Information & Management 58 (2021) 103289

Contents lists available at ScienceDirect

Information & Management

journal homepage: www.elsevier.com/locate/im

Mediation role of business value and strategy in firm performance of organizations using software-as-a-service enterprise applications

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ARTICLE INFO

Keywords:
Business strategy
Business value
Enterprise applications
Firm capabilities
Firm performance
Software-as-a-service

ABSTRACT

Firm performance impact arising from capabilities enabled by software-as-a-service enterprise applications (SaaS EA) has been the subject of limited research. By drawing on the resource-based view and competitive strategy theories, this study builds a model that (1) explains the firm performance effect of firm capabilities supported by SaaS EA and (2) clarifies the role of business value and strategy by acting as mediators between them. The model and its hypotheses are empirically tested through a survey of 257 company managers in a southern European country, confirming the importance of those mediators in firm performance.

1. Introduction

There is an increasing trend to adopt enterprise applications in the software-as-a-service model [1]. This tendency is in line with the expected growth of the worldwide market for cloud software (considered as SaaS and platform as a service by market analysts, IDC) until 2020, at 18.6 % in a five-year compound annual growth rate, a growth rate more than five times greater than that of the traditional software market [2]. More specifically, other market analysts (Gartner) say that the enterprise application software market continues to exhibit its most dramatic shift in 30 years; an irreversible shift that will continue and which by 2020, 35 % of all application software spending will be on SaaS [3].

Information technologies' (IT) and information systems' (IS) return on investment and impact on business have always been a major industry and market concern [4]. However, subjects such as the benefits or economic dimensions of cloud computing adoption and usage are still among the less studied aspects [5]. As we probed deeper into our research, we also did not uncover significant research regarding how software-as-a-service enterprise applications (SaaS EA) might create an impact on productivity, profitability, and competitive performance (e.g., revenue growth and market share). According to several researchers, firm capabilities are among the primary drivers of economic value, and IT can magnify those [6], which motivated us to look at how SaaS EA-supporting firm capabilities generate an impact on firm performance as the first subject we wanted to address with this work.

Additionally, the usage of enterprise applications is frequently associated with the creation of intermediate-process level impact in the organization, also known as operational benefits [7], that we refer to as "business value," whereas many researchers associate firm performance to strategic benefits. The majority of relevant studies in IT-based business value research either about the impact of more generic IT systems or enterprise applications. Even in cloud computing [8], they do not make a clear distinction between those two types of benefits, save for some rare exceptions [9], which makes it often common to find research work citing the impact of firm capabilities supported by IT in firm performance [10], without delineating that distinction and marking the dependency among the two types of benefits, that is, "business value" and "firm performance." In our research, we want to clarify if in a company that uses SaaS EA, the impact on firm performance is a direct influence of the firm's capabilities or if it is a consequence of the business value generated.

Some market analysts and consultancies, such as McKinsey [11] , state that despite the adoption growth of software-as-a-service, many organizations experience difficulty to get all the potential value from their transition of enterprise applications to the cloud, probably because they "are not taking this approach as part of a holistic strategy." How important is the organization's business strategy, both in the intermediate-process level impact ("business value"), deriving from the effectiveness of the business processes supported by those enterprise applications [12], and in the "firm performance," is also another topic we want to address in our research. So, in summary, we want to answer the following research question:

How do "capabilities supported by software-as-a-service enterprise applications" contribute to firm performance, and what are the roles of business value and business strategy?

Motivated by the previously described issues, and to try to answer

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https://doi.org/10.1016/j.im.2020.103289
Received 10 September 2017; Received in revised form 26 February 2020; Accepted 28 February 2020
Available online 29 February 2020
0378-7206/

this question, we built a theoretical model combining the resource-based view (RBV) [13] and Michael Porter's competitive strategy theories [14] that we empirically assess using structural equation modeling (SEM) and partial least squares (PLS) path modeling. The purpose of our work is to make relevant contributions to academics and practitioners regarding the advancement of knowledge in the areas of enterprise applications software and software-as-a-service. The first one regarding the contribution to the research stream of business issues in cloud computing, especially in areas such as intermediate-process level performance, financial performance, and relevance of competitive strategies, supported by a theoretical model and a quantitative methodology, because, to date and according to a recent literature review [15] most of the research in cloud computing lacks theoretical models and established methodologies such as quantitative methods. Secondly, by studying "how" and under "which conditions" SaaS EA-enabled capabilities influence the creation of different types of performance, and the complementarity of other mediating factors, such as business strategy, we are trying to respond to the challenges of some authors [6] regarding areas of research to be developed, to contribute to the advancement of knowledge in the field of value creation. Thirdly, this work also makes additional contributions to the advancement of knowledge of researchers and practitioners in the areas of cloud computing and enterprise applications software, as it brings clarity about the complementarity or competitiveness role of the combination of two mediators in the proposed theoretical model [16], to evaluate the impact of competitive strategy and intermediate-process level performance in the creation of firm performance arising from firm capabilities supported by SaaS.

We organized the remainder of this article as follows. The next section presents the theoretical background. We then describe the research model and propose the hypotheses in Section 3. In Section 4, we explain the research methodology. Sections 5 and 6 present the results, discussion, contributions, limitations, and suggest future work. We make the concluding remarks in Section 7.

2. Theoretical background

The theoretical background in this research starts with an analysis of the IT-based business value research done to date and where SaaS EA stands when compared to traditional implementation models, such as "on-premise" and more generic IT investments. We then clarify the differences between business value and firm performance, and afterward go more in-depth into how the integration of the RBV and competitive strategy theories can be used to explain operational and strategic benefits.

2.1. IT-based business value and software-as-a-service enterprise applications

IT-based business value research has already demonstrated that investments in IT have an important effect on productivity and the market value of firms, especially when these investments are combined with changes in the way people work and are organized [17]. However, much of this research refers to IT generically, which has a vast scope, as it can mean several types of applications, including productivity tools (e.g., Microsoft Office and Google Docs), infrastructure like middleware, network software, etc.

More specific IT applications such as enterprise applications are used to manage activities and processes that spread through the organization and, in some cases, also through other third-party organizations such as customers, suppliers, or both. Among the most common enterprise applications are enterprise resource planning (ERP), customer relationship management (CRM), manufacturing resource planning (or materials requirement planning) (MRP), human resources management (HRM), and supply chain management (SCM) [18–20]. Moreover, as some authors point out [21,22], there might be differences in IT-based value research between the results arising from all types of generic IT implementation and the impact of enterprise applications. The latter is very much related to process standardization and integration, and often we cannot distinguish which type of systems are inserted into the term "generic IT."

To date most implementations and usage of enterprise applications remain "on-premise," and SaaS EA refers to the delivery of enterprise applications hosted at a third-party data center, usually as a "pay per use" model through a monthly fee depending on the number of users and functionalities [23]. This model is an evolution from the application service provisioning model [24], which was limited by its single-tenant architecture, whereas SaaS architecture is multi-tenant [25]. This type of architecture and the advances in telecommunications capabilities at a low price [26] allowed a significant increase in the deployment of enterprise applications such as ERP and CRM in software-as-a-service, and these are also the leading product categories in SaaS, expected to represent nearly 36 % of all public cloud spending in 2021, according to IDC (Robert P. Mahowald [27].). This development will provide the possibility, especially to small and medium enterprises (SMEs), of more convenient access to new software packages and added functionalities for organizations that did not have these before, or for replacement of the existing ones.

In similar conditions between two firms with identical enterprise applications (versions and functionalities), but one with an "on-premise" EA and the other with a SaaS EA, similar results in several items would be expected, except perhaps in some financial KPIs. Simply because in one case, we have a "capital expenditure," which can affect the Return on Equity (ROE), for instance, differently from the other deployment, which is characterized by "operational expenditure." However, SaaS EA also accelerated the availability of what is called ERP II, which on the base of core ERP functionalities, enlarges the functions into CRM, MRP, SCM, and HRM functionalities [28], sometimes with several other modules (add-ons), also in SaaS. This improvement means that firms that deploy enterprise applications as a service are accessing the most up-to-date software versions with added functionalities, in comparison with most of the organizations that have "on-premise" installations. The latter often already with old or not up-to-date versions (e.g., on average, the lifetime of an ERP installation is five to ten years [29]), especially in the case of SMEs. This aspect is an important difference between SaaS EA and traditional IS implementation because IT capabilities increase, and so the enhancement of business processes can increase firm capabilities as well [20]. Therefore, the expectation from a positivist point of view (and cloud vendors also try to make their prospects believe it) that the adoption and usage of SaaS EA should reflect better support to the capabilities of the enterprises, and consequently lead to increased business value and firm performance.

However, as some other authors have already cautioned in recent studies [1,30], the success of enterprise applications in software-as-a-service might be challenged by organizational, management, and strategic issues and, as such, these must be taken into account before making decisions. It is, therefore, our aim to verify how the adoption and usage of enterprise applications delivered as software-as-a-service influence business value and its respective mediation role in the creation of firm performance, and to the best of our knowledge, to date, no study has probed this topic specifically.

2.2. Business value and firm performance

In IT-based business value research, there seems to be no consensus about what business value and firm performance are and the difference between them. This debate arises from a heterogeneous terminology that has persisted over time, as pointed out in recent reviews [4]. Our point of view and definition intends to differentiate between the internal impact that IT investments have on the organization and how and if these internal effects are also reflected in performance compared to competitors, to reflect competitive advantage.

We take the view of a stream of researchers who make a clear distinction between operational and strategic benefits, corresponding to our business value and firm performance, respectively. Business value results from intermediate-process level impact, reflecting an internal perspective effect from the firm capabilities, which has consequences on items such as customer service or inventory management, to name only two. This approach is similar to that of other authors [31–33] whose work regarding the connection of business strategy and business processes or the relationship between the performance of business processes and the business model, also consider that there is an intermediate (operational) process level perspective of value creation, with such value creation stemming from RBV capabilities such as production or service delivery methods, administrative processes, resource flows, knowledge management, and logistical streams.

On the other hand, the business model concept has also been considered as a conceptual alignment layer that allows translating the business strategy into business processes, especially as these are nowadays more IT-enabled, and the success of an organization is highly dependent on a successful relationship between business strategy and business processes along with the IS [12]. Hence, business value, as an intermediate-process level impact, is expected to be the result of the effectiveness of this relation underlying the business model of the organization.

Different authors assign diverse nomenclature to what we refer to as "business value" and "firm performance," and in Table 1, we summarize some of the various designations adopted to distinguish between these two terms.

Firm performance is also intended to be comparable among different organizations, with financial performance indicators such as revenue, profits, and return on capital, or others such as market share, to name a few. These are commonly associated with a competitive advantage, which is represented through the creation and sustaining of superior performance and market value [34] when compared to the competition. In IT-based business value research, some authors [35] also represent the competitive advantage with the financial impact measured by profitability, distinguishing it from the intermediate value [6]. Others explicitly distinguish between business value and firm performance, to differentiate between the impact of IT felt at low levels in the organization, before it can be demonstrated as competitive advantage through firm performance indicators such as "market share" and "return on assets" [36], or use business value as a mediator between big data analytics and firm performance [9].

Finally, in the specific area of enterprise applications, business value is also considered as the benefit obtained through the improvements in processes throughout an organization, efficiency, cost reductions, and increased productivity [21,22].

2.3. The resource-based view and competitive strategy theories

RBV theory is based on the idea that firms comprise a bundle of resources, and the more valuable, rare, not imitable, and difficult to substitute they are, the higher is the impact on the firm's competitive advantage and performance [13,40,41]. The deployment of a combination of these resources (which might be physical, human, or technological) using organizational processes can build firm capabilities in several functional areas [42]. IT-based business value research dedicated to analyzing the impact of IT in value and performance at the organization, economy, or country level, is a stream in which RBV theory has often been the basic theory for modeling [38,43,44].

One of the first steps to set up the business strategy of the firm is to choose the positioning that a company elects to create value for buyers and to obtain a competitive advantage relative to its competitors. Considering industry structure as a constant, a company does this by selecting a competitive strategy, which can be a cost base lower than the competition (low-cost strategy), or going for the differentiation of its offer (differentiation strategy), enabling it to establish pricing that consumers are less sensitive to, due to the differentiation through its marketing approach (marketing differentiation) or offer innovation (innovative differentiation) [14,45]. The competitive strategy that is chosen to be the company business strategy commonly involves setting goals, determining actions to achieve the goals, and mobilizing resources that are usually limited to execute these goals to increase firm performance [46]. With a low-cost strategy, the firm is trying to generate competitive advantage through cost control and cost reductions from all possible sources, whereas with a differentiation strategy the firm is looking for uniqueness, either from the image and branding or from the product or services provided to generate higher returns [14]. Therefore, the effects on firm performance from the chosen business strategy can be reinforced more or less successfully by the IT adoption choices, as some authors have shown [47–49].

On the other hand, some authors [40] argue that the competitive advantage resulting from the selected competitive strategy, which is primarily driven by a market-centric point of view, can only be sustainable over time if the firm has valuable, rare, imperfectly imitable,

Table 1
Examples of terminology and items of "Business Value" and "Firm Performance".

Business Value *(items)*	Firm Performance *(items)*	Author(s)
Intermediate level variables *(Capacity utilization, Inventory turnover, Relative inferior quality, Relative price, and New products)*	***Final performance variables*** *(Market share and Return on assets)*	[36]
Operational benefits *(Generated through reengineering of the internal processes of an organization, resulting in (e.g.,) order processing cycle)*	***Strategic benefits*** *(Sales gains (direct strategic impact). Improvement in operational measures bring in further indirect strategic benefits)*	[37]
Business process performance *(Operational efficiency of specific business processes, measures of which include customer service, flexibility, information sharing, and inventory management)*	***Organizational performance*** *(Overall firm performance, including productivity, efficiency, profitability, market value, competitive advantage,* etc.*)*	[38]
Operational business value *(Efficiency improvement, process optimization, and time and cost reduction)*	***Strategic business value*** *(Improvements in effectiveness, profitability, market share, and customer satisfaction)*	[39]
Business value *(Savings in supply chain management, Reducing operating costs, Avoiding the need to increase the workforce, Increasing return on financial assets, Enhancing employee productivity, Creating competitive advantage, Enabling quicker response to change, Improving customer relations, Providing better products or services to customers, An improved skill level for employees, Developing new business plans, Expanding organizational capabilities, Improving business models, and Improving organizational structure/processes)*	***Firm performance*** *(Customer retention, Sales growth, Profitability, New markets entered, New products or services introduced, Success rate of new products or services, and Market share)*	[9]

and not substitutable (also known as VRIN) capabilities, suggesting the importance of integrating the RBV theory; an idea that was later reinforced by other strategic management authors [42,50,51], who argued about the importance of integrating both theories to have a complementarity that can best explain firm performance. This aspect was also the starting point of the work by Spanos [52], which proved that firm performance was best explained through the complementarity of the two theories.

In IT-based business value research, combining both the RBV and the competitive strategy theories to explain firm performance has not been common, as far as we know, except for some cases [10], that also departed from the Spanos [52] model. However, these previous researches do not cover the context of this new delivery model of enterprise application functionalities, which is software-as-a-service-based, supporting firm capabilities in the creation of competitive advantage, not the influence through the creation of intermediate-process level performance, which we refer to as business value. These are research gaps that led us to create a research model relating these variables, which, as far as we know, has not been the subject of any previous work.

3. Research model

In the literature, the RBV theory emphasizes the importance of firm capabilities in the creation of firm benefits. Moreover, according to the competitive strategy theory, an organization's firm performance is influenced by the chosen competitive strategy, which makes us expect that its capabilities, supported by functionalities provided through SaaS EA, will reinforce the elected business strategy to obtain a competitive advantage. Firm benefits should be considered in its internal and external dimensions, to be more accurate as to how firm capabilities exert its effects, a separation that has been classified in operational and strategic benefits, that we designate as business value and firm performance, and we are exploiting how the latter is influenced by the former. Accordingly, we developed a research model, as shown in Fig. 1.

We argue that firm capabilities supported by SaaS EA are a driver for organizations to create firm performance, represented through market performance and profitability, and we also postulate that these have the contribution of the elected business strategy and business value, both acting as mediators of the effects of firm capabilities supported by SaaS EA on the impact on firm performance. Additionally, we also consider that the selected business strategy should influence business value.

The proposed model also includes control variables such as industry sector, firm size, and respondent position (to remove whatever effects these may have on firm performance); we incorporate some effects already tested by Rivard et al. [10]. We only want to confirm (or rebut) this behavior toward previous conclusions – these are the effects of firm capabilities on business strategy and profitability; the direct effect of business strategy on market performance, or mediation between the capabilities and market performance; and the effect of market performance on profitability.

3.1. Software-as-a-service enterprise applications and firm capabilities

Firm capabilities are the articulation of the capacities, materials, and expertise that a firm needs to implement advantageous strategies to meet its business goals and transform inputs into outputs of greater worth [42], that is, grow its business value, especially when supported by IT investments [53]. In our model, firm capabilities are based on RBV theory and conceptualized as other authors did [10,52,54], where high-level firm capabilities include concepts such as organizational-managerial, marketing, and technical capabilities that can govern various business processes, and business functions, which, as mentioned previously, can be amplified by IT [6]. This measuring variable from Spanos [52] work was chosen due to the context of our research, with the significant fit between the mentioned conceptual capabilities of an enterprise and the usage of IT enterprise applications in SaaS, that affect business processes and functions ruling these capabilities, which are detailed next.

Organizational capabilities refer to organizational and managerial processes, reflected through managerial expertise, the ability to attract human talent and grow its knowledge and skills, or the firm's culture, or coordination and integration capacity, and strategic planning competences [55]. Enterprise applications for HRM or ERPs are enablers for the development of human talent, greater connectivity and integration of processes among different departments, and the availability of

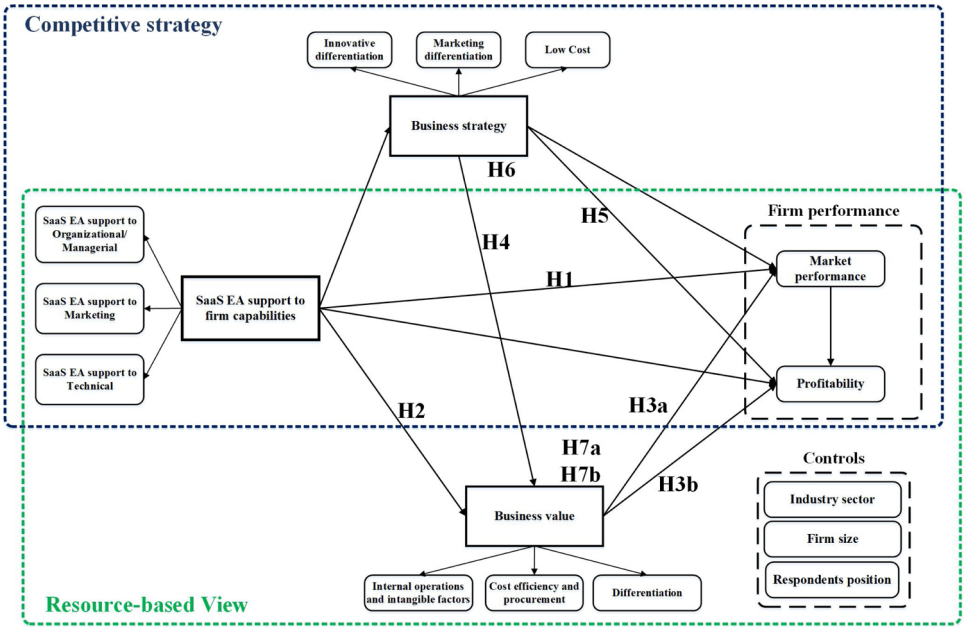

Fig. 1. Research model.

accurate data for planning [56–58]. Increased availability of these enterprise applications in software-as-a-service, with up-to-date and state-of-the-art functionalities, predicts that firms that adopt and use these should expect a reflection in their organizational capabilities.

Marketing capabilities enhance the firm's relationship with its clients [59], comprising items such as market knowledge, market presence, or market-share represented by the existing customer base, the distribution channel, and added-value relationships with the customers, also known as "output-based competencies" by other authors [60]. The most widely used enterprise applications to support and enhance marketing capabilities are CRM solutions [61], and these are also among the segment of the most available as software-as-a-service [27].

Technical capabilities are considered as the capabilities necessary to convert inputs into outputs [60], which include the technological resources available to the organization [62], and can also include optimized sourcing of materials and efficient communication with suppliers [63]. These are based on items such as production efficiency, increased technological capability, and the implementation of economies of scale [52]. Enterprise applications such as ERP, MRP, and SCM [64,65] are the ones that best support and enhance these capabilities, also in the software-as-a-service model.

Through the support that SaaS EA gives to organizational, managerial, marketing, and technical capabilities, the "SaaS EA support to firm capabilities" construct aims to capture all the causal complementary effects, departing from Spanos [52] firm assets variable; and thus representing a second-order reflective-reflective type [66] construct.

According to some authors, firm capabilities represent how the firm can achieve new and innovative forms of competitive advantage and produce a direct effect on performance [52,55]. The two dimensions of market performance and profitability represent both the external view and the internal view of value creation [52], where the first is mainly related to the competitive strategy adopted by the firm and the second to the effectiveness of usage of internal resources and capabilities. Rivard et al. [10] tested the direct impact of firm capabilities supported by IT in one of the dimensions of firm performance (profitability), considering that RBV mainly affects internal efficiency, which is aligned with profitability, but not the direct effect on market performance. In our model, we are led to believe that enterprise applications in SaaS enable improved capabilities in areas such as marketing and sales, organizational processes, and cost reductions, which lead to immediate effects in additional competitiveness through added sales volumes and an increase in market share, which posits:

H1. *SaaS EA support to firm capabilities positively affects market performance.*

The proposed model, based on the complementarity between the RBV and competitive strategy theories to explain the contribution to firm performance, also establishes the relationship between the firm capabilities supported by SaaS EA and the business strategy. This attribute is in line with the support of the theory, given by several other authors [42,67,68] that the available capabilities constrain the choice of the strategy. Therefore, in our model, we want to confirm the hypothesis already tested by Spanos [52] that "firm capabilities," in this case, supported by SaaS EA, positively determine the configuration of the business strategy.

3.2. Business value

As we have seen in sub-section 2.2, the difficulty of finding a single definition of "business value" is due to the different theoretical perspectives adopted by researchers. Several authors integrate both the items of operational benefits and strategic benefits, like impact in Return on Assets or the creation of competitive advantage [69], to cite an example) under the business value variable. Moreover, other authors only focus on the impact on the strategic benefits, hiding the intermediate-process level performance, or operational benefits, under "efficiency effects" [10,52].

In our research, business value, or intermediate-process level performance, represents benefits from improvements in processes, efficiency, cost reductions, and increased productivity, or in similar items such as internal operations, procurement, marketing, and sales, as is the case of enterprise mobility applications usage [70].

These intermediate benefits are also often cited by software vendors as the result of enterprise software implementation, and according to the comprehensive review made by Hsu [21] in the area of enterprise applications, these are felt in cost efficiency, differentiation, and intangibility. Hence, we depart from Hsu's (2013) model, to establish the construct "business value," due to the similarities of context – empirical work about enterprise applications impact on business value, and the impact at operational level, plus the same understanding of operational benefits, which is also shared by other authors [71,72], representing cost savings, improved support quality of business processes and integration, and availability and quality of information. Some detail on these sub-constructs is provided as follows: *cost efficiency* is about lower-cost ratios or cost reductions [38,73,74], which are frequently the most cited benefits of IT/IS implementations; *differentiation* relates to the quality of products [7,21,75], customer service [7,39], and on-time delivery (Shang refers it as "cycle time reduction"); and *intangible factors* refer to the ones that arise from the usage of EA, such as availability and information quality or improved decision support [7,72,76]. As such, business value in our research was conceptualized as a second-order reflective-reflective type [66], based on three first-order constructs: cost efficiency, differentiation, and intangibility, and this also led us to posit:

H2. *SaaS EA support to firm capabilities positively affects the creation of business value.*

Moreover, the intermediate benefits resulting from the capabilities supported by SaaS EA are expected to be reflected in lower costs. This advantage, in turn, allows the firm to be more competitive in pricing and so augmenting the elasticity in sales volumes and market share; on the other hand, benefits such as lower costs should also reflect in higher profit margins, net profits, and ROE. Therefore, we posit the following:

H3. *a, b: Business value positively affects market performance (a) and profitability (b).*

3.3. Business strategy

To gain competitive advantage and increase firm performance [46], a firm should choose a competitive strategy among the options of low-cost, marketing differentiation, and innovative differentiation. However, it is not sure that a firm has made a single choice, and in fact, especially in SMEs, a combination of strategies might be made that is viable in the long term, as some researchers argue [77]. In strategic management, some previous research also considers that a differentiation strategy can be a way to achieve low-cost competitive advantage and that it is often a result of a mixed choice of strategies [78].

Thus, to capture the complementarities among the three dimensions encompassing low-cost and differentiation choices, we conceptualize a business strategy as a second-order reflective-reflective type [66], based on three first-order constructs: low cost, marketing differentiation, and innovative differentiation, as other research analyzing the intermediary role between resource-based capabilities and firm performance, have done [52].

Current expectation is that the choice of a particular competitive strategy will be accompanied by the implementation of the adequate business processes that generate higher intermediate-process level impact, especially when those processes are also automated with IT [12], or, according to Porter [79], an "alignment" between their operational activities and strategies. Therefore, if low cost is the main strategy

chosen by an organization, the way to succeed in implementing this strategy, and getting the respective competitive advantage, is expected to be to perform business processes differently. With *modi operandi* supported as much as possible by automation and as such to reduce operational costs to a minimum [79], or in the case of a marketing differentiation strategy to implement customer-centric relationship management processes and culture supported by contact management and CRM technologies [61]. Therefore, it is expected that this relationship between business strategy and processes, which is nowadays considered the business model [12] can generate business value, and as such, we posit:

H4. *The chosen business strategy positively affects business value.*

The research model suggests that the chosen business strategy impacts firm performance (market performance and profitability). The impact on market performance has already been successfully tested [10,52], and we will confirm, or not, that business strategy positively affects market performance. Several authors have already evaluated the possible impact of the chosen business strategy on profitability [77], with some arguing that a differentiation strategy can eventually lower costs and increase profitability [78] or defending the impact from a combination of strategies to improve profitability [77,80].

Thus, we might be led to suppose that a company that invests in SaaS EA to reinforce its firm capabilities can reinforce the business strategy to use these capabilities for competitive advantage and thereby achieve greater returns. Enterprise applications consumed as software-as-a-service improve processes, allowing to increase volumes and obtain cost reductions, implementing a successful business strategy of lower costs that we would expect to be reflected in increased profits. At the same time, if it improves marketing differentiation, such as easier and increased customization of products or services according to customer requests or innovative features, these can lead the customers to be less price-sensitive because perceived value justifies a premium price, also meaning a higher profit margin. Therefore, we posit the following:

H5. *Profitability of a firm with SaaS EA-enabled firm capabilities is impacted by the business strategy.*

3.4. Firm performance

Most of the work related to firm performance measurement has been centered on financial metrics. However, as some researchers mention [81], access to financial data is never easy to obtain, because of the sensitivity of this information, and this is especially true in the case of SMEs, in which the stock market valuation typically does not make sense, and other performance indicators must be found. Therefore, in these cases, the recourse to indirect or perceived measures has been employed to establish firm performance [82,83] enabling comparisons among organizations, and in this research, managers were asked to make a perceived valuation of the items corresponding to market performance and profitability over the last three years, in comparison to their competitors.

Firm performance has two dimensions, market performance and profitability, but although it could be conceptualized as a whole, as a second-order reflective-reflective type [66], we decided to follow Spanos [52] measurement model, to make this work more rich in findings and conclusions about the effects. Thus, the two dimensions are first-order constructs, where market performance is based on the perceived measurement of items such as sales volume, market share, and their respective growth, and profitability with items such as profit margin, net profits, and ROE [10,52]. According to several authors, market performance has a considerable effect on profitability [10,52,84], a hypothesis that we primarily want to confirm, or not, in our model.

3.5. Mediation hypothesis

This research model is a multiple mediator model [85], in which both business strategy and business value are mediator variables between SaaS EA support to firm capabilities and firm performance. We have seen that the configuration of the activities of a firm allows the implementation of the chosen business strategy to achieve a competitive advantage, be it a low-cost approach or through differentiation [34]. The intermediate effects of business strategy, between firm capabilities and the creation of firm performance, have been the subject of previous work [10,52], where the mediation effects of business strategy were tested with respect to market performance, with significant results that we will try to confirm in this work. However, we are especially interested in probing the following hypothesis:

H6. *Business strategy positively mediates the relationship between SaaS EA support to firm capabilities and profitability.*

We also conceptualize that business value is a mediator between the firm capabilities supported by SaaS EA and firm performance, in both dimensions of market performance and profitability, and this is an important difference from the earlier work with a similar model [10,52]. Other authors also considered business value as a mediation factor impacting firm performance [9,58,70], which also motivates our hypothesis between the firm capabilities supported by SaaS EA and the creation of business value. So, we posit:

H7a,b: Business value positively mediates the relationship between SaaS EA support to firm capabilities and market performance (a) and profitability (b).

In both cases of the variables, business strategy and business value, we are evaluating them as mediators of firm capabilities enabled by SaaS EA, and not on any reverse causalities.

4. Research methodology

4.1. Measurement model, validation, and administration

The measurement model was based on a comprehensive review of the literature, and departing from earlier work [10,21,52], the proposed model was operationalized through a questionnaire to be submitted as a web-based survey, choosing the appropriate items and following the same set of questions to reinforce construct validity [86]. The definitions of the measurement items are listed in Table 2, with "SaaS EA support to firm capabilities," business value and business strategy configured as second-order constructs of reflective-reflective type [66]. There are some similar terms, such as "cost" or "differentiation," in subconstructs of the business strategy and business value variables, but this is not an issue regarding respondents interpretation because, in the first variable, we are looking at how the company compares to its competitors at the level of implementation of each of the competitive strategies, whereas in the second variable we are looking at how much the operational benefit items increased, decreased, or stayed the same, as a result of using SaaS EA.

The evaluation of the theoretical model was conducted in firms that have adopted SaaS EA, located in a southern European country, using a questionnaire with items mentioned in published literature (see Table 2) of which the several constructs are reflective [87]. These items were measured using a seven-point range scale - where 1 represents "totally disagree" or "without any support from SaaS EA" or "much less than competitors" or "never uses" or "decreased strongly" or "much less than average," and 7 represents "totally agree" or "strongly supported by SaaS EA" or "much more than competitors" or "frequently uses" or "increased strongly" or "much more than average."

Qualification of respondents includes questions to determine the industry sector, the firm size determined by the number of employees, and the turnover volume (stratified under European enterprise size class [88]), the position of the respondent in the organization and

Table 2
Measurement items of research variables.

Construct		Item	Item description	Base literature
SaaS EA support to firm capabilities (second-order construct)**	Organizational/managerial (O/M)**	O/M1	Managerial competencies *	[10,52]
		O/M2	Knowledge and skills of employees	
		O/M3	Firm climate	
		O/M4	Efficient organizational structure *	
		O/M5	Coordination	
		O/M6	Strategic planning	
		O/M7	Ability to attract creative employees	
	Marketing (Mkt)**	Mkt1	Market knowledge	
		Mkt2	Control and access to distribution channels	
		Mkt3	Advantageous relationships with customers	
		Mkt4	Customers "installed base"	
	Technical (Tec)**	Tec1	Efficient and effective production department	
		Tec2	Economies of scales and technical experience	
		Tec3	Technological capabilities and equipment	
Business strategy (second-order construct)**	Innovative differentiation (ID)**	ID1	Research and Development expenditure for product development	[52,102,103]
		ID2	Research and Development expenditure for process innovation	
		ID3	Emphasis on being ahead of the competition	
		ID4	Rate of product/service innovations	
	Marketing differentiation (MD)**	MD1	Innovations in marketing techniques	
		MD2	Emphasis on marketing department organization	
		MD3	Advertising expenditures	
		MD4	Emphasis on strong sales force	
	Low cost (LC)**	LC1	Modernization and automation of (production) processes	
		LC2	Efforts to achieve economies of scale	
		LC3	Capacity utilization	
Business value (second-order construct)**	Internal operations and intangible factors (IOIF)**	IOIF1	Support to Decision-making	[21]
		IOIF2	Quality of the Information	
	Cost efficiency and procurement (CEP)**	CEP1	Operational Costs	
		CEP2	Procurement Costs	
		CEP3	Inventory Costs	
	Differentiation (Df)**	Df1	Quality of Customer Service and Support	
		Df2	On-time Delivery	
		Df3	Product/Service Quality	
Firm performance	Market Performance (MP)**	MP1	Sales Volume	[52]
		MP2	Growth in Sales Volume	
		MP3	Market Share	
		MP4	Growth in Market Share	
	Profitability (Pf)**	Pf1	Profit margin	
		Pf2	Return on own capital (/Equity)	
		Pf3	Net profits	

Notes:: (*) The items "managerial competencies" and "efficient organizational structure" were deleted due to weaknesses in the respective discriminant validity analysis affecting business value outer loadings, and therefore were not included as measurement components of the "SaaS EA support to Firm capabilities" construct in this study. (**) Reflective constructs. (***) The full questionnaire is available from the authors on request.

corresponding department. Prior to the main survey application, a pilot study was conducted with responses from 30 companies from a similar sample, but which were not included. This phase permitted checking the validity and scales' reliability with Cronbach's α coefficients exceeding 0.70, which led to the deletion of the items "managerial competencies" and "efficient organizational structure," from the "SaaS EA support to firm capabilities" construct, due to weaknesses in the respective discriminant validity analysis affecting business value outer loadings; some other items were also revised for increased clarity.

4.2. Data collection

The survey was presented online, including an explanation of the research scope and relevance, through an invitation email sent by IDC, a major worldwide research analyst in the area of IT/IS, to a selected sample of respondents in board and management positions (such as Chief Executive Officers (CEO), Chief Financial Officer, Chief Information Officer, General Manager (GM), directors, and senior managers), from 2000 organizations in different industry sectors (e.g., services, commerce, health, information and communications, manufacturing, and construction). Instructions included a statement that it should be filled out by the individuals who are most familiar with the firm's usage and policies regarding SaaS EA, to obtain the best content validity.

Data collection occurred over six consecutive weeks during May and June 2016, with a total of 381 responses received. There was a steady stream of responses, due to some reminders from IDC in their usual communication channels (e.g., newsletters and seminar announcements), which caused the first 105 responses in the first week of administration and 276 responses in the remaining 32 days. However, from the total responses received, only a total of 257 have been considered usable, representing a response rate of 12.9 % from the initial global sample.

Common method bias was examined using Harman's one-factor test [89], revealing that none of the factors had a variance explained by one factor with more than the 50 % threshold value, with a maximum of 35.6 %. The marker-variable technique [90,91] also had a good outcome.

The sample profile is in Table 3; 56 % of the respondents are from the services sector, 14 % from the information and communication industries, 13 % from the manufacturing industry, and the remaining 17 % are from other sectors.

The respondents, in its majority, are qualified managers/top management within the firms, indicating good quality of data, with 53 % at board level or 1st line Directors and a further 24 % of managers, with the remaining 23 % of the respondents as specialists or information workers with specific knowledge of the subject.

Table 3
Sample characteristics.

Industry			Firm size		
Services	143	56 %	Micro	89	35 %
Health	12	5%	Small	60	23 %
Commerce	17	7%	Medium	41	16%
Construction	8	3%	Large	67	26%
Manufacturing	34	13 %			
Information and communications	36	14 %			
Other	7	3%			
Respondent's position					
Board Member/CEO/GM	90	35 %			
Director	46	18%			
Manager	62	24 %			
Specialist/Technical worker	46	18%			
User/Information worker	13	5%			

5. Results

For an empirical assessment of the research model, this work uses SEM with the variance-based technique [92] of PLS path modeling. This method is the most adequate for cases like ours, with a complex model, insufficient theoretical information [92], and in which the items are not normally distributed ($p < 0.01$, Kolmogorov-Smirnov's test) [93,94], as is the case with our data.

5.1. Measurement model

Table 4 shows the results for the average variance extracted (AVE) and composite reliability (CR). All of the constructs have an AVE greater than 0.5, which demonstrates a measurement model with adequate convergent validity, as the latent variable explains more than half of the variance of its indicators [95,96]. Also, the CR is higher than 0.7 for all constructs, which is a confirmation of the reliability of scales [92,97]. Table 5 reports that all loadings (in bold) are higher than 0.7, confirming that the measurement model has good indicator reliability [98].

The results also reveal good discriminant validity, for all constructs, as i) the square root of the AVE of each latent construct is greater than the correlation between that construct with all other constructs [92,95]; ii) based on Table 5, all loadings (in bold) are higher than respective cross-loadings (except O/M1 and O/M4, which were eliminated due to lower loadings); iii) the heterotrait-monotrait ratio also meets the criterion of being less than 0.90 [99].

With all these criteria met, there is a good confidence level for using the constructs proposed in this conceptual research model.

5.2. Structural model

We started with an analysis of the absence of multicollinearity between the constructs/variables based on the variance inflation factor to assess the structural model, which was confirmed by the value of the factor below the threshold of 3.3 [87]), with values between 1.00 and 2.25. We then tested the research model with the PLS structural model with an assessment of the hypotheses based on the path coefficients and respective significance levels. We used a bootstrapping procedure with the resampling method of 5000 iterations [92,100,101] to estimate the statistical significance of the parameter estimates, and the path coefficients results are shown in Fig. 2.

In this analysis, it is clear that the SaaS EA support to firm capabilities does not significantly impact market performance ($\hat{\beta} = 0.097$, $p < 0.01$), that is, it does not confirm H1. However, it is impactful in business value, with statistical significance ($\hat{\beta} = 0.432$, $p < 0.01$), thereby confirming hypothesis H2.

Regarding firm performance, the model also explains 44.7 % of the variation in market performance and 60.3 % of the variation in profitability. Business value affects market performance with statistical significance ($\hat{\beta} = 0.330$, $p < 0.01$), thereby confirming H3a, but does not have an impact on profitability, which means that H3b is not confirmed. Even if, to a lesser degree than SaaS EA support to firm capabilities, the business strategy also influences business value, with statistical significance ($\hat{\beta} = 0.298$, $p < 0.01$), thereby confirming H4. Nonetheless, the business strategy does not have a significant effect on profitability, and as such, it does not confirm H5.

Also confirmed, like previous research [10,52], are the hypotheses of the impact of firm capabilities supported by SaaS EA, in the business strategy of the organization ($\hat{\beta} = 0.619$, $p < 0.01$), and of market performance in the profitability ($\hat{\beta} = 0.695$, $p < 0.01$).

5.3. Mediation models and analysis

To test hypotheses H6, H7a, and H7b, we performed a mediating effects analysis by evaluating the single importance of each of the mediators, tested with declined versions of the global structural model, in which one of the two constructs is eliminated. Table 6 presents the results.

Variance accounted for analysis reveals that both business value and business strategy have complementary effects [85] on the impact of SaaS EA support to firm capabilities on market performance, and both are partial mediators. Thus, hypothesis H7a is also confirmed, and, for the original overall research model proposed, it is possible to see that the total mediation effect resulting from the two mediator variables between firm capabilities supported by SaaS EA and market performance, is important, with a VAF of 81 %, and indirect effect of 0.405.

Table 4
CR, AVE, and correlations.

Constructs	Mean	SD	CR	O/M	Mkt	Tec	ID	MD	LC	IOIF	CE	Df	MP	Pf
Organizational/Managerial (O/M)	4.35	1.75	0.95	**0.89**										
Marketing (Mkt)	4.53	1.76	0.94	0.77	**0.90**									
Technical (Tec)	4.51	1.87	0.96	0.80	0.71	**0.94**								
Innovative differentiation (ID)	4.49	1.47	0.94	0.52	0.50	0.49	**0.89**							
Marketing differentiation (MD)	4.26	1.52	0.95	0.46	0.52	0.47	0.68	**0.90**						
Low cost (LC)	4.63	1.42	0.95	0.52	0.39	0.55	0.66	0.55	**0.93**					
Internal operations and intangible factors (IOIF)	5.06	1.26	0.94	0.55	0.47	0.47	0.39	0.35	0.46	**0.94**				
Cost efficiency and procurement (CEP)	4.09	1.23	0.92	0.32	0.31	0.31	0.22	0.32	0.21	0.37	**0.90**			
Differentiation (Df)	4.78	1.27	0.96	0.62	0.61	0.55	0.54	0.48	0.49	0.71	0.41	**0.94**		
Market performance (MP)	4.52	1.14	0.95	0.50	0.43	0.44	0.49	0.50	0.50	0.46	0.29	0.59	**0.90**	
Profitability (Pf)	4.48	1.23	0.97	0.42	0.29	0.35	0.42	0.39	0.47	0.41	0.25	0.51	0.76	**0.96**

Note: Standard deviation (SD); The diagonal elements (in bold) are the square root of the average variance extracted (AVE).

Table 5
Loadings and cross-loadings.

	O/M	Mkt	Tec	ID	MD	LC	IOIF	CEP	Df	MP	Pr
O/M2	**0.91**	0.75	0.75	0.51	0.46	0.50	0.47	0.32	0.59	0.47	0.38
O/M3	**0.91**	0.65	0.69	0.44	0.35	0.44	0.48	0.25	0.58	0.44	0.37
O/M5	**0.90**	0.70	0.72	0.42	0.37	0.48	0.57	0.27	0.56	0.43	0.35
O/M6	**0.88**	0.66	0.70	0.46	0.42	0.46	0.51	0.28	0.52	0.43	0.35
O/M7	**0.86**	0.69	0.71	0.50	0.46	0.47	0.43	0.28	0.52	0.45	0.41
Mkt1	0.71	**0.91**	0.62	0.49	0.53	0.34	0.40	0.28	0.53	0.41	0.27
Mkt2	0.68	**0.89**	0.67	0.49	0.48	0.38	0.37	0.31	0.49	0.36	0.28
Mkt3	0.71	**0.92**	0.62	0.45	0.43	0.36	0.43	0.25	0.60	0.37	0.24
Mkt4	0.68	**0.88**	0.64	0.38	0.42	0.34	0.50	0.26	0.56	0.39	0.26
Tec1	0.75	0.69	**0.92**	0.45	0.43	0.50	0.46	0.30	0.53	0.39	0.33
Tec2	0.77	0.67	**0.96**	0.47	0.44	0.54	0.42	0.28	0.50	0.42	0.34
Tec3	0.75	0.65	**0.95**	0.45	0.47	0.53	0.46	0.31	0.52	0.43	0.32
ID1	0.42	0.42	0.37	**0.87**	0.62	0.52	0.32	0.14	0.44	0.41	0.31
ID2	0.47	0.39	0.44	**0.88**	0.54	0.56	0.33	0.20	0.44	0.40	0.35
ID3	0.47	0.45	0.39	**0.90**	0.58	0.61	0.32	0.23	0.47	0.46	0.43
ID4	0.50	0.51	0.51	**0.90**	0.68	0.65	0.41	0.21	0.55	0.47	0.40
MD1	0.48	0.51	0.45	0.65	**0.92**	0.52	0.33	0.27	0.47	0.48	0.40
MD2	0.46	0.47	0.46	0.64	**0.93**	0.51	0.34	0.28	0.47	0.45	0.34
MD3	0.37	0.43	0.41	0.61	**0.90**	0.50	0.27	0.32	0.39	0.43	0.33
MD4	0.35	0.46	0.38	0.57	**0.87**	0.46	0.31	0.29	0.40	0.45	0.36
LC1	0.49	0.37	0.53	0.61	0.49	**0.92**	0.40	0.20	0.42	0.41	0.41
LC2	0.46	0.35	0.51	0.63	0.55	**0.94**	0.41	0.17	0.43	0.51	0.45
LC3	0.51	0.38	0.51	0.61	0.49	**0.92**	0.47	0.22	0.52	0.48	0.43
IOIF1	0.51	0.43	0.45	0.38	0.36	0.44	**0.94**	0.36	0.67	0.42	0.36
IOIF2	0.52	0.45	0.44	0.35	0.29	0.42	**0.94**	0.33	0.65	0.44	0.41
CEP1	0.27	0.28	0.25	0.19	0.28	0.15	0.32	**0.90**	0.36	0.23	0.23
CEP2	0.29	0.28	0.29	0.19	0.30	0.18	0.31	**0.94**	0.35	0.26	0.22
CEP3	0.29	0.26	0.31	0.21	0.28	0.24	0.36	**0.84**	0.37	0.28	0.22
Df1	0.60	0.62	0.54	0.49	0.45	0.44	0.65	0.39	**0.94**	0.54	0.46
Df2	0.55	0.53	0.49	0.49	0.42	0.46	0.66	0.37	**0.95**	0.54	0.47
Df3	0.60	0.58	0.52	0.54	0.48	0.49	0.69	0.39	**0.94**	0.59	0.50
MP1	0.47	0.41	0.43	0.47	0.49	0.49	0.40	0.26	0.55	**0.93**	0.70
MP2	0.43	0.39	0.35	0.43	0.42	0.41	0.45	0.28	0.56	**0.90**	0.68
MP3	0.43	0.36	0.40	0.45	0.43	0.47	0.37	0.24	0.49	**0.90**	0.71
MP4	0.46	0.38	0.40	0.43	0.47	0.45	0.43	0.25	0.53	**0.88**	0.66
Pf1	0.40	0.29	0.34	0.36	0.35	0.43	0.38	0.23	0.49	0.73	**0.95**
Pf2	0.38	0.27	0.32	0.42	0.40	0.46	0.40	0.25	0.50	0.73	**0.97**
Pf3	0.42	0.29	0.34	0.42	0.38	0.45	0.40	0.24	0.47	0.75	**0.97**

Notes: Organizational/managerial (O/M), marketing (Mkt), technical (Tec), innovative differentiation (ID), marketing differentiation (MD), low cost (LC), internal operations and intangible factors (IOIF), cost efficiency and procurement (CEP), differentiation (Df), market performance (MP), profitability (Pf).

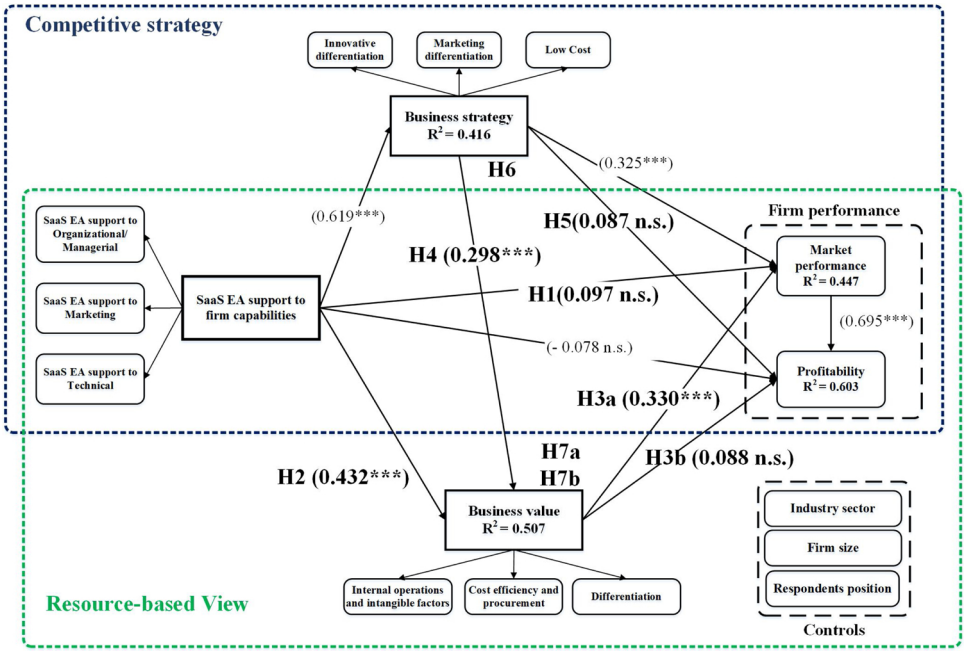

Fig. 2. Research model results.

Table 6
Results from mediating effects tests.

Path: from - > to	Total effect (mediated)	Direct effect	Indirect effect	VAF	Conclusion
Direct, indirect, and total effects of proposed model					
SEA Firm capabilities - > Market performance	0.502	0.097	0.405	81 %	full mediation
SEA Firm capabilities - > Profitability	0.380	−0.078	0.458	n.a.	no mediation
Direct, indirect, and total effects. With Business Strategy mediator (only)					
SEA Firm capabilities - > Market performance	0.489	0.237	0.252	52%	partial mediation
SEA Firm capabilities - > Profitability (H6)	**0.371**	**−0.046**	**0.417**	**n.a.**	**no mediation**
Direct, indirect, and total effects. With Business Value mediator (only)					
SEA Firm capabilities - > Market performance (H7a)	**0.433**	**0.235**	**0.198**	**46%**	**partial mediation**
SEA Firm capabilities - > Profitability (H7b)	**0.416**	**−0.047**	**0.463**	**n.a.**	**no mediation**

Notes: [VAF > 80 %: Full mediation] [20 % ≤ VAF ≤ 80 % : Partial mediation] [VAF < 20 % : No mediation] [n.a. = not applicable] [SEA Firm capabilities = SaaS EA support to firm capabilities].

However, regarding the impact of SaaS EA support to firm capabilities on profitability, neither business value nor business strategy is seen as a mediator, and thus, neither H6 nor H7b is confirmed.

6. Discussion and implications

This research started with the goal of determining the influence of business strategy and business value on the impact of firm capabilities supported by SaaS EA on firm performance. To date, research about enterprise applications in cloud computing has mostly focused on adoption and usage, but work on the impact in value and performance using a model based on RBV and competitive strategy theories is, as far as we know, an unexploited area of research. The empirical analysis demonstrated several significant findings, which we discuss in this section, together with some of this study's limitations and contributions for practitioners and researchers. We start by discussing these significant findings.

6.1. Discussion of findings

Finding 1 – There is no direct impact of the capabilities that are supported by software-as-a-service enterprise applications in Firm Performance!

The fact that H1 is not confirmed is an important conclusion, and because there are also no impacts on profitability, it brings significant differences to the results of earlier studies that combined RBV and competitive strategy theories. In those studies, where firm assets or firm assets supported by IT were found to have significant impact on market performance [52], or profitability [10], through the so-called "efficiency effects," which apparently concealed cost reductions due to improved process efficiency, higher customer satisfaction, and loyalty or increased productivity, and which in our model are part of the variable business value. Furthermore, this is an important finding because it demonstrates the relevance of introducing this variable.

Finding 2 - *Capabilities supported by software-as-a-service enterprise applications positively impact the creation of business value* resulting from the improved quality of information to make better decisions, better procurement costs, and quality differentiation, confirming H2. As the use of SaaS EA improves the technical capabilities related to economies of scale and technical expertise, there is a stronger relationship with the satisfaction of deliveries according to the established schedules, which is followed closely by improved customer service and quality in the products/services provided. Better procurement costs and quality of information and support to decisions are also similarly related, confirming the conclusions of earlier studies regarding business value and IT [21]. These findings also match those of other earlier studies that enterprise applications, such as ERPs and CRM, improve production and product planning, avoiding stock shortages, and thereby also keeping procurement costs more controlled or optimized and improving service and support to customers, respectively [72].

Finding 3 - Business value positively affects market performance but not profitability.

The confirmation that business value has a direct impact on items such as an increase in sales and market share (H3a) but not on profits or ROE (H3b) seems contradictory. When looking at the loadings in this study, it seems that in SMEs the intermediate-process level performance caused by capabilities supported by SaaS EA is mostly felt in increases of product, services, and process quality that, for a given price (or lower prices, allowed by cost efficiencies), give the possibility to increase sales but are not the direct cause for more profits. However, the proposed model establishes the direct impact of market performance in profitability, which in the case of our sample is confirmed as also confirmed by previous work [52,84,104]. Additionally, in this case, an analysis of the level of mediation effects from market performance between business value and profitability was made, and there is a statistical significance of the indirect effects. The direct effect is not statistically significant, revealing that market performance acts as a full mediator between those variables.

Finding 4 - Business value is dependent on the chosen business strategy

The confirmation of H4, and looking at the results obtained, in this measurement model, for the constructs business strategy and business value, also highlights that if the strategy is more targeted at innovative differentiation than lower costs, with organizations looking at how to continuously differentiate their products and services from their competitors and investing in process innovation, which results in higher business value reflected in improved quality of product, services, and processes [105,106].

Finding 5 - Profitability is only impacted by market performance

Hypothesis H5 is also not confirmed, and so neither business strategy, business value, nor the capabilities supported by SaaS EA have a direct effect on profitability other than market performance. Moreover, this is in line with Spanos [52] and Rivard et al. [10], who also showed that higher market performance reflects improved profitability.

Finally, finding 6 – Both business value and business strategy mediate the relationship between SaaS EA support to firm capabilities and market performance, and this is also the answer to the research question How do "capabilities supported by software-as-a-service enterprise applications" contribute to firm performance, and what is the role of business value and business strategy?

The combined effects of both business value and business strategy result in establishing a strong relationship between "SaaS EA support to firm capabilities" and market performance, meaning that both variables create a full mediation effect. When analyzed separately, both business strategy and business value demonstrate partial mediation effects, although the mediation role of business strategy between capabilities and the market performance had already been confirmed previously [10,52].

Therefore, this study also demonstrates that organizations with SaaS EA support to firm capabilities can increase sales volumes by achieving business value through more timely deliveries, better quality in products, customer service, information that supports decision-making, and optimized procurement costs. Previously, other authors [38] also related business value, which they called business process performance, with firm resources in association with IT and the respective impact on organizational performance, in which market performance is included. Market performance, such as an increase in revenues, is also referred to by some authors as strategic benefits, which are a result of operational benefits gained through the capabilities enhanced with IS such as business intelligence [107].

6.2. Theoretical implications

Most of the research and literature in the context of SaaS EA, as seen previously, has been focused on the areas of intent to adopt and usage [14], and as per the authors knowledge no work has been done around the post-implementation stages – the creation of value and firm performance. This research contributes to this stage of the literature stream of IS value related to enterprise applications deployed as a service, with empirical research focusing on intermediate-process level performance, strategy, and financial performance factors.

For researchers, this study provides a basis for further refinement of theoretical models on firm performance, being a starting point for future research on this crucial subject. Competitive strategy and RBV have been two of the most known and complete theoretical models used in IS research at the firm level; so, identifying factors to extend them is always an important fact, even more, if it reinforces results significance and predictability. Other significant contributions include (i) understanding the role of complementary mediation [16] of business value and business strategy, among the firm capabilities supported by SaaS and firm performance, to explain the impact on firm performance, and to fill some gaps in theory and previous studies; (ii) to show how business value, as an intermediate internal perspective [38,39], differs from firm performance, contributing to the IT-based business value stream of research [6,9]; and finally, (iii) the evidence of the importance of market performance mediation role between, either business strategy or business value, and profitability, which should be taken into account in future research on the value of IT.

Overall, our findings demonstrate that business value and business strategy are essential links between the contribution of capabilities supported by SaaS EA and the firm performance, confirming the crucial relevance of the mediators used in our study, and supporting the overall recommendation to include them in future SaaS EA technological studies.

6.3. Managerial and practical implications

The managerial and practical implications of our results are: firms that invest in SaaS EA can expect that their firm capabilities impact firm performance, through indirect effects obtained with the created business value and the supported business strategy. This factor also reveals the importance of having a proper alignment between the business and IT choices, because decisions of adoption and the use of enterprise applications in SaaS should be made to obtain business value and serve a defined business strategy. The results in our case show that the business strategy is mainly focused on obtaining a low-cost advantage by enabling technical capabilities and economies of scale, which is possible through a SaaS ERP (or an MRP) with MRP functionalities, which will allow to improve the production efficiency and lower costs, contributing to those, and if this is integrated with a business intelligence application it will also allow managerial information and decision-making improvements. However, if the organization focuses on achieving marketing differentiation, then the adoption of a CRM in SaaS that affects marketing capabilities is also expected to improve firm sales and boost profitability growth [108].

6.4. Limitations and suggestions for future research

Regarding limitations and possible future directions, we believe there are several opportunities for further work, starting from the fact that these results are based on respondents from firms of only one southern European country. Other areas of application of this model that could be interesting to make an in-depth analysis of are the application to different regions in Europe and diverse continents. The sample respondents belong mainly to services and information and communications organizations (70 %), which is a figure similar to the one found in the Eurozone EU-28 for use of cloud computing services in the “information and communications” and “professional, scientific, and technical activities” economic areas [109].

Similar to previous work [52,110–112], the fact that this work is based on subjective measures of performance, capabilities, and strategy, compared with other companies, can be seen as a limitation[1]. We therefore also propose that future work based on this model can be developed for specific industries, with the collection of objective measures of performance and evolving the questionnaire to normalize and make the capabilities and strategies of each respondent company more tangible.

The research was not intended to make a comparison between companies with firm capabilities supported by SaaS EA and similar samples of firms with “traditional” or “on-premise” EA. However, it would be interesting to see future empirical work addressing this comparison to best validate some of our conclusions. Future work can also include questions to clarify the business-IT choices alignment, as in whether a selected competitive strategy or the expected business value to be obtained by the organization influenced the enterprise applications adopted and the chosen deployment model (“on-premise” vs. software-as-a-service).[1]

7. Conclusions

SaaS EA is increasingly adopted by firms, often under the promise of increased benefits. However, there is little academic evidence on the impact on firm performance arising from the use of these applications in this deployment model. This study departs from previous work made by joining RBV and competitive strategy theories in a model to test the impact on strategic firm performance but differentiates by creating a variable that explains intermediate-process level performance, which is considered to be strongly influenced by enterprise applications. The research framework is tested empirically through a survey with a sample of southern European firms using PLS structural modeling. Our model has three constructs: the SaaS EA direct effect construct and two intrinsic mediation constructs (business value and business strategy).

In fact, business value, the intermediate-process level performance variable, introduces a major distinction with most of the research done so far on the value of IT, which has mainly been focused on extrinsic firm performance, usually composed of some items comparable with other companies (e.g., market share or growth of market share), and serves to distinguish the effective impact results created by firm capabilities supported by enterprise applications in SaaS. The results show a significant contribution to IT value literature because the direct effects of the capabilities do not impact firm performance, whether it is market performance or profitability, but results in increased business

[1] As noted by one of the reviewers, it might be argued that the subjectivity of the responses regarding the relative comparisons can perhaps be problematic for the conclusions. However, the alternative of collecting quantifiable measures in a multisectoral study in SMEs from developing countries is also very challenging and does not guarantee total accuracy. We also assume that the respondents, by their position in their companies and respective industries, have some sensitivity of their relative position regarding the most direct competitors.

value, intrinsic to the firm, and stronger business strategy effects, which in turn build up firm performance. The importance of business value as a mediator construct is reinforced, as the indirect effect from firm capabilities in firm performance is stronger than that of a model with business strategy as the single mediator. Another conclusion, in line with previous studies, is the fact that profitability is not significantly affected by firm capabilities, business value, or business strategy, but is strongly affected by market performance, which means that market leader companies also tend to be more profitable.

CRediT authorship contribution statement

Jorge Rodrigues: Conceptualization, Investigation, Methodology, Writing - original draft, Writing - review & editing. **Pedro Ruivo:** Conceptualization, Writing - review & editing, Project administration. **Tiago Oliveira:** Conceptualization, Validation, Writing - review & editing, Supervision.

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