

B2B relationships on the fast track: An empirical investigation into the outcomes of solution provision*

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ABSTRACT

In academic and business literature, suppliers providing solutions to their business-to-business (B2B) customers are often described as achieving increased customer retention, higher sales volumes, and enhanced cross-selling. Yet there is limited empirical evidence to support the positive impact of solutions on these customer-related outcomes. Moreover, it is unclear whether suppliers obtain similar outcomes from buyers at different relationship life-cycle stages. This paper aims to address these two gaps and tests the contingency role of the relationship life-cycle in driving future customer outcomes. It proposes that there is a positive effect for solutions provided to recent customers (labeled as “accelerator” role) rather than to established ones (labeled as “leverage” role). Results from a longitudinal analysis of the sales database of a North American company providing solutions to its customers empirically support the “accelerator” role of solutions.

1. Introduction

In today's business-to-business (B2B) marketplace, companies increasingly enhance their customer offerings with services to achieve differentiation and a competitive edge in the market (Eggert, Hogreve, Ulaga, & Muenkhoff, 2014; Fang, Palmatier, & Steenkamp, 2008). Such service-led growth strategies frequently entail what is referred to as “customer solutions” (Matthyssens & Vandenbempt, 2008; Ulaga & Eggert, 2006), whereby companies move from a stand-alone product or service offering to providing a much more complex and customized integration of goods and/or services that address customer needs more completely and specifically and include a relational process between customer and supplier (Evanschitzky, Wangenheim, & Woisetschlager, 2011; Tuli, Kohli, & Bharadwaj, 2007). These customer solutions contribute to achieving key business objectives in a variety of sectors ranging from industrial equipment, chemicals, information technology, to healthcare and beyond (Day, 2004; Sharma, Lucier, & Molloy, 2002). For example, Ricoh not only sells printing equipment and supplies but also offers centralized printing solutions to its customers.¹ In the heating, ventilation, and air conditioning industry, Belimo provides integrated solutions where the Internet of Things enriches its offering of damper actuators, control valves, and sensors.²

Notwithstanding their costs and organizational challenges (Sawhney, 2006), solutions are often presented as leading to increased revenues for their providers by means of improved customer retention, higher sales volumes, and more extensive cross-selling (Biggemann, Kowalkowski, Maley, & Brege, 2013; Miller, Hope, Eisenstat, Foote, & Galbraith, 2002). These customer-related outcomes should arise because customers tend to respond favorably to such offerings and further develop their relationship with the solution provider, leading to higher switching costs and increased dependency on the provider (Bonney & Williams, 2009). Although there is a growing literature that deals with the topic of solution provision, according to Evanschitzky et al. (2011), there is a lack of empirical research to support the claims above regarding customer-related outcomes. Thus, the first objective of this paper is to undertake such empirical research to deal with this limitation and to determine whether solution provision does enhance customer-related outcomes for their suppliers.

Moreover, solution provision is aimed at both recent (or new) and established B2B customers; in other words, at customers who are at early or advanced relationship life-cycle stages with the supplier (Bonney & Williams, 2009; Cova & Salle, 2007; Storbacka, 2011). While acknowledging both as targets of solutions, the literature has yet to

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¹ <http://www.ricoh-usa.com/>

² https://www.belimo.com/en_US/solutions

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provide a conclusive answer regarding whether different customer groups respond homogeneously to solution provision or whether one group benefits more than the other. Building on buyer–seller relationship dynamics (Jap & Anderson, 2007; Johnson & Selnes, 2004) and on the relational component that is a defining element of solutions (Tuli et al., 2007), this paper argues in favor of a different impact of solution provision on customer-related outcomes generated by customers at early and advanced relationship life-cycle stages.

On the one hand, providing solutions to established customers is described as being more effective thanks to the pre-existing relationship and knowledge developed (Cova & Salle, 2007), which could be leveraged to produce positive outcomes. This is consistent with the stronger emphasis in existing literature on established customers as preferred targets of solutions. On the other hand, the sustained outcome levels already typically achieved by these established customers (e.g., the so-called ceiling effect; see Homburg, Steiner, & Totzek, 2009) might limit any improvement in customer retention, purchase volume, and cross-selling following solution provision. In turn, recent customers might be lacking a solid preexisting relationship with the supplier at the time of solution provision. For these recent customers, the solution itself, with its highly interactive and relational nature, becomes an opportunity for both customer and supplier to get to know each other and develop their relationship. These customers are less likely to be affected by the ceiling effect and have higher growth potential. Based on these life-cycle related dynamics, it could be argued that, after solution provision, suppliers can expect better customer-related outcomes from recent rather than from established customers. Although theoretical support can be derived from the literature, this contingency framework is yet to be empirically tested. Hence, this is the second objective of this paper.

To address these two knowledge gaps in the B2B literature on the topic of solution provision, the present study analyzes archival sales data from a North American solution provider, which allows the identification of customers who were involved or not in the purchase of solutions. Its results suggest that not all customers are likely to produce higher future outcomes for the solution providers. The positive effect of solution provision is mostly present for customers at earlier stages of the relationship life-cycle. Recent customers have significantly higher outcomes than their counterparts who had not purchased solutions; however, no significant differences are found for established customers whether they had or had not purchased solutions. Thus, the results support a contingency role for the relationship life-cycle. Solution provision is found to lead to positive outcomes for recent customers, as it accelerates relationship development rather than leveraging the existing relationship to benefit more established customers. To sum up, providing empirical evidence on the relationship between solution provision and customer-related outcomes and testing the moderating effect of customer relationship life-cycle in this setting represent the two key contributions of this paper to the B2B marketing literature.

2. Literature review

2.1. An overview of solutions

Sawhney (2006, p. 378) initially defined solutions as “a customized, integrated combination of products, services, and information that solves a customer's problem.” Tuli et al. (2007, p. 2) enriched this view of customer solutions as “a set of customer-supplier relational processes comprising: (1) customer requirements definition, (2) customization and integration of goods and/or services, (3) their deployment, and (4) post-deployment support.” The actual customization and integration of products and services present in each solution go hand in hand with the relational component involved in its provision process (Nordin & Kowalkowski, 2010; Tuli et al., 2007). Evanschitzky et al. (2011, p. 657) summarize these elements by defining solutions as “individualized offers for complex customer problems that are interactively designed

and whose components offer an integrative added value by combining products and/or services so that the value is more than the sum of the components.” The relational dimension of the solution provision process is now embraced as a distinctive feature of solutions and of their selling approach (Evanschitzky et al., 2011; Storbacka, Polsa, & Sääkjärvi, 2011).

2.2. Solutions and customer-related outcomes

The B2B marketing literature presents companies' decisions to include solutions as part of the product strategy as a way to increase differentiation, deliver superior value to customers, and improve financial performance (Matthyssens & Vandenbempt, 2008). Often accompanied by a word of caution about the costs and organizational challenges involved, several statements can be found supporting the claim that solutions often produce a win-win situation for both customers and suppliers (Sawhney, 2006; Sharma & Iyer, 2011). Customers benefit from the higher value in use delivered by solutions (Biggemann et al., 2013; Macdonald, Wilson, Martinez, & Toossi, 2011). This value has a variety of sources including “superior or simplified operations, cost savings, performance guarantees, convenience, customized service, and state-of-the-art offerings” (Miller et al., 2002, p. 6). For suppliers, these elements are likely to lead to positive customer-related outcomes, including better retention rates, higher sales volumes, and more cross-selling opportunities (Cova & Salle, 2007; Miller et al., 2002; Sawhney, 2006). Based on the literature reviewed, solutions can be expected to have an impact on three customer-related outcomes, in line with the theory on customer relationship management (Aurier & N'Goala, 2010; Bolton, Lemon, & Verhoef, 2004): *retention*, which is an indicator of relationship maintenance (i.e., length of time), and increased usage levels or *volume* (i.e., depth) and *cross-selling* (i.e., breadth), which are indicators of relationship development.

The empirical evidence found in the literature in support of these claims about the positive impact of solution provision, however, is limited. An example is the classic article by Miller et al. (2002), very often cited on the positive outcomes of solution provision. Although based on a longitudinal study of 30 successful solution providers, this article does not provide either empirical evidence or case-specific highlights to support the statements in favor of a positive effect of solutions for the suppliers. Even if some industrial marketing scholars have included solutions among broader service-led growth strategies, these few empirical studies have focused on the impact of solutions on the firm's shareholder value (Fang et al., 2008), or on self-reported (Eggert et al., 2014) and perceptual (Antioco, Moenaert, Lindgreen, & Wetzels, 2008) revenue measures aggregated at the firm level. As a result, there has been an ongoing call for more empirical research on solutions, with particular attention to objective measures of customer-level outcomes and their implications for suppliers (Day, 2004; Evanschitzky et al., 2011; Lilien et al., 2010). Thus, the first objective of the current study is to address this very research gap, by focusing on three objective customer-related outcomes, that is, on customer retention, sales volume, and cross-selling.

2.3. The contingency role of customer relationship life-cycle stage

Theory and practice suggest that solution provision targets equally new/recently established and long-standing relationships between customers and suppliers (Bonney & Williams, 2009; Cova & Salle, 2007; Storbacka, 2011). For example, Bonney and Williams (2009, p. 1047) acknowledge that solutions “have the potential to offer significant competitive barriers with existing customers as well as opportunities to increase sales with new customers.” If it recognizes these different groups of customers as targets of solution provision, the literature seems to implicitly assume that solutions lead to positive outcomes from all customers or to suggest that more positive outcomes arise from solution provision targeted to established customers. This study aims at

further analyzing the contingency role of the relationship life-cycle stage and tests whether recent and established customers will produce similar outcome levels for solution providers or whether some differences exist between them. It should be noted that this contingency approach is consistent with the one adopted by Eggert et al. (2014) in their investigation of the moderating role of an existing loyal customer base on the financial impact of service-led growth strategies.

The B2B literature underscores how suppliers are typically involved with a diverse portfolio of customer relationships, with some more developed than others (Bolton et al., 2004; Homburg et al., 2009; Jap & Anderson, 2007). Within this perspective, the distinction between recent and established customers can be viewed as reflecting different stages in the evolution of the relationship between a supplier and its customers, or relationship life-cycle (Dwyer, Schurr, & Oh, 1987; Jap & Anderson, 2007). According to relationship life-cycle theory, inter-organizational relationships such as those between B2B suppliers and their customers move through different stages as repeated business opportunities and contacts allow the development of relational bonds between firms. Relationships typically move from exploration to buildup, to maturity, and eventually to decline (Dwyer et al., 1987; Jap & Anderson, 2007).

Established customers are at the more advanced stages of buildup or maturity and have experienced repeated transactions with the supplier, resulting in a stronger bond and a higher level of interdependency (Dwyer et al., 1987; Jap & Anderson, 2007). This relates to the idea that solution providers should prioritize established customers with whom a relationship already exists (Cornet et al., 2000; Cova & Salle, 2007; Matthyssens & Vandenbempt, 2008). This priority is driven by enhanced inter-partner knowledge and deeper understanding of respective needs gained over time (Dwyer et al., 1987; Jap & Anderson, 2007). These elements could suggest that solutions generate positive outcomes for established customers because they “leverage” a solid relationship. Yet the literature points to some potential downsides for these customers. To begin with, Eggert et al. (2014) discuss how long-term customers might be asking for free service, discounts, etc., which would have a negative impact on revenues generated by service-led growth strategies. Moreover, established customers are likely to have already reached sustained purchase levels, experiencing the so-called ceiling effect (see Homburg et al., 2009). This might indicate more limited room for growth in comparison to bottom-tier customers such as more recent customers (Jap & Anderson, 2007; Johnson & Selnes, 2004). Altogether, these elements point toward possible limitations in the positive customer-related outcomes generated by established customers after solution provision. This paper argues that, for these customers, solutions do not leverage the relationship to produce positive outcomes but serve more to maintain the relationship, rather than having a significant positive effect on future outcomes.

In turn, more recent customers lack the pre-existing relational background but have a higher growth potential due to the absence of the ceiling effect (Homburg et al., 2009; Johnson & Selnes, 2004). Thanks to its relationship-intensive nature (Tuli et al., 2007), the solution itself and the learning that occurs within have the potential to nurture the recently established relationship more quickly than stand-alone transactions. The theory of economics of information (Stigler, 1961) predicts that initial interactions will be more informative than later ones. Also, building on relational theory (Selnes & Sallis, 2003), buyer and supplier can use the solution to gather knowledge to be deployed in the future. As a result, solutions provided to recent customers could accelerate relationship development, lead to a quicker achievement of sustained outcome levels typical of more established relationships, and unlock more substantial growth in future revenues, where this growth can still take place (hence, “accelerator” role).

In summary, the second objective of this paper is to test the contingency role of the relationship life-cycle in the context of the customer-related outcomes after solution provision. From an empirical standpoint, support to such a role of the relationship life-cycle stage will

be found if, in line with the accelerator role, the outcome levels generated by recent customers targeted by solutions are higher than those of their counterparts who did not purchase solutions, whereas such a difference is not found for established customers targeted by solutions.

3. Research method

3.1. Data

Archival sales data were obtained from a North American B2B company that provides solutions as part of its offering (called LabelCo to maintain confidentiality). The company employs 65 people, records annual revenues of \$10–\$15 million, and has approximately 5000 customers, ranging from nonprofit organizations and government services to local small and medium-sized enterprises and large international corporations. LabelCo granted access to its sales database, which covers > 120,000 transactions over a ten-year period (2001–2011). It contains information on 4395 different customers. Of these, > 2000 customers are active each year; and 70% of these active customers have a long-standing record of transactions (i.e., active over a four-year period). Customers tend to engage in repeated patronage behavior within the one-year horizon considered in this research: LabelCo retains > 67% of the customers active in a given year in the following year.

To better understand LabelCo's approach to solutions and its suitability for the investigation, exploratory interviews were conducted with top managers of the company. Lasting in total 6 h, the interviews were recorded and content-analyzed. To begin, the president provided a general overview of the company, its competitive positioning, and its evolution. A senior sales representative and the vice president technical service then provided additional information about the solution provision process and the interactions with customers and their impact on the company. Based on these interviews and subsequent e-mail exchanges, the following picture emerges.

LabelCo offers solutions by combining three main activities: in-house production of labeling products (approximately 50% of its revenues); distribution of third-party products for labeling, printing, and product identification (25%); and consulting, technical, and printing services (25%). Using the classification of organizational configurations for solution provision by Davies, Brady, and Hobday (2007), LabelCo can be defined as a “system integrator” because the company collaborates with its upstream suppliers and customers in customization activities and performs most of the integration activities at its headquarters. More importantly, the interviews with LabelCo's top management indicated that typical solution provision consists of the four relational processes described by Tuli et al. (2007), that is, customer requirements definition, customization and integration of products and services, deployment of the solution, and post-deployment customer support. For example, when describing a recent typical solution provision process, the vice president technical service of LabelCo described the *customer requirement definition* phase in the following terms:

Two weeks ago, a customer of ours asked a sales representative for an automated print-and-apply labeler. I decided to visit the customer because I did not have all the information needed to address this request. Once I met the customer and finished the study, I proposed two options: “I have the print-and-apply labeler your VP-Operations has asked for; but I also have another option that costs \$5,000 more, but that eliminates the shortage of label supplies and saves money by eliminating the waste of labels that are printed and not used.”

The company described the *customization and integration of goods and services* stage in the following terms:

As the customer accepted our second option, we needed to integrate

the print-and-apply labeler and the conveyor, and also to configure the right settings for the software managing the process. We did the integration in our technical department and kept the customer informed.

Deployment of the solution consisted of the following:

Once we finished the integration, we went on site to install the solution with all the components. We undertook tests to make sure that everything was working as expected and we trained customer staff to make full usage of the solution.

Finally, the *post-deployment customer support* phase was described thus:

We ensure that everything works fine with the labeler-conveyor solution for our customer. We provide a guarantee to our customer that we will stand by in case issues arise during the daily use of the labeler-conveyor solution. We make sure that the solution continues to correspond to the company's needs.

Moreover, from the analysis of the sales database, on average, 10% of LabelCo customers purchase at least one solution every year. This proportion is similar to what is suggested in the literature, with solutions typically targeted at approximately 10%–20% of the customer base (Cornet et al., 2000; Cova & Salle, 2007). Hence, based on qualitative and qualitative evidence, LabelCo provides an appropriate setting for the empirical investigation of the impact of solutions on customer-related outcomes.

3.2. Measures

3.2.1. Customer-related outcomes as dependent variables

In line with Bolton et al. (2004), this paper investigates three customer-related outcomes linked to revenue generation for suppliers, these being the improved length of the customer relationship (e.g., retention), its depth (e.g., sales volumes) and its breadth (e.g., cross-selling). As a result, the three dependent variables of interest in this study are customer retention (R_{it+1}), sales volume (SV_{it+1}), and cross-selling (CS_{it+1}). Retention was operationalized as a binary variable (R_{it+1}) based on repeated purchase activity by customer i in year $t + 1$ (van Triest, Bun, van Raaij, & Vernooij, 2009). R_{it+1} takes the value of 1 if a customer i active in year t made at least one purchase in the following year and 0 otherwise. Preliminary analyses conducted on the database revealed that the average number of transactions per customer was 3.6 per year (median = 2), suggesting the appropriateness of the one-year window. Sales volume (SV_{it+1}) was calculated as the sum of the monetary value of all purchases made by customer i in year $t + 1$. Cross-selling (CS_{it+1}) was calculated as the sum of the different product categories in which customer i made purchases in year $t + 1$ (Kamakura, Wedel, de Rosa, & Mazzon, 2003; Reinartz, Thomas, & Bascoul, 2008). From the interviews conducted with LabelCo's management, 13 product categories were identified and used in the calculation of the cross-selling dependent variable (with 10 as maximum value).

3.2.2. Solution as independent variable

Solution (Sol_{it}) is a binary variable that takes the value of 1 if at least one solution-based transaction was recorded among the purchases made by customer i at time t and the value of 0 if no solution-based transaction was recorded for customer i . According to LabelCo senior managers, customized print-and-apply labelers and data capture equipment and software are the main types of solutions offered. Thus, transactions were categorized as a “solution” if they involved these items in the invoice.

3.2.3. Relationship life-cycle as moderating variable

As a proxy for the Relationship Life-cycle Stage, a time-based dummy variable labeled *Established* (E_{it-1}) was created. This approach is in line with previous studies that used the number of years in the relationship

as a proxy for the life-cycle stage (e.g., Stock & Hoyer, 2005; Wagner, 2011). A four-year window was chosen because it represents twice the typical window for sales cycles of B2B customers similar to those of LabelCo (Siguaw, Kimes, & Gassenheimer, 2003). *Established* takes the value of 1 if customer i has been active in purchasing from LabelCo over the past four years. Such a customer is considered an “established” customer who is at a more advanced stage in the relationship life-cycle. *Established* takes the value of 0 if the year before solution provision represents the first year during which customer i had transactions with LabelCo. Such a customer is considered “recent” for LabelCo and, thus, at an earlier stage in the relationship life-cycle.

3.2.4. Control variables

The following control variables were included to account for alternative explanations: *geographical distance*, *customer importance*, *salesperson*, *company size*, and *recession*. With respect to *geographical distance* (GD_{it-1}), physical proximity between a company and its customers may facilitate the development of business and interpersonal relationships (see, e.g., Ganesan, Malter, & Rindfleisch, 2005), which in turn may translate into higher retention and sales volume, as well as a higher likelihood of solution provision. At the same time, the relationship life-cycle stage may be linked to geographical distance, as a company might first develop a customer base in the surroundings of its headquarters. The geographical distance between the shipping addresses of customer i and LabelCo headquarters was calculated according to the Haversine formula, based on latitude and longitude coordinates (Ivis, 2006; Shumaker & Sinnott, 1984). For *customer importance* (CI_{it-1}), LabelCo might have deployed other actions or exerted greater effort to keep more important and valuable customers, independently of solution provision. In this paper, customer importance (based on the measure developed by Palmatier, Scheer, Houston, Evans, & Gopalakrishna, 2007), was calculated as the sum of all purchases made by customer i in the year before solution provision. As LabelCo employs different salespersons, a dedicated control variable was created to cover the salesperson in charge of any given customer (SP_{it-1}). In addition, based on prior literature (e.g., Eggert et al., 2014; Park, Srivastava, & Gnyawali, 2014), company size and the conditions of the macroeconomic environment were controlled for.³ For *company size*, the Bureau van Dijk Orbis classification of companies into small, medium-sized, large and very large was used. To measure company size, three dummy variables were created, namely, *Medium* (M_{it-1}), *Large* (L_{it-1}) and *Very Large* (VL_{it-1}), taking the value of 1 if the company corresponds to the above classification and having *Small* as the category of reference. Finally, to account for the impact of broader macroeconomic conditions on customer-related outcomes, a dummy variable for whether or not the economy was in recession (*Recession*, Rec_{it-1}) at the time of solution provision was created, taking the value of 1 if the economy was in recession before the year of solution provision and 0 otherwise (Cross & Bergevin, 2012).

For *time*, a six-year period was used to estimate the independent variables, starting from the fiscal year of 2004–2005 and the five fiscal years of July 2006–June 2011 were used to estimate the dependent variables. The variable *time* was added to test for a possible linear effect of time (values from 1 to 6, starting at 1 = 2004–2005). Lagged values of the independent variables were used to attenuate potential endogeneity concerns, as detailed in the next section. All independent and control variables were mean-centered to facilitate the interpretation of parameters.

3.3. Analytical approach

In line with current guidelines found in the marketing literature (Zaefarian, Kadile, Henneberg, & Leischnig, 2017), several steps were

³ We would like to thank one of the anonymous reviewers for suggesting this.

undertaken to attenuate the potential sources of endogeneity to be found in any study that uses naturally occurring data, such as the present one. First, to account for possible selection bias, the propensity score matching (PSM) approach was implemented. Second, the use of variables based on objective, observable measures was likely to reduce the issue of error-in-measures. Finally, the ex-ante research design attempted to tackle potential simultaneity issues by using lagged independent and control variables. The following paragraphs give further detail on the use of the PSM approach in the current setting.

This study examines the main effect of *Solution* (i.e., Sol_{it}) on the three dependent variables under investigation (i.e., retention, sales volume, and cross-selling). The study also aims at testing the moderating role of the relationship life-cycle stage through the interaction term between *Solution* and *Established* (i.e., $Sol_{it} \times E_{it-1}$) and by comparing the levels of the three customer-related outcomes for recent and established customers who have or have not purchased solutions. Owing to the nature of the data collected in collaboration with LabelCo, however, there is no random assignment of subjects to the treatment condition (Cochran & Rubin, 1961)—in this case, of customers to the solution purchase. As discussed in similar research settings (e.g., Garnefeld, Eggert, Helm, & Tax, 2013), in such an observational context, comparing outcome levels for different customer groups could lead to inaccurate estimates, owing to the potential bias arising from the non-random nature of the treatment condition.

To address this potential bias for LabelCo customers, the PSM technique was used (for an overview of the different matching procedures available, see Caliendo & Kopeinig, 2008). In line with Rosenbaum and Rubin's (1985) notation, x indicates the covariates for a given customer, and the binary variable z whether the customer received ($z = 1$) or did not receive ($z = 0$) the treatment condition—in this case, the solution purchase. In the matching procedure, an artificial control group of subjects that did not receive the treatment ($z = 0$) is created to allow for the comparison of the outcomes of interest between these control observations and those that received the treatment ($z = 1$). The propensity score ($e(x)$) is obtained by means of a logistic regression, with the conditional probability of receiving the treatment, given the covariates x ($e(x) = \Pr(z = 1|x)$), as the dependent variable. Similar propensity scores are then used to match the subjects that received the treatment to those in the artificial control group that did not receive the treatment but had a similar likelihood of receiving the treatment. These matched subjects are often referred to as “statistical twins.”

After the quality of the matching procedure was assessed (Garnefeld et al., 2013; Rosenbaum & Rubin, 1985), regressions were run on the matched sample to compare the impact of solutions on the three dependent variables for recent and established customers. The model in Eq. (1) was used to this end:

$$Y_{it+1} = \alpha_{it} + \beta_1 Sol_{it} + \beta_2 E_{it-1} + \beta_3 Sol_{it} \times E_{it-1} + \beta_4 GD_{it-1} + \beta_5 CI_{it-1} + \beta_6 M_{it-1} + \beta_7 L_{it-1} + \beta_8 VL_{it-1} + \beta_9 Rec_{it-1} + \beta_{10} time + \beta_{11} SP_{it-1} + u_i \quad (1)$$

Three separate regressions were run for each outcome, where Y_{it+1} in Eq. (1) was replaced respectively by *retention* (R_{it+1}), *sales volume* (SV_{it+1}), and *cross-selling* (CS_{it+1}). In the results, the parameters for the *retention* equation are accompanied by the subscript 1 (e.g., “ β_{10} ” indicates the intercept of the regression for the first dependent variable), those for *sales volume* by the subscript 2, and those for *cross-selling* by the subscript 3. All the models contained a random effect (u_i) associated with the possibility that each customer i may be active for multiple years, and the following control variables: *geographical distance* (GD_{it-1} , log transformed), *customer importance* (CI_{it-1} , log transformed), the three dummy variables for customer company size (CS_{it-1}), *recession* (Rec_{it-1}), *time*, *salesperson* (SP_{it-1} ; categorical variable, fixed

Table 1

Results for multilevel regression for propensity score.

Variable	Beta (S.E.)		
Intercept	−1.73	(0.26)	***
Established	−1.68	(0.16)	***
Customer importance	0.14	(0.02)	***
Distance	−0.02	(0.03)	n.s.
Recession	0.15	(0.1)	n.s.
Medium company	−0.16	(0.11)	n.s.
Large company	0.15	(0.13)	n.s.
Very large company	0.40	(0.25)	n.s.
Time	0.01	(0.03)	n.s.
Salesperson Fixed Effect			Yes

n.s. not significant

*** $Pr > \text{ChiSq} < 0.001$.

effect). The data analysis was performed using SAS software, version 9.4, for Windows (SAS Institute, 2012).

Different statistical models were run to account for the different nature of each dependent variable. First, for *retention* (R_{it+1}), a multilevel binary regression (Guo & Zhao, 2000) was estimated to account for the repeated nature of the data and for the non-contractual setting in which LabelCo operates. Marketing studies have implemented the logistic regression as an alternative approach to a discrete time survival modeling of retention (Singer & Willett, 1991) when a limited number of periods are available (van Triest et al., 2009). This approach is also employed because defection—defined as the absence of transactions recorded in the year following the event of interest—is not considered a unique event, as required by survival analysis using Cox hazard models (Singer & Willett, 1991). Indeed, the vast majority of the transactions recorded in the LabelCo database are of a non-contractual nature (Schmittlein, Morrison, & Colombo, 1987), in that “customers purchase completely at their discretion” (Reinartz & Kumar, 2000, p. 21) and thus can defect or return at any time. This leads to an unbalanced and right-censored panel setting.

The second model consisted of a multilevel linear regression, with *sales volume* (SV_{it+1}) as the dependent variable. For the third dependent variable, *cross-selling* (CS_{it+1}), preliminary analysis showed that this count variable (e.g., the number of product categories) had excess zeros. To allow for a multilevel specification for such an over-dispersed count variable, a generalized Poisson model was run (Joe & Zhu, 2005).

4. Results

4.1. Results of the PSM procedure

The propensity score of customer i purchasing at least one solution at time t was calculated by estimating a hierarchical logistic regression, with the probability of purchasing at least one solution as the dependent variable ($e(x) = \Pr(z = 1|x)$, where z is Sol_{it}). The independent variables used in the PSM procedure—*Established* as the proxy of relationship life-cycle and *geographical distance*, *customer importance*, *salesperson*, *customer company size*, *recession* and *time*—met the requirements identified in the literature in terms of characteristics that are fixed over time or collected before the treatment (Caliendo & Kopeinig, 2008). All the variables are theoretically related not only to the treatment condition but also to the final outcomes of interest. Table 1 reports the results.

The nearest-neighbor matching method with no replacement was used to match observations in the treatment and control group according to similar propensity scores (Caliendo & Kopeinig, 2008). As a result, a statistical twin was found for all the 1145 observations in the treatment group. Table 2 provides a summary of the assessment of the quality of the matching procedure as recommended in the literature

Table 2

Group means before and after matching and percentage reduction in bias.

Variable	Before matching (n = 10,862)		After matching (n = 2290)		Bias reduction (%)
	Treatment mean (n = 1145)	Control mean (n = 9717)	Treatment mean (n = 1145; 100%)	Control mean (n = 1145)	
Established	0.69	0.78	0.69	0.60	100.47
Customer importance	5.41	5.05	5.41	0.04	95.90
Distance	3.25	3.46	3.25	3.19	100.57
Recession	0.19	0.18	0.19	0.19	100.00
Medium company	0.18	0.23	0.18	0.15	102.22
Large company	0.16	0.18	0.16	0.19	100.37
Very large company	0.04	0.02	0.04	0.02	100.20
Time	2.85	2.94	2.85	2.85	100.00
Average					99.97

Variable	Unmatched t-test p-value (n = 10,862)	Matched t-test p-value (n = 2290)
Established	< 0.0001	< 0.0001
Customer importance	0.0016	0.0176
Distance	0.0005	0.4044
Recession	0.8750	1.0000
Medium company	< 0.0001	0.0546
Large company	0.0093	0.0467
Very large company	0.0221	0.0709
Time	0.0440	1.0000

(Garnefeld et al., 2013; Rosenbaum & Rubin, 1985). A first indicator is the percentage reduction in bias, based on the standardized difference between the means in the treatment and control groups,⁴ before and after the matching: the analysis shows an overall good performance, with values within the threshold proposed in the literature (Rubin, 2001). The results of *t*-tests (Caliendo & Kopeinig, 2008) lead to a similar conclusion: the means of all the control variables in the treatment and control groups in the matched sample are not significantly different ($p > .001$). Taken together, these elements suggest that the matching procedure performs reasonably well in removing the differences in the unmatched sample. The matched sample obtained ($n = 2290$) is used to run all subsequent regression analyses to determine the impact of solution provision on customer-related outcomes.

4.2. Results from the regressions on the matched sample

Table 3 provides the descriptive statistics and the correlations for all the variables included in the models. The variance inflation factor was inspected for multicollinearity for all the models estimated. The highest factor was 4.71, below the threshold of 10 (Mason & Perreault, 1991), suggesting that multicollinearity is not a concern.

Table 4 contains the results of the regressions run for each dependent variable. As regards control variables, customer importance is positively associated with the three outcomes of interest ($\beta_{14} = 0.26$, S.E. = 0.02, $p < 0.001$; $\beta_{24} = 0.53$, S.E. = 0.03, $p < 0.001$; $\beta_{34} = 0.11$, S.E. = 0.02, $p < 0.001$). Difficult economic periods (i.e., recession) negatively affect the dependent variables. ($\beta_{19} = -0.43$, S.E. = 0.14, $p < 0.05$; $\beta_{29} = -0.60$, S.E. = 0.15, $p < 0.05$;

$\beta_{39} = -0.17$, S.E. = 0.05, $p < 0.05$). Large client companies are generally associated with greater retention, sales volume and cross-selling when compared to smaller ones ($\beta_{17} = 0.26$, S.E. = 0.14, $p < 0.10$; $\beta_{27} = 0.62$, S.E. = 0.20, $p < 0.05$; $\beta_{37} = 0.19$, S.E. = 0.06, $p < 0.01$). Entered as fixed effect, salesperson has a significant effect on retention ($F = 1.87$, $p < 0.05$), sales volume ($F = 2.49$, $p < 0.05$) and cross-selling ($F = 6.08$, $p < 0.001$).

Moving to the independent variables of interest, the interaction terms in each regression are inspected to determine whether there is a contingency role for relationship life-cycle. As Table 4 shows, the interaction term is negative and significant for retention ($\beta_{13} = -0.47$, S.E. = 0.21, $p < 0.05$), sales volume ($\beta_{23} = -0.77$, S.E. = 0.30, $p < 0.05$), and cross-selling ($\beta_{33} = -0.41$, S.E. = 0.11, $p < .05$). The significant interaction term indicates a difference in the response levels for established and recent customers. Its negative sign suggests a negative interplay between solutions and more established relationships, pointing toward a more beneficial impact of solutions when provided to recent customers. Figs. 1, 2 and 3 further explore this pattern of results, illustrating the customer-related outcomes during fiscal year 2008–2009 for a small customer of average importance at an average distance from LabelCo who purchased or did not purchase solutions during the previous fiscal year and when the economy was not in recession.

As shown in Fig. 1, when a recent customer purchases at least one solution the probability of retention is 75%, compared to 69% in the absence of any solution purchase. This difference is statistically significant ($p < 0.05$). In contrast, the probability of retaining an established customer who purchased at least one solution is lower for an established customer who purchased a solution than for one who did not (Established|Solution = 69% vs. Established|No Solution = 72%, $p < 0.05$).

A similar effect emerges for sales volume (see Fig. 2). After solution provision at year t , the sales volume generated by recent customers in year $t + 1$ shows a significant increase (Recent|Solution = \$358 vs. Recent|No Solution = \$162, $p < 0.05$). The sales volume of established customers shows a significant, although small, difference after solution provision (Established|Solution = \$150 vs. Established|No Solution = \$147, $p < 0.05$). As Fig. 2 shows, solution provision leads to higher sales volumes for recent rather than established customers

⁴ The percentage reduction in bias is calculated as the standardized difference between treatment and control groups, before and after the matching (adopted from Rosenbaum & Rubin, 1985):

$$\text{Percentage reduction in bias} = 1 - \frac{\text{StdDif}_{\text{matched}}}{\text{StdDif}_{\text{unmatched}}},$$

$$\text{where} = 100 * \frac{\text{Mean}_{\text{Treatment}} - \text{Mean}_{\text{Control}}}{\sqrt{(\text{StdDif}_{\text{Treatment}}^2 + \text{StdDif}_{\text{Control}}^2)/2}}.$$

Table 3
Descriptive statistics and correlations.

		Mean	SD	Min	Max	Y1	Y2	Y3	X1	X2	X3	X4	X5	X6	X7	X8	X9
Y1	Retention	0.67	0.47	0	1	0.22											
Y2	Sales	5.51	4.12	0	13.47	0.94	16.98										
	Volume (log)					***											
Y3	Cross-selling	2.11	2.15	0	10	0.68	0.83	4.62									
						***	***										
X1	Solution	0.5	0.5	0	1	0.03	0.05	0.06	0.25								
						n.s.	**	**									
X2	Established	0.65	0.48	0	1	0.44	0.5	0.44	0.1	0.23							
						***	***	***	***								
X3	Customer Importance (log)	5.25	4.39	0	13.43	0.48	0.58	0.54	0.05	0.88	19.24						
						***	***	***	**	***							
X4	Geographical Distance (log)	3.22	1.83	-2.74	7.88	0.03	0.04	0	0.02	0.01	0.03	3.34					
						n.s.	**	n.s.	n.s.	n.s.	n.s.						
X5	Recession	0.19	0.39	0	1	-0.01	-0.01	-0.04	0	0.08	0.06	0.03	0.15				
						n.s.	n.s.	*	1	**	**	n.s.					
X6	Medium	0.16	0.37	0	1	0	-0.02	-0.05	0.04	0.01	-0.03	-0.03	-0.02	0.14			
						n.s.	n.s.	**	**	n.s.	n.s.	n.s.	n.s.				
X7	Large	0.17	0.38	0	1	0.06	0.09	0.12	-0.04	0.05	0.07	-0.04	-0.02	-0.2	0.14		
						**	***	**	**	**	**	**	n.s.				
X8	Very large	0.05	0.21	0	1	-0.03	0	-0.01	-0.04	0	0.02	-0.04	-0.01	-0.1	-0.1	0.04	
						n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	***	***	***		
X9	Time	2.85	1.38	1	5	0.09	0.08	0.02	0	0.13	0.1	0.06	0.4	-0.03	0	-0.03	1.89
						***	**	n.s.	1	***	***	**	***	*	n.s.	n.s.	

Note: Covariance on the diagonal; Correlation below the diagonal; n.s. not significant.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.001$.

(Recent|Solution = \$358 vs. Established|Solution = \$150, $p < 0.05$).

The results for cross-selling show a comparable pattern (see Fig. 3). After solution provision at year t , the cross-selling levels in year $t + 1$ of recent customers having purchased solutions are significantly higher than those of recent customers who did not purchase a solution (Recent|Solution = 1.55 vs. Recent|No Solution = 1.04, $p < 0.05$). In contrast, the cross-selling levels of established customers do not show a significant difference after solution provision (Established|Solution = 1.46 vs. Established|No Solution = 1.47, $p > 0.05$). The cross-selling levels of established and recent customers involved in solution provision are not significantly different (Established|Solution = 1.55 vs. Recent|Solution = 1.46, $p > 0.05$).

Overall, the analysis of the interaction effects confirms that the effect of solutions on customer-related outcomes cannot be appraised in

isolation from the relationship life-cycle stage. The results show that recent customers who had purchased solutions consistently have higher retention, sales volume, and cross-selling levels than those who had not purchased. These differences are not found for established customers. These findings lend support for the contingency role of the relationship life-cycle stage; more specifically, for the accelerator role of solutions provided to recent customers and not for the leverage role for established customers.

4.3. Robustness checks

To assess the robustness of the results, alternative specifications of the key variables were tested. For *Solution*, the binary specification was replaced by the sum of all solution transactions in year t (dollar

Table 4
Results of regressions on matched sample.

Variable	Retention			Sales volume			Cross-selling		
	(DV1)			(DV2)			(DV3)		
	Beta (S.E.)			Beta (S.E.)			Beta (S.E.)		
Intercept	β_{10}	0.79 (0.19)	***	β_{20}	5.09 (0.27)	***	β_{30}	0.04 (0.12)	n.s.
Solution ($Sol_{i,t}$)	β_{11}	0.31 (0.15)	**	β_{21}	0.79 (0.24)	**	β_{31}	0.40 (0.10)	***
Established ($E_{i,t-1}$)	β_{12}	0.16 (0.25)	n.s.	β_{22}	-0.10 (0.36)	n.s.	β_{32}	0.35 (0.15)	**
Solution \times Established ($Sol_{i,t} \times E_{i,t-1}$)	β_{13}	-0.47 (0.21)	**	β_{23}	-0.77 (0.30)	**	β_{33}	-0.41 (0.11)	**
Customer importance ($CI_{i,t-1}$)	β_{14}	0.26 (0.02)	***	β_{24}	0.53 (0.03)	***	β_{34}	0.11 (0.02)	***
Geographical distance ($GD_{i,t-1}$)	β_{15}	-0.01 (0.03)	n.s.	β_{25}	-0.008 (0.05)	n.s.	β_{35}	-0.02 (0.02)	n.s.
Medium-sized company ($M_{i,t-1}$)	β_{16}	0.06 (0.14)	n.s.	β_{26}	-0.004 (0.21)	n.s.	β_{36}	-0.07 (0.07)	n.s.
Large company ($L_{i,t-1}$)	β_{17}	0.26 (0.14)	*	β_{27}	0.62 (0.20)	**	β_{37}	0.19 (0.06)	**
Very large company ($VL_{i,t-1}$)	β_{18}	0.40 (0.25)	n.s.	β_{28}	-0.22 (0.36)	n.s.	β_{38}	-0.21 (0.12)	*
Recession ($Rec_{i,t-1}$)	β_{19}	-0.43 (0.14)	**	β_{29}	-0.60 (0.19)	**	β_{39}	-0.17 (0.05)	**
Time	$\beta_{1,10}$	0.14 (0.05)	**	$\beta_{2,10}$	0.13 (0.07)	*	$\beta_{3,10}$	-0.009(0.02)	n.s.
Salesperson fixed effects	Yes			Yes			Yes		

n.s. not significant.

* $p < 0.10$.

** $p < 0.05$.

*** $p < 0.001$.

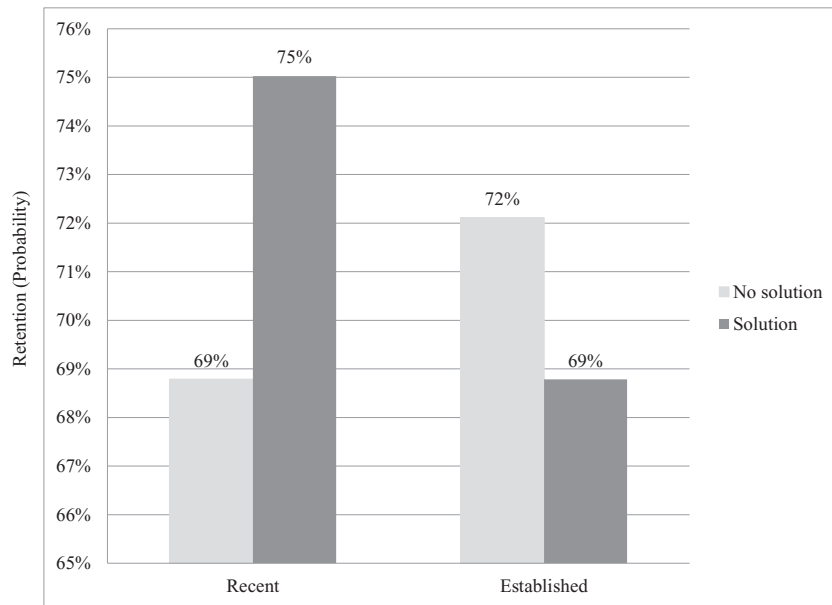


Fig. 1. Effect of solution provision on retention at time $t + 1$ for recent versus established customers.

Note: Results are displayed for Retention (on matched sample) at fiscal year 2008–2009 for a small customer of average importance at an average distance from LabelCo who purchased or did not purchase solutions during the previous fiscal year and when the economy was not in recession.

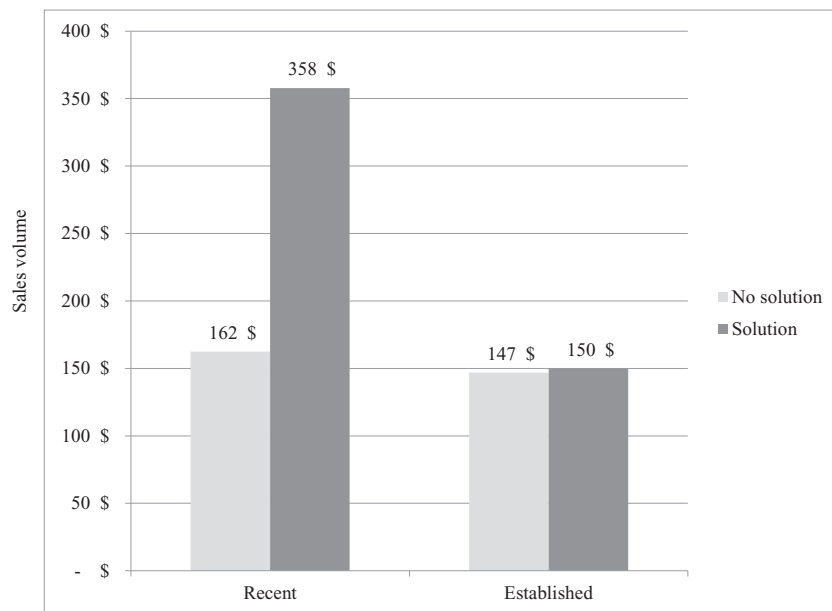


Fig. 2. Effect of solution provision on sales volume at time $t + 1$ for recent versus established customers.

Note: Results are displayed for sales volume (on matched sample) at fiscal year 2008–2009 for a small customer of average importance at an average distance from LabelCo who purchased or did not purchase solutions during the previous fiscal year and when the economy was not in recession.

amount). For *Established*, to test the boundary conditions of the limited impact of solutions on long-term loyal customers,⁵ a set of regressions was run on a subset of the sample (i.e., the fiscal year 2009–2010, $n = 368$), which maximized the number of years available to the analysis. Hence, a dummy variable was created, *Long-Term Customer* (LT_C_{it-1}), taking the value of 1 if the customer had been active for the eight previous years and 0 otherwise. Under the alternative solution specification, the interaction *Solution* \times *Established* remains negative and significant ($p < 0.05$) for all the outcomes. When considering long-term, loyal customers, solutions do not appear to be a significant predictor of any customer-related outcome, nor does the interaction effect, confirming the lack of support for the leverage role. As a result, the similar patterns in parameter sign and significance levels provide overall support for the robustness of the results, suggesting that

solutions produce better customer-related outcomes when provided to recent customers than to established ones.

5. Discussion

The academic and business literature refers to solution provision by B2B suppliers as an essential route to ensure customer satisfaction, to achieve differentiation, and to secure a competitive advantage in the marketplace (Miller et al., 2002; Sawhney, 2006). As a key element of the offerings of B2B firms, solution provision is a service-led growth strategy that is often portrayed as leading to better customer-related outcomes for suppliers, and through these, to improved future revenue streams (Biggemann et al., 2013; Matthyssens & Vandenbempt, 2008; Sawhney, 2006). In this regard, two important knowledge gaps emerge in the existing body of knowledge about solutions. First, the literature is rich in statements about the positive impact of solutions on customer-related outcomes, such as customer retention, sales volume, and cross-

⁵ We would like to thank one of the anonymous reviewers for suggesting this.

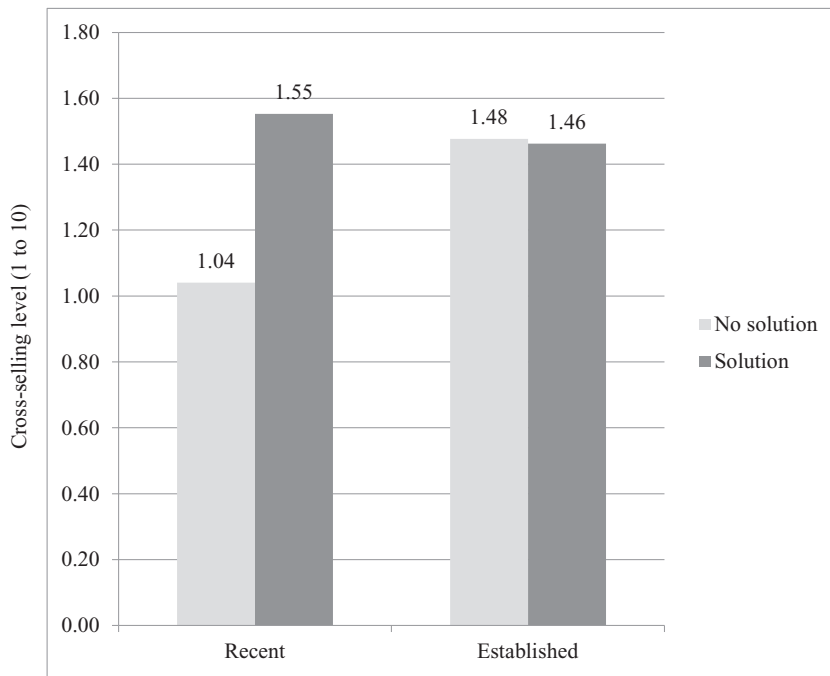


Fig. 3. Effect of solution provision on cross-selling at time $t + 1$ for recent versus established customers.

Note: Results are displayed for cross-selling (on matched sample) at fiscal year 2008–2009 for a small customer of average importance at an average distance from LabelCo who purchased or did not purchase solutions during the previous fiscal year and when the economy was not in recession.

selling, but lacks the empirical evidence to support these claims. Second, although both recent and established customers have been shown to purchase solutions (Bonney & Williams, 2009; Cova & Salle, 2007; Storbacka, 2011), it is unclear whether these more complex service-intensive offerings produce similar positive effects on customer-related outcomes from both types of customers, or whether differences exist. The current study addresses these knowledge gaps by analyzing the sales patterns of a North American B2B company that provides solutions as part of its offering. The empirical study conducted makes two important contributions to the literature and to managerial practice.

As its first contribution, this paper responds to calls for more empirical evidence about the effects of solution provision (Day, 2004; Lilien et al., 2010; Nordin & Kowalkowski, 2010). As exploring customer responses to solutions was one of the key priorities identified by Evanschitzky et al. (2011), this study improves the current understanding of future customer behaviors that follow solution provision. It enriches the investigation into the moderating role of characteristics of the customer base on the impact of service-led growth strategies on revenues (Eggert et al., 2014). More specifically, the present study shows that retention, sales volume, and cross-selling after solution provision are subject to a key boundary condition, leading to the paper's second contribution.

The results are found to support a contingency framework for the positive impact of solutions on customer outcomes depending on the stage of the relationship life-cycle (Jap & Anderson, 2007). After purchasing solutions, established customers were found not to experience levels of retention, sales volume, and cross-selling that were significantly different from those experienced by customers who did not purchase solutions. In the additional robustness checks, solutions did not appear to play a role in driving future customer-related outcomes for long-term loyal customers. Although the solution provision process itself might benefit from a pre-existing relationship (e.g., Cornet et al., 2000; Cova & Salle, 2007), it does not seem to have a further positive effect on maintaining the association with the suppliers or on increasing sales volumes or cross-selling. Hence, this finding does not support the leverage role discussed in the literature review. This result is consistent with Eggert et al. (2014) on the net neutral impact on revenues of service-led growth strategies provided to an existing and loyal customer

base; where opposite forces in long, trusting relationships cancel each other out. Another possible explanation for this result is that established customers are likely to already have a long-term mindset (Jap & Anderson, 2007), independently of solution provision. For these customers, the embeddedness generated by the solution (Sawhney, 2006) does not appear to change much in their purchase patterns with the existing supplier because existing customers tend to replicate past purchase behaviors (i.e., purchase inertia, Fang et al., 2008).

In turn, recent customers who purchase solutions experience significantly higher retention, sales volume, and cross-selling levels than their counterparts who do not purchase solutions. Furthermore, solution provision brings recent customers to retention, sales, and cross-selling levels comparable to those of established customers. Solutions appear to provide additional reasons for recent customers to pursue and even further develop their association with the supplier. This finding supports the accelerator role outlined in the literature review. Based on the results of the current study, solutions appear to be an effective means to improve the length, depth, and breadth of the relationship of recent customers with solution providers. This finding can be further understood by building on relationship learning theory (Selnes & Sallis, 2003) and economics of information (Singh, 1985; Stigler, 1961). The empirical support for the accelerator role shows that, because of the relational nature of the solution provision process, recent customers are neither put at a disadvantage nor less likely to respond positively to this offering. With the provision process becoming the context for relational learning (see Selnes & Sallis, 2003), the initial interactions between these recent customers and suppliers happening during the solution provision are more informative than later ones (see Dutton & Thomas, 1984; Yelle, 1979).

This second contribution to the B2B marketing literature improves the current understanding of the interplay between the relational nature of solutions and B2B relationship dynamics. Moreover, the positive effect of solutions provided to recent customers takes on particular importance in challenging market conditions such as the economic recession explored among the control variables of this study. Solutions appear to provide an additional breathing space to companies, as these more complex offerings can offset the negative effect of such adverse macroeconomic conditions.

6. Managerial implications

These results provide significant insights to managers of B2B companies offering solutions to their customers. These managers often pursue relationship maintenance goals (e.g., increasing length through retention) and relationship development goals (e.g., increasing depth and breadth through sales volume and cross-selling respectively) to improve their future revenue generation (Aurier & N'Goala, 2010; Bolton et al., 2004). Based on the results of this study, managers can be more confident about the positive impact of solutions on these customer-related outcomes, in addition to the immediate revenues generated by these complex offerings. Managers can use solution provision in a deliberate attempt to generate more revenues from recent customers by increasing the length, depth, and breadth of these relationships, assuming that solutions can be provided profitably.

This research has shown that through solutions, suppliers can boost the growth potential of recent customers at a faster pace than they would achieve by offering them stand-alone products and services only. Indeed, in a non-contractual setting such as the one investigated in this study, customers are free to switch suppliers. In such a context, solutions can increase the likelihood that recent customers will remain in a commercial relationship with the solution provider, creating a lock-in early in the relationship life-cycle thanks to the learning occurring during the solution provision process and the increased embeddedness resulting from the solution. As the results support the accelerator role for solutions provided to recent customers, all the staff involved in the solution process will play a crucial role in contributing to such relationship development. This aspect reinforces the importance not only of technical knowledge, but also of relational training of the salespeople (Storbacka et al., 2011) and of those directly involved with customers throughout the solution provision process.

From the lack of difference in the levels of retention, sales volume, and cross-selling between established customers who purchased solutions and those who did not, managers can learn that solutions do not lead to significant increases for these customers. This result indicates that, in the context of more advanced relationships, solutions are instrumental to maintaining the existing relationship by fulfilling complex customer needs, without an improvement of the length, depth, and breadth of the customer relationship. This result suggests that in the context of established relationships, solutions may be necessary to fulfill complex customer needs but do not unlock any additional growth. Managers are invited to be aware of the more limited development potential of these established customers, due, in part, to the ceiling effect in outcome levels (Homburg et al., 2009).

7. Limitations and future research avenues

This study used information only about a single supplier and its customers. This single-firm approach is a widespread practice when investigating the outcomes of marketing actions in B2B scenarios (e.g., Niraj, Gupta, & Narasimhan, 2001; Tarasi, Bolton, Hutt, & Walker, 2011). It helps to control for “contextual effects and [minimize] possible contingencies common in cross-industrial research” (Singh, Goolsby, & Rhoads, 1994, p. 563), but it limits the generalizability of the findings. Future replications with a broader database (e.g., covering a larger pool of suppliers) would strengthen the conclusions of this study. One of the strengths of the study was the access to substantial longitudinal data from a B2B firm, with details about all the transactions of each customer—a database that is often difficult to access but proven to be particularly valuable for empirically grounded studies (Lilien & Grewal, 2012). Data availability led to measures based on observable indicators (e.g., sales-based), the only ones that could be derived from the company database. Though coherent with the goals of this investigation, these measures provide only an initial grasp of the solution provision process and could be fruitfully expanded.

First, the analysis focused on the final invoice prices charged to the

customer. None of the analyses included the costs associated with solution provision or with starting and maintaining relationships, owing to limited data from the partner company. Because solutions seem able, for recent customers, to generate higher revenues for suppliers, future research could pursue the investigation of profitability and of the long-term impact on customer lifetime value (Bolton et al., 2004; Borle, Singh, & Jain, 2008; Homburg et al., 2009). Such an investigation would need to include the direct costs of solution provision (Sawhney, 2006; Sharma & Iyer, 2011) and the other costs associated with the development of the buyer–supplier relationship. It should be noted that the relationship between costs and stages of the relationship life-cycle is a complex one. On the one hand, new customer relationships can require significant monetary and nonmonetary investments from the supplier (Jap & Anderson, 2007; Johnson & Selnes, 2004). On the other hand, established customers might feel entitled to and ask for discounts or free services as part of the process (Eggert et al., 2014; Wetzel, Hammerschmidt, & Zablah, 2014). Hence, the combined effect on profits of these opposing revenue and cost dynamics for recent and established customers remains uncertain: its investigation represents a promising follow-up to the present study.

Second, each solution was identified from the invoice describing the type of purchase. Though reflecting the solution as a whole, the invoice information does not capture what happens at the different stages of the solution provision process, including its implementation (Macdonald et al., 2011). Future survey-based research could map the four stages of solution provision targeting recent and established customers. Such research could compare the levels of relational properties beneficial to solution provision—such as trust, commitment, or information-sharing norms (Palmatier, Dant, & Grewal, 2007)—before, during, and after each stage of the solution provision process for the different groups of customers. Additional support for the accelerator role of solutions would emerge if these properties showed a significant increase during the provision process targeting recent customers.

Finally, the control variable for the salespersons (entered as fixed effect in all the regressions) turned out to be significant. As a result, a promising research avenue could be a more detailed investigation of potentially different and/or evolving selling approaches adopted within the same company. Solution selling requires salespeople to develop distinctive management and operational practices (Storbacka et al., 2011). According to Adamson, Dixon, and Toman (2012), the best salespeople are already moving beyond solution selling approaches to a partnership-based, proactive approach centered on insights.

To conclude, the study responds to crucial questions about the impact of solution provision on three customer-related outcomes and sheds additional light on the implications of the relational dimension of solutions for customers at different stages of the relationship life-cycle. The current study presents empirical evidence about an overall positive impact of this service-intensive offering, but with a significant contingency role for the relationship life-cycle. Given the growth of solution provision among B2B companies, this empirical study provides new insights into an important topic and a more solid basis both for managerial action and for future research in this area.

References

- Adamson, B., Dixon, M., & Toman, N. (2012). The end of solution sales. *Harvard Business Review*, 90(7–8), 60–68.
- Antico, M., Moenaert, R. K., Lindgreen, A., & Wetzels, M. G. M. (2008). Organizational antecedents to and consequences of service business orientations in manufacturing companies. *Journal of the Academy of Marketing Science*, 36(3), 337–358.
- Aurier, P., & N'Goala, G. (2010). The differing and mediating roles of trust and relationship commitment in service relationship maintenance and development. *Journal of the Academy of Marketing Science*, 38(3), 303–325.
- Biggemann, S., Kowalkowski, C., Maley, J., & Brege, S. (2013). Development and implementation of customer solutions: A study of process dynamics and market shaping. *Industrial Marketing Management*, 42(7), 1083–1092.
- Bolton, R. N., Lemon, K. N., & Verhoef, P. C. (2004). The theoretical underpinnings of customer asset management: A framework and propositions for future research. *Journal of the Academy of Marketing Science*, 32(3), 271–292.

- Bonney, F. L., & Williams, B. C. (2009). From products to solutions: The role of salesperson opportunity recognition. *European Journal of Marketing*, 43(7), 1032-1052.
- Borle, S., Singh, S. S., & Jain, D. C. (2008). Customer lifetime value measurement. *Management Science*, 54(1), 100-112.
- Caliendo, M., & Kopeinig, S. (2008). Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys*, 22(1), 31-72.
- Cochran, W. G., & Rubin, D. B. (1973). Controlling bias in observational studies: A review. *Sankhyā: The Indian Journal of Statistics, Series A* (1961-2002), 35(4), 417-446.
- Cornet, E., Schädler, J., Katz, R., Sharma, D., Molloy, R., & Tipping, A. (2000). *Customer solutions: From pilots to profits*. McLean, VA: Booz Allen & Hamilton.
- Cova, B., & Salle, R. (2007). Introduction to the IMM special issue on "Project marketing and the marketing of solutions": A comprehensive approach to project marketing and the marketing of solutions. *Industrial Marketing Management*, 36(2), 138-146.
- Cross, P., & Bergevin, P. (2012). *Turning points: Business cycles in Canada since 1926*. Commentary. Toronto: C. D. Howe Institute 366.
- Davies, A., Brady, T., & Hobday, M. (2007). Organizing for solutions: Systems seller vs. Systems integrator. *Industrial Marketing Management*, 36(2), 183-193.
- Day, G. S. (2004). Achieving advantage with a new dominant logic. Invited commentaries on Evolving to a new dominant logic for marketing. *Journal of Marketing*, 68(1), 18-19.
- Dutton, J. M., & Thomas, A. (1984). Treating progress functions as a managerial opportunity. *Academy of Management Review*, 9(2), 235-247.
- Dwyer, F. R., Schurr, P. H., & Oh, S. (1987). Developing buyer-seller relationships. *Journal of Marketing*, 51(2), 11-27.
- Eggert, A., Hogreve, J., Ulaga, W., & Muenkhoff, E. (2014). Revenue and profit implications of industrial service strategies. *Journal of Service Research*, 17(1), 23-39.
- Evanschitzky, H., Wangenheim, F. V., & Woisetschlager, D. M. (2011). Service & solution innovation: Overview and research agenda. *Industrial Marketing Management*, 40(5), 657-660.
- Fang, E., Palmatier, R. W., & Steenkamp, J.-B. E. M. (2008). Effect of service transition strategies on firm value. *Journal of Marketing*, 72(5), 1-14.
- Ganesan, S., Malter, A. J., & Rindfleisch, A. (2005). Does distance still matter? Geographic proximity and new product development. *Journal of Marketing*, 69(4), 44-60.
- Garnefeld, I., Eggert, A., Helm, S. V., & Tax, S. S. (2013). Growing existing customers' revenue streams through customer referral programs. *Journal of Marketing*, 77(4), 17-32.
- Guo, G., & Zhao, H. (2000). Multilevel modeling for binary data. *Annual Review of Sociology*, 26, 441-462.
- Homburg, C., Steiner, V. V., & Totzek, D. (2009). Managing dynamics in a customer portfolio. *Journal of Marketing*, 73(5), 70-89.
- Ivis, F. (2006). Calculating geographic distance: Concepts and methods. *Paper presented at the 19th annual North East SAS Users Group (NESUG)*.
- Jap, S. D., & Anderson, E. (2007). Testing a life-cycle theory of cooperative inter-organizational relationships: Movement across stages and performance. *Management Science*, 53(2), 260-275.
- Joe, H., & Zhu, R. (2005). Generalized Poisson distribution: The property of mixture of Poisson and comparison with negative binomial distribution. *Biometrical Journal*, 47(2), 219-229.
- Johnson, M. D., & Selnes, F. (2004). Customer portfolio management: Toward a dynamic theory of exchange relationships. *Journal of Marketing*, 68(2), 1-17.
- Kamakura, W. A., Wedel, M., de Rosa, F., & Mazzon, J. A. (2003). Cross-selling through database marketing: A mixed data factor analyzer for data augmentation and prediction. *International Journal of Research in Marketing*, 20(1), 45-65.
- Lilien, G., Grewal, R., Bowman, D., Ding, M., Griffin, A., Kumar, V., ... Wang, Q. (2010). Calculating, creating, and claiming value in business markets: Status and research agenda. *Marketing Letters*, 21(3), 287-299.
- Lilien, G. L., & Grewal, R. (Eds.). (2012). *Handbook of business-to-business marketing*. Cheltenham: Edward Elgar Publishing.
- MacDonald, E. K., Wilson, H., Martinez, V., & Toossi, A. (2011). Assessing value-in-use: A conceptual framework and exploratory study. *Industrial Marketing Management*, 40(5), 671-682.
- Mason, C. H., & Perreault, W. D., Jr. (1991). Collinearity, power, and interpretation of multiple regression analysis. *Journal of Marketing Research*, 28(3), 268-280.
- Matthyssens, P., & Vandenbempt, K. (2008). Moving from basic offerings to value-added solutions: Strategies, barriers and alignment. *Industrial Marketing Management*, 37(3), 316-328.
- Miller, D., Hope, Q., Eisenstat, R., Foote, N., & Galbraith, J. (2002). The problem of solutions: Balancing clients and capabilities. *Business Horizons*, 45(2), 3-12.
- Niraj, R., Gupta, M., & Narasimhan, C. (2001). Customer profitability in a supply chain. *Journal of Marketing*, 65(3), 1-16.
- Nordin, F., & Kowalkowski, C. (2010). Solutions offerings: A critical review and re-conceptualisation. *Journal of Service Management*, 21(4), 441-459.
- Palmatier, R. W., Dant, R. P., & Grewal, D. (2007). A comparative longitudinal analysis of theoretical perspectives of interorganizational relationship performance. *Journal of Marketing*, 71(4), 172-194.
- Palmatier, R. W., Scheer, L. K., Houston, M. B., Evans, K. R., & Gopalakrishna, S. (2007). Use of relationship marketing programs in building customer-salesperson and customer-firm relationships: Differential influences on financial outcomes. *International Journal of Research in Marketing*, 24(3), 210-223.
- Park, B., Srivastava, M. K., & Gnyawali, D. R. (2014). Walking the tight rope of cooperation: Impact of competition and cooperation intensities and balance on firm innovation performance. *Industrial Marketing Management*, 43(2), 210-221.
- Reinartz, W., Thomas, J. S., & Basoul, G. (2008). Investigating cross-buying and customer loyalty. *Journal of Interactive Marketing*, 22(1), 5-20.
- Reinartz, W. J., & Kumar, V. (2000). On the profitability of long-life customers in a noncontractual setting: An empirical investigation and implications for marketing. *Journal of Marketing*, 64(4), 17-35.
- Rosenbaum, P. R., & Rubin, D. B. (1985). Constructing a control group using multivariate matched sampling methods that incorporate the propensity score. *The American Statistician*, 39(1), 33-38.
- Rubin, D. B. (2001). Using propensity scores to help design observational studies: Application to the tobacco litigation. *Health Services & Outcomes Research Methodology*, 2(3-4), 169-188.
- SAS Institute (2012). *Proprietary software release 9.4*. Cary, NC: SAS Institute.
- Sawhney, M. (2006). Going beyond the product, defining, designing and delivering customer solutions. In R. F. Lusch, & S. Vargo (Eds.). *The service-dominant logic of marketing: Dialog, debate and directions* (pp. 365-380). New York: M.E. Sharpe.
- Schmittlein, D. C., Morrison, D. G., & Colombo, R. (1987). Counting your customers: Who are they and what will they do next? *Management Science*, 33(1), 1-24.
- Selnes, F., & Sallis, J. (2003). Promoting relationship learning. *Journal of Marketing*, 67(3), 80-95.
- Sharma, A., & Iyer, G. R. (2011). Are pricing policies an impediment to the success of customer solutions? *Industrial Marketing Management*, 40(5), 723-729.
- Sharma, D., Lucier, C., & Molloy, R. (2002). From solutions to symbiosis: Blending with your customers. *Strategy and Business*, 38-43.
- Shumaker, B. P., & Sinnott, R. W. (1984). Astronomical computing: 1. Computing under the open sky. 2. Virtues of the Haversine. *Sky and Telescope*, 68, 158-159.
- Siguaw, J. A., Kimes, S. E., & Gassenheimer, J. B. (2003). B2B sales force productivity: Applications of revenue management strategies to sales management. *Industrial Marketing Management*, 32(7), 539-551.
- Singer, J. D., & Willett, J. B. (1991). Modeling the days of our lives: Using survival analysis when designing and analyzing longitudinal studies of duration and the timing of events. *Psychological Bulletin*, 110(2), 268-290.
- Singh, J., Goolsby, J. R., & Rhoads, G. K. (1994). Behavioral and psychological consequences of boundary spanning burnout for customer service representatives. *Journal of Marketing Research*, 31(4), 558-569.
- Singh, N. (1985). Monitoring and hierarchies: The marginal value of information in a principal-agent model. *Journal of Political Economy*, 93(3), 599-609.
- Stigler, G. J. (1961). The economics of information. *Journal of Political Economy*, 69(3), 213-225.
- Stock, R. M., & Hoyer, W. D. (2005). An attitude-behavior model of salespeople's customer orientation. *Journal of the Academy of Marketing Science*, 33(4), 536-552.
- Storbacka, K. (2011). A solution business model: Capabilities and management practices for integrated solutions. *Industrial Marketing Management*, 40(5), 699-711.
- Storbacka, K., Polsa, P., & Sääkjärvi, M. (2011). Management practices in solution sales—A multilevel and cross-functional framework. *Journal of Personal Selling & Sales Management*, 31(1), 35-54.
- Tarasi, C. O., Bolton, R. N., Hutt, M. D., & Walker, B. A. (2011). Balancing risk and return in a customer portfolio. *Journal of Marketing*, 75(3), 1-17.
- van Triest, S., Bun, M. J. G., van Raaij, E. M., & Vernooij, M. J. A. (2009). The impact of customer-specific marketing expenses on customer retention and customer profitability. *Marketing Letters*, 20(2), 125-138.
- Tuli, K. R., Kohli, A. K., & Bharadwaj, S. G. (2007). Rethinking customer solutions: From product bundles to relational processes. *Journal of Marketing*, 71(3), 1-17.
- Ulaga, W., & Eggert, A. (2006). Value-based differentiation in business relationships: Gaining and sustaining key supplier status. *Journal of Marketing*, 70(1), 119-136.
- Wagner, S. M. (2011). Supplier development and the relationship life-cycle. *International Journal of Production Economics*, 129(2), 277-283.
- Wetzel, H. A., Hammerschmidt, M., & Zablah, A. R. (2014). Gratitude versus entitlement: A dual process model of the profitability implications of customer prioritization. *Journal of Marketing*, 78(2), 1-19.
- Yelle, L. E. (1979). The learning curve: Historical review and comprehensive survey. *Decision Sciences*, 10(2), 302-328.
- Zaefarian, G., Kadile, V., Henneberg, S. C., & Leischnig, A. (2017). Endogeneity bias in marketing research: Problem causes and remedies. *Industrial Marketing Management*, 65(1), 39-46.

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