

The “As-a-Service”-Paradigm and Its Implications for the Software Industry – Insights from a Comparative Case Study in CRM Software Ecosystems

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Abstract. By presenting insights from our comparative case study of two CRM ecosystems, we indicate how “as-a-service”-based ecosystems differ from traditional “on-premise” ecosystems and how the particular roles of the market players might change due to the increasing diffusion of the “as-a-service” paradigm. Within the scope of our case studies, we differentiate two views on the ecosystems: the relationship between the platform provider and providers of complementary extensions (ISVs) as inside perspective and the relationship between customers and the CRM ecosystem as a whole as outside perspective. Based on transaction cost theory and intermediary theory our results let us assume that (1) “as-a-service”-based ecosystems will have a higher level of market coordination than “on-premise” ecosystems and (2) the task profiles of intermediaries and platform providers participating in “as-a-service”-based software-ecosystems will differ from task profiles in “on-premise” ecosystems. Based on these findings, we discuss practical implications for involved market players.

Keywords: software-ecosystems, analysis of value chains and value creation structures, “as-a-service” vs. “on-premise”, cloud computing, transaction costs, intermediaries, case-study research.

1 Introduction

Following the latest news from the software industry, buzz words such as cloud-computing or platform- and software-as-a-service have gained ground in the attention span of IS executives. Driven by numerous examples of successful pure software-as-a-service providers like Salesforce.com, traditional software companies, such as SAP with Business ByDesign or Microsoft with the Azure platform, have significantly expanded their “as-a-service” activities in recent years. These new service based products now form the basis of “as-a-service”-based software ecosystems.

The term ecosystem refers to the fact, that the platform provider together with vendors of complementary applications and services can be described as a sort of “ecosystem” in terms of a “biocoenosis” including the surrounding environment. A specific characteristic of software ecosystems’ core products is that customers derive

added value only if the core product is extended with functions that are outside the core competencies of the particular core platform provider and that can be delivered by independent software vendors (ISVs), instead. Hence, on the one hand participants of ecosystems commonly benefit from their commitment and on the other hand their commitment is also necessary for the long-term survival of the system. Due to these occurring reciprocal dependencies, also called indirect network effects [1], market players who are involved in these ecosystems strongly urge to align their activities and integrate themselves into the system [2-4].

Unlike “on-premise”-software, ecosystems based on the “as-a-service”-paradigm are characterized by the fact that the software is no longer sold to the customer as a *product* but operated on the infrastructure (i.e. servers, ...) of the suppliers and therefore provided as a *service*. This technically entailed change is also the starting point of numerous economic and organizational implications for the involved participants of “as-a-service” ecosystems [5]. For all market players in these “as-a-service” ecosystems (including platform providers, ISVs as providers of complementary extensions, system integrators and customers) the question arises, how “as-a-service”-based ecosystems differ from traditional “on-premise” ecosystems and accordingly how the particular roles of the involved market players might change due to the increasing diffusion of the “as-a-service” paradigm.

Hence, the purpose of this paper is to compare a typical “on-premise” ecosystem with a typical “as-a-service” ecosystem within the scope of a comparative case study. In section 2, we therefore review the literature on the analysis of value creation structures and pinpoint the research gap addressed in the paper at hand. In the subsequent sections 3 and 4, we first introduce the design of our case studies and report its results. Our paper closes with a conclusion in which we summarize possible practical implications and suggest starting points for further research.

2 Related Work

The possible paradigm shift in the software industry, which we address in our research question, is to be considered on the level of the involved market players and hence aims at the analysis of value creation structures. Such analyses of value creation structures are already intensively discussed in the literature. In their overview article, Picot et al. (2007) summarize established concepts and distinguish them on a macro-, meso- and microeconomic level [6]. Models on a macroeconomic level examine the contribution of different economic sectors to the gross national product while in case of a consideration on the microeconomic level a single company is in the focus of research activities. The meso-level of analysis resides in between the aforementioned levels and refers to value creation in different branches. Since the intention of our paper is the investigation of software ecosystems, our analysis focuses on the meso-level.

Although the body of knowledge on value chains has also dealt with changes of value creation structures at the meso-level, amongst other things also within the context of digital goods [7-8], there were no studies which analyzed value creation structures of software-ecosystems in particular. Hence, beside the general literature on added value creation structures, the emerging body of knowledge on economic

changes in the software industry is chosen as theoretical basis. Here, the “application service provider” (ASP) concept which is considered as predecessor of the “as-a-service” paradigm, has been elaborately discussed (see e.g. [9-10]). Although we meanwhile know that the ASP-concept has not lead to a sustainable structural change in the software business, Cusumano (2008) could still empirically prove that a change from products to service business is taking place in the software industry [11]. Consequently, in recent literature on the software business, the “as-a-service” paradigm is still intensively discussed. In their empirical study based on transaction cost economics, Susarla et al. (2009), e.g., have identified the form of contracts as a critical success factor for service business models [12]. Regarding the transformation of value creation activities, the reference model for “as-a-service” value chains by Altmann et al. represents an particularly important preliminary work of this study [13].

Summing up, we find that topical contributions agree in the assumption that the shift towards the “as-a-service” paradigm will result in a sustainable structural change of the software industry. Nevertheless, to our knowledge, no contributions exist that specifically address the differences between “on-premise”- and “as-a-service” ecosystems and indicate which changes could arise for the involved market players. This research gap is to be addressed in the paper at hand.

3 Research Concept

The design, procedures and evaluation of our case study is based on the concept and the recommendations of Yin (2008) [14]. In order to achieve an adequate level of representativeness, we consciously selected two ecosystems for our comparative case studies that can be considered as typical in terms of the respective paradigm (“as-a-service” or “on-premise”) [14]. The chosen enterprises *CAS Software AG* and *Salesforce.com* as well as their respective ecosystems are therefore introduced in detail in section 3.1. In the following sections 3.2 and 3.3, we develop the applied research framework and present the theoretical backgrounds for the analysis. The detailed and transparent description of the research design ensures the repeatability and therefore guarantees the reliability of our research [14].

3.1 Presentation of the Case Study Objects

CAS Software AG. Founded in 1986, the CAS Software AG with its headquarter in Karlsruhe is the German market leader for CRM solutions for small and medium-sized businesses. In the preceding fiscal year the company gained a turnover of approx. € 35 million with 190 employees and more than 150,000 users (see: CAS website).

Since 1998 CAS produces the CRM-Groupware software “genesisWorld”, which we regard in the following. Because of the fact that more than 100 ISVs develop diverse horizontal and vertical complementary extensions on it, genesisWorld is to be understood as a core product of an “on-premise” software ecosystem for the purpose of this paper. The mentioned cooperation partners produce horizontal extensions which are specific for a branch, as well as vertical extensions for additional functionalities which are independent from branches. All extensions are listed and priced in

the official solution catalog of CAS genesisWorld. Beyond that, integration partners exist in the CAS ecosystem, which offer services like the installation and configuration of the solution and can act as general contractors.

Salesforce.com. Salesforce.com was founded in 1999 by the former Oracle manager Marc Benioff with the purpose to provide enterprise applications and in particular CRM solutions over the internet. Salesforce accomplished a remarkable development since its foundation – up to date, more than 63,000 customers and 1.5 million users, e.g. numerous famous enterprises like Dell, Motorola or CNN, use the CRM solution which is now called “Sales Cloud 2”. The Salesforce group, which appoints more than 3,500 employees worldwide, reached a turnover of \$ 316 million in Q2 2009. Hence, Salesforce is regarded as a SaaS pioneer as well as one of the most prominent success stories in the field of SaaS providers (see: Salesforce.com website).

An important driver of the depicted growth is the open architecture of the Salesforce ecosystem. With the introduction of the “Force.com”-platform in 2007, Salesforce offers a “platform-as-a-service”-solution which enables ISVs to provide extensions of the Salesforce products as well as Salesforce-independent “software-as-a-service”-solutions. In the associated AppExchange marketplace for Salesforce extensions typically more than 1,000 horizontal and vertical extensions are listed by approx. 500 partners (see: Salesforce.com AppExchange portal).

3.2 Case Study Design

Starting point of the case study survey were interviews with experts conducted with responsible persons from the respective ecosystems¹. To guarantee the comparability of both cases, the interviews were partly standardized, meaning that a questionnaire and an interview guide were used to structure the conversations. To ensure the validity of the research, according to the recommendations of Yin (2008), we carried out a document analysis of publicly available information like corporate websites and press releases of the participating market players in the sense of a data triangulation [14].

As we discussed in chapter 2, the analysis of ecosystems constitutes a consideration at the meso-level. Important for the structures of value chains at this level are on the one hand the relations between the platform provider and the ISVs and, on the other hand, the relations between customers and the ecosystem as a whole [4]. To take into consideration both views, our case study design is divided into the analysis from an inside and an outside perspective. We therefore consider four market players: The (1) *platform provider* is the hub of the ecosystem since he develops and provides the core system. (2) *ISVs* offer complementary extensions, while (3) *integrators* typically help (4) *customers* to install and configure the software solution. The inside perspective examines the relationship between the platform provider and the ISVs while the outside view refers to the connection between the customers and the software ecosystem as a whole, as well as the support of integrators where appropriate. These two perspectives are illustrated in Fig. 1.

¹ Altogether, we conducted 9 circumstantial interviews over a period of six months in 2009. Our interview partners included managerial executives of the respective platform providers (Salesforce.com and CAS) as well as general managers and leading employees of ISVs and system integrators.

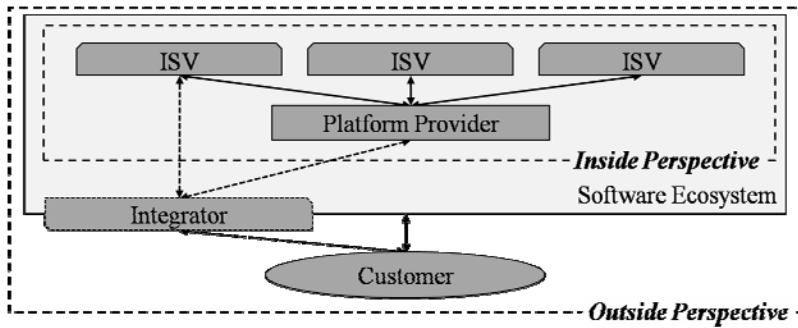


Fig. 1. Case study design: *Inside-* and *Outside Perspective* of a software ecosystem

3.3 Two Research Perspectives on Value Creation

Inside Perspective. A key aspect when considering the relationship between the platform provider and ISVs, which we refer to as inside perspective, is, to find the optimal coordination form of this relationship. The question of the optimal coordination form of an economic relationship, regarding its efficiency is often analyzed by the transaction cost theory [15]. The transaction cost theory is based on the fact that the coordination of distributed value creation activities generates costs. Therefore, transaction costs cover the costs for the initiation, agreement, execution, control, and adaptation of the transaction [16]. The purpose of an analysis based on transaction costs is to determine the coordination form of a relationship that minimizes its transaction costs, depending on the value of certain parameters. Based on the assumption of limited rationality and opportunistic behavior of the involved market players, the parameters asset specificity, uncertainty and transaction frequency determine the extent of the transaction costs [17]. The transaction costs theory generally recommends hierarchic coordination for relationships which are characterized by high asset specificity and uncertainty, hybrid coordination for average specificity and uncertainty and market coordination for low specificity and uncertainty [15]. Since the transaction frequency only leads to a strengthening of the recommendation towards hierarchic coordination, if the asset specificity and/or uncertainty are increased, it is commonly considered as supportive only and can therefore be neglected in the following [18].

The purpose concerning the inside perspective therefore is to analyze, whether “as-a-service” ecosystems differ from “on-premise” ecosystems in the parameters asset specificity and uncertainty. If yes, the transaction cost minimizing coordination form in “as-a-service” ecosystems would differ from the coordination form in “on-premise” ecosystems.

Outside Perspective. In terms of the outside perspective, the relevant question particularly is to what extent intermediaries are needed to support the relationship between customers and the overall system [4]. In the given context, market players who act neither as suppliers nor as consumers, but who, for a commission, facilitate the functioning of the market are called intermediaries [15]. According to this definition, integrators, which adapt software solutions to the individual needs of customers and support the integration into their processes, represent typical examples of intermediaries in the

software industry. The central functions of intermediaries in electronic markets are (1) to supply the market participants with information (2) to organize the composition of the individual solution, (3) to build trust between the market participants and (4) to offer additional services like handling of payments or financing [15].

Therefore, based on the intermediary theory, the purpose concerning the outside perspective is to point out whether a change of market structures caused by a shift towards the “as-a-service”-paradigm also leads to a differentiated task profile of intermediaries in software-ecosystems [19].

4 Results

We derived our results by performing a qualitative content analysis of the conducted interviews[20]. A document analysis of corporate websites and press releases on the two selected ecosystems was used to complement our information basis [14]. According to the perspectives introduced above, the presentation of our case study results is subdivided into inside- and outside perspective. In chapters 4.1 and 4.2 the results from the chosen ecosystems are compared and the implications are pointed out.

4.1 Comparative Analysis of the Inside Perspective

The comparative analysis of the inside perspective is based on the transaction cost theory. As discussed in the preceding chapter, the influential factors asset specificity and uncertainty are analyzed in terms of their impact on the transaction cost occurring in the relationship between the platform provider and the associated ISVs.

Asset specificity. From the perspective of ISVs, the asset specificity of the relationship between them and the platform provider is determined in particular by the extent of their need to make specific investments for being able to provide complementary products. These investments can either be to acquire specific knowledge or to buy specific hard- and software, which would only be useful in the context of the respective ecosystem [18]. The higher these specific investments are, the higher is the resulting threat potential of the platform provider which he could use opportunistically e.g. to enforce a higher revenue share for himself. From the view of the platform providers, however, the specificity is measured through the extent to which he has to reveal specific knowledge about his product core to the ISVs. This is also correlated with an imminent behavioral uncertainty, because opportunistic ISVs could use the specific knowledge otherwise, e.g. to become competitors or to pass it on to an existing competitor of the platform provider.

Investments in transaction specific hardware and software are in both worlds equally of little importance, because the development of extensions is possible in each case with standard development tools and with no specific hardware needed. Nevertheless, ISVs associated to CAS as well as to Salesforce.com have to intensively invest in gaining specific knowledge about the respective product core before being able to produce suitable extensions. Because the documentation of how to develop complementary applications for Salesforce.com is publicly available on the Internet, it can be supposed that the obtainment of specific knowledge is easier with Salesforce.com than with CAS and accordingly that it will be easier to recruit employees

with the required skill sets. Furthermore, Salesforce.com offers numerous SOA interfaces. With their help, ISVs can integrate standardized external software. Therefore, the knowledge ISVs have to build up in the Salesforce.com ecosystem can possibly be used in other SOA-based ecosystems as well. Consequently, regarding the perspective of ISVs, asset specificity in the Salesforce.com ecosystem tends to be lower in comparison to the ecosystem of CAS genesisWorld. Because both, CAS and Salesforce.com offer open interfaces to their core systems, both platform providers only have to reveal very little information and insights about their specific product core. Because the conceptual design of Salesforce.com was very open from the beginning on, we however expect that Salesforce.com has to reveal even less specific information about the core system in their interface descriptions than CAS has to for genesisWorld. Hence, the platform providers’ perspective allows us to confirm our assumption of a comparatively low specificity of the relationship between Salesforce.com and the associated ISVs. Hence, we can overall assume a higher extent of specificity in the relationship between platform providers and ISVs at CAS genesisWorld.

Uncertainty. The uncertainty as an influencing factor of transaction costs is usually subdivided into environmental uncertainty and behavioral uncertainty [17]. *Behavioral uncertainty* is especially high if one party is able to fleece his transaction partner due to an existing opportunism potential, e.g. because of high transaction-specific investments [16]. The relationship between Salesforce.com and its ISVs was built on a purely electronic processing from the very first; hence, the partner management is entirely handled via the online-platform. At CAS genesisWorld, however, interested ISVs first have to complete questionnaires and send them to the partner management office of CAS before CAS gets in touch with the potential ISV and initiates the contract negotiations. Overall it is to be stated that the relationship between Salesforce.com and the associated ISVs is characterized by a higher behavioral uncertainty because purely electronic connections generally offer bigger opportunities for opportunistic behavior than relationships that are at least to some extent built on a personal basis [7].

Besides the just mentioned behavioral uncertainty, the second important influencing factor of transaction costs is the *environmental uncertainty*, which is characterized by the complexity and dynamic of a relationship [18]. In the case of the here examined relationship between platform providers and ISVs of a software ecosystem, complexity refers in particular to technical developments as well as to the resulting necessary abilities and knowledge of human capital, while dynamic applies to the change of complexity over time [21]. In terms of the analyzed ecosystems, we assume that the complexity and dynamics and therefore also the environmental uncertainty are a little higher in the ecosystem of CAS genesisWorld than at Salesforce.com. This is caused by the fact that Salesforce.com’s platform force.com is also widely established as stand-alone programming environment and therefore Salesforce.com must guarantee a certain continuity and compatibility. In contrast, CAS genesisWorld is, like other established on-premise software systems such as SAP’s R3 or Oracle’s E-Business Suite, a proprietary platform that is only utilizable to develop specific extensions for CAS genesisWorld. Hence, because the impact of modifications is generally less far-reaching, CAS as a manufacturer could make changes easier and more often than Salesforce.com could do it.

Table 1. Recommendations of the transaction cost analysis

influencing factor	relative parameter value in the		result of analysis
	“as-a-service” ecosystem	“on-premise” ecosystem	
asset specificity	lower	higher	indication for a relatively higher degree of market coordination in the selected “as-a-service” ecosystem
environmental uncertainty	lower	higher	indication for a higher degree of market coordination in the selected “as-a-service” ecosystem
behavioral uncertainty	higher	lower	indication for a higher degree of market coordination in the selected “on-premise” ecosystem

Implications. The results of our transaction cost analysis are summarized in table 1. We find that two central influential factors of the transaction cost theory, specificity and environmental uncertainty, are relatively lower in the relationship between Salesforce.com and its ISVs compared to the relationships between CAS and its partners. However, the results of the behavioral uncertainty point at the opposite direction.

Following the general notion that the asset specificity is the most important influential factor of transaction costs [16], our results allow the following careful assumption: Under the condition that the transaction partners manage to control the given opportunism potential caused by the purely electronic relationships (e.g. by implementing accordant contract conditions and adequate possibilities for sanctions), in the “as-a-service” world a higher degree of market coordination is reasonable than in the “on-premise” world because this coordination causes the comparatively lowest transaction costs in the relationship between platform providers and ISVs. The following scenario is imaginable: the platform provider of an “as-a-service” ecosystem establishes a special online marketplace that enables ISVs to offer their extensions to the customers of the ecosystem. In doing so, the core manufacturer keeps control of all terms and especially entry conditions of this marketplace. As we will elaborate more thoroughly in the following chapter, Salesforce.com, for example, has already established an element of market coordination by offering the AppExchange Marketplace.

4.2 Comparative Analysis of the Outside Perspective

The analysis of the relationship between customers and the CRM-system as a whole, which is covered by the outside perspective, aims to reveal whether the presumed paradigm shift results in a modified task profile of integrators. The analysis is carried out along the central functions of intermediaries as introduced in chapter 3.3.

Supply of market players with information. Especially in opaque markets the supply of market players with information is an important function of intermediaries. Salesforce.com offers a considerably larger number of extensions, currently about 1,000, compared to CAS genesisWorld (with about 100 extensions) or other typical “on-premise” software ecosystems. This implies a greater need of a central bundling

of information by an intermediary. Salesforce.com is, however, trying to shape the market for extensions as transparent as possible and has established the AppExchange platform for this purpose. Besides providing a complete list of all available extensions and their prices, this platform allows commenting and evaluating extensions as well as browsing reviews of other users. At CAS genesisWorld all extensions are documented in an official solution directory, too, but a public platform for ratings or comments does, however, not exist. Altogether, the higher number of available extensions in the "as-a-service"-ecosystem entails a stronger need for an intermediary to bundle and provide information about the supply. In this case, however, this task is undertaken by the platform provider itself.

Composition and configuration. The second fundamental function of an intermediary is to support customers in the composition and configuration of the specifically customized software solution. Due to the fact that CAS tries to establish long-term relationships with their partners, the frictionless integration of extensions is largely guaranteed. Because of the high complexity of their software system, it is however intended that the installation and configuration is supported by CAS or a certified partner. In accordance to the SaaS-paradigm, the solution of Salesforce.com is operated on their dedicated infrastructure and accessed by customers solely via the browser. Hence, an installation is not necessary and accordingly the integration of specific extensions can be done with a few clicks by the customers themselves. Although Salesforce.com does offer support services (especially to key accounts), such as the adaptation of special templates, customers should generally be able to accomplish most of the necessary adjustments by themselves. Overall, our analysis indicates a higher need for clients of the CAS genesisWorld ecosystem to task an intermediary with the composition and configuration of the software solution than for clients of Salesforce.com.

Trust Building. Another function of intermediaries arises from the need to build trust between the various market players. Salesforce.com addresses this issue by providing the above mentioned evaluation and annotation features and thus ensures a certain transparency and security within their extension marketplace. As the partner network of CAS genesisWorld consists of significantly fewer partners, who moreover are tightly bounded to CAS by means of detailed partnership agreements, however, it can be assumed that within the CAS genesisWorld ecosystem the need of confidence building between customers and complementors is less important in comparison to Salesforce.com.

Additional services. In addition to the mentioned core functions, intermediaries often offer additional services to support the functioning of the market. One of these additional functions is the handling of payments. Whereas at CAS genesisWorld integrators can appear as general contractors, and so undertake this function, Salesforce.com takes care of the handling of payments by itself. Furthermore, according to the SaaS paradigm customers of Salesforce.com do not have to pay for the acquisition of the software and pay a monthly fee instead. Hence, for customers of Salesforce.com no significant costs of acquisition occur and accordingly generally no need of financing these upfront costs arises.

Table 2. Results of the intermediary functions analysis

function of intermediaries	greater need in
information supply of market participants	“as-a-service” ecosystem
composition and configuration of the software system	“on premise” ecosystem
trust building	“as-a-service” ecosystem
additional services (handling of payments and financing)	“on premise” ecosystem

Implications. The results of the intermediary functions analysis are summarized in Table 2. The analysis of the two considered cases indicates a change of integrators’ task profiles as a result of the postulated shift towards the “as-a-service” paradigm. Especially those integrators that have specialized on the composition and configuration of software systems and/or that were acting as general contractors in the sense of handling payments and offering financing will possibly have to take on a different role in “as-a-service” ecosystems which are comparable to the one we considered.

Our analysis reveals that besides the informational function, which is largely undertaken by the platform provider itself, the function of building trust will gain further importance. A possible scenario for the change in the specific role of the integrators would be that in addition to traditional integration services, trust building services such as customized security consulting will become increasingly important in “as-a-service” ecosystems. How necessary these confidence-building services can be, became obvious at Salesforce.com: the SaaS-provider had to react on customer demands for more transparency and now provides permanently updated data on safety and the system status of the infrastructure on their publicly available portal trust.salesforce.com.

5 Limitations, Further Research and Discussion

The goal of this paper was to take a closer look at possible changes in the software industry resulting from the increasing diffusion of the “as-a-service” paradigm. For this purpose, we analyzed the value creation structures of an exemplary “on-premise”- (CAS genesisWorld) and an exemplary “as-a-service” software ecosystem (Salesforce.com). The transaction cost theory was used for the inside perspective and the intermediary theory has built the basis for the analysis of the outside perspective.

The results of both views let us assume that a paradigm shift towards “as-a-service” based ecosystems will result in changes for all involved market players. It should be noted, however, that, although the usual quality criteria for case studies have been sufficiently taken into account, a generalization of the results has only a limited legitimacy [14]. The findings presented in chapter 5.1 are therefore consciously formulated as propositions which should be understood as starting points for further research on the given topic. Moreover, in chapter 5.2 we discuss concrete practical implications resulting from our findings.

5.1 Propositions for Further Research

Proposition 1: “As-a-service”-based software ecosystems will have a higher level of market coordination than “on-premise” ecosystems. The tendency towards a

comparatively lower specificity and environmental uncertainty, which was detected in the context of the inside perspective analysis, could indicate a relatively higher degree of market coordination in “as-a-service” ecosystems, because a coordination implementing a market would result in comparably lower absolute transaction costs in the relationship between the particular platform provider and the associated ISVs. For established ISVs this development raises the question whether they have to be afraid to lose their contractually secured position in the future and therefore encounter the mere price mechanism of market coordination. Platform providers will face the challenge to retain those ISVs that are providing especially important extensions within their ecosystem and therefore control the increased behavioral uncertainty resulting from the trend towards all-electronic extension marketplaces.

Proposition 2: The task profiles of intermediaries and providers participating in “as-a-service”-based software ecosystems will differ from task profiles in “on-premise” ecosystems. Consistent with comparable findings on “as-a-service” implications, our analysis showed that a significant shift of task profiles is to be expected [22-23]. Our findings imply that the importance of conventional integrators that primarily undertake the task of composing and configuring the software solution will comparatively rather decrease in “as-a-service” ecosystems, because providers themselves might undertake this task. At the same time, our analysis however reveals that the task of building trust becomes more relevant. Hence, a possible scenario would be that integrators increasingly focus on addressing the confidence issues occurring in the “as-a-service” context, for example by becoming a “trusted third party” [24]. Conversely, providers whose role in “on-premise” ecosystems is especially the production of the core software will undertake additional tasks in “as-a-service” ecosystems. Together with the higher degree of market coordination (see proposition 1), our findings imply that platform providers will increasingly undertake the task of supplying the market participants with information. So, beyond the role of being pure software manufacturers, platform providers will increasingly also act as orchestrators of their platform ecosystems.

5.2 Discussion of Practical Implications

Though, as we already denoted above, only a limited generalizability of our results is possible, we want to discuss which implications could arise for the individual market players of “as-a-service”-based software ecosystems.

As our results indicate that in “as-a-service” ecosystems the supplies of extensions will rather be organized in markets, we expect an intensification of the competition among the ISVs compared to “on-premise” ecosystems. Hence, *customers* of “as-a-service”-based solutions should find a wider variety of extensions at lower prices. In addition, upfront costs for the integration and configuration of the software solutions will rather decrease, because customers become less reliant on integrators. As a result, it can be assumed that *integrators* undertake more confidence-building functions in “as-a-service” ecosystems, because their function of customizing and integrating the software solution becomes less relevant. For example, established integrators could offer additional services, like legal counseling services, involving aspects of individual forms of contracts and the potential risks, which could arise from the global distribution of the IT-infrastructure. In doing so, integrators could use their reputation to

convince those customers, who are still critical for “as-a-service”-solutions especially because of security concerns. ISVs that could rely on their contractually protected position within the ecosystem so far are likely to face greater competition in “as-a-service” ecosystems. Due to the increased importance of markets, it will in reverse also be easier for ISVs to offer their extensions in further ecosystems and there to assert themselves against well-established competitors. We expect the task profile of *platform providers* to change as well. In addition to the changes, which are directly determined by the “as-a-service”-paradigm, such as the development of an own multi-tenant server infrastructure or the implementation of a service-based pricing model, providers will most likely have to fundamentally rethink the character of their relationship with customers, integrators and ISVs. Whereas customers of “on-premise” solutions were tied to providers because of extensive expected switching costs, this lock-in effect is much lower with “as-a-service” solutions. Therefore, it can be assumed that “as-a-service” platform providers will increasingly invest in customer loyalty. Also the shift of partner management, moving away from a small number of partners bound by contracts towards a market-organized ecosystem, will make it inevitable for platform providers to develop new skills in the management and orchestration of ecosystems.

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