Defining a theoretical model to assess transition from on-premises to Software-as-a-Service

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Abstract

Transitioning enterprise applications (EA) software from on-premises to Software-as-a-Service (SaaS) is a crucial question for IT adoption decisions. Grounded in the literature, this article suggests a research model to support enterprises assessing a transition strategy from on-premises to a SaaS model. The research model proposes eight hypotheses to be tested and analysed with data collected from a questionnaire among firms that have EA software. This paper goes beyond the software functionality and usage to address the strategic challenges of selection in a new landscape of the enterprise software industry, also considering the industry’s software deployment chain, business model, and the moderating factor of firm’s business process sophistication. We aim to provide new and significant guidelines for enterprise’s and software vendor’s decision-making.

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1. Introduction

Today, enterprise applications (EA) play an increasingly significant role for businesses, with multiple categories of EA being adopted such as the enterprise resource planning (ERP), customer relationship management (CRM), supply chain management (SCM), human resources management (HRM), and others [1]. According to a new International Data Corporation (IDC) report [2], worldwide revenue for EA will grow from $279.6 billion in 2022 up to $385.2 billion in 2026. In the EA market, on-premises software (implemented on customer server and maintained by customer, including upgrades, updates, and security patches) provides customers more control, and higher levels of user and business processes customization. This model represented 70% of the EA market in 2021. However, accordingly with Synergy [3], in recent years, software-as-a-service (SaaS) model is significantly changing the adoption of EA from a perpetual to a consumption type approach - software vendors are releasing EA over the internet, together with the subsequent patches, with organizations taking advantage of continuous bug fixing, new data technologies, as well as functionality and security improvements [4]. Contrary to on-premises, when adopting SaaS, customers can scale the cloud computing resources up or down after their purchases, which is also recognized as one of the SaaS software’s core advantages. Under this, many well-established EA software vendors such as SAP, Oracle, Microsoft, SAGE and Infor have been investing in this model of software release [1], [5]. Synergy [3] also shows that in the third quarter of 2022, the top five cloud providers have taken more than 74% of the worldwide cloud infrastructure market. Taking into consideration the huge impact of these two models offered by software vendors, enterprise customers should react cautiously by fully considering on-premises versus SaaS possible adoption strategies. Hence, considering the entire EA software value chain composed by EA software vendors in the upstream of the chain, and the EA enterprise customers in the downstream, the following research question deserves to be investigated: Should customers move from On-premises to SaaS? The remainder of the paper is organized as follows. In Section two, based on the literature review we provide the theoretical ground that supports our research model. In section three, we present the proposed research model, followed by the proposed research methodology in section four, and then, in section five we conclude and propose future steps.

2. Theoretical grounding

The great majority of the authors claim that the main difference between the SaaS and traditional on-premises model lies on how information is provisioned. Choudhary [6] mentioned small up-front investment, data security, and especially the subscription pricing model (SaaS). Cusumano [7] emphasized the direct and indirect network effects stemming from the high connectivity. Benlian and Hess [8] add other factors like security risks, strategic flexibility, by surveying IT executives. In line with these authors, we derive from the literature five factors worth of particular attention:

1) concerning software functionality, SaaS software has been designed to address standard business needs. In this case, SaaS is equipped with standardized UI and functionalities and thus becomes simple enough for customers to understand and use [9]. This kind of design perfectly matches the multi-tenant architecture so that software vendors can enjoy economies of scale, and customers benefit from the subscription price. However, the disadvantage in supporting customization also emerges, as SaaS underlying code is hard to adjust according to customers’ specific requirements, which is seen as an inconvenience when compared with perpetual products (on-premise) [8], and also in terms of functionality SaaS software is sometimes a limited alternative to on-premise software [10].

2) concerning the commercial model, compared with the on-premises model in which the software is a capital expenditure to acquire a perpetual licensing (CAPEX) [1], the SaaS model has been famous for its pay-per-use pricing [6], [11]. However, the pay-per-use model influence on software customer’s profit-earnings is not always straightforward. Benlian and Hess [8] pointed out that the subscription model brought an expense that customer can input directly into business operations (OPEX), but this model demands that software vendors attend to customer needs more frequently, since it is easy for them to unsubscribe [12], [13] also refer to the level of quality demanded to SaaS vendors in order to retain customers.

3) concerning software use, customers need to keep a real-time Internet connection to the “cloud” to enjoy functionalities and patches [14]. Software vendors provide the long-term maintenance of these data resources, bringing both positive and negative influences on user experience. The positive influence is mainly stemming from the
portability and network effects. For example, Lal and Bharadwaj [4] reported that cloud storage of user data and real-time interaction effectively ease usage scenarios for enterprises. However, information security risks cannot be ignored since they rely heavily on SaaS vendors for data control and maintenance [15]. Other authors claim that contrary to on-premises model, data technologies such as Big Data Analytics, IoT, Machine Learning in SaaS [16]–[19] can be used with low efforts (resources, time and capital) from the customer side.

4) concerning the software deployment chain, in addition to the software vendor there are other actors in the deployment of software that affect the customer software adoption [20], [21]. In the on-premises model, besides the EA software costs, customers also have costs with hardware, databases, system integrators, whereas with SaaS EA customers usually lease cloud resources from cloud providers (such as hyperscalers), and thus the magnitude of renting fee charged may greatly moderate the subscription adoption or purchase perpetual licenses [22], [23].

5) concerning the business process sophistication, regarding firm’s policies and procedures that employees need to undertake in running the daily operations, the decision to adopt SaaS EA or to stay with an on-premises model can be highly influenced by the differences in business processes between organizations [24], so, several authors consider it as an important factor to moderate the adoption of EA [16], [25], [26] in the context of selecting the on-premises or SaaS model.

The research conducted by Zhang et al. [27], regarding the SaaS versus On-premise from a pricing perspective, and the work of Feng et al. [28], which exploited the adoption strategy from a competitive environment perspective, did not discuss the above five factors. Besides, to the best of our knowledge, there is still limited research discussing the factors that lead organizations with o-premises EA to adopt these applications on SaaS deployment, or to decide to stay on the same on-premises model. Hence, in this study, we develop and present a conceptual model that will allow organizations to assess if they should move EA from on-premises to SaaS, which is presented next.

3. Model and Hypotheses

The model presented in Figure 1 aims to assess the best adoption strategy for EA software by measuring how the above five factors correlate between them.

![Fig. 1. Conceptual model.](image)

In the theoretical model presented, four factors directly influence the likelihood to adopt a transition strategy from on-premises to SaaS EA (software functionality, software use, software deployment chain, and software commercial model), which lead us to postulate the following four hypotheses:

H1: the level of EA software functionality influences an organization to transition from on-premises to SaaS.
H2: the level of EA software use motivates the organization to make the transition from on-premises to SaaS.
H3: the EA software deployment chain led an organization to move from on-premises to SaaS.
H4: the EA software commercial model motivates an organization to make the transition from on-premises to SaaS.

Moving beyond and to answer our second research question a fifth factor (business process sophistication) was identified from the literature and incorporated into our research model, to moderate the four factors mentioned above. So, the firm’s level of relevance given to its business process sophistication will reinforce or diminish the likelihood to adopt a moving strategy from on-premises to SaaS. Which lead us to postulate the following four hypotheses:

H5a: Firm’s business process sophistication will reinforce the positive relationship between EA software functionality and the adoption of a transition strategy from on-premises to SaaS.
H5b: Firm’s business process sophistication will reinforce the positive relationship between EA software use and the adoption of a transition strategy from on-premises to SaaS.
H5c: Firm’s business process sophistication will reinforce the positive relationship between EA software deployment chain and the adoption of a transition strategy from on-premises to SaaS.
H5d: Firm’s business process sophistication will reinforce the positive relationship between EA software commercial model and the adoption of a transition strategy from on-premises to SaaS.

For control variables, we set: 1) ‘Firm Size’ as a proxy to capture variations of data that are not explained by the factors in the model [29], [30]; 2) IT related ‘infrastructure sophistication’ to assess the differences in both generic and specialized systems that may affect the adoption strategy for EA software [16], [31], and 3) ‘time since adoption of EA’ to control for the knowledge and experience that enterprises gain by using EA over time [32].

Due to the differences in size, budget, industry, and others, the decision to adopt SaaS or to stay in on-premises model can be very different [24]. Likewise whereas [25] uncover the influence of firm size on SaaS adoption, Ruivo et al. [19] discussed the moderating role in on-premises model.

4. Research methodology (future work)

Following this theoretical study, we will develop an empirical study through the usage of an online questionnaire. The content will be validated by five research academics and five professional experts in the EA software area, and, to assess the factors (constructs) reliability, a pilot test with 20 firms and correspondent remarks will be incorporated. We plan to measure the factors by using reflective items on a seven-point Likert-type scale, ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (7). With the assistance of a world leading software vendor (SAP) that offers EA in both on-premises and SaaS, a large-scale survey will target several European firms, for data collection. Due to the nature of the research model and the fact that it has not been tested in the past, the data analysis will be supported by Partial Least Squares (PLS). PLS fulfills the research objective by examining the validity of the factors, without requiring normal distributions for the factors. PLS requires a sample size of ten times the number of the largest number to structural paths directed at a particular factor. Hence, for the conceptual model the largest number of structural paths directed to ‘from on-premises to SaaS adoption’ factor is four, which means that the minimum sample size should be 40 [19], [29].

5. Conclusions

In this paper, we suggest a research model that aims to explore the decision support process of organizations to move or not from EA software on-premises to the SaaS model. It is a first attempt to produce knowledge on the overall research question: “Should customers transition their EA from on-premises to SaaS?” To deal with this question, we presented a theoretical model developed to contribute to the IT literature by examining five factors (software functionality, commercial model, software use, software deployment chain, and business process sophistication). This work will continue with the development of the questionnaire and then analyses of collected data using PLS. The research project aims to achieve contributions both to theory (in particular to IS literature by empirically testing if and how business process sophistication moderates the move from on-prem to cloud EA) as well as practice (including software vendors and executives, this research aims to support investments and organizational programs decisions) by
producing new knowledge on how these factors correlate with the decision of moving from on-premises to a SaaS model, and hence positively influence the value from IT. This reach might yield a limitation because it considers factors that are perceptions from executives on the impact of the adoption of SaaS from on-prem at the process level, whereas the model is firm-level. Hence to minimize bias and the generalization of the results, we will consider the business process factor as a moderator factor and include more than one respondent per firm to mitigate this risk as well as to have samples from different software vendors.

References


