The effects of service orientation, technology orientation and open innovation on the performance of software-intensive service businesses

Risto Rajala
Aalto University, School of Economics
risto.rajala@aalto.fi

Mika Westerlund
Aalto University, School of Economics
Haas School of Business, University of California
mika.westerlund@berkeley.edu

Abstract

Our analysis of data from 179 software firms reveals how they react to industry-wide shifts including increasing service-intensity, changing technologies and the growing openness of innovation. Firms’ strategic responses to these shifts explain a significant amount of their business model performance. Service orientation is connected with “customer proximity” strategy, which has a greater positive effect on the firms’ short-term financial performance than on market performance. Firms’ engagement in open innovation fosters their “product uniformity” strategy, which influences positively on their long-haul market performance. Technological capabilities and response to technology changes drive customer- and product-focused service development. They result in positive financial and market performance effects. Firms in service industries benefit of our results in designing and managing their service business models.

1. Introduction

Service research has utilized a theory of business models, which asserts that organizational performance outcomes are influenced by internal impetus. The spur includes managerial knowledge, expertise, choice and execution. They have a practical appeal, but fail to explain the effect of major industry trends on business model performance [1]. Managing service business models is a fine tuning process that involves voluntary and emergent changes in and between permanently linked internal components. It also includes responses to changes in the competitive environment. Industry trends and developments are among the most important change factors that a firm meets. Its sustainability and performance depend on how it anticipates and reacts to these changes [2]. Major industry-wide changes affect the design and evolution of successful service business models in turbulent technology-intensive fields such as the software industry. To date, research has recognized the effects of these changes. However, they remain fairly unexplored, because firms compete with heterogeneous business models, the outcomes of which are difficult to predict [3].

The evaluation of performance has become of interest in service business model research only recently. The latest research on service strategies focuses on the central role that the design of business models play in explaining firm performance [4]. For example, Zott and Amit [5] investigate the relationship between business model design and performance through the novelty and efficiency options. Casadesus-Masanell and Llanes [6] analyze the impact of business model design on software firms’ performance by comparing proprietary vis-à-vis open source models. A growing cohort of studies has forwarded from design-performance relationships and indicates that firm’s strategic orientations have an impact on its business models and performance [7]. This instrumental and pragmatic approach considers business models as narrative and calculative devices that allow firms to explore markets and play a performative role in their operation [8].

This paper contributes to the discussion on the performance of service business models. Specifically, it investigates how the business model choices of software firms affect their financial and market performance. The study examines business models from the focal firms’ perspective. It investigates their focus on either “customer proximity” or “product uniformity”-based strategies. It uses simplified models in the analysis, but goes beyond them through strategic orientations. These orientations are identified as firm’s voluntary and reflex strategic responses to major industry-wide changes. They are operationalized at the firm-level as service orientation, technology orientation and the openness of innovation activity.

The effects of business model choice on software firm’s performance are analyzed through market performance and financial performance. The former describes changes in the firm’s market share, its growth relative to competitors, and the changes the firm has induced in the market. The latter focuses on firm’s economic success and measures the changes in
its profitability and product or service sales during the last three years. Our analysis shows that these measures capture the essential organizational performance outcomes of firms’ business models.

2. **Theory and hypotheses**

This paper discusses the industry changes that cause impetus for firms to develop service business models as strategic responses to change. Three evident responses include: service orientation, technology orientation, and the openness of innovation activity.

2.1 **Service orientation**

The concept of service orientation has intrigued scholars and executives likewise [9]. To investigate the effect of a firm’s service orientation on its business model, we need to examine the key dimensions at the organizational level. This study distinguishes between two different dimensions of service orientation: service strategy and service-centric organizational structure.

2.1.1 **Service strategy.** Business strategy manifests either a goods- or service-dominant logic in business [10,11]. The literature has reached a consensus on that a service-dominant strategy provides a more holistic and long-term approach to customers than does a goods-dominant strategy. A fundamental principle of service-dominant strategy is that value is the outcome of co-creation between service providers and their clients [12]. However, service strategists view the customer as the value creator and a service provider as a value facilitator [13]. Value created by the customer is exchanged for value created by the firm and service provides a mediating factor in the process. Service providers’ customer orientation and value co-creation describe their approach to service development as part of their service strategy [14].

Prior research has examined firms’ service strategy through the extent of an organization’s service orientation in its business strategy [15,16] or marketing strategy [17].

2.1.2 **Service-centric organization.** Scholars have examined service orientation through organizational structure, climate and culture [9,18]. Studies show that customer service processes influence organizational attributes such as organizational structure and design [19]. Organizational structure is a prerequisite of service business model, because it encompasses the organization’s activities and the relations it establishes with other organizations to combine and exploit its resources [2]. In addition, the management of effective service organizations relies on climatic and cultural mechanisms such as shared service norms and values [20]. According to Goldstein et al. [21], the necessary service components are “a combination of processes, people, skills and materials that must be appropriately integrated to result in planned or designed service.” The resources needed to support service delivery and the resulting complexity of the overall service offerings require effective management [18]. As a result, both customer-specific and standardized service deliveries increase in service-oriented organizations [22]. A firms’ service orientation augments its customer proximity and facilitates product uniformity-focused business models. Therefore, we hypothesize that:

   \[ H1a: \text{Software firms’ service orientation is positively related to their customer proximity.} \]

   \[ H1b: \text{Software firms’ service orientation is positively related to their product uniformity.} \]

2.2 **Technology orientation**

The expanding use of IT stimulates innovation in business practices and organization models. Technology by itself has no single objective value and the economic value of a technology remains latent until firms commercialize it in some way via their business model [23]. The organizational learning literature [24,25] suggests that technology orientation can take two distinctive forms: technology exploration and technology exploitation. Firms emphasize exploration in seeking effectiveness in new business development or stress exploitation in seeking efficiency of operation [26]. However, research on strategic IS has shown that a narrow focus on technology as a source of competitive advantage is misguided and misleading [27]. Therefore, we focus on technology orientation through two dimensions: the exogenous environment and endogenous context. The first is operationalized as the firm’s responsiveness to technological change, and the second describes its technological capabilities.

2.2.1 **Responsiveness to technological change.** Technology orientation within an organization is about refinement, choice, production, efficiency, selection, implementation and execution in IS development. It focuses on the use and refinement of extant knowledge and technologies to strengthen the excellence of the present operation [28]. Products and services that result from improved processes are likely to satisfy their customers and lead to increased revenues and improved firm performance [29]. Davidson and Davis [30] argue that IT is driving a shift in business models from mass production to mass customization. Incremental technological innovations and those designed to meet the needs of current customers are exploitative and build upon existing organizational knowledge. Process innovators often need to work closely with partners to develop new technologies [31].
2.2.2 Technological capabilities. Technologies are resources developed in interaction with the external environment, for example, with innovation partners [32]. Product technologies, which consist of the ability to design products and services, are different from process technologies, which comprise the ability to manufacture or produce these products and services. Relationships with the environment and explorative technology orientation are important for firms under the conditions of technological uncertainty [33]. Technology exploration refers to firms’ ability to capture resources through activities characterized by search, variation, risk taking, experimentation, play, flexibility, discovery and innovation [24]. These arguments suggest that explorative technology orientation is associated with business models that focus on customer proximity. In addition, exploration plays a key role in creating new knowledge, which results in completely new products [34]. Therefore, explorative technology orientation can be present in business models that focus on product and service innovation. It follows that:

H2a: Software firms’ technology orientation is positively related to their customer proximity.

H2b: Software firms’ technology orientation is positively related to their product uniformity.

2.3 Open innovation

The widespread popularity of open innovation has led to a drastic increase in the number of open source software (OSS) activities and OSS projects [35]. OSS has changed large parts of the software industry. It constitutes an alternative or complement to proprietary software, which enables radically new business models, organizational forms and commons-based platforms as new foundations for value creation [36]. Open business models enable an organization to be more effective in creating as well as capturing value [37]. More than ever, innovation development refers to the creation and management of strategic partnerships with communities and other organizations [38]. Inter-organizational collaboration is often said to be the source of competitive advantage to companies [39,40], as it allows them to exploit external resources and develop their own capabilities [41].

Innovators rely on many different external sources of knowledge [42]. However, engagement in open innovation poses a challenge for firms. Learning from partners to maximize the effectiveness and efficiency requires transparency in the partnership. However, excess leakage of information may dilute the firms’ internal sources of competitive advantage [43]. Prior literature points out that open innovation refers to content (products, processes and services) and context (organizations) [44]. Therefore, we investigate the aspects of openness in innovation through organizational openness and open source products and components.

2.3.1 Organizational openness. Having an open organization increases a firm’s potential for cross-fertilization and cross-functional support of ideas [45]. The reason is that it supports a willingness to collaborate across organizational units and acquire knowledge outside the organization. Furthermore, increased openness reduces fear and encourages new ideas and risk taking [46]. Open source innovation offers an interesting means of organizing software development. OSS projects are exemplars of a “soft” mode of governance [47], as open source innovation is based on online communication. Vujovic and Ulhøi [48] describe the Internet as an e-R&D networking tool for openness and teamwork, as well as for decentralized linkages and knowledge flows.

OSS projects are based on online communication, cooperation, and coordination. They are characterized by virtual organizations or communities. Innovation activity that focuses on creating publicly available software relies on a community of voluntary contributors, such as software developers and users. The transfer and sharing of knowledge in such a community involves various social interactions [48]. Tighter intra- and inter-organizational linkages increase efficiency, because they streamline the handoffs between activities and accelerate delivery times [48]. Open innovation means the utilization of both internal and external sources and linkages [49] and requires the opening up of organization.

2.3.2 Open source products and components. Involvement in open source development is a promoter of change in perceptions, development processes and business models [50]. An open mode of governance [47] is made possible by two interrelated and mutually reinforcing features of software production, modularization and distribution, in which an extensive exchange of information during product development supports coordination [51]. Modularity as a general structuring principle consists in the literature on technology design [52]. When applied to software, it allows a rather loosely managed and structured approach to production [48]. In such a setting, software developers can work on different modules independently and exchange experiences together.

Shared information, such as component libraries, user support, technical discussions and announcements, make knowledge dissemination easier and facilitate learning from the project. Shared files and lists make contributions to software development visible and reveal the organization of contributions to some extent. The Internet provides planning and organizational
resources as well as cost-effective communication and distribution systems used in both product development and customer-specific system implementations. While most OSS programmers focus on developing software for large masses, some work on solutions with more customer-specific needs [50]. Therefore, the following hypotheses are suggested:

H3a: Openness of innovation has a positive relationship with software firms’ customer proximity.

H3b: Openness of innovation has a positive relationship with software firms’ product uniformity.

2.4 Service business models in the software industry

A business model consists of a set of managerial choices and the consequences of those choices [3]. They may be related to policy, assets or governance. The underlying dimensions of the business model are resource structure, transactive structure and value structure [1]. The question of standardization versus adaptation is a crucial dilemma in business models [53]. The first aspect in measuring an offering is its homogeneity or similarity across several transactions. This aspect is a central issue in transaction cost economics (TCE) [54], which argues that economies of scale are realized by increasing the number of similar offerings. Alternatively, the economies of scope are related to close integration between the service provider and the user, conducting more business between the seller and the buyer.

2.4.1 Customer proximity. Some software firms create new types of transactions with customers. They aim at intense and longer-lasting relationships with their clients by increasing the total number of transaction types. If this is pursued by focusing on a small number of customers, it also strengthens the focal firm’s bargaining power in its customer relationships vis-à-vis other business model stakeholders [55]. The current consensus in the marketing literature suggests that firms benefit from building long-term relationships with their customers instead of focusing separately on each transaction [56].

In the case of software related services, customer proximity represents a specific situation. It is outlined by Lovelock [57], who points out that the nature and recipient of services, the relationship between the firm and customers, and the level of service customization [58] represent an intense relationship between the seller and the buyer. It causes a high degree of customization and an emphasis on people as providers and recipients [16]. Literature on market orientation [59,60] suggests that customer orientation is linked to business performance, but in a complex way that requires myriad capabilities. Empirical studies have been inconsistent on whether customer orientation strengthens business performance. However, the study by Zhu and Nakata [61] suggests that customer orientation contributes to performance. Bearing these considerations in mind, we hypothesize that:

H4a: Software firms’ customer proximity has a direct and positive relationship with their market performance.

H4b: Software firm’s customer proximity has a direct and positive relationship with their financial performance.

2.4.2 Product uniformity. In service businesses characterized by standardized product or service offerings, innovation focus is on developing uniform solutions, uniform service processes [62], or both. A great deal of business literature emphasizes the scale advantages of firms [63]. These studies describe the multiple advantages enjoyed by large-scale offerings, which are provided to a larger target group instead of single or small groups of clients within narrow customer domains. However, scale economies not only pinpoint adding new customers, but are also based on having loyal customers in terms of repeat purchases. Zott and Amit [55] show that efficiency-centered business models aim to reduce transaction costs for all transaction participants.

Uniform software product or service offerings range from dedicated domain-specific software to a standardized online service. A dedicated software package offers a solution to the user’s information processing problem. It is dedicated to some particular function, such as transaction processing or production planning [64]. Empirical research has indicated that a firm’s propensity to enter exploration and exploitation alliances is related to its resource endowments [65]. The possession of or access to key resources in the network is important when firms develop new products and business concepts. Radically new innovations or those for emergent customers or markets are exploratory, since they require new knowledge or departures from existing skills [24]. Therefore, we suggest that:

H5a: Software firm’s product uniformity is positively related to its market performance.

H5b: Software firm’s product uniformity is positively related to its financial performance.

2.5 Firm performance

Studies on firm performance include a wide variety of managerial concerns, such as strategy types [66], customer orientation [59,60] and innovation orientation [67]. Demsetz [68] posits that firms with higher market share gain efficiencies that translate into
greater profitability. This suggests that market performance precedes and influences financial performance. Furthermore, many empirical studies cite market performance as an antecedent of financial performance. In a meta-analysis of determinants on firm performance, Capon et al. [69] found that market share, sales growth, and quality of products and services are positively tied to financial performance. In another study, Szymanski et al. [70] learned that market share is a significant contributor to profitability. After reviewing these conceptual and empirical studies, we hypothesize that:

H6: Firms' market performance is positively related to financial performance.

3. Methodology and data

We conducted an online survey of software firms’ strategic orientations, business models and performance in 2008-2009. Our empirical inquiry was administered to virtually all software firms in Finland. The total sample consisted of potential respondents in 1355 firms. The selected respondents were senior managers, because they typically possess the knowledge of the firm’s strategic orientations and business models. However, we acknowledge the role of strategists outside the senior management teams and the potential impact of others within the field of strategizing activities. The average number of selected potential respondents in all firms was two, because the investigated phenomena are complex and require multifaceted perspectives. We recruited the respondents via e-mail by including an invitation and a link to the survey in the message body. The questionnaire yielded 197 usable responses from 179 firms. Thus, the yielded scope of the survey equates to 13.2 %, which is considered acceptable in online surveys targeted to nationwide whole sampling frames covering all firms in the selected industry.

Following the standard industrial classification (SIC; Dun and Bradstreet), the majority of firms in the sample are considered small to medium sized in terms of the number of employees. In addition, 25% of the firms had an annual turnover of less than 0.5 million euros (MEUR), 50% of the firms had annual turnover with less than 1.8 MEUR, and 75% with less than 8 MEUR. The turnover of the largest firm was equal to 4,500 MEUR. The distribution of turnover in the sample is consistent with previous research on the Finnish software industry (e.g., the annual Finnish software business survey 2002-2008).

3.1 Variables

We used multi-item scales for all constructs. All items were measured on a five-point Likert-type scale (1=“strongly disagree” to 5=“strongly agree”). We developed the scales for service orientation and business model focus for this study after a literature review and interviews with the industry experts and senior managers in software firms. The items for technology orientation, openness of innovation activity and firm performance were drawn from the literature. However, we modified the wording of the questionnaire for a better fit in the software industry.

The dependent variable is firm performance, which is investigated through market performance and financial performance. Market performance (MPERF) is a reflective construct that consists of three items drawn from prior literature [64,65]. They are market share, changes the firm has induced in the market and growth relative to competitors during the last three years. Financial performance (FPERF) is a formative construct. It consists of two items that are used commonly in the extant research literature to investigate firms’ economic success. They are improved profitability and increased product and service sales during the last three years.

The independent variables capture firms’ service orientation (SERVOR), technology orientation (TECHOR) and openness of innovation activity (OPENNESS). SERVOR is a second-order construct that uses two reflective indicants. One of them captures a firm’s service strategy and the other assesses the structure of the service organization with three items derived from prior studies. We aggregated technology orientation (TECHOR) from two first-order constructs, which describe technological issues that are endogenous and exogenous to the firm. Consistent with He and Wong [71], who distinguish the objectives and structures designed for efficiency of operation from those designed for the exploration of innovation, our model of firms’ engagement in open innovation (OPENNESS) distinguishes organizational openness from that of software development.

The intermediary variables encompass business model type. To this end, we identify the customer proximity and product uniformity-focus in business models. Narver and Slater [59] and Jaworski and Kohli [60] developed scales which, in whole or part, are the most prominent assessments of customer orientation. Following their scales and that of Theoharakis and Hooley [72], we use three indicators to assess a firm’s customer proximity-focused (CUSTFOCUS) business models. Moreover, consistent with Tether and Tajar [73], the indicators for the product uniformity focus (STDFOCUS) in business models include the extent to
which the company focuses on the development of new products and services, building success based on the development capabilities for new products and services, and the ambition to develop products and services that are new to the industry.

3.2 Scale validity and reliability

Our study uses Wold’s [74] method of partial least squares (PLS) to estimate parameters. To assess the reliability and validity of the constructs, we examined composite reliability values and average variance extracted values for each first-order latent variable. We used the composite reliability analysis suggested by Fornell and Larcker [75] to assess construct reliability, which shows the degree of consistency between multiple measurements of a variable. All composite reliability values were above the recommended level of .70 [75].

A complementary measure to composite reliability is the average variance extracted, which is useful in examining convergent validity. Average variance extracted is the average variance shared between a construct and its measures [76]. It shows the amount of variance captured by the construct in relation to the variance due to measurement error. In our study, all constructs exceeded the recommended .50 benchmark [77]. Overall, the composite reliability values and average variance extracted values indicate that the scales perform adequately.

The customer proximity-focused business model construct (CUSTFOCUS) had the lowest coefficient value ($\rho=.65$) in the data set. Yet a Cronbach’s alpha that is equal to or greater than .60 is considered acceptable, as both the composite reliability value (.80) and average variance extracted value (.57) indicate that the construct performs well—although we would generally prefer a stronger standard of $\alpha > .70$. It should be noted, that the reliability measure available in Cronbach’s alpha is non-robust and is extremely sensitive to violations, as a single observation can have a significant impact on this coefficient [78]. Thus, we consider it in proportion to other reliability measures.

Discriminant validity is the extent to which different constructs diverge from each other. We assessed it by examining the correlation matrix of the constructs. Satisfactory discriminant validity among constructs is obtained when the square root of the average variance extracted is greater than corresponding construct correlations [75]. This implies that the variance shared between any two constructs is less than that shared between a construct and its indicators. For each pair of constructs, the square root of the average variance extracted exceeded their correlations. Thus, all constructs meet the criterion, which supports their discriminant validity.

4. Empirical analysis and results

We used the SmartPLS 2.0 developed by Ringle et al. [79] to analyze the data and examine hypotheses through partial least squares (PLS) causal modeling. The PLS method is recommended in situations in which there are no stable, well-defined theories to be tested in a confirmatory research setting, the research model includes reflective and formative constructs, or the sample size is small [80]. In addition, it is viable for analyzing predictive research models that are in the early stages of theory development, as is the model in the present study [81]. Because PLS considers all path coefficients simultaneously and estimates multiple individual item loadings in the context of a theoretically specified model rather than in isolation, it helps to avoid biased and inconsistent parameter estimates for equations.

Following the guidelines of Kaplan [82], we coded and cross-checked both the type of the variable and content of the cases in our data. Missing values were marked and treated in the analysis by the SmartPLS algorithm. We then conducted an exploratory factor analysis in SPSS 16.0 with principal component analysis and Varimax rotation. The factor analysis provided support for the hypothesized constructs, because they emerged as clear factors from the data. We accepted only variables with absolute coefficient values exceeding .50 within the constructs for the analysis. We examined the hypotheses with full-sample t-tests (df=517). First, we generated estimates of the standardized regression coefficients for the paths in the model. Then, we used the bootstrap procedure to approximate the sampling distribution of an estimator by resampling with replacement from the original sample, which is necessary to derive valid t-values. We conveyed the analysis using 1,000 bootstrap replications.

Table 1 lists the results for the hypotheses. As predicted in hypotheses H1a, a software firm’s service orientation (SERVOR) has a positive relationship with the customer proximity-focus of the business model (CUSTFOCUS). However, contrary to our hypothesis H1b, its service orientation does not have a statistically significant effect on the product uniformity focus (STDFOCUS) of business model. Conversely, the results of the analysis suggest that a software firm’s technology orientation (TECHOR) advances both its customer focusing business models and standard offering-focused business models. Hence, the analysis provides support to hypotheses H2a and H2b, a firm’s engagement in open innovation activity (OPENNESS)
does not have a significant effect on customer-focused business models, which is against our hypothesis. Conversely, engagement in open innovation has a significant positive effect on standard offering-focused business models. Hypothesis H3a is thus not supported, whereas hypothesis H3b received strong and statistically significant support. This result means that firms engaged in open innovation rather focus on standard products than on customer proximity in their business models.

Furthermore, the analysis shows that business model types have significant effects on firm performance. Supporting our hypotheses, customer proximity-focused business models (CUSTFOCUS) advance both a firm’s market performance (MPERF) (H4a) and financial performance (FPERF) (H4b). Moreover, a firm’s focus on product uniformity (STDFOCUS) has a significant positive effect on its market performance (MPERF), thus supporting hypothesis (H5a). Nevertheless, the analysis shows no significant relationship between the studied software firms’ focus on standardized offerings and their financial performance (FPERF), which contradicts our hypothesis H5b. Finally, the analysis reveals that market performance has a significant positive effect on financial performance. There is a statistically significant difference between individual customer proximity-focused business models (CUSTFOCUS) and product uniformity-focused business models (STDFOCUS). Customer focus has a direct positive effect on a firm’s financial performance (FPERF), while it has a slightly weaker, yet positive effect on firms’ market performance (MPERF). Conversely, standard offering strategy has a statistically significant effect only on a firm’s market performance (MPERF) and not on its financial performance (FPERF).

Table 1. Results of hypotheses testing (n=197, bootstrap samples=1000, df=517)

<table>
<thead>
<tr>
<th>H#</th>
<th>Relationship</th>
<th>β</th>
<th>t-value</th>
<th>p-value</th>
<th>Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a</td>
<td>SERVOR → CUSTFOCUS</td>
<td>.43</td>
<td>6.80</td>
<td>&lt;.001</td>
<td>Yes</td>
</tr>
<tr>
<td>H1b</td>
<td>SERVOR → STDFOCUS</td>
<td>-.11</td>
<td>1.84</td>
<td>.066</td>
<td>No</td>
</tr>
<tr>
<td>H2a</td>
<td>TECHOR → CUSTFOCUS</td>
<td>.18</td>
<td>2.40</td>
<td>.017</td>
<td>Yes</td>
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<tr>
<td>H2b</td>
<td>TECHOR → STDFOCUS</td>
<td>.35</td>
<td>4.86</td>
<td>&lt;.001</td>
<td>Yes</td>
</tr>
<tr>
<td>H3a</td>
<td>OPENNESS → CUSTFOCUS</td>
<td>.11</td>
<td>1.51</td>
<td>.132</td>
<td>No</td>
</tr>
<tr>
<td>H3b</td>
<td>OPENNESS → STDFOCUS</td>
<td>.37</td>
<td>5.16</td>
<td>&lt;.001</td>
<td>Yes</td>
</tr>
<tr>
<td>H4a</td>
<td>CUSTFOCUS → MPERF</td>
<td>.16</td>
<td>2.49</td>
<td>.013</td>
<td>Yes</td>
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<tr>
<td>H4b</td>
<td>CUSTFOCUS → FPERF</td>
<td>.22</td>
<td>3.66</td>
<td>&lt;.001</td>
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<tr>
<td>H5a</td>
<td>STDFOCUS → MPERF</td>
<td>.32</td>
<td>3.78</td>
<td>&lt;.001</td>
<td>Yes</td>
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<tr>
<td>H5b</td>
<td>STDFOCUS → FPERF</td>
<td>.03</td>
<td>0.44</td>
<td>.660</td>
<td>No</td>
</tr>
<tr>
<td>H6</td>
<td>MPERF → FPERF</td>
<td>.53</td>
<td>10.26</td>
<td>&lt;.001</td>
<td>Yes</td>
</tr>
</tbody>
</table>

We measured the explanatory power of the model for the dependent construct by using the squared multiple correlations value ($R^2$) as suggested by Hulland [76]. In this study, the independent constructs explained 14% of the variance in market performance (MPERF) and 36% of the variance in financial performance (FPERF), which is considered good for this kind of analysis. To conclude our structural analysis, we calculated the goodness of fit (GoF) of the model using the global fit measure for PLS by Tenenhaus et al. [83]. By taking the square root of the product of the variance extracted of all constructs with multiple indicators and the average $R^2$ value of the endogenous constructs, we can calculate a fit measure ranging between 0 and 1. According to the categorization by Cohen [84] and using .50 as a cutoff value for communality [75], the GoF criteria for small, medium, and large effect sizes are .10, .25, and .36. In the present model, the GoF is .43, which indicates a good fit of the model to the data.

5. Discussion and conclusions

This study investigated the relationship between a firm’s capability to react to industry-wide trends and its service business model performance. The study investigated industry-wide shifts at the firm-level through firms’ strategic responses to increasing service-intensity, changing technologies and the
openness of innovation. A PLS path analysis in the software industry shows the connection between the changes and their effects on software firms' business model focus. In other words, firm-level orientations regarding the service dominance, technological dynamics and open innovation in the software industry have significant effects on software firms' business models and on the firms' performance. These findings indicate that service orientation, technology orientation, and engagement in open innovation influence on firms' service business models.

The main managerial implication of this research is that through our analysis, executives learn the effects of their crucial business model choices. The results demonstrate that openness of innovation activity has a significant role in the contemporary software business. Congruent with Vujovic and Ulhøi [48], our study shows that open innovation fosters the development of uniform software offerings. Conversely, service orientation plays a key role in supporting customer proximity focused business models. In addition, high customer proximity has a direct positive effect on firms' financial performance, whereas has a slightly weaker, yet positive effect on firms' market performance.

These findings are in contrast to Zhu and Nakata [61], who found that customer orientation is related to market performance and that market performance is associated with financial performance. Our findings give rise to critical concerns against their chain effect in line with Macdonald [85], who suggested: “The firm which would take getting close to the customer seriously must consider the degree to which it can, should, and will integrate with its customers’ activities, and probably with those of others in the market.” Conversely, high product uniformity through standardized service offerings has an effect only on firms’ market performance and not on their financial performance. However, market performance has a strong positive relationship with financial performance.

Our study is not free from limitations. One of the limitations is that the empirical analysis was limited by a population derived from a small geographical area with a homogenous cultural background. Furthermore, the data used in the analysis were cross-sectional. Therefore, we call for future research to investigate whether the results hold between different geographical and cultural areas and whether objective longitudinal performance data shows different results. Moreover, future research should use confirmatory analyses to validate the results.

6. References