Is *Service Infusion* always worth it?

The association between SI of different nature and levels of intensity and the sales performance

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ABSTRACT

This research aims to contribute with empirical evidence to the understanding of the association between Service Infusion (SI) and firm performance. We tested the posited association with statistical methods in a single firm supplier and data of 6.635 buyers targeted at some point over a 2-year period with SI. Results show (i)a positive association between SI practices and the volume of purchased product units, (ii) that the association varies with the nature of implemented SI and, (iii) that there is an optimal number of SI actions. This research adds to theory, also providing managers with insights on expected SI outcomes.

1. INTRODUCTION

Despite the extensive literature on the shift from product to service strategic orientation that many industries have been going through, the need for further studies on the subject is recurrently claimed for (Baines et al., 2015, Kowalkowski et al., 2017, Ostrom et al., 2015). Overall, there has always been an effort to aggregate services to the offered products (Robinson et al., 2002), but more recently, that effort became more evident. Among the main drivers for this shift in firms' strategic orientation are (a) the possibility of product differentiation (Mathieu, 2001; Robinson et al., 2002), (b) lower revenue volatility (Baines et al., 2009; Gebauer et al., 2005) and (c) higher profitability (Oliva, & Kallenberg, 2003; Wang et al., 2018).

We use the term Service Infusion (SI) to refer to the inclusion in the offer of services linked to the products purchased by the buyer company. Different terminologies have been used over the years for Service Infusion (SI), such as servicetization (Vandermerwe & Rada, 1988), service transition (Fang et al., 2008) or service addition (Eloranta & Turunen, 2015). A substantial part of the research on SI aims to define and highlight the importance of such practice (Stremersch et al., 2001; Vandermerwe & Rada, 1988), as well as to discuss the transition from product to service orientation (Forkmann et al., 2017). Some studies also sought to measure the impacts resulting from of SI practices (Fang et al., 2008; Gebauer et al., 2011; Kohtamäki et al., 2013), and in this domain, the predominant view is that there is a positive relationship between SI and performance (Wang et al., 2018). For example, Fang et al. (2008) concluded that a service orientation can, under certain conditions, result in an increase in company's value, whereas Kohtamäki et al. (2013) found a positive yet non-linear association between IS and sales performance. On the other hand, although most studies show the positive impact of this

practice, there are less beneficial aspects that, depending on the situation, should be considered when deciding whether or not to engage in IS practices. For example, Sousa and De Silveira (2017) show that while (so-called) more advanced services show a positive impact on sales performance, services considered more basic negatively affect the performance of the company. Kwak and Kim (2016), emphasize the importance of considering the costs inherent to the integration of services, such as transaction costs or the opportunity costs of investing in improvements in the manufacture of the products, since these costs will have an impact on the relation between IS and the profitability that then assumes the U-inverted format. Benedettini et al. (2015) and Valtakoski (2017) deal with situations of IS failure and consequent abandonment or decrease of intensity of this practice by companies, even with a risk of bankruptcy for the company. Valtakoski (2017) argue that this failure is a consequence of problems in the process of knowledge and learning inherent in the implementation and maintenance of IS. In line with this argument, Kowalkowski et al. (2017) conclude that much has been written about the process for greater service orientation and that many industries are developing profitable businesses by adopting a service-based growth strategy but that it is also important to understand the counterpoint to these practices.

This work aims to deepen the knowledge on the association between suppliers' performance and their adoption of SI practices. More specifically, we investigate the association between the buyer purchases and 1) the practice of SI by the supplier, as well as 2) the intensity of such practices (measured by the number of SI actions put into practice for each specific buyer), and c) the nature of the services provided. In addition, while previous studies on the effects resulting from SI traditionally focus on making a comparison between several SI suppliers and their aggregate performance (e.g., Kohtamäki et al., 2013), this research focuses on the individual performance of multiple buyers of a single supplier. We thus conduct an SI analysis at a more granular level, i.e., considering the intensity and nature of SI actions used with each buyer, thus eliminating the variability resulting from the specific characteristics of the supplier firms (e.g., staff training to provide services to buyer). The research objective is relevant, especially in a context of intense competition that leads to a *commoditization* of the products offered, or low technical differentiation between products. As an alternative to price-only disputes, companies can seek to add value to their offerings through SI, but to be effective firms need to understand if SI results, in fact, in improved performance.

2. CONCEPTUAL MODEL

2.1 The Impact of Service Infusion

Although several studies have looked into the the association between a stronger service orientation and return to the firm, there is still space for further research. In fact, some of the findings found so far are contradictory (Eggert et al., 2011). For example, Fang et al. (2008) concluded that a service orientation can, under certain conditions, result in an increase in

company value, whereas Kohtamäki et al. (2013) found a positive, yet non-linear association between SI and sales performance. The latter authors also found a moderating effect that network capabilities have on this relationship. These authors propose cooperative skills as a moderating effect based on the logic that a greater orientation to services increases organizational complexity. That is, the more towards services the company is in the continuous product-service, the more skills it has to develop to capture the potential benefit of differentiation via superior value delivery, as well as to attain a positive impact on the growth of its sales.

For Eggert et al. (2014), differentiations such as innovation in services can positively impact sales performance. On the other hand, some authors argue that although most studies show the positive impacts of this practice, there are less beneficial aspects that, depending on the situation, should be considered when deciding whether or not to engage in SI practices. For example, Sousa and De Silveira (2017) show that while so-called more-advanced services show a positive impact on sales performance, services considered more-basic negatively affect the performance of the company. Kwak and Kim (2016), emphasize the importance of considering the costs inherent to the integration of services such as transaction costs or the opportunity costs of investing in improvements in the products manufacturing, since these costs will have an impact on the relation between SI and the profitability; this way, it assumes an inverted-U shape. Benedettini et al. (2015) and Valtakoski (2017) look into situations of SI failure and consequent abandonment or decrease of intensity of this practice by companies, even with a risk of bankruptcy for the supplier. Valtakoski (2017) argue that this failure is a consequence of problems in the knowledge and learning processes underlying the implementation and maintenance of SI. In line with these ideas, Kowalkowski et al. (2017) conclude that although much has been written about the process for greater service orientation and that many industries are developing profitable businesses by adopting a service-based growth strategy, it is also important to understand the counterpoint to these practices.

Given that the majority of the studies propose a positive impact of SI on the return of the company, we put forward the following hypothesis.

Hypothesis 1: The adoption of SI practices by a supplier is positively associated with the increase in the volume of purchased product units by its buyers.

Trying to identify which customer activities led to an increase in customer loyalty, Dixon et a. (2010) conclude that high efforts to overcome customer expectations produce only a marginal effect on the level of customer retention. It is understood that there is a level after which the effort made interacting with a client no longer has positive effects, reflecting a banalization of efforts. In terms of possible knowledge sharing, this reflects reaching a level of saturation of information sharing capacity, beyond which it is no longer possible to absorb anything additional.

These arguments are in line with the microeconomic theory represented by the law of diminishing returns, where, *ceteris paribus*, additional units of a variable factor will start a positive effect on the total product, so that afterwards, and after a certain amount of variable factor used, it starts growing at declining rates to a point where production declines (Black et al., 2017). Following this same line of reasoning, it is understood that there is an optimum point of SI intensity measured by the number of actions implemented with specific buyers; from that point onwards, the association between SI and sales performance is no longer significant.

Hypothesis 2: There is an optimum point, after which the increase in number of implemented actions of SI for a buyer no longer results in increase in the volume of purchased product units.

2.2 Nature of Service Infusion: Customer Services

Mathieu (2001) distinguishes between a) services associated with the supplied product (service centered on the product) and b) services related to the usage of the product by the customer (service centered on the customer), while Cusumano et al. (2015) distinguish between a) complementary services to products (softeners and adaptive), and b) products substitution. There are other classifications (see Kohtamäki et al., 2013, for an overview of the various classifications of services in product manufacturing industries). Kohtamäki et al. (2013) proposed a new operationalization, which they classify as more accurate than all previous ones. The authors highlight three specific dimensions in the proposed operationalization to classify SI actions, namely: a) Maintenance services: this category includes installation, repair, maintenance and upgrade services; b) R&D services: this category includes research services, prototype design, feasibility studies and problem analysis; and c) Customer services: technical training, product demonstration, customer seminars, provision of written material, and telephone support and advisory services

We adopt the classification proposed by Kohtamäki et al. (2013), focusing specifically on SI actions of type (iii) customer services, that is, actions that focus on the customer and not on the product. Within this type of actions, there are different possible natures of SI . In this study, we focus on technical training, product demonstration, and seminars, as we consider that the provision of written material and advisory and support services are closely related to technical training actions. We propose to investigate whether the different types of SI in the context of customer service actions have the same level of impact in the association between the SI practices and sales performance.

When considering the technical-dependent nature of products traditionally involved in business-to-business sales, the lack of technical training can prevent the proper use of the product acquired. Thus, to stimulate demand, it is necessary to train clients for products' effective application, an argument reinforced by the binding capacity that such action presents

under the perspective of emotional ties. It is expected that the buyer will have a greater preference for a product which he learned and improved the usage technique with the help of the supplier.

The demonstration of the product benefits focuses on the resolution of the issues felt by the buyer's customers. Thus, if the demonstration is done with this final customer, it is expected that there will be a pull effect on the demand, as that customer will ask for the product from his supplier, which in turn will demand input from his supplier. Drawing on this argument, the binding potential of such action is also taken into account, i.e., the product demonstration provides the buyer with greater confidence in recommending the products.

Finally, in most cases, the seminars are expected to cover broad themes, not necessarily having a direct association with specific products. One may expect that this type of action will result in a low association with the increased volume of product units purchased. The seminars may even be of marginal interest to the participants. We therefore put forward as follows:

H3a: Technical capacity-type SI actions have a strong association with the volume of purchased units.

H3b: Product demonstration-type SI actions have an average association with the volume of purchased units.

H3c: Seminar-type SI actions have a low association with the volume of purchased units.

Figure 1 presents an overview of the proposed conceptual model.

--- Insert Figure 1 here ---

3. METHODOLOGY AND RESEARCH DESIGN

The validation of the theoretical models through the test of the proposed hypotheses was carried out by means of a quantitative study and application of statistical methods. We used a database of 10.537 buyers of a multinational pharmaceutical laboratory. Over the last years, the company has developed a service platform that aims at differentiating its offer from its competitors by offering its clients (i.e., aesthetic clinics), content and value-added actions both from a medical development perspective, as well as business support. The services included in the scope of this platform are offered free-of-charge and that are perceived as marketing tools used according to the objectives set for each customer segment: development, maintenance, conversion or protection from competition.

The analysis of the database allowed identifying a total of 10.537 physicians that in 2015 and/or 2016 bought at least one unit of one of the firm's offered products. As dependent variable, we considered the variation in the volume of units purchased by the firm's business-to-business buyers between 2015 and 2016. In order to test the conceptual model, we used a database of 6.635 customers, who bought at least one unit of one of the company's products in 2015; some of these

6

clients also bought at least one unit of product in 2016. We were able to identify SI actions that could be classified as a) Products Demonstrations, b) Seminars, or c) Technical Training.

The Annual Sales Growth of purchases per client (i.e., aesthetic clinique) of inputs for aesthetic treatments (see LogCres variable, in Table 1) was defined as dependent variable (on a logarithmic scale). Three independent variables were included in the model: Service Infusion (SI) - in a given year, the buyer has received at least one service type; SI intensity - corresponds to the number of SI actions carried out with each buyer in each of considered year; and, finally, the Nature of SI, which captures the SI actions that were categorized as: Products Demonstrations, b) Seminars, or c) Technical Training, as mentioned above. Segmentation variables were used to control the effects between the dependent and independent variables; these were obtained considering the potential of purchase and share of wallet that the company uses to better customize the service to buyers.

Control Variable 1: Buying Potential - Buyers are classified according to the potential of performing aesthetic procedures for which they have as inputs the products offered by the company.

Control variable 2: Share of Wallet - We also considered the participation that their products have in the total purchases of this category of product by the aesthetic clinic.

Table 1 shows the variables contained in the database.

--- Insert Table 1 ----

We used regression models for panel data (Wooldridge, 2015). The choice between fixed or random effects models was based on the Haussman test and, to overcome problems of data heteroscedasticity, we chose robust standard errors (Wooldridge, 2015). We used The statistical software STATA, version 12, to carry out the data analysis.

4. MAIN FINDINGS

The results of Model 1 (see Table 2) show that SI has a positive and statistically significant coefficient on the growth response variable of units of products purchased between 2015 and 2016 (β = .32; p <0.01). H1 was thus supported, demonstrating that as expected the practice of SI shows a positive association with the increase in the volume of product units purchased per buyer. For the control variables, the coefficients for Segmentation by Potential and by Share of Wallet, were as expected negative and statistically significant.

--- Insert Table 2 ----

The results of Model 2 show that the number of SI with a specific buyer has a positive and statistically significant coefficient (β =, 23, p <0.01) and the quadratic analysis shows a negative and significant coefficient (β = -, 025, p <0.001).

H2 was therefore supported, that is, there is an optimal amount of SI actions (i.e., quantity of services provided), after which there is no increase in sales. The number of SI actions shows a positive association with the variation in the volume of units of product until a certain point, when it becomes negative (inverted-U shape). More specifically, we estimate that the optimal number of SI actions is around five.

The results of Model 3 show that the association between SI and the variation in the volume of product units purchased varies according to the nature of the service provided. Results are statistically significant and stronger for actions involving technical training ($\beta = .32$, $p < 0.01$), which is consistent with the idea that technically-dependent product purchases grow more when associated with training aimed at its usage. H3a was thus supported. For product demonstration, the effect was also statistically significant and positive ($\beta = .18$; $p < 0.01$), supporting H3b and showing that the demonstration of the functioning and benefits of the product positively impacts the volume of product units purchased, due to the pull effect that the action generates, that is, the customer of the focal firm's buyer (in this case, patient of the aesthetic clinic) requests the demonstrated product. Regarding the seminars, although positive, the effect was not statistically significant (H3c was not supported), which is also consistent with the idea that seminars are more comprehensive, and therefore have no direct relationship with the application of the products bought conferring a character of marginal utility to actions of this nature.

5. DISCUSSION

Discussions related to SI have gone through different stages over the past 50 years. The empirical analysis of the association between SI practices and performance has been identified being of central importance (Kohtamäki et al., 2013, Wang et al. 2018). Moreover, it is the SI area that academics find being most necessary further research, so that the knowledge on the topic moves forward (see the call for papers in the editorial of the recent Special Issue on SI in the Industrial Marketing Management - Kowalkowski et al., 2017 - as well as the definition of service research priority in the Journal of Service Research; Ostrom et al., 2015).

In line with Eggert et al. (2014) that found a positive impact of innovations (including services) on both revenue and profitability, the evidence from this research also shows a positive association between SI actions and the growth of volume of product units purchased by the buyers that are targeted with such actions. However, we also found that the optimal number of SI actions is of approximately five, as from five SI actions onwards returns decrease. Thus, from that optimal point onwards, more SI actions lead to a decrease in the volume of purchased products units instead of the growth that was intended by the suppliers when implementing such SI actions. These results are in line with Kohtamäki et al. (2013), who identified a non-linear association between service offerings and sales growth. The law of decreasing incomes

is therefore applicable in such context, given that the constraints such as those related to the ability to receive additional information or even the trivialization of efforts, limit additional returns.

Using the typology suggested by Kohtamäki et al. (2013) for classifying the possible natures of SI actions, it was possible to analyze the association between customer service actions of different nature, and the growth of volume of purchased products units by the buyer. This type of granular analysis by specific type of customer service did not, as far as we know, been carried out to date. We conclude that depending on the type of provided customer service, the association observed between the number of SI action and the increase of units sold, varies in degree of intensity. Thus, given the technical-dependent nature of the products, the fact that the technical training actions are those that have the greatest connection to the growth of the volume of purchased products units, followed by product demonstrations that entail a specific stimulus for the products demand, was not surprising. The seminars were not statistically significant, perhaps because they have a more comprehensive and marginal utility for the application of products by customers.

5.1. Contributions to Theory and Practice

This study makes important contributions to marketing theory and practice. This research contributes to the SI body of knowledge bringing forward empirical evidence of an optimal point for the number of SI actions. In our specific case, we found that more than five SI actions for each buyer generate a negative growth in the number of units purchased by specific buyer. In addition, we found evidence that SI actions of different nature result in associations of different degrees of intensity with the growth of number of units purchased. Previous work was usually limited to discussing the importance of SI (e.g.,, Kwak & Kim, 2015), and besides with few exceptions (e.g., Kohtamäki et al., 2013), only a few studies analyzed the main drivers for SI success, such as the quantity and nature of the provided services, variables which we consider in our conceptual model. Our work also sets itself apart from previous studies by focusing on a single vendor and its buyers, instead of using a multi-vendor database and aggregate performance (without distinction between its different buyers). We thus eliminate possible variability effects resulting from different characteristics of the supplier (e.g., quality of SI actions provided to the buyers) that may affect the degree of success of specific SI actions.

In managerial terms, this work brings important contributions to managers interested in evaluating the adoption of IS practices. First, the work highlights the importance of marketing analytics, that is, the importance of including metrics and analytical tools to evaluate marketing actions (Wedel & Kannan, 2016). In this way, "doing-just by-doing" is avoided, and more intentionality is chosen, choosing the highest return actions that maximize the effectiveness of the planned actions (Ransbotham, Kiron, Prentice, 2016). In line with this, and drawing on the presented results, managers can make better decisions about the nature of IS actions to be implemented. For example, given the low association between seminars and

performance, it may be that one chooses to no longer perform actions of this nature and instead direct the available resources to SI actions of different nature that show greater association with performance. In addition, it is evident that from a certain number of IS actions implemented with the customer, this offer generates a negative association with the growth of purchased product units, being more productive to distribute the actions among the buyers' panel. All IS actions implemented by the analyzed company reflect knowledge transference between supplier and customer. Thus, beyond a certain number of actions, the knowledge considered necessary for the purpose underlying the proposed action (e.g., demonstration of specific product) will have already been transferred, constituting a "burden" for that specific client. With this information, managers will be better prepared to decide on a transition towards greater service orientation, considering the expected challenges and the potential benefits underpinning this strategy.

5.2. Limitations and Suggestions for future Research

As mentioned earlier, unlike previous studies that consider the association between IS actions and performance at an aggregate level of each company (see for example Kohtamäki et al., 2013), in this study we consider performance at a more capillary level, that is, per customer. However, one of the main limitations of this work was the access to more than one database structured by client that would allow the comparison between companies and sectors. This difficulty made us use the data of one single company over a two year period. This may raise some considerations regarding the generalization of the results obtained. It is suggested that future studies include the same level of capillarity per client, but include several companies from the same industry, as well as from other sectors. Another limitation was the access to information of the costs involved in the IS activities. As emphasized by Kwak and Kim (2016), costs should be considered in the analysis of the effects of IS actions. These costs would allow us to assess whether the additional volume of purchased product units was sufficient to cover the additional costs resulting from this increased service orientation, and thus effectively measure the association with the company's profitability. In our research, we assumed that products had reasonable margins and that the cost of IS activities was marginal, making it possible to estimate that the positive association in revenue was accompanied by a positive impact on profit; however there may be cases where this situation does not occur. As a suggestion for future research it is recommended that the costs inherent to the implemented IS actions are included, allowing a cost-benefit analysis.

Figure 1

Conceptual Model
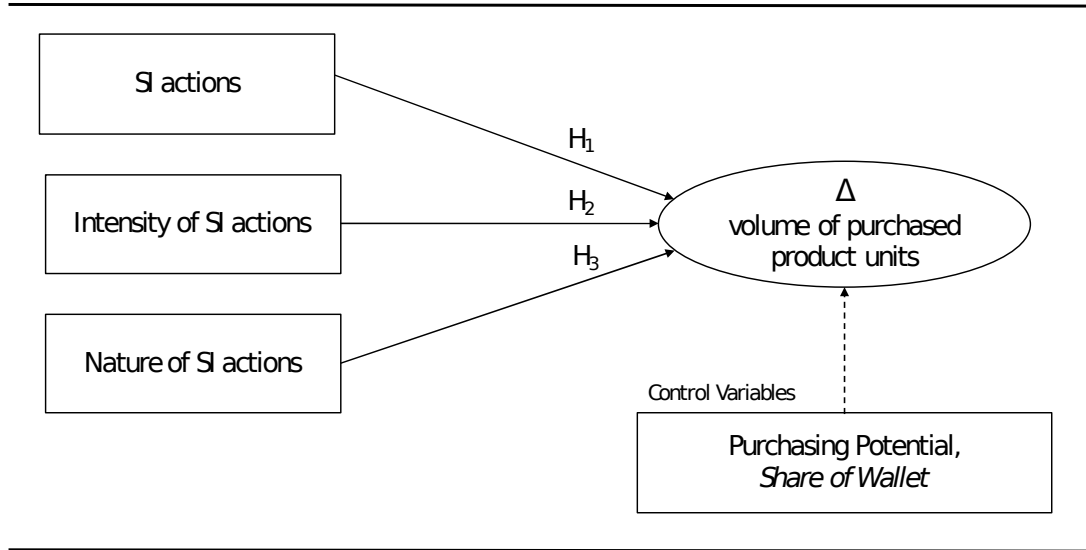
Fonte: The authors

Table 1

Operationalization of Variables

Variables	Description	Operationalization
UniT_14	Amount of product purchased by the doctor in 2014	Number of units
UniT_15	Amount of product purchased by the doctor in 2015	Number of units
UniT_16	Amount of product purchased by the doctor in 2015	Number of units
LogCresc	Log(UniT_Current Year_/UniT_Previous_Year)	
Segment	Segment = I (1.000 or + procedures/year) Segment = II (500 to 999 procedures /year) Segment = III (250 to 499 procedures /year) Segment = IV (until 249 procedures /year)	Segment I: 1 = yes, 0=no Segment II: 1 = yes, 0=no Segment III: 1 = yes, 0=no Other: 1=yes, 0=no
Share of Wallet	*Share of Wallet*: A: > 80% B: between 20-80% or C: < 20%	SW > 80%: 1 = yes, 0=no SW between 20-80%: 1 = yes, 0=no SW <20%: 1 = yes, 0=no
SI	Has received some type of SI in 2015 and/or 2016	SI: 1 = Has received, 0=Has not received
QtdSI	Intensity of SI practices – amount of SI actions received by the doctor	Number of units
Nature of the SI	The SI was: Products Demonstration Seminar Technical Training	Products Demonstration: 1=yes, 0=no Seminar: 1=yes, 0=no Technical Training: 1=yes, 0=no

Source: The authors

Table 2.
Estimated Results

	Model 1	**Model 2**	**Model 3**
	LogCresc	LogCresc	LogCresc
SI	$0,32^{***}$		
	$(10,37)$		
Intensity of SI practices		$0,23^{***}$	
		$(10,22)$	
Intensity of SI practices $^\wedge 2$		$-0,025^{***}$	
		$(-7,49)$	
Products Demonstration			$0,18^{***}$
			$(4,00)$
Seminars			$0,14$
			$(1,68)$
Technical Training			$0,32^{***}$
			$(8,81)$
Share of Wallet > 80%	$-0,47^{***}$	$-0,46^{***}$	$-0,46^{***}$
	$(-11,45)$	$(-11,41)$	$(-11,44)$
Share of Wallet > 20% <80%	$-0,36^{***}$	$-0,36^{***}$	$-0,37^{***}$
	$(-8,64)$	$(-8,62)$	$(-8,65)$
Segment I	$-0,077^{*}$	$-0,078^{*}$	$-0,079^{*}$
	$(-2,05)$	$(-2,07)$	$(-2,06)$
Segment II	$-0,13^{***}$	$-0,13^{***}$	$-0,13^{***}$
	$(-4,74)$	$(-4,75)$	$(-4,74)$
Segment III	$-0,12^{***}$	$-0,12^{***}$	$-0,12^{***}$
	$(-5,21)$	$(-5,25)$	$(-5,22)$
Constant	$0,41^{***}$	$0,41^{***}$	$0,41^{***}$
	$(10,35)$	$(10,40)$	$(10,41)$

t Statistics in parentheses: * $p<0.01$, ** $p<0.05$, *** $p<0.001$. White's Robust Standard Errors.
Source: The authors

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