on-premise and Cloud-based technology. By focusing on the new Cloud Computing business area, vendors seem to neglect relationships with partners still operating in the on-premise area: *“Recently, we acquired an important customer for an ERP project. However, when we communicated the achievement to VENDOR*[2]*, we realized that on the vendor’s side no one cares as long as the client signed for an on-premise solution ”* (E 13). This is also in line with findings of previous researchers. For instance, Hedman and Xiao (2016) describe challenges of vendors when starting to compete strategically with SaaS offerings. Hedman and Xiao (2016) report on the lack of communication and uncertainty of partners regarding their future business model.

The vendor’s business transformation from a reseller model to a service provider model does not only affect the vendor but also other actors involved in the value network. One critical aspect mentioned by interviewees is the payment of VARs and other partners. It is a challenge for actors in the value network as the transformation means a change of the revenue streams. On-premise solutions generate short-term revenues by selling the license, implementation projects, maintenance agreements, and contract renewals. Whereas, Cloud Computing generates long-term monthly revenue based on clients subscriptions, while revenue from implementation projects are rather small. Furthermore, the clients’ commitment towards Cloud-based enterprise software is rather low compared to on-premise solutions as fewer investments are required regarding e.g. IT infrastructure. Thus, capital expenditures are inconsiderable which increases the risk that clients switch to another solution after a short period of time. Therefore, partners still prefer to sell on-premise products to the clients. From a vendor’s perspective, in order to enforce Cloud Computing, not only benefits for customers need to be highlighted but also more incentives for partners are required.

The participating experts of this research can be divided into two groups, advocates of standardized enterprise software and opponents of standardized software. As already detected in the case studies,

[2] Anonymized by author

especially software provided through the public Cloud offers limited customization possibilities. Therefore, the standardized processes applied in the Cloud need to be adopted by the consumer. While advocates of standardized enterprise software say that the customizing possibilities are still sufficient enough to fulfill requirements of customers, opponents argue that there is not such encompassing software that covers all potential clients' business processes. *"There is always need to modify the software so that the customer's business processes are applicable in the software"* (E 3). Although the main functionalities of on-premise and Cloud-based applications are the same, some experts report issues to map customers' workflows in the system. In this regard, customers show uncertainty and question the functionalities of the Cloud-based application. In contrast, partners analyze the client's business processes and realize that the approach used in the Cloud-based enterprise software might work much more efficient for the client. Experts agree that, in general, the standardized approach fulfills requirements of SMEs, but business processes of large companies are too complex and unique. However, one can notice that a number of individualized solutions decreases and the number of pre-defined best practice solutions increases but still need to be customized to some extent. Thus, for Cloud Computing implementation projects the conformity of customer's business processes and the Cloud-based enterprise software needs to be sufficiently analyzed. Therefore, expertise regarding business process management is necessary. According to the information received from the interviews, business process management constitutes a significant part of Cloud Computing implementation activities. As partners often have business process expertise of specific industries and customers, they still play a major role in the value network. However, one needs to consider that these expertise results from long-term relationships with clients and operations in the industry: *"That knowledge cannot be easily transferred through three days workshops to new employees; so, experienced consultants are more important than ever"* (E 7).

Experts believe that the technical consultation in public Cloud-based implementation projects constitutes a minor role because of one main reason; the IT complexity at the client's place disappears and shifts to the Cloud Provider. As the customer does not need to deploy the application on-premise, less technical support is required e.g. regarding the procurement of hardware, installation of the software, and technical operation. Furthermore, the customization of the application is less time-consuming due to best practice approaches followed by the application. Moreover, a lot of customizing can be realized without coding skills via pre-defined building blocks. Some experts argue that as soon as the standardization of enterprise software prevails, also customization activities will become marginal. However, this is mostly the case for public Cloud deployment models, whereas private Cloud enterprise software focuses more on individualized solutions for consumers. In this case, the Cloud Provider establishes a private environment for the consumer which allows individualized modifications according to the business processes of the customer. However, technical expertise is always necessary for the migration of data and definition of interfaces to enable the communication between the Cloud Computing application and other existing applications. Indeed, most applications offer interfaces following a technical industry standard. Nevertheless, the consistent communication between the applications needs to be developed and tested. Interviewees state that customers prefer to purchase Cloud-based services that are self-contained and have little interaction with other applications e.g. travel expense accounting, mobile device management, service request management. Additionally, for setting up a hybrid deployment model, technical concepts need to be developed to ensure the smooth interaction e.g. between on-premise software and the Cloud-based application. Moreover, experts prognosticate that the development of mobile applications will have more relevance due to Cloud Computing. Mobile Cloud applications are designed to be accessed by portable devices. Customers ask especially for mobile reporting applications which allow managers to track operational events on their phone or tablet while they are away on business.

As the technical consultation seem to decrease, the project management of enterprise software rollouts changes. For instance, the time to market of Cloud-based enterprise software is significantly decreasing due to the best practices approaches and minor technical implementation. *"The implementation of an on-premise ERP system takes several months, whereas we talk about weeks when implementing Cloud solutions"* (E 7).While traditional project management follows a sequential approach such as the Waterfall Model, modern concepts apply agile software development e.g. the Scrum Model. The Waterfall Model represents a rather rigid and sequentially process starting with the analysis of requirements, designing, coding, and testing. In contrast to that, the Scrum Model was designed to stay flexible and respond quickly to ad hoc requests and changes in the requirements. Therefore, the implementation is divided into smaller self-contained working packages and realized in so-called short-term sprints. Hence, costumers are able to try out innovative ideas or quickly test different approaches in the Cloud.

Another aspect that has been reported by interviewees is that a partner hosted systems is not an innovation that came with Cloud Computing. However, with the Cloud Computing technology the hosting of customers' enterprise systems become easier as the purpose of the software is to run in the Cloud. Nowadays, vendors have established themselves as service providers; they more and more penetrate the market of partner managed Cloud environments by rising license prices for partners and offering substitute services. Thus, hosting enterprise software in a private Cloud environment becomes less attractive for partners. *"VENDOR[3] wants to conquer the whole market and squeeze companies which operate downstream the value chain"* (E 6). This is in line with the longitudinal case study investigation of Ojala and Helander (2014) who observed that partners services had been replaced by the vendor's Cloud Computing services. Furthermore, this forward integration trend of the vendor describes Wise and Baumgartner's (1999) call to 'go downstream' within the supply chain by introducing services into their offerings to create new profit compulsion and competitive advantage.

[3] Anonymized by the author

Experts experience data security and privacy concerns of the consumers of the service. Especially medium-sized firms show resistance to give up control of their data. Customers want to know where the data is stored and under which circumstances. The interviewees assure that their data centers follow higher security standards than most of their clients as data security is usually not customer's core business. However, persuasive power is necessary to convince potential clients that Cloud Computing services carefully handle their data. In fact, in times of cyber attacks, USA PATRIOT Act, and company spying, customers are afraid of losing control of confidential business critical data. Whereas, small ventures show different behavior as the benefits of Cloud Computing outweighs security concerns. Another aspect is the license policy of Cloud Providers as they seem to be not transparent for potential customers. Experts claim that the clients are overstrained and need support to overcome the lack of clarity to clarify which services are included in the contract and which additional services the customer is charged for (e.g. customization). This is becoming particular complex when several services are received. Therefore, often consultants act as Service Aggregator or Multi-Supplier Integrator which task it is to bundle several services and provide them with a single contract to the consumer. Moreover, customer's decision-makers need financial advice regarding capital budgeting, particularly, Capex and Opex. Customer need to understand that the upfront investments into e.g. hardware (Capex) are much fewer compared to on-premise solutions. The costs for operating the service (Opex) adjust themselves to the volume of business operations of the customer. Interviewees report that more and more large enterprises are interested in reducing their carbon emissions and consider Cloud Computing as a way to lower their carbon footprint (environmental benefits of Cloud Computing are stated in chapter 2.2.2.2.). Thus, consultation in respect of environmental impact through Cloud Computing is becoming more relevant such as applying the Life Cycle Assessment. However, one needs to consider that, so far, the reduction of carbon footprint is rather seen as a side effect than the main reason for purchasing Cloud Computing services. Nevertheless, achieving a climate neutral business is the vision of many companies, e.g. Siemens, and positively affects company's reputation (Siemens AG, 2016).

4.4. The generic value network for Cloud-based enterprise software

The multiple case study offers insights into specific Cloud-based enterprise software solutions. Also, the interviews with experts enrich the information from the cases with deeper knowledge. Based on both methods conclusions about how the value network of enterprise software solutions changes as a consequence of shifting from on-premise to Cloud-based technology can be derived. Furthermore, a generic value network for Cloud-based enterprise software is elaborated as an outcome of the empirical research.

Understanding the client's and industry-specific business processes becomes more crucial for the implementation of Cloud-based enterprise software. The refocus from technical consulting to business process consulting comes along with the shift from on-premise to Cloud Computing. As the IT infrastructure at the client's place becomes less complex, and the enterprise software becomes more standardized, the role of the consultative partner changes from an IT-intensive role to a more business process management role. The consultation by partners, therewith, is not limited to IT related topics but also impacts far-reaching organizational decisions. However, besides the consultation and implementation, partners also need to sell the service to the consumers. Therefore, building a trustful relationship not only with customers' IT departments or CIOs but also with other customers' decision makers becomes a key success factor. Whereas, the technical consulting still keeps its relevance due to data migration, interface definition, customizing, and mobile application development. However, one needs to differentiate between the deployment models. While enterprise software that runs on private and hybrid environments requires most technical support, enterprise software on public Cloud environments demands more business process support. In the latter case, workflows of the client need to be analyzed and compared to the best practices approaches of the Cloud-based enterprise software; the outcome is either the customization of the enterprise software (if possible) or the transformation of client's business practices according to the best practices. Certainly, smaller customizing activities without deeper technical knowledge are always the case such as renaming columns or changing currency. Furthermore, the shift also changes project management concepts to a quicker and agile approach which better fits the rapid implementation process of Cloud-based applications. Moreover, IT security demands more attention and educational work at the client's place. Additionally, partners can act as Service Aggregator to bundle appropriate services into a single service which, at the same time, simplifies license policies for consumers. Furthermore, partners can utilize their client and industry specific knowledge to offer clients a suitable solution through a partner managed Cloud. New service fields can be detected in regard to financial and environmental consultation.

The vendor role transforms from a software producer to a service provider. Thus, the vendor acts in several roles, namely: Infrastructure Provider, Platform Provider, and Application Provider. The vendor, on the one hand, develops and improves the enterprise software solution, and on the other hand, provides and ensures the flawless functionality as a service. Therefore, vendors have to manage infrastructure to offer the service by either third-party provider or own data centers. Enterprise software functionalities come as SaaS, but additional services such as PaaS and IaaS can be purchased by the consumer. The design of the public Cloud enterprise application is dominated by pre-defined best practices with limited modification possibilities that in return facilitate maintenance. Microsoft even provides a collaborative platform for that which contains best practices frameworks which can be adapted by users. However, the standardization approach is perceived differently by actors of the value network. The vendor also licenses partners to host the enterprise software solution (License Provider) for the consumer to offer industry and client specific solutions. As partners still play a crucial role in the value network, vendors still contrive partnership programs. On the basis of the market platforms external developer can offer and distribute their value-added solutions more easily. Due to the Cloud technology, software development of mobile Cloud applications receives more attention for external developer and partner.

From the consumer perspective, IT infrastructure becomes less relevant; thus, consumers neither perform system administration nor install the software locally. Instead, the consumer focuses on integrating the service into his business processes. Talking about public Cloud Computing, one also needs to consider that the staffing of IT specialists can be reduced as long-term high sophisticated IT know-how is not required. This is not the case if the deployment model is a hybrid Cloud. Furthermore, the consumer needs to analyze in which regards he needs advice and support by a partner or independent consultant. This depends on consumer's resources and know-how. Moreover, the consumer should monitor SLA critical performance indicators and if necessary report violations to the Cloud Provider. Additionally, consumers can take advantage of the rapid deployment of services by trying out the new Cloud-based technology.

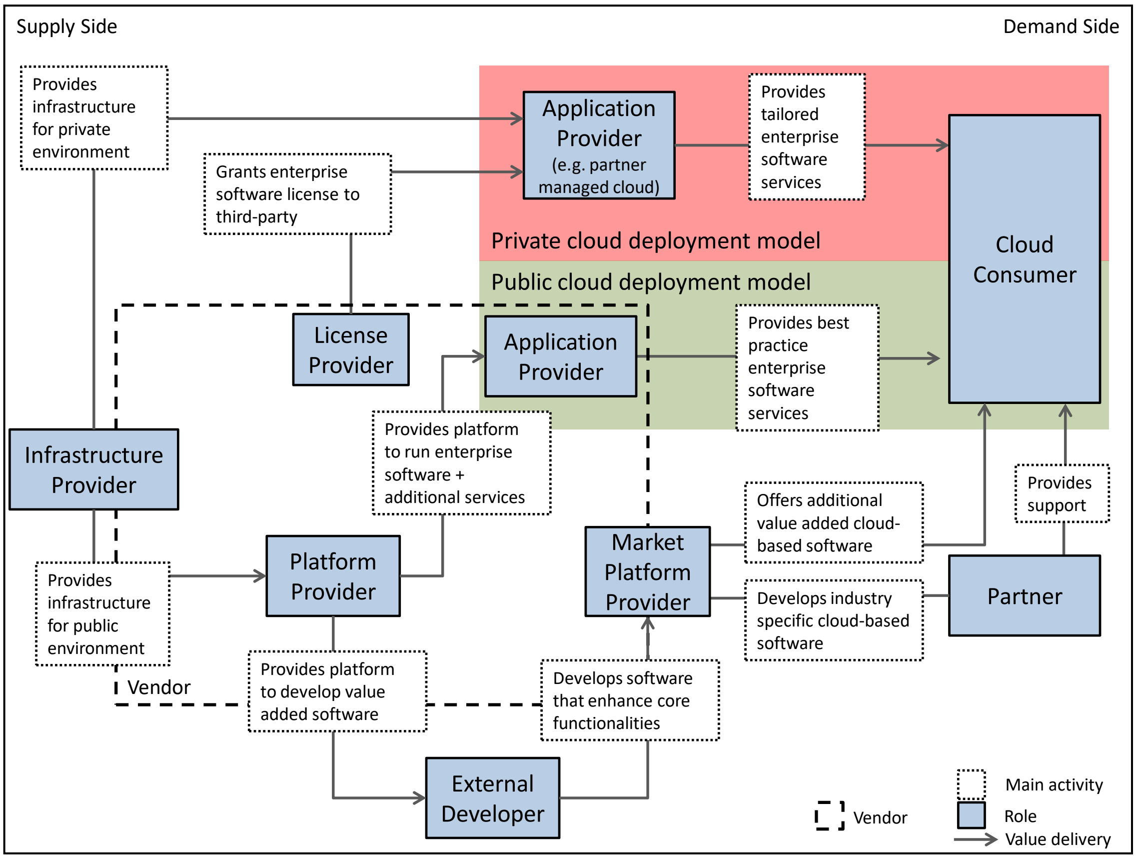
The main roles, actors, and activities of the generic value network of Cloud-based enterprise software are listed in Table 12. Figure 13 provides an overview of the value network.

Table 12: Generic Cloud-based enterprise software roles, actors, and activities

Roles	*Actors*	*Activities*
Partner	Certified partner of vendor / independent consultant	Perform customer relationship management Sell the service to the Consumer Apply agile project management Provide technical consultation (e.g. implementation, interface development, data migration, customizing, mobile Cloud applications) Provide business process management consultation Provide IT Security consultation (e.g. educational work, security configuration, and identity management) Provide license consultation Provide Service Aggregation / Multiple Supplier Integration Provide financial consultation Provide environmental consultation Offer industry specific services through market platform Provide partner managed Cloud to tailor services according to customer's needs
Application Provider	Vendor or licensed partners	Provide the Cloud-based enterprise software functionalities in a SaaS manner Develop further the service according to customers' needs and technical advances Provide the SaaS either in a private or a public environment
Platform Provider	Vendor	Provide a platform to consumers, partners, and external developers which offer an environment for developing Cloud-based software
Infrastructure Provider	Vendor or third-party provider	Provide and maintain infrastructure

		Storage and database capacity management High availability and disaster recovery Infrastructure capacity, scale up and down Infrastructure Management and deployment Data center networking, Power & Cooling Backup database Determine a disaster recovery plan
License Provider	Vendor	License partners to deploy the enterprise software solution in a private Cloud environment
Cloud Consumer	Customer / Client	Analyze and identify appropriate service provider Analyze in which regards support and consultation is required through a partner Use the enterprise software functionalities Collaborate with partners Integrate the SaaS into business processes Adopt best practice approaches or map business processes in the system Harmonize on-premise applications with Cloud-based application (hybrid Cloud) Migrate transactional and master data Use PaaS to develop, test, or prototype new functionalities Monitor SAL critical performance indicators and report violations
External Developer	Independent non-vendor developer	Develop value-added software/ add-ons that enhance the core functionality of the enterprise software
Market Platform Provider	Vendor or independent provider	Offer platform which distributes value-added Cloud-based applications Review submitted application of an external developer or partner

Figure 13: Generic value network of Cloud-based enterprise software



Chapter 5: Conclusion and Discussion

This chapter provides the conclusion of this present research based on the previous chapters. Furthermore, managerial implications are derived from the generic value network for D-VAR as an example. Finally, limitations of this present research and further research fields are discussed.

5.1. Conclusion

Cloud Computing is rapidly gaining ground in the enterprise software market which influences the way enterprise software is developed, distributed and implemented at the client's place. Traditionally, enterprise software has been distributed and implemented on-premise through VARs and other consultative companies in protracted rollout projects. Hence, Cloud Computing does affect not only the vendors' business models but also other actors of the business ecosystem. This present work aims to find out how the value network of enterprise software solutions changes as a consequence of shifting from on-premise to Cloud-based technology. Therefore, four sub-questions have been defined which give this research a clear structure. In order to conclude this present thesis, each sub-question will be answered.

The first sub-question initiates the literature review and aims to find out what the shift from on-premise to Cloud-based enterprise software means. The shift towards Cloud Computing means the transformation from a physical product into a service provided over the internet. In other words, the enterprise software is no longer physically installed at the client's place; instead, the functionalities are provided as services which the client subscribes for. The introduction of services into a goods-dominant industry is also known as servitization and has been broadly discussed in the literature. Servitization can be viewed as a trend or strategy that focuses on customer's needs by providing integrated bundles of products and services. However, the shift from on-premise to Cloud-based technology is only partly in line with the concept of servitization. In contrast to Cloud Computing, servitization rather declares services as completions of products than substitutions of products. Therefore, the emerging Cloud Computing technology in the IT industry represents a new paradigm of servitization. Especially for enterprise software, the shift into Cloud Computing obtains explosive nature as it is characterized by high complexity and a decisive factor for business operating success.

The second sub-question focuses on roles, actors, and activities that exist in a value network of on-premise enterprise software solutions. Therefore, this work reviews the fundamental literature about value creation logic and business ecosystems respectively value networks. A business ecosystem is described by a value network of several actors who are involved in the provisioning of services or products around a specific platform (Moore, 1993). As the specific enterprise software solution represents a technology platform, many stakeholders of the business ecosystem are apparently facing a fundamental change due to Cloud Computing. Therefore, stakeholders need to understand how the ecosystem is going to change to adopt the new technology and transform their competencies into new value propositions for customers and other stakeholders. Previous investigations on roles, actors, and activities of an on-premise enterprise software value network are discussed and summarized in Table 5 and Figure 6. There are three main functions, namely: vendor, partner, and customer. While the vendor develops the software and does marketing, the partner, in the form of a VAR or implementation partner, sells the software and supports the customer in mainly technical regards. The customer takes care of the technical and organizational rollout of the on-premise enterprise software. Furthermore, the client’s responsibility is to ensure sufficient operation of the enterprise software by staffing IT experts for administration and continuously improve IT infrastructure regarding performance, storage, and security.

The next sub-questions aims to find out more about roles, actors, and activities in a value network of Cloud Computing. To answer the question, literature about Cloud Computing value networks is reviewed. The review includes previous research which investigates the value network of Cloud Computing solutions from different focuses and angles. Based on that, this work brings together the findings into one overview of roles, actors, and activities which are summarized in Table 6. According to literature, the Cloud Provider offers SaaS, PaaS, and IaaS to the Cloud Consumer. While the Cloud Provider ensures the flawless service delivery, the Cloud Consumer uses the service in a pay-as-you-go manner. Furthermore, there are also supportive roles in the value network such as Enabler, Cloud Carrier and Cloud Broker (respectively Consultant or Service Aggregator). However, in the regard of supportive roles, literature is not compliant with the designation of roles and the allocation of activities. Moreover, there are control roles such as Cloud Auditor and Regulator. Additionally, the Market Platform Provider brings together Cloud Consumers and Cloud Provider by distributing Cloud-based solutions.

As enterprise software differs from other conventional software (see chapter 2.3.), the final sub-question aims to find out which roles, actors, and activities emerge, disappear, and/or change in a value network of Cloud-based enterprise software solutions. In order to answer this question, this present work uses a multi-method qualitative study by applying a multiple case study and a survey in the form of semi-structured interviews with experts (see chapter 3). The outcome of the empirical research is a generic value network for Cloud-based enterprise software which is summarized and illustrated in Table 12 and Figure 13. In the following, this present work points out the main conclusions regarding the change of the value network of enterprise software as a consequence of shifting from on-premise to Cloud-based technology.

Firstly, the shift from on-premise to Cloud-based technology does not mean that roles, actors, and activities related to IT simply disappear. Instead, the activities appear no longer at the client's place but in someone else’s activity field. From the customer’s perspective, Cloud Computing means a shift of complexity from customer’s on-premise infrastructure to the vendor or the partner.

Secondly, as IT infrastructure at the client's place becomes less complex, and the enterprise software becomes more standardized, the role of the consultative partner changes from an IT-intensive role to a more business process management role. This is at least the case when enterprise software is deployed in a public Cloud environment. Public Cloud enterprise software follows best practices approaches, standardized processes, and limited customization opportunities. Therefore, customers in collaboration with partners need to analyze whether best practices fit their current or future business model. If this is not the case, a private hosted environment might be a more appropriate deployment model. However, the vendor’s focus on standardized solutions has advocates and opponents. Nevertheless, both advocates and opponents agree that standardized solutions rather fulfill SMEs requirements; whereas, the best practice approaches are not sufficient for large enterprises.

Thirdly, technical consulting still keeps its relevance due to IT security, data migration, interface definition, customizing, and mobile application development. As soon as the standardization of enterprise software prevails, also customization activities will become marginal. With Cloud Computing IT security demands more attention and educational work at the client's place.

Fourthly, new emerging fields for value-added services provided through partners are financial consulting, license management, environmental consultation, and service aggregation. Financial advice regarding Capex and Opex are of particular importance in the selling process to support the customer regarding the economic evaluation process. This present research has shown that lack of transparency of licenses discourage potential customers to enter into a contract. This also includes the monitoring of SLA critical indicators and can be handled through a Service Aggregator. Many companies aim to reduce their carbon footprint which can be achieved through energy efficient Cloud Computing solutions.

Fifthly, the vendor transforms into a service provider and acts in several roles, namely: Infrastructure Provider, Platform Provider, Application Provider, and License Provider (for partner managed Cloud). Nevertheless, as the business model of vendors changes also the revenue streams for partners change from a short-term revenue stream into a long-term revenue stream. Therefore, vendors need to create new incentives for partners to sell Cloud-based solutions to the customers.

Sixthly, the shift also changes project management concepts to a quicker and agile approach which better fits the rapid implementation process of Cloud-based enterprise software.

Seventhly, the technological platform offers the opportunity for an external developer, partners, and customers to develop applications that extend the core functionality of the enterprise software. Through market platforms, external developer and partners can offer and distribute their value-added solutions more easily.

Finally, as the IT infrastructure becomes less relevant for the Cloud Consumer, he can concentrate on his core business, but needs to consider applying best practices processes when receiving public Cloud services. Furthermore, the Cloud Consumer can take advantage of the rapid deployment of services by trying out the new innovative Cloud-based technology.

5.2. Practical and theoretical implications

This present research provides a number of implications for both theory and practice. It contributes to the IS literature by deriving a generic value network for Cloud-based enterprise software. The generic value network illustrates the value created by each actor and the interaction of the actors. Even though the literature provides a profound basis, this research delivers valuable findings and opens new aspects. For instance, the partners still play a major role in the service delivery process, due to their industry and client specific knowledge regarding business processes which is more crucial than ever. While literature does not correspond with the naming of roles and their remit, this work contributes to theory by determining more precisely roles, actors, and activities. Moreover, this present research demonstrates how service dominated business ecosystems can be studied from a value network perspective. Previous literature rather has a more generic character and states that stakeholder's business model changes due to Cloud Computing. This work provides more in-depth insights of how exactly the roles changes by analyzing in detail the value exchange in a multi-actor setting. Furthermore, this present thesis discusses the emerging Cloud Computing technology in the meaning of the shift from GD logic to SD logic by Vargo and Lusch (2004a) (see chapter 2.2.3.). As a result, the SD logic shows contradictory approaches and needs to be expanded with the upcoming possibilities enabled by Cloud Computing. In line with the critique of SD logic by Grönroos (2011) (see chapter 2.2.1.3.), the distinction between operand and operant resources as well as service and services becomes inappropriate.

The generic value network can be used by practitioners in order analyze the changing business ecosystem. Practitioners can then transform specialized competencies into value propositions with market potential to customers and other stakeholders of the value network. This is demonstrated in the approach at D-VAR. D-VAR's main competence lies in the technical consultation regarding the installation and system administration of Dynamics AX. Moreover, the company possesses industry specific knowledge, particularly in manufacturing, wholesale and distribution. Furthermore, D-VAR develops value-added applications which enhance the core functionalities of Dynamics AX to fulfill industry specific requirements.

The generic value network for Cloud-based enterprise software shows that the role of the VAR respectively partner is still relevant. Regarding the technical focus of D-VAR, the research concludes that the technological complexity shifts from the client's place to the Cloud Provider. Therefore, the technical support regarding installation and system administration needs to be adopted. The expertise of D-VAR can be utilized for offering partner managed Cloud to customers. By providing the partner managed Cloud to customers, the D-VAR transforms into the Cloud Provider and, therefore, can use its technical know-how in-house. However, the company needs to consider that additional investments regarding IT infrastructure are necessary. Beware, this research finds out that vendors are penetrating the partner managed Cloud market by offering substitute services and rising prices for licensing the service. However, technical consulting in regard to IT security, interface development, customizing, and data migration is still demanding by clients. As the D-VAR holds industry specific value-added software applications, two strategic decisions based on this work are evident. First, the value-added on-premise solutions need to be developed in the Cloud-based platform (in this case Microsoft Azure) and distributed as a service through the market platform. Second, this present work suggests transforming the functionalities of the value-added software into mobile Cloud solutions, as the potential of such software is increased through the Cloud Computing technology.

This research states that the role of the consultative partner changes from an IT-intensive role to a more business process management role. Therefore, expertise in customers' workflow and industry specific operational processes is indispensable. D-VAR needs to leverage its expertise in this regards and become a strong partner for its clients in respect of Cloud Computing. This research has shown that potential customers struggle with identifying the scope of licenses and what kind of Cloud Computing concept might be appropriate according to their processes. Therefore, D-VAR can offer support by analyzing customers' processes and detect proper deployment models for their clients by acting as an intermediate between the vendor and the client. Furthermore, the time to market of implementations is decreasing rapidly; therefore, the D-VAR can offer agile project management to fulfill the needs of its clients. Moreover, new emerging fields for value-added services are financial consulting, environmental consultation, and service aggregation which can be added to the D-VAR's service portfolio.

Overall, D-VAR possesses capabilities which offer opportunities to play a role also for Cloud-based enterprise software solutions. Nevertheless, D-VAR needs to change and transform these on-premise capabilities into Cloud Computing relevant competences as conducted in the approach in this chapter.

5.3. Limitation

The generalizability of findings is restricted despite the research design due to several reasons. The case studies only include the two different deployment models, namely private Cloud and public Cloud. As there is also the third deployment model hybrid Cloud, findings might not be applicable to this case. Furthermore, there are much more roles and actors in the value network of Cloud-based enterprise software which cannot be considered in this present research as this goes behind the scope. In fact, this research focuses on the main roles, actors, and activities which are most relevant to value creation in the business ecosystem. Consequently, this research does not claim to be absolutely comprehensive. The cases offer much more variations and scenarios which, in return, would result in more various findings. Due to limited available information, time restrictions and feasibility this present research investigates only single scenarios within the cases. Moreover, as the IT industry is characterized by short innovation cycles, findings of this research might be outdated soon. However, this present research does not investigate how the value networks of the cases evolved over time.

5.4. Further Research

This research's outcome is the first approach towards a generic value network for Cloud-based enterprise software. Further research which considers other cases of different scenarios, deployment models such as hybrid Cloud and enterprise software type can enhance the current model. This study applies the value network role activity analysis by Kijl et al. (2010) but does not investigate on financial streams related to value delivery as well as the calculation of expected benefits and costs. Thus, further research can easily build on this study by applying the quantitative abstract cost benefit model introduced by Kijl et al. (2010). This might also help stakeholders of the value network to understand the new revenue streams due to Cloud Computing which might help e.g. vendors to build incentives for partners to sell Cloud-based solutions. The generic value network of this present research can be extended by investigating external factors such as market or technology developments and regulation which may influence the value network. By combining findings of external factors with longitudinal investigations of value networks, further advances could be made. As already elaborated in this work, the roles and activities change in different scenarios e.g. private Cloud or public Cloud environments. Further research is necessary which investigates precisely on changing second and primary roles and activities when it comes to a change of the scenario. The main findings of this research aid the formulation of hypothesis which can be tested through further quantitative research. Additionally, further research can focus on grievances or gaps between value creation and utilization in the value network of Cloud-based enterprise software and develop hypothetical roles and activities as well as business models in order to overcome such drawbacks or generate new value streams.

Appendix

RESEARCH PAPER OUTLINE

SOFTWARE VENDORS' SERVICE INFUSION:

A GENERIC VALUE NETWORK OF CLOUD-BASED ENTERPRISE SOFTWARE

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Abstract

Cloud Computing is rapidly gaining ground in the enterprise software market, which influences the way enterprise software is developed, distributed and implemented at the client's place. Traditionally, enterprise software has been distributed and implemented on-premise through a network of partners and other actors in protracted rollout projects. Hence, Cloud Computing does affect not only the vendors' business models but also other stakeholders of the business ecosystem. This present work aims to find out how the value network of enterprise software solutions changes as a consequence of shifting from on-premise to Cloud-based technology.

This present research contains a multi-method qualitative study by applying a multiple case study analyses and a survey in the form of semi-structured interviews with experts. This work follows the value network role activity analysis by Kijl et al. (2010) to analyze the value networks. The outcome of the empirical research is a generic value network for Cloud-based enterprise software which illustrates the value created by each actor and the interaction of the actors. All in all, the shift from on-premise to Cloud-based technology does not mean that roles, actors, and activities related to IT simply disappear. Instead, the activities appear no longer at the client's place but in someone else's activity field. The refocus from technical consulting to business process consulting comes along with the shift from on-premise to Cloud Computing. Even though the literature provides a profound basis, this research delivers valuable findings and opens new aspects. Moreover, the generic value network can be used by practitioners to analyze the changing business ecosystem and transform competencies into value propositions with market potential to customers and other stakeholders of the value network. This is demonstrated in the approach at a practical example of a Value-Added Reseller of Microsoft Dynamics AX.

Keywords: Business Ecosystem, Cloud Computing, Cloud-based enterprise software, Servitization, Value Network

Introduction

By providing Software as a Service (SaaS), Platform as a Service (PaaS), and/or Infrastructure as a Service (IaaS) Cloud Computing promises advantages regarding flexible cost structure, scalability, and efficiency (Sultan, 2014). The emerging Cloud Computing technology is considered to be a disruptive innovation which infuses services into the Information Technology (IT) industry. The recent literature claims that the model of Cloud-based services is related to the concept of servitization. Servitization describes the introduction of new services around core products to obtain competitive advantage (Grönroos, 2015; Vandermerwe & Rada, 1988). Due to Cloud Computing the way computing resources are *"invented, developed, deployed, scaled, updated, maintained and paid for"* (Marston et al., 2011, p. 1) is drastically changing (Mell & Grance, 2011).

In fact, more and more software and hardware solutions are transferred to Cloud-based technology. This implies not only a change in utilizing computing resources for customers but also a profound shift in the value creation logic of vendors and their partners' business model (Marston et al., 2011). Hitherto, traditional enterprise software vendors have distributed their software solutions through partners such as Value-Added Resellers (VAR) to their customers (Rebsdorf & Hedman, 2014). With service infusion through Cloud Computing, the traditional way of delivering software to the end customers is changing. The delivery of Cloud service is clearly different from the delivery of traditional IT systems, which means the transition from a goods-dominant logic (GD logic) to a service-dominant logic (SD logic) (Ojala & Tyrväinen, 2011; Vargo & Lusch, 2004a). Regarding this, scholars have mainly focused on e.g. Cloud Computing technologies, economic benefits of users, and the changing value creation logic through value networks from a rather broad perspective (see Hoberg et al., 2012). However, the characteristics of enterprise software such as complexity, high level of dependency, high data volume, and security comprise a special case (Boillat & Legner, 2013). As on-premise enterprise software rollouts at a client's organization traditionally include several actors in an ecosystem, Cloud Computing seems to disrupt this ecosystem by providing the solution remotely as a service (Ojala & Helander, 2014). Nevertheless, enterprise software solutions still need to solve complex problems and functions in a convoluted organization which cannot be ignored. Conclusively, the value network of Cloud-based enterprise software is not sufficiently investigated.

Although researchers have mentioned the change of actors' relevance in the value chain of enterprise software, there is no clear answer regarding the future role of those actors (Boillat & Legner, 2013). In this respect, the following main research question emerges: ***How does the value network of enterprise software solution change as a consequence of shifting from on-premise to Cloud-based technology?***

The value networks of three different cases of Cloud-based enterprise software solutions will be analyzed. Furthermore, interviews with fifteen experts in the field of Cloud Computing and enterprise software will be conducted to gain more in-depth insights on the evolving IT industry. Based on both the multiple case study analysis and the interviews, the outcome of this present research is a generic value network of Cloud-based enterprise software.

This research seeks to contribute to the Information System (IS) literature by 1) examining how the value network of on-premise enterprise software changes due to Cloud Computing approaches, 2) identifying roles, actors, and activities in a Cloud-based enterprise software value network, 3) enhancing existing value network models of Cloud Computing through the generic value network, and 4) relating Cloud Computing to servitization, especially to the SD logic. The results will help practitioners to understand the changing environment and customer requirements in the enterprise software segment. Thus, actors can use the generic value network to create new value propositions and capabilities to stay competitive in the changing environment. This is demonstrated in the approach in a practical example of a Dutch VAR (in the following D-VAR)[4]. D-VAR initiated this research because it considers the movement of software vendors to the Cloud as a fundamental change in the industry, which also demonstrates the practical significance of this investigation. However, traditional software vendors will benefit from the research at hand by understanding the ecosystem and reinforcing the relationship between relevant actors. Furthermore, traditional partners are served with relevant findings regarding new customer requirements. Moreover, this present work provides potential customers with relevant information regarding characteristics of enterprise software in a public, private, and hybrid Cloud environments.

This paper reviews literature regarding Cloud Computing, servitization, enterprise software, and value networks. Moreover, Cloud Computing in the context of servitization is investigated thoroughly. Furthermore, findings of previous research related to this topic are presented. After that, the methodology part explains the research approach, strategy, and design at hand. In the next part of this work, the cases of the multiple case study are briefly introduced, and findings of each case are summarized. As a result, the generic value network derived from both the multiple case study analysis and interviews is presented. Finally, this present research concludes with a summary of the research, main findings, theoretical and practical implications, limitations, and further research.

Literature Review

Cloud Computing

The National Institute of Standards and Technology (NIST) provide an often cited definition of Cloud Computing: "*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"* (Mell & Grance, 2011, p. 2) Several research papers provide their own definition of Cloud Computing, but the definition of NIST can be seen as the most compact and encompassing approach. NIST goes beyond a general definition of Cloud Computing by differentiating between categories of services (Mell & Grance, 2011):

Software as a Service (SaaS): The provider's application runs on a Cloud-based infrastructure which is accessible from several end-user devices through a client interface (e.g. web browser) or program interface via an application programming interface (API). The consumer manages only specific application configuration settings.

Platform as a Service (PaaS): The consumer uses the platform for running, testing, or offering applications using programming languages, libraries, tools and other services supported by the provider. The consumer manages only specific deployed applications and configuration settings for the environment.

[4] In order to keep this work public, the name of the Dutch VAR is anonymized.

Infrastructure as a Service (IaaS): Storage, networks, processing, and other fundamental computing resources can be used to run arbitrary software (i.e. operating systems and applications). The consumer does not manage the Cloud infrastructure but controls storage, deployed applications, operating systems, and selected configurations of network settings.

Besides the Cloud Computing categories, the NIST differentiates between several deployment models (Mell & Grance, 2011):

Public Cloud: Cloud infrastructure is available for the general public and is managed by an organization selling Cloud services. The Cloud exists on the premises of the *Cloud Provider*.

Private Cloud: Cloud infrastructure is mostly based on internal data centers of a certain venture and thus provisioned for a single organization. A private Cloud may be managed and operated by the organization (on-site private Cloud), a third party (outsourced private Cloud), or some combination of them.

Community Cloud: Cloud infrastructure is provisioned by a conglomerate of organizations with shared interests (e.g. Universities).

Hybrid Cloud: A structure of two or more bounded Cloud infrastructures (private, community, or public). The Cloud infrastructures remain separate entities but are bounded by standardized technology that allows data and application portability.

According to NIST, a Cloud service enables five essential characteristics. On-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service (see Mell & Grance, 2011).

Benefits and concerns regarding Cloud Computing are well documented in the literature. Nevertheless, the *cost and efficiency* aspect of Cloud Computing is controversially discussed in the literature (see e.g. Catteddu & Hogben, 2009). Sultan (2014) highlights besides economic benefits, also *environmental benefits* improving environmental sustainability by reducing companies' electricity consumption which entails minor carbon footprints. The research of Chauhan and Jaiswal (2015) provide an overview of benefits and concerns related to Cloud Computing (see Table 1: Characteristics of cloud services in Chauhan & Jaiswal, 2015, p. 91).

Servitization

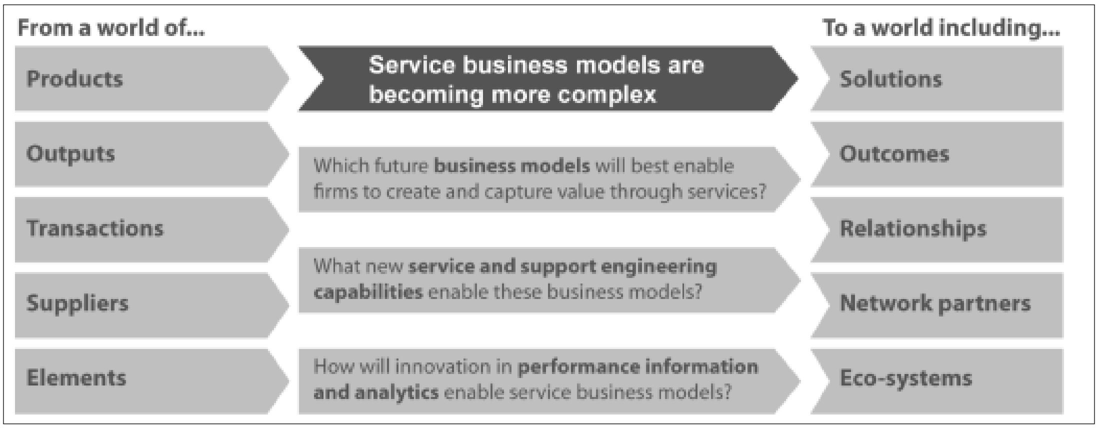
According to Grönroos (2015), a service is a *process*, which consists of a series of intangible activities. Services typically include interactions between the customer and service employees. Additionally, a service includes physical goods and/or systems of the service provider. The characteristics of a service compared to products can be summarized through the following properties (Vargo & Lusch, 2004b): *intangibility* (lack of tactile quality of goods), *heterogeneity* (no standardization possible), *inseparability* (simultaneous production and consumption), and *perishability* (no storage possible).

The term servitization was mentioned for the first time in the paper of Vandermerwe and Rada (1988) who provided a description of the phenomenon: *"(...) managers looking at their customers' needs as a* *whole, moving from the old and outdated focus on goods or services to integrated "bundles" or systems, as they are sometimes referred to, with services in the lead role" (p. 314)* With this introduction, servitization or service infusion is seen as a synonym for the movement towards customer-focused offerings, which include the combination of goods, services, support, self-service and knowledge in an integrated package (Vandermerwe & Rada, 1988).

Servitization can be seen as a *trend* and as a *strategy*. The article of Wise and Baumgartner (1999) claims that there is a need for manufacturing firms to 'go downstream' within the supply chain in order to create new profit compulsion. This *trend* describes the efforts of firms to introduce services into their product offerings to gain competitive advantages (Neely et al., 2011). The *strategy* aspect describes the long-term plan to transform the business from goods driven towards a service driven company. The main aim is to offer a holistic solution by providing integrated solutions that focus on customers' needs and achieve competitive advantage (Neely et al., 2011). According to literature *financial drivers*, *growth*, and *innovation* are the main motivations for companies to switch to a service-driven strategy (see Grönroos, 2015).

Literature has clustered challenges of servitization into the three categories *shifting mindsets*, *timescales*, and *business model and customer offering (see e.g. Neely, 2008)*. The call for *shifting the mindsets* is directed to the sales and marketing department as well as the end-customer. The t*imescale* is about the handling of contractual problems by developing long-term service relationships including the evaluation of long-term risks. The category *business model and customer offering* lead to customer-oriented solutions by understanding the clients' needs, the creation of new service related capabilities and the promotion of a service culture. Furthermore, Neely et al. (2011) highlighted that service business models are becoming more complex by shifting from a world of products to the world including solutions (see Figure 1).

Figure 1: Describing the shift to services (Neely et al., 2011, p. 3)



Grönroos (2015) critically elucidates the transformation into a service business and highlights the ineffectiveness of a step by step approach. According to Grönroos (2015), the only option to maintain a sustainable competitive advantage is the adoption of a service perspective by strategically transforming into a service business.

With the emergence of the phenomenon of servitization Vargo and Lusch (2004a) highlighted the shift from a GD logic into an SD logic. The GD logic focuses on the exchange of operand resources or static resources that need to be transformed to create value (e.g. raw materials). In contrast, the SD logic focuses on the action of operant resources which are all intangible resources used for the value process (e.g. knowledge and skills). Those operant resources represent the competitive advantage of a company. In SD logic, Vargo and Lusch distinguish between service and services. Service is defined as the utilization of competencies for the benefit of another party (i.e. customer or partner). The definition of services was grounded mainly in the activity of marketing (Vargo & Lusch, 2008). Understanding that the clients rather buy the service capabilities and, therefore, the need to develop collaborations with customers resulted from the business-to-business (B2B) marketing.

The essence of the SD logic is that all exchange is based on service. The goods are involved as tools for the delivery and application of resources. The beneficial application of operant resources results in value, which is co-created through the combined efforts of employees, firms, customers, and stakeholders. *"According to S–D logic, only the customer can assess value and always co-creates value. Stated alternatively, value is not obtained in the economic exchange of market offerings but rather through their use and within a context"* (Lusch et al., 2010, p. 21). Grönroos (2011) criticizes that when all types of resources are used as service and transmit a service, it is service logic rather than a logic dominated by service. Hence, all kinds of resources aim to provide service which supports or assists to customers' practices. Consequently, "*(...) when adopting a service perspective on business according to which all kinds of resources are used as service, the traditional distinction between goods and services or service as activities is not meaningful"* (Grönroos, 2011, p. 284). According to Grönroos (2011), the customer creates value independently in the first place, while the provider offers value facilitation by developing, designing, manufacturing and delivering resources required by the client. In line with Grönroos' critique, Campbell et al. (2013) argue that operant resources do not act alone. In fact, the operant resources are conjunct with the operand resources.

Cloud Computing in the context of servitization

By screening Cloud Computing with the meaning of servitization, one can recognize that Cloud Computing represents a special case of service infusion. In contrast to traditional servitization that adds services to an existing physical product, Cloud Computing transforms a whole physical product into a service. However, the provider of Cloud Computing services built ecosystems (especially in the case of PaaS) that is in line with the description by Neely et al. (2011) (see Figure 1). The SD logic follows several contradicting approaches e.g. services are not seen as an alternative to physical products and the focus on operant resources. In contrast, Cloud Computing is about providing physical resources as a service to the customer. Cloud Computing, therefore, does not fully reflect the core assumptions of the SD logic. However, the SD logic needs to be expanded with the upcoming possibilities enabled by Cloud Computing. Considering the critique of SD logic by Grönroos (2011), the distinction between the operand and the operant resources as well as service and services becomes inappropriate. Moreover, according to Grönroos (2011), the provider acts as a value facilitator for the consumer by offering resources which fit more Cloud Computing.

Enterprise software

The term enterprise software describes a collection of business software applications, tools for modeling organizational processes, and development tools. By providing business functionality, those software solutions aim to solve enterprise-wide problems as well as improve productivity and efficiency (Boillat & Legner, 2013). Nowadays, vendors often sell a solution platform, which might contain several modules, for multiple functionalities. There are several industry standards of enterprise software types which are e.g. Accounting Software, Business Intelligence (BI), Business Process Management (BPM), Content Management System (CMS), Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), and Supply Chain Management (SCM). Each type represents an autonomous system, but often the interaction between several systems is reasonable and necessary (Boillat & Legner, 2013). Therefore, many enterprise solutions provide interfaces to enable connection to other enterprise software which is realized through electronic data interchange (EDI). Enterprise software includes the handling of a high volume of business-related data. Therefore, enterprise software demands excessive data storage. Additionally, enterprise software is affiliated with fundamental business processes, which shows a high dependency of organizations on such a system. This dependency affects several business levels of a company like the strategic decision making process (e.g. sales growth reports) and the daily business processes (e.g. purchasing, order processing). Therefore, the enterprise software application needs to be reliable and available. As the data is critical, both IT security measurements as well as maintenance concepts need to be established. Many enterprise software systems provide preconfigured best practices and are customizable to support clients' processes. In contrast to a single-user application which is executed on a user's personal computer, enterprise software is hosted on servers and supplies simultaneous access to a variable number of users via a network. As this overview of characteristics of enterprise software shows, many aspects have to be taken into account, which requires deep knowledge and expertise regarding technology, applying the software, business processes, and industry standards. Thus, the implementation of enterprise software is often realized through the expertise of specialized third-party providers.

Cloud computing is considered to be a further evolutional step in the history of enterprise software (Luoma & Nyberg, 2011). It removes the need and cost of retaining specific technical expertise in-house and reduces deflection from an enterprise's main focus. Furthermore, it provides controlled IT budgeting (Catteddu & Hogben, 2009). Together with Cloud Computing, the possibility of enterprise mobility solutions emerges, which enables access from everywhere via mobile devices. Scholars agree that the emerging Cloud technology affects the way how software is distributed to customers (see e.g. Boillat & Legner, 2013; Rebsdorf & Hedman, 2014). Nevertheless, enterprise software still needs to solve complex problems and function in a convoluted organization which cannot be ignored.

Business ecosystems and value networks

The concept of value can be seen as trade-offs between benefits and costs (Bowman & Ambrosini, 2000). A product or a service is usually purchased because its purchaser expects a benefit by receiving it. The benefit can be understood in monetary terms, but also in non-monetary terms. However, the benefit of receiving a product or service depends on the customers' valuation and perception. The customer also faces costs for purchasing the good or service which can also be monetary (i.e. the price) and non-monetary (e.g. time and effort). In the context of value networks, the value is created and received by actors of the value network. However, literature which investigates the value creation logic of Cloud Computing more and more focuses on value networks and business ecosystems (see e.g. Böhm et al., 2010; Li, 2009; Ojala & Helander, 2014).

The business ecosystem perspective focuses on three main characteristics: the *platform*, *symbiosis*, and *co-evolution* (Li, 2009). Moore (1993) introduced the business ecosystem concept as a network of opposing and collaborating actors from distinct sectors who are involved in the provisioning of services or products around a specific *platform*. The *platform* is often provided by a single firm and it includes services, tools, and technologies that are used by stakeholders involved in the *platform* (Li, 2009). The stakeholders within an ecosystem gain a certain level of *symbiosis*, as competition is usually stronger between distinct ecosystems than within the ecosystem (Ehrenhard et al., 2014). A group of firms together *evolves* over a period of time, thus, creating additional value by adding complementary products and services to the core platform (Ehrenhard et al., 2014). A business ecosystem can be analyzed by looking at the value network concept that describes and analyzes a platform-based product or service offering (Kijl et al., 2010; Peppard & Rylander, 2006). A value network is a *"set of relatively autonomous units that can be managed independently, but operate together in a framework of common principles and service level agreements (SLAs)"* (Peppard & Rylander, 2006, p. 132). Various actors with agreed roles, activities, and resources are key elements in the value network (Ehrenhard et al., 2014). Thus, a value network can be seen as design or subset of a business ecosystem (Ehrenhard et al., 2014). Furthermore, firms constantly need to be agile and adaptive in a spontaneously sensing and responding network in order to survive and ensure organization growth (Flint & Mentzer, 2006). According to Lusch et al. (2010), a firm's ability to learn, to adapt, and to change is crucial in order to transform specialized competencies into value propositions with market potential to customers and other stakeholders of the value network.

The statements regarding business ecosystems and value networks can be perfectly related to the current enterprise software ecosystem. As a specific enterprise software solution represents a technology platform, many stakeholders of its ecosystem such as VARs and other partners are apparently facing a fundamental change in the platform's technology due to Cloud Computing. Many stakeholders follow a single platform strategy, gained competencies, and built value-added products or services based on the platform technology. With the emerging Cloud Computing technology, stakeholders need to adopt the new technology and transform their competencies into new value propositions (Lusch et al., 2010). Therefore, stakeholders need to understand how the ecosystem is going to change, which is the purpose of this work.

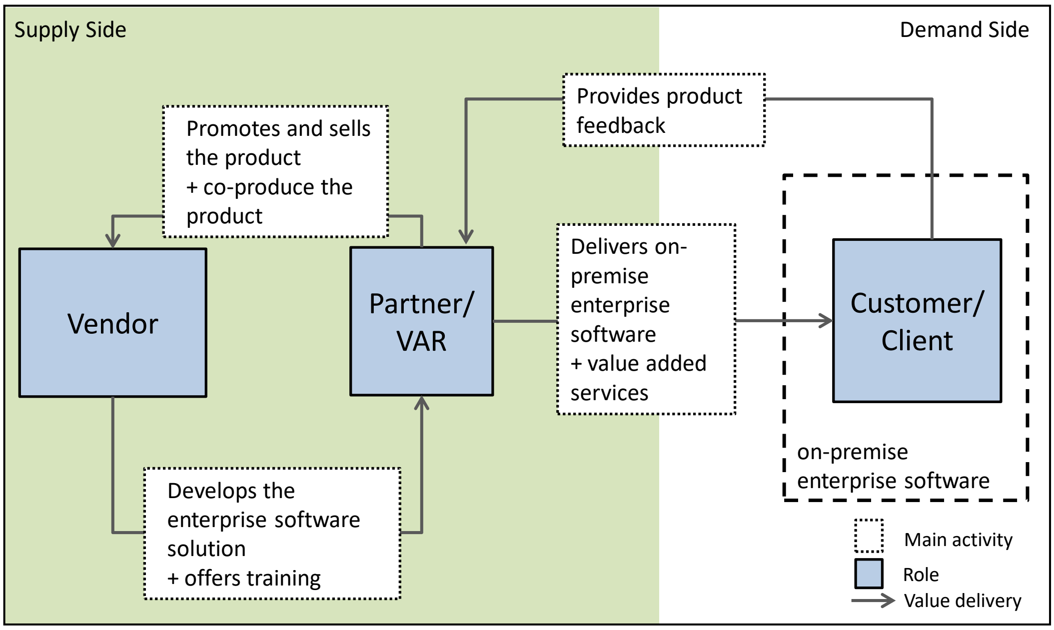
Value network of on-premise enterprise software

Sarker et al. (2012) argues that most researchers assume a one-way transfer of the software from the vendor straight to the customer; ignoring that: *"in many contexts, the business model involves vendors selling, extending, and delivering packaged software through partners, who contribute to value addition for the customer firms"* (p. 318). In literature, most frequently used terms for those partners are VAR, sales partner, indirect/ external sales channels, sales distributor, and sales agency. Sarker et al. (2012) empirically developed an understanding of co-creation in the context of B2B partnership especially in the case of ERP technology. Table 1 contains an overview of on-premise enterprise software value network by listing roles, actors, and activities which are found in the literature review. Furthermore, Figure 2 contains an overview of the value network which illustrates the main operations of the actors of the value network (Kohli & Grover, 2008; Piturro, 1999; Sarker et al., 2012; Simpson et al., 2001; von Arb, 1998).

Table 1: On-premise enterprise software roles, actors, and activities

Roles	*Actors*	*Activities*
Partner	Consultants/ VAR	Selling and promoting the vendor's product Customer Relationship Management Customizing on-premise enterprise software Consulting (business processes & technical) Co-producing product (using customers' feedback, industry competencies) Developing value-added products or service Offering project management Implementation at the client's place Conducting Training Offering troubleshooting and update support Providing technical support Offering technical and organ. integration Offering maintenance service
Client/ Customer	Organization or a department of a company	Running local infrastructure and managing related responsibilities (e.g. maintenance, security, and expansion of storage and CPU) Providing sufficient IT staff for hosting and supporting the solution (e.g. fist-level help desk support) Running the software on-premise: System administration (e.g. network administration, backup and recovery management), user administration (e.g. manage system privileges), database administration (e.g. data backup), release planning (e.g. cost-benefit analysis, analysis of hardware requirements, analysis of system changes through new releases), and sending feedback to the reseller
Vendor	Enterprise software vendor	Providing the enterprise software package Continuously innovating the software Developing a knowledge community (knowledge sharing platform) Marketing activities Offering product training to partners Relationship/ Partnership Management

Figure 2: Value network of on-premise enterprise software



Value network of Cloud Computing

From a value network perspective, several analyses on Cloud Computing detect numerous stakeholders in the network. According to Marston et al. (2011), a Cloud Computing business network includes (1) *Consumers, (2) Providers, (3) Enablers, and (4) Regulators*. (1) The *Consumers* are subscribers, who use the provider's service on an operational expense bases ("pay-per-use service"). Moreover, the role of the C*onsumer* is to ensure that the purchased service supports the firm's processes. (2) *Providers* own and operate Cloud Computing systems. Their task is to maintain the system and the software used in the Cloud as well as the pricing of the Cloud service. (3) *Enablers* sell products and additional services that ease the delivery, adoption and operation of Cloud Computing. (4) The *Regulator* indirectly adds value to the network by influencing Cloud Computing adoption through laws and policies.

The NIST Cloud Computing reference architecture detects five major roles F. Liu et al. (2011): (1) *Cloud Consumer*, (2) *Cloud Provider*, (3) *Cloud Carrier*, (4) *Cloud Auditor*, and (5) *Cloud Broker*. While (1) *Cloud Consumer*, (2) *Cloud Provider* describe similar roles as in the previous model, this model takes the Cloud Computing service models (SaaS, PaaS, and IaaS) into account which affect the actors and their activities (see Table 2). (3) The *Cloud Carrier* ensures the connectivity and transport of Cloud services between consumers and providers. (4) The *Cloud Auditor* can conduct an independent assessment of Cloud services (e.g. performance, security controls, privacy impact). (5) If the integration of Cloud services becomes too complex for Cloud Consumers, the *Cloud Broker* manages the utilization, performance, and delivery of Cloud services and negotiates between the *Cloud Provider* and *Cloud Consumer*. More technical details are explained in-depth in the publications of NIST (see F. Liu et al., 2011).

Böhm et al. (2010) describe a value network of Cloud Computing using the e³-value method. In the e³-value model, Böhm et al. (2010) highlight *market platform (provider)*. Figure 3 illustrates the e³-value model of Cloud Computing. The figure shows the different roles as well as their relationships and value exchanges which are created by delivering services throughout the network that are valuable for the receiver who pays money in return. The exchange of value is illustrated through value ports and links among the actors. The receivers of the Cloud-based service (Aggregator, Consumer, and Integrator) can purchase the service directly from one of the providers or use the market platform. Furthermore, the model shows that providers also perceive services from one another.

Figure 3: e³-value model of Cloud Computing (Böhm et al., 2010, p. 8)

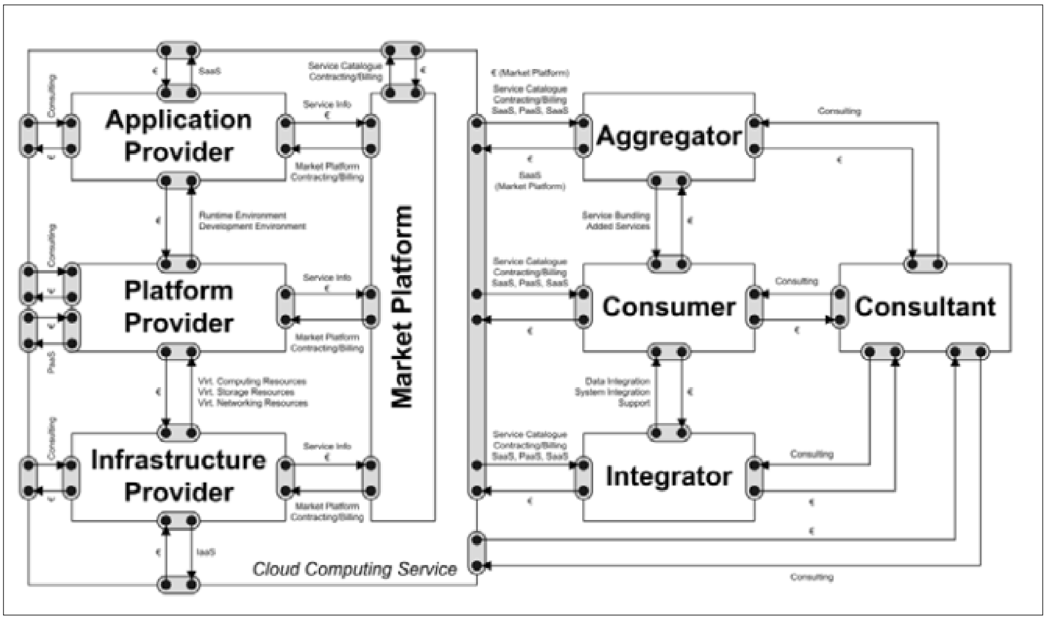


Table 2 contains all roles, actors, and activities of the value network of Cloud Computing which are derived and summarized from several research papers (see e.g. Böhm et al., 2010; Boillat & Legner, 2013; F. Liu et al., 2011; Marston et al., 2011).

Table 2: Overview of value network of Cloud Computing

Roles	*Actors*	*Activities*
Cloud Consumer	**In general**: person/ organization/ subscribers/ clients/ customer	Using the service (pay-per-use) from a Cloud Provider Ensuring that the purchased service supports the firm's processes Setting up contracts with the Cloud Provider Setting up Service Level Agreements (SLAs) to specify technical performance requirements (quality of service, security, legal remedies for performance failures) Comparing different Cloud Providers' services
	SaaS: organization, end-user, software application administrator	Providing organization's members with service access Configuring the SaaS for end-users (software application administrator)
	PaaS: application developer, tester,	Designing and implementing application software in the Cloud-based environment

	deployer, administrator	Publishing applications into the Cloud Configuring and monitoring application performance on a platform
	IaaS: system developers, administrators	Creating, installing, managing and monitoring services for IT infrastructure operations
Cloud Provider **SaaS =** Application Provider **PaaS =** Technical Platform Provider **IaaS =** Infrastructure Provider	A person, organization, or entity that offers SaaS, PaaS, or IaaS e.g. an enterprise software vendor or an IT department	**In general:** Operating Cloud Computing system Maintaining the system and the software used in the Cloud Making a service available for interested parties Acquiring and managing the computing infrastructure required for providing the services
		Service Deployment: Building a Cloud infrastructure based on the deployment models: public, private, community, and hybrid Cloud. Private Cloud and community Cloud can be both on the organization's premises (on-site Cloud) or hosted by another company (outsourced Cloud)
		Service Orchestration: Defining interfaces for Cloud Consumers to access the computing services Providing and managing access to the physical computing resources via software abstraction (including e.g. virtual machines, virtual data storage, hypervisors) Managing all physical computing resources (e.g. networks, storage components)
		Cloud Services Management: Performing all service-related functions to provide the main Cloud service <u>Business Support</u> (Inventory, Accounting & Billing, Reporting & Auditing, Pricing & Rating Management) <u>Provisioning/ Configuration</u> (Rapid Provisioning, Monitoring & Reporting, Metering, SLA Management) <u>Portability/ Interoperability</u> (Data Portability, Copy Data To-From, Service Interoperability, Unified Management Interface, System Portability)
		Security: Authentication, availability, authorization, confidentiality, identity management, audit, security monitoring, integrity, incident response, and security policy management
		Privacy: Protect personal information and personally identifiable information in the Cloud
(Regulator)	Government body or policy makers	Enabling Cloud Computing adoption through laws and policies
Cloud Carrier	Network and telecommunication carriers or transport agents	Providing connectivity and transport of Cloud services between consumers and providers Manage and monitor consistency with SLA (provider – carrier) through dedicated and secure connections between consumers and providers
Enabler/ Cloud	A person, organization, or	Selling products and services that ease the delivery, adoption and operation of Cloud Computing

Broker/ Consultant/ Service Aggregator	entity: business partner of Cloud Provider, VAR, consultancy	Building and maintaining the infrastructure at the client's place of a hybrid Cloud Computing system Managing the use, performance and delivery of Cloud services through Cloud Providers Negotiating between Cloud Providers and Cloud Consumers Service Intermediation: Enhancing the Cloud service through additional value-added services or improving some specific capability (e.g. enhanced security, identity management, performance reporting) Service Aggregation: Combining and integrating multiple services into one or more new services (data integration, ensuring secure data movement) Service Arbitrage: Evaluating and selecting appropriate Cloud services
Cloud Auditor	Consultancy, specialized company	Conducting an independent assessment of Cloud services (e.g. performance, security controls, privacy impact)
Market Platform Provider	Third party consultancy, specialized company, VAR, software vendor	Providing a platform for Cloud Providers to advertise and distribute their Cloud-based products Bringing together consumers and providers Offering additional services (SLA contracting or billing)

Boillat and Legner (2013) investigate the differences between software vendors' business models by looking at different deployment models in the case of enterprise software. The authors suggested a business model called *Enterprise SaaS+PaaS* in which the core enterprise software is provided together with a platform for the value-adding content of the partners. However, Boillat and Legner (2013) propose Cloud Computing as a technology that offers new profitable value-adding activities, also for traditional partners that is in line with other scholars (see e.g. Hedman & Xiao, 2016; Rebsdorf & Hedman, 2014).

Nevertheless, longitudinal investigations of Cloud Computing value networks have shown that the network changes over time (see e.g.Ojala & Tyrväinen, 2011). Ojala and Helander (2014) observe that partners of the value network of a PaaS provider have disappeared by integrating the former partners' activities into the platform service. In this regard, Hedman and Xiao (2016) analyze in a single case study the challenges of an ERP software vendor moving to a Cloud-based ERP solution. They have found out that the role of the pre-existing partners is relevant for the distribution of the new service because the partners possess a broad customer base. However, in a later stage, the vendor aims to offer replacing services via the internet e.g. customer training and support.

Methodology

Research approach and research strategy

As Cloud-based enterprise software is currently emerging and literature is rare, the inductive research approach is more suitable (Creswell, 2008). The purpose of the empirical work is an *exploratory research*, which is useful to clarify the understanding of the emerging change of the ecosystem in the enterprise software industry. The strategy of this thesis follows a *two-step qualitative approach* including a *holistic multiple case study approach* and a *survey approach*. Case study research fits the research subject since it leads to detailed insights into the interrelated actors in a value network and how Cloud Computing changes the value network of enterprise software (Boillat & Legner, 2013). By using multiple cases the findings' external validity or generalization is thought to increase (Saunders et al., 2009). Furthermore, this research follows the *cross-sectional approach*. In a second step, the findings of the case analysis are enriched by data from a *one to one semi-structured telephone interviews* with fifteen experts from several business organizations which is a *qualitative survey approach*. Semi-structured interviews are non-standardized interviews, in which predefined themes and questions need to be covered, but more freedom to the interviewees is provided (Saunders et al., 2009). By using the case study approach and the survey approach this work represents a *multi-method qualitative study* (Saunders et al., 2009). According to Saunders et al. (2009), multi-method qualitative studies are beneficial regarding triangulation and complementarity. *"Triangulation refers to the use of different data collection techniques within one study in order to ensure that the data are telling you what you think they are telling you"* (Saunders et al., 2009, p. 146).

Research design

A holistic multiple case study analysis of three cases is conducted which provides valuable information from real live examples of Cloud-based enterprise software value networks. Based on that, roles, actors, and activities are defined as well as their relational constellation. To process the analysis in a structured way, this study follows the value network role activity analysis by Kijl et al. (2010), which can be done in both a qualitative and a quantitative way. Previous researchers used other approaches such as the Network Value Analysis (NVA) by Peppard and Rylander (2006). However, the value network role activity analysis focuses more on roles and activities, which is necessary for this research. Nevertheless, this study does not investigate on financial streams, the calculation of expected benefits and costs, and external factors. However, by using this approach, further research can easily build on this study, e.g. applying the quantitative abstract cost benefit model introduced by Kijl et al. (2010).

In a second step, the findings of the case analysis are refined and extended by insides derived from fifteen semi-structured interviews with experts from business organizations in the field of enterprise software and Cloud Computing. The information derived from expert interviews contribute to a holistic view on the Cloud-based enterprise software business ecosystem. Based on both, the case analysis and the interviews, this work derives a generic value network tailored for Cloud-based enterprise software. Together with the literature review and the empirical study, the change of value networks of enterprise software solutions as a consequence of shifting from on-premise to Cloud-based technology can be demonstrated.

Data collection and data analysis

The selection of the cases is driven by theoretical sampling (Eisenhardt & Graebner, 2007). According to the theoretical sampling, the selection of cases is based on their commonalities and differences to predict contradictory results and to extract generalizable patterns (Boillat & Legner, 2013). All dimensions which are considered are listed in Table 3.

Table 3: Case study selection criteria

Dimension	*Case 1: Microsoft Dynamics AX*	*Case 2: SAP S/4HANA*	*Case 3: Salesforce Sales Cloud*
Functional scope	ERP	ERP	CRM
On-premise vendor	Yes	Yes	No
Market launch/ maturity	March 2016	February 2015	1999
Possible deployment models	Public, private, hybrid, and on-premise (2017)	Public, private, hybrid and on-premise	In general, public; but also on-premise is possible
Scenario	Cloud hosted by Microsoft in a public Cloud	Cloud hosted by partner in a private Cloud	Cloud hosted by Salesforce in a public Cloud
Service models of the scenario	SaaS + PaaS (Azure)	SaaS	PaaS + PaaS (Force.com)

To get crucial insights for the cases, secondary data from the literature, documentaries, product information, websites, reports, and other available materials, as well as primary data from business partners have been collected to increase the validity of analysis using data triangulation (Saunders et al., 2009). To develop the value network, the value network role activity analysis for each case was conducted (see Kijl et al., 2010) Therefore, roles are defined as abstract names for organizations executing some activities. First, all the main activities are identified and listed in a table. Second, all the main activities and actors are allocated to roles of the value network. Third, the value network structure of the underlying Cloud-based enterprise software solution is outlined. Last, the value network analysis of the individual cases serve as the basis of the cross-case analysis and is used to discover similarities and differences between the cases.

The insights from the holistic multiple case study are enhanced through *one to one semi-structured telephone interviews* with experts. In this research, fifteen experts with different focuses on technology solutions and job roles are interviewed. The job roles of interviewees are Director Senior Manager, Senior Account Manager, Project Manager (2x), Business Development Executive for Cloud Service Provider, Junior Partner, Developer (2x), Key Account Manager, Head of IT, CEO, subject specialist of IT infrastructure, and Senior Consultant (3x). The companies are located in Germany; nevertheless, the companies possess international business operations which explain the international focus of the experts; thus, the insights are internationally relevant. Moreover, the experts possess industry specific knowledge such as Banking, Insurance, Automotive, Engineering and IT service, and electricity suppliers. Furthermore, knowledge of all enterprise software types are covered. As promised to the interviewees, the interviews are made anonymous. Thus, the companies name as well as the interview transcripts cannot be published. Before the interview phase started, the questions have been tested through a simulated interview. The data from interviews need to be structured to analyze them (Saunders et al., 2009). This work follows the approach for analyzing data by Miles and Huberman (1994). Therefore, the interviews' most important statements are summarized in a spreadsheet to draw valuable conclusions and simplify the data. By means of data display, the researcher can analyze the well-structured data and draw conclusions.

Scientific quality: validity and reliability

The literature claims that validity and reliability are treated differently, as for a qualitative research there is no intention to apply a quantitative measure of validity and reliability (Golafshani, 2003). Moreover, researchers need to take into account that *"the way to achieve validity and reliability of a research get affected from the qualitative researchers' perspectives which are to eliminate bias and increase the researcher's truthfulness of a proposition about some social phenomenon using triangulation"* (Golafshani, 2003, p. 604). As this research follows a multi-method qualitative study with several sources, triangulation, complementarity, and external validity are served sufficiently. However, by applying qualitative research, the bias issues have to be discussed.

"Validity is concerned with whether the findings are really about what they appear to be about" (Saunders et al., 2009, p. 157). According to literature, there are two major forms of validity: *internal validity* and *external validity* (Golafshani, 2003; Saunders et al., 2009). In respect of qualitative research, internal validity refers to *"the extent to which research findings are a true reflection or representation of reality rather than being the effects of extraneous variables"* (Brink, 1993, p. 35). Whereas, external validity addresses the extent to which such representations of reality are legitimately transferable across groups (Brink, 1993). Due to the research design, which applies two methods and uses several sources, the present work is less sensitive to validity issues.

Reliability is the appropriate collection of data processed through the right techniques to gain consistent findings (Saunders et al., 2009). In respect of qualitative research, this refers to whether alternative researchers would produce similar information (Silverman, 2013). Nevertheless, findings derived from semi-structured interviews are not intended to be repeatable as they represent reality at a time they were collected (Saunders et al., 2009). The strength of using this non-standardized method results from the flexibility which is needed to explore the complexity of the topic. However, the analysis of each case and interviews are conducted in the same process.

Results

Each case is briefly introduced while the findings of each case regarding roles, actors, and activities are summarized in Table 4. Furthermore, main findings of both the cross-case analysis and interviews with experts are summarized.

Case 1: Microsoft Dynamics AX

Microsoft Corporation is an international software and hardware company headquartered in the US. Dynamics AX is one of Microsoft's ERP products which has been developed to operate on Microsoft's Cloud Computing market platform Azure (Microsoft Corporation, 2016d). The platform enables building, deploying, and managing applications, as well as offers access to online tools, frameworks, and services of Microsoft or Non-Microsoft services. Microsoft operates a global network of partners distributing the Dynamics products to clients. Microsoft's Dynamics-Partners provide industry expertise and process know-how. The Microsoft Dynamics Lifecycle Services (LCS) is a collaborative workspace for customers and partners which has been initiated to help organizations to improve the quality Dynamics AX implementations by applying standardized solutions. As Microsoft is responsible for running the software flawlessly in the Cloud, standardized software optimizes the maintainability which in return reduces cost.

Case 2: SAP S/4HANA

The company SAP was founded 1972 in Germany. SAP S/4 HANA provides Cloud-based ERP which transforms SAP from an on-premise software vendor into a Cloud-based service provider (Schreiner, 2015). The Cloud-based ERP solution is offered either in a public Cloud or a private Cloud. The public Cloud edition is designed for companies which need standardized Cloud integration offerings that cover the core business processes (Gellaw, 2016). S/4HANA in a private Cloud is provided either by SAP or SAP partners as a Partner Managed Cloud. Non-SAP solutions, as well as newly developed capabilities, can be integrated using APIs (Gellaw, 2016).

Case 3: Salesforce Sales Cloud

Salesforce reinvented the CRM software market by shifting CRM into the Cloud. In 1999, the CRM solution Sales Cloud was introduced (Boillat & Legner, 2013). Main functionalities of Sales Cloud are account and contact management, partner management, sales prognoses, and opportunity management (Salesforce, 2016c). Sales Cloud offers standardized best practice processes which cover most of the customers' requirements. Force.com is a PaaS environment which operates the applications and provides several developer tools and methods. The advanced applications are distributed through the market platform AppExchange. AppExchange applications are web-based applications that interoperate with the Force.com platform (Salesforce, 2016c). Salesforce works with own data centers as well as with third-party infrastructure providers. Furthermore, Salesforce certifies partners who support the implementation, customization and training of Sales Cloud at the client's place (Salesforce, 2016c).

Table 4: Overview of roles, actors, and activities of each case

Role	*Case 1: Dynamics AX (public Cloud)*	*Case 2: S/4HANA (Partner Managed private Cloud)*	*Case 3: Sales Cloud (public Cloud)*
Application Provider	**Actor: Microsoft** Develop Microsoft Dynamics AX functionalities Steadily improve functionalities of the service Provide updates and upgrades Integrate feedback and fix functional issues	**Actor: SAP partner** Offer packaged solutions to potential customers including Develop terms, conditions for subscription-based software pricing to position the service Build extensions for SAP S/4HANA technology tailored to an industry or customer needs that can be reused by several consumers; consider also Non-SAP extensions for the provided service Give feedback to License Provider and Solution Provider	**Actor: Salesforce** Provide the Cloud-based CRM Sales Cloud in a SaaS manner Develop further the service according to customers' needs and technical advances
Infrastructure Provider	**Actor: Microsoft** Storage and database capacity management, high availability and disaster recovery, platform security, infrastructure capacity, scale up and down, infrastructure management and deployment, data center networking, backup database, determine a disaster recovery plan	**Actor: SAP partner (Partner Managed Cloud Provider)** Similar to Microsoft	**Actor: Salesforce data centers, Amazon Web services, and other third-party providers** Similar to Microsoft
Platform Provider	**Actor: Microsoft or third-party provider (Azure)** Provide a platform to deploy Dynamics AX Provide a platform for other Microsoft or third-parties to advertise and distribute their Cloud-based products Azure is also a Market Platform which offers SaaS, PaaS, and IaaS	**Actor: SAP partner (Partner Managed Cloud Provider)** Provide a platform to deploy SAP S/4HANA Provide a platform for other SAP or third-parties to advertise and distribute their Cloud-based products	**Actor: Salesforce (Force.com)** Offer platform with tools, development environments, test environments, and methods to create value-added software Offer platform to operate Sales Cloud, partner applications, and third-party applications
Partner	**Actor: Microsoft's certified partners** Sells the product to the Consumer Applies industry know-how and provides own solutions, products, and services to customer; Applying the LCS together with the client to move the system into the Cloud Advising regarding license requirements and networks and domains (site-on-site VPN connection) Define and test business processes	**Actor: SAP partner or independent consultant** Supports Cloud Consumer according to customer's know-how e.g. implement highly individual requirements for business processes and customization, migration of master and transactional data, connect Cloud solution into existing other application in use	**Actor: By Salesforce certified persons or companies** Sell the service to clients Offer implementation, integration and customer development services Give feedback about customers' challenges Support customer regarding customer's business processes and Salesforce

	Develop and test customizations Monitoring of development and test instances (no productive instances) Security configuration and Identity management		standardized best practices approaches
Cloud Consumer	**Actor: Organizations/ subscribers/ clients/ customers** Evaluate whether a Partner is needed for: <u>Provisioning of environments:</u> Size projected load in LCS sizing estimator and request deployment of the specific environment(s); Define, develop, test the update; Request deployment of update to the production environment <u>Scale up and down:</u> Add additional users, storage, and instances; Manage sandbox, development and test environment <u>Security/Remote access:</u> Provide access for users and partners to LCS project and environments	**Actor: Organizations/ subscribers/ clients/ customers** Analyze and identify appropriate service provider Conclude the contract with partner Collaborate with partners or consultants Migrate transactional and master data Implement and customize individual requirements of business processes	**Actor: Organizations/ subscribers/ clients/ customers** Conclude the contract Application Provider Collaborate with partners or consultants Implement and customize individual requirements of business processes Analyze which best practices processes from the application can be adopted
Collaborative Platform Provider	**Actor: Microsoft (LCS)** Provide a platform for automating application lifecycle management for consumers or partners (Project Managers, Business Analysts, Developers, IT Administrators); Provide customers with the tooling to deploy, manage, monitor, and diagnose the ERP service		
Service Engineer	**Actor: Microsoft Dynamics Service Engineers (DSE)** Deploy, update, and administer the customer's production environment Maintain the SLA of the service by actively monitoring and servicing the application platform for the customer Diagnostics, patches, updates, hotfixes, and upgrades; 24/7 application monitoring and support Create code and data backup for production deployments Provide database backup Pro-actively manage the resources needed for the service Investigate and troubleshoot issues in cooperation with customer Monitor production, sandbox, and development environment		

	24/7 using monitoring and diagnosis tools		
External Developer	**Actor: Non-Microsoft developer** Use Microsoft Azure to develop and distribute value-added solutions to consumer	**Actor: Non-SAP developer** Offer value-adding software which extends the functionality of SAP S/4HANA and solves a specific problem	**Actor: Non-Salesforce developer** Offer value-adding software which extends the functionality of Sales Cloud and solves a specific problem
License Provider		**Actor: SAP** Grant term license to partner for providing SAP solutions to customers; Align together with partner on customer solution and territory	
Solution Provider		**Actor: SAP** Develop further the enterprise software S/4HANA regarding security, performance, functionality, and interaction with other applications; Provide updates and upgrade packages to the *Cloud Provider*	
Market Platform Provider	**Actor: Microsoft** See Microsoft Azure (Platform Provider)	**Actor: SAP** SAP also provides a Market Platform (SAP Store), but it plays a minor role in this scenario.	**Actor: Salesforce** Offer platform (AppExchange) which distributes third-party provider AppExchange applications Review submitted AppExchange application of an external developer or partner

Findings from cross-case analysis and interviews

The cases indicate that the shift from on-premise to Cloud Computing does not mean that roles, actors and value-added activities related to IT just disappear. Instead, the activities appear no longer at the client's place but in someone else's activity field. From the customer's perspective, Cloud Computing means a shift of complexity from his on-premise infrastructure to the vendor or the partner. When enterprise software is provided in a public Cloud (case 1 and 3), functionalities rather base on standardized and best practice approaches. As many virtual instances of customers have to be hosted by the vendor, modified applications will enormously increase maintenance cost. The public Cloud enterprise software contains best practices processes which need to be adopted by the consumer. In contrast, the private Cloud enterprise software shows a high level of customization and modification possibilities.

Additionally, a challenge for actors in the value network is the management of revenue as the transformation means a change of the revenue streams. On-premise solutions generate short-term revenues; whereas, Cloud Computing generates long-term monthly revenue based on clients subscriptions. From a vendor's perspective, to enforce Cloud Computing, not only benefits for customers need to be highlighted but also more incentives for partners are required. This is in line with challenges of servitization (see Neely, 2008).

Understanding the client's and industry-specific business processes becomes more crucial for the implementation of Cloud-based enterprise software. As the IT infrastructure at the client's place becomes less complex and the enterprise software becomes more standardized, the role of the consultative partner changes from an IT-intensive role to a more business process management role. The consultation by partners, therewith, is not limited to IT related topics but also impacts far-reaching organizational decisions. Therefore, building a trustful relationship not only with customers' IT departments or CIOs but also with other customers' decision makers becomes a key success factor. Whereas, the technical consulting still keeps its relevance regarding data migration, interface definition, customizing, and mobile application development. While enterprise software that runs on private and hybrid environments requires most technical support, enterprise software on public Cloud environments demands more business process support. In the latter case, workflows of the client need to be analyzed and compared to the best practices approaches of the Cloud-based enterprise software; the outcome is either the customization of the enterprise software (if possible) or the transformation of client's business practices according to the best practices. Certainly, smaller customizing activities without deeper technical knowledge are always the case. Furthermore, the shift also changes project management concepts to a quicker and agile approach which better fits the rapid implementation process of Cloud-based applications. Moreover, IT security demands more attention and educational work at the client's place. Also, partners can utilize their client and industry specific knowledge to offer clients a suitable solution through a partner managed Cloud. New service fields can be detected regarding financial and environmental consultation.

The vendor role transforms from a software producer to a service provider. Thus, the vendor acts in several roles, namely: Infrastructure Provider, Platform Provider, Application Provider, or License Provider (Partner Managed Cloud). The vendor, on the one hand, develops and improves the enterprise software solution, and on the other hand, provides and ensures the flawless functionality as a service. Therefore, vendors have to manage infrastructure to offer the service by either third-party provider or own data centers. Enterprise software functionalities come as SaaS, but additional services such as PaaS and IaaS can be purchased by the consumer. The vendor also licenses partners to host the enterprise software solution (License Provider) for the consumer to offer industry and client specific solutions. On the basis of the market platforms external developer can offer and distribute their value-added solutions more easily. Due to the Cloud technology, software development of mobile Cloud applications receives more attention for external developer and partner.

From the consumer perspective, IT infrastructure becomes less relevant; thus, consumers neither perform system administration nor install the software locally. Instead, the consumer focuses on integrating the service into his business processes. Furthermore, staffing of IT specialists can be reduced as long-term high sophisticated IT know-how is not required. This is not the case if the deployment model is a hybrid Cloud. Moreover, the consumer should monitor SLA critical performance indicators and if necessary report violations to the Cloud Provider. Additionally, consumers can take advantage of the rapid deployment of services by trying out the new Cloud-based technology.

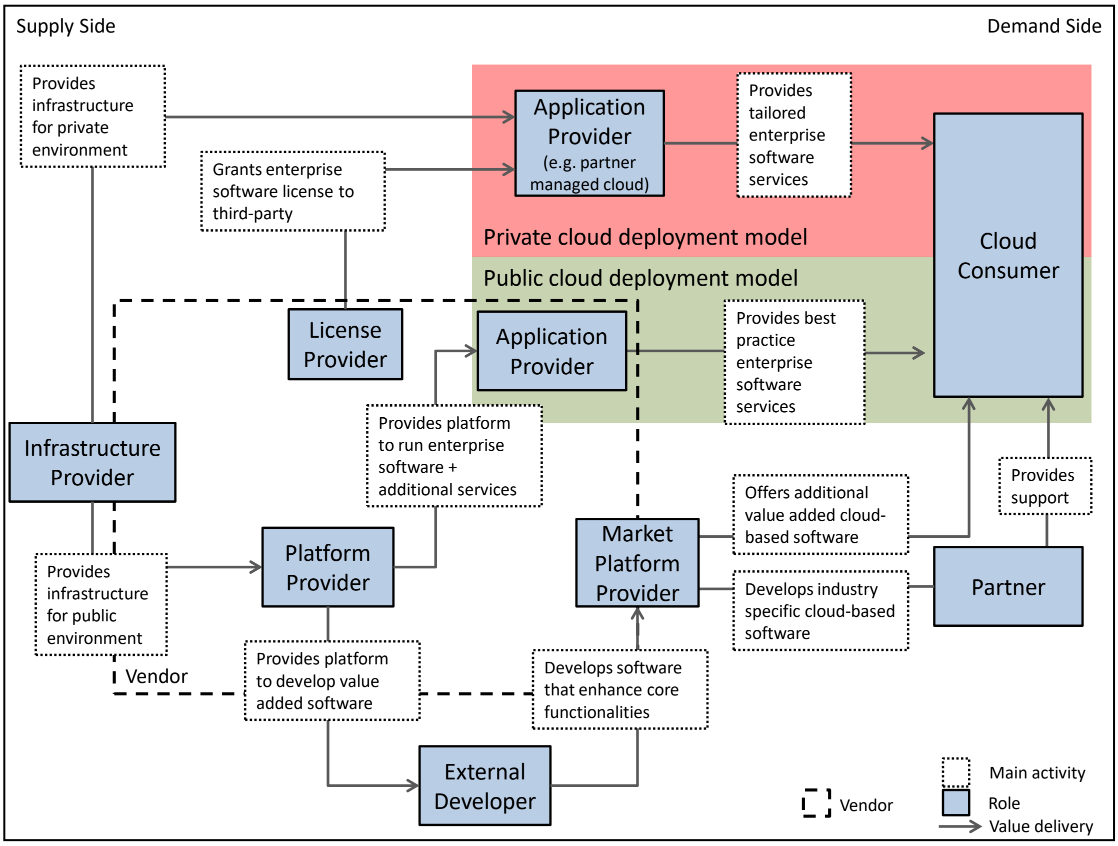
The main roles, actors, and activities of the generic value network of Cloud-based enterprise software are listed in Table 5. Figure 4 provides an overview of the value network.

Table 5: Generic Cloud-based enterprise software roles, actors, and activities

Roles	*Actors*	*Activities*
Partner	Certified partner of vendor/ independent consultant	Perform customer relationship management Sell the service to the Consumer Apply agile project management Provide technical consultation (e.g. data migration, customizing, mobile Cloud applications) Provide business process management consultation Provide IT Security consultation (e.g. educational work, security configuration, and identity management) Provide license consultation Provide Service Aggregation Provide financial and environmental consultation Offer additional services through market platform Provide partner managed Cloud
Application Provider	Vendor or licensed partners	Provide the Cloud-based enterprise software functionalities in a SaaS manner Develop further the service according to customers' needs and technical advances

		Provide the SaaS either in a private or a public environment
Platform Provider	Vendor	Provide a platform to consumers, partners, and external developers which offer an environment for developing Cloud-based software
Infrastructure Provider	Vendor or third-party provider	Provide and maintain infrastructure Storage and database capacity management Infrastructure capacity, scale up and down Backup database, determine a disaster recovery plan
License Provider	Vendor	License partners to deploy the enterprise software solution in a private Cloud environment
Cloud Consumer	Customer/ Client	Analyze and identify appropriate service provider Analyze in which regards consultation is required through a partner Use the enterprise software functionalities Adopt best practice approaches or map business processes in the system Harmonize on-premise applications with Cloud-based application (hybrid Cloud) (e.g. migrate transactional and master data) Use PaaS to develop, test, or prototype new functionalities Monitor SAL critical performance indicators and report violations
External Developer	Independent non-vendor developer	Develop value-added software/ add-ons that enhance the core functionality of the enterprise software
Market Platform Provider	Vendor or independent provider	Offer platform which distributes value-added Cloud-based applications Review submitted application of an external developer or partner

Figure 4: Generic value network of Cloud-based enterprise software



Conclusion and Discussion

Conclusion

Cloud Computing is rapidly gaining ground in the enterprise software market which influences the way enterprise software is developed, distributed and implemented at the client's place. Traditionally, enterprise software has been distributed and implemented on-premise through VARs and other consultative companies in protracted rollout projects. Hence, Cloud Computing does affect not only the vendors' business models but also other actors of the business ecosystem. This present work aims to find out how the value network of enterprise software solutions changes as a consequence of shifting from on-premise to Cloud-based technology.

The shift towards Cloud Computing means the transformation from a physical product into a service provided over the internet. The introduction of services into a goods-dominant industry is also known as servitization. However, the shift from on-premise to Cloud-based technology is only partly in line with the SD logic by Vargo and Lusch (2004a). In contrast to Cloud Computing, servitization rather declares services as completions of products than substitutions of products. Therefore, the emerging Cloud Computing technology in the IT industry represents a new paradigm of servitization. Especially for enterprise software, the shift into Cloud Computing obtains explosive nature as it is characterized by high complexity and a decisive factor for business operating success.

As the enterprise software solution represents a technology platform, many stakeholders of the business ecosystem are apparently facing a fundamental change due to Cloud Computing. Therefore, stakeholders need to understand how the ecosystem is going to change to adopt the new technology

and transform their competencies into new value propositions for customers and other stakeholders. Regarding the on-premise enterprise software, there are three main functions, namely: vendor, partner, and customer. While the vendor develops the software and does marketing, the partner sells the software and supports the customer in mainly technical regards. The customer takes care of the technical and organizational rollout of the on-premise enterprise software, as well as ensures sufficient operation of the system by staffing IT experts and continuously improve IT infrastructure.
In order to find out how the value network changes, this present work uses a multi-method qualitative study by applying a multiple case study and semi-structured interviews with experts. The outcome of the empirical research is a generic value network for Cloud-based enterprise software which is summarized and illustrated in Table 5 and Figure 4. In the following, this present work points out the main conclusions regarding the change of the value network of enterprise software as a consequence of shifting from on-premise to Cloud-based technology.

Firstly, the shift from on-premise to Cloud-based technology does not mean that roles, actors, and activities related to IT simply disappear. Instead, the activities appear no longer at the client's place but in someone else's activity field. From the customer's perspective, Cloud Computing means a shift of complexity from customer's on-premise infrastructure to the vendor or the partner. Secondly, as *IT infrastructure at the client's place becomes less complex*, and the enterprise software becomes more standardized, the role of the consultative partner changes from an IT-intensive role to a more business process management role. This is at least the case when enterprise software is deployed in a public Cloud environment as it follows best practices approaches, standardized processes with limited customization opportunities. Therefore, customers in collaboration with partners need to analyze whether best practices fit their current or future business model. If this is not the case, a private hosted environment might be a more appropriate deployment model. Interviewees agree that standardized solutions rather fulfill SMEs than large enterprises' requirements. Thirdly, *technical consulting still keeps its relevance* due to IT security, data migration, interface definition, customizing, and mobile application development. As soon as the standardization of enterprise software prevails, also customization activities will become marginal. Fourthly, *new emerging fields for value-added services* provided through partners are financial consulting, license management, environmental consultation, and service aggregation. Financial advice regarding Capex and Opex are of particular importance in the selling process to support the customer regarding the economic evaluation process. The lack of transparency of licenses discourages potential customers to enter into a contract. This also includes the monitoring of SLA critical indicators and can be handled through a Service Aggregator. Many companies aim to reduce their carbon footprint which can be achieved through energy efficient Cloud Computing solutions. Fifthly, the *vendor transforms into a service provider and acts in several roles*. As the business model of the vendor changes, also the revenue streams for partners change from a short-term to a long-term revenue stream. Therefore, vendors need to create new incentives for partners to sell Cloud-based solutions to the customers. Sixthly, *the shift also changes project* *management concepts* to a quicker and agile approach which better fits the rapid implementation process of Cloud-based enterprise software. Seventhly, the *technological platform offers new opportunities* for the external developers, partners, and customers to develop applications that extend the core functionality of the enterprise software. Through market platforms, external developer and partners can offer and distribute their value-added solutions more easily. Finally, as the *IT infrastructure becomes less relevant for the Cloud Consumer*, he can concentrate on his core business but needs to consider applying best practices processes when receiving public Cloud services.

Practical and theoretical implications

This present research contributes to the IS literature by deriving a generic value network for Cloud-based enterprise software. The generic value network illustrates the value created by each actor and the interaction of the actors. Even though the literature provides a profound basis, this research delivers valuable findings and opens new aspects. While literature does not correspond with the naming of roles and their remit, this work contributes to theory by determining more precisely roles, actors, and activities. Moreover, this present research demonstrates how service dominated business ecosystems can be studied from a value network perspective. While previous literature has a rather general character, this work provides more in-depth insights of how exactly the roles changes by analyzing in detail the value exchange in a multi-actor setting. Furthermore, this present thesis discusses the emerging Cloud Computing technology in the meaning of the shift from GD logic to SD logic by Vargo and Lusch (2004a). As a result, the SD logic shows contradictory approaches and needs to be expanded with the future possibilities enabled by Cloud Computing. In line with the critique of SD logic by Grönroos (2011)), the distinction between the operand and operant resources as well as service and services becomes inappropriate.

The generic value network can be used by practitioners in order analyze the changing business ecosystem. Practitioners can then transform specialized competencies into value propositions with market potential to customers and other stakeholders of the value network. This is demonstrated in the approach at D-VAR. D-VAR's main competence lies in the technical consultation regarding the installation and system administration of Dynamics AX. The technical support regarding on-premise installation and system administration needs to be adopted. The expertise of D-VAR can be utilized for offering partner managed Cloud to customers; thus, the D-VAR can use its technical know-how in-house. Beware, this research finds out that vendors are penetrating the partner managed Cloud market by offering substitute services and rising prices for licensing the service. However, technical consulting regarding IT security, interfaces development, customizing, and data migration is still demanding by clients. As the D-VAR holds industry specific value-added software applications, two strategic decisions based on this work are evident. First, the value-added solutions need to be developed in the Cloud-based platform and distributed as a service through the market platform. Second, D-VAR should transform the functionalities of the value-added software into mobile Cloud solutions, as the potential of such software is increased through the Cloud Computing technology. The expertise in customers' workflow and industry specific operational processes is indispensable. D-VAR needs to leverage its expertise in this regards and become a strong partner for its clients in respect of Cloud Computing. Customers struggle with identifying the scope of licenses and what kind of Cloud Computing concept might be appropriate. Therefore, D-VAR can offer support by analyzing customers' processes and detect proper deployment models. Overall, D-VAR possesses capabilities which provide opportunities to play a role also for Cloud-based enterprise software solutions. Nevertheless, D-VAR needs to change and transform these on-premise capabilities into Cloud Computing relevant competences.

Limitation and further research

The generalizability of findings is restricted despite the research design due to several reasons. The case studies only include the two different deployment models, namely private Cloud and public Cloud. As there is also the third deployment model hybrid Cloud, findings might not be applicable to this case. In fact, this research focuses on the main roles, actors, and activities which are most relevant to value creation in the business ecosystem. Consequently, this research does not claim to be absolutely comprehensive. The cases offer much more variations and scenarios which, in return, would result in more various findings. Moreover, as the IT industry is characterized by short innovation cycles, findings of this research might be outdated soon.

This research's outcome is the first approach towards a generic value network for Cloud-based enterprise software. Further research which considers other cases of different scenarios, deployment models such as hybrid Cloud and enterprise software type can enhance the current model. This study applies the value network role activity analysis by Kijl et al. (2010) but does not investigate the financial streams or the calculation of expected benefits and costs. Thus, further research can easily build on this study by applying the quantitative abstract cost benefit model introduced by Kijl et al. (2010). This might also help stakeholders of the value network to understand the new revenue streams due to Cloud Computing. This aids vendors to build incentives for partners to sell Cloud-based solutions. The generic value network can be extended by investigating external factors such as technology developments which may influence the value network. Further research is necessary which investigates precisely on changing second and primary roles and activities when it comes to a change of the scenario. The main findings of this research aid the formulation of hypothesis which can be tested through further quantitative research. Additionally, further research can focus on grievances or gaps between value creation and utilization in the value network of Cloud-based enterprise software and develop hypothetical roles and activities as well as business models in order to overcome such drawbacks or generate new value streams.

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