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Dealing with privacy concerns in product-service system selling

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Dealing with privacy concerns in product-service system selling: Value-based selling as fair treatment practice

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ABSTRACT

Privacy concerns are an important aspect of business-to-business customers' adoption decision of advanced product—service systems and a significant inhibiting factor. However, empirical evidence on its effect is scarce and anecdotal. Based on the observation that customers assess the "privacy vs. service/benefit" trade-off in a calculative way, this study examines how customers' privacy concerns affect their price sensitivity and in turn, the provider's profitability. Specifically, we propose value-based selling as an approach for providers to alleviate the potential negative effects of customers' privacy concerns. The results of a sample of 250 US firms confirm value-based selling's power to disable the privacy concerns–price sensitivity mechanism and mitigate the negative effect of price sensitivity on product-service system provider profitability. However, value-based selling's positive impact on performance is dependent on the level of contract specificity. Thus, value-based selling and contract specificity are complementary arrangements.

1. Introduction

In many industries, emphasis is shifting from selling products to selling innovative product-service systems (PSS) (Suppatvech, Godsell, & Day, 2019). Enabled by sensor technology and digitalization, these PSS generally rely on remote monitoring, extensive data sharing and analyses, and predictive analytics to improve system performance and drive down cost (Porter & Heppelmann, 2015). However, despite the rapid growth and potential of these advanced services, getting customers to accept them continues to be a challenge (Paluch, 2014).

There are very good reasons for customers' reluctance. The adoption of PSS often comes with serious security issues and privacy concerns for the customer firm, as well as with the danger of opportunistic behavior by the PSS provider (Paluch & Wunderlich, 2016; Vendrell-Herrero, Bustinza, Parry, & Georgantzis, 2017; Weinberg, Milne, Andonova, & Hajjat, 2015). Data transmission may not be secure, data leakage may occur, and providers may use sensitive competitive information for other purposes than agreed upon. This can make the customer vulnerable and could seriously hurt its firm's competitive sustainability. More importantly, Paluch and Wunderlich (2016, p. 2429) argue that "providers are aware of the customers' security concerns, but they underestimate their urgency."

As a result, customers' privacy concerns, which we define as the degree to which customers worry about the quality and intentions of the PSS provider's data management, are a significant aspect of customers' PSS adoption decisions and a potential inhibiting factor (Paluch & Wunderlich, 2016; Suppatvech et al., 2019). However, although prior literature mentions privacy concerns, empirical evidence on its impact is scarce and anecdotal, particularly in the business-to-business (B2B) and PSS context (Suppatvech et al., 2019).

Customers may choose to circumvent the privacy issue by opting out at the risk of losing out to competitors that do opt in, or opting in but requesting extra securities, risk coverage, or price discounts. The additional cost and price pressure to compensate customers for their risk may explain, at least in part, the difficulties of providers to achieve a profit (Gebauer, Fleisch, & Friedli, 2005). Based on the observation that customers often assess the "privacy vs. service/benefit" trade-off in a calculative way (Smith, Dinev, & Xu, 2011), this study examines how business customers' privacy concerns affect their price sensitivity and in turn, the PSS provider's profitability.

Traditionally, research has focused on formal versus relational governance mechanisms to help parties mitigate the risk involved in

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their market exchange (Cao & Lumineau, 2015; Lusch & Brown, 1996). Particularly, the simultaneous use of multiple governance mechanisms can often assure the mutual commitment of both PSS suppliers and customers (Colm, Ordanini, & Bornemann, 2020). It has resulted in the introduction of contracts that guarantee uptime or even performance output levels to reduce the risk of any opportunistic behavior on the part of the provider, and to manage the high level of interdependence of PSS providers and customers effectively (e.g., Liinamaa et al., 2016; Schaefers, Ruffer, & Böhm, 2021). However, prior research has not considered the different selling approaches a PSS provider may use to mitigate PSS-related customer privacy concerns and their potential negative effects on customers' price sensitivity and the PSS provider's rent-earning capabilities. This is peculiar since the buyer–seller interaction is particularly relevant when selling complex and innovative PSS (Salonen, Terho, Böhm, Virtanen, & Rajala, 2021; Schaarschmidt, Walsh, & Evanschitzky, 2018). This observation is consistent with research by Storey, Raddats, Burton, Zolkiewski, and Baines (2017), that selling advanced services requires specific capabilities both of suppliers and customers, including careful risk management and skillful pricing. Selling thus also may be an important relational governance mechanism and complement formal contractual arrangements.

To address this important issue, we propose value-based selling (VBS) as an approach for PSS providers to alleviate the effects of customers' privacy concerns on price sensitivity and the PSS provider's profitability. VBS is a selling approach that seeks to co-create customer value-in-use by demonstrating the provider's contribution to the customer's business outcomes in clear monetary terms (Terho, Eggert, Ulaga, Haas, & Böhm, 2017). VBS makes benefits and costs (or risk) transparent and emphasizes the actual or expected value of an offer to the customer in its business processes. Consistent with this, VBS should act as a fair information practice from the PSS provider's point of view and as a fairness heuristic from the customer's vantage point (Crosno & Dahlstrom, 2011). By focusing customers' attention on the value-in-use of the PSS and its contribution to the bottom line, customers should better appreciate the overall deal. This should reduce their sensitivity to specific issues such as data privacy. Consequently, VBS should help reduce customers' price sensitivity due to the calculative response to their privacy concerns.

We make three important contributions. First, we add to the PSS literature (e.g., Tuli, Kohli, & Bharadwaj, 2007; Ulaga & Reinartz, 2011; Worm, Bharadwaj, Ulaga, & Reinartz, 2017) by focusing on the rather neglected issue of customer privacy concerns. Systematic underestimation of privacy-driven price sensitivity may explain why many PSS providers struggle to sell these systems profitably (Gebauer et al., 2005; Neely, 2008). Building on privacy calculus theory (Culnan & Armstrong, 1999), which argues that customers deal with privacy/benefit trade-offs in a very calculative way, we propose that the weighing of privacy risk versus PSS benefits tends to increase business customers' focus on price. While for consumers, privacy concerns represent an intrusion (e.g., potential loss of freedom, personal safety), for companies they primarily relate to violations of data security (Paluch & Wunderlich, 2016) and are a threat to its competitive position and money earning capability. Directly related to business economics, business customers initially focus on the price mechanism, but the provider can decide to emphasize the extra benefits involved and delivered instead (Plangger & Montecchi, 2020).

Second, we add to a very limited number of studies on the risk perceptions of B2B customers regarding technology-based service innovations (for an exception see Paluch & Wunderlich, 2016). We present contract specificity and VBS as two contingencies of the relationships of our baseline model, linking customer privacy concerns and customer price sensitivity to PSS provider's profitability. We argue that contract specificity (contractual details guaranteeing the customer a particular PSS performance) and VBS make the relationship between privacy concerns and customer price sensitivity more and less salient, respectively. We also propose that VBS is a fair information practice that can counter the negative impact of customer price sensitivity on PSS provider profitability. By focusing on the general costs and benefits rather than on specific technical aspects or outcomes, VBS offers transparency and emphasizes a win-win situation through joint value creation. This draws attention away from privacy issues and related risk. So, while contract specificity primes customers on privacy and price, VBS primes customers on value-in-use and not on privacy or price.

Third, in contrast to most prior research on data privacy and ethical concerns in marketing (e.g., Martin, Borah, & Palmatier, 2017; Martin & Murphy, 2017), we focus on B2B settings and the often-neglected inter-organizational level. As Bélanger and Crossler (2011) note: "What is interesting is that very few researchers study information privacy concerns of organizations…. There [even] seems to be a paradox where organizations are concerned with information privacy, but researchers rarely consider this level of analysis in their studies (except to discuss privacy policies)." (p. 1029). By identifying VBS as fair information practice for PSS providers, we also add to the emerging stream of privacy and organizational research.

2. Theoretical background

2.1. Defining product-service systems

Product-services systems (PSS) are bundles of physical products and services to fulfill customer needs (e.g., Barquet, de Oliveira, Amigo, Cunha, & Rozenfeld, 2013). The marketing literature also refers to these PSS as hybrid offerings and solutions. Literature on hybrid offerings emphasizes the innovativeness of the combination of products and services as well as the idea of additional benefits to the customer (e.g., Ulaga & Reinartz, 2011). The solution literature emphasizes the notion of customization and value co-creation resulting in superior value-in-use for the customer (e.g., Tuli et al., 2007). Consistent with this, several approaches to classify different types of PSS have been developed, for instance, depending on the importance of the product or the service for value creation (Tukker, 2004) and the nature of the service (Ulaga & Reinartz, 2011).

Servitization of manufacturing firms and the increasing popularity of PSS are fostered by the ongoing digitization and the growth of the Internet of Things (IoT) (Ardolino et al., 2018; Lerch & Gotsch, 2015; Porter & Heppelmann, 2015). Many manufacturing firms now offer products and integrated services beyond standard support and maintenance services (see e.g., de Oliveira, de Sousa Mendes, de Albuquerque, & Rozenfeld, 2018; Neto, Pereira, & Borchardt, 2015). As a result, PSS become increasingly digitalized or "smart", as they increasingly involve (Kropp & Totzek, 2020): (1) a product equipped with IoT-technology such as sensors, embedded operating systems, and connectivity devices to collect and transmit real-time data; (2) use this real-time data for service provision such as predictive maintenance; and (3) even help the system sense the environment, automatically approach customers and users with suggestions, and effectively connect to other systems as needed. Examples of these increasingly intelligent systems are: remote monitoring to allow for quick machine recovery service, smart sensors for cows to track and monitor their behavior offering advice when and how to take action, and complete 'price per wafer'-solutions in the semiconductor industry resulting from partly taking over the customer's chip production process. These examples involve increased data sharing and raise new issues in terms of privacy.

Paluch and Wunderlich (2016) highlight that systems that are based on such advanced (smart) technology raise serious concerns with large percentages of potential PSS customers regarding the risk involved. Privacy concerns are the most important risk factor, even more important than the functional risk associated with PSS adoption. In line with this, a negative relationship between privacy risk and customers' intention to adopt smart PSS has been found (Kropp & Totzek, 2020). Interestingly, decision-makers are often unwilling to pay a premium for privacy or specific security features (Naous & Legner, 2019).

2.2. Customer privacy concerns, price sensitivity, and PSS provider's profitability

Privacy concerns refer to the question whether customers should share their data in exchange for services offered. In the PSS context, these concerns to share data are particularly related to the fear of unauthorized third-party access or hacks, the PSS providers' access to customers' systems and data, or even to the fear of espionage (Paluch & Wunderlich, 2016).

Consistent with a large body of literature on decision-making under uncertainty (e.g., Payne, Bettman, & Johnson, 1992; Xu, van der Borgh, Nijssen, & Lam, 2021), privacy calculus theory posits that customers generally deal with privacy trade-offs in a rational way (Culnan & Armstrong, 1999). Decision-makers establish trade-offs between expected costs and benefits in a specific information-disclosure context (Li, 2012). In general, higher levels of uncertainty lower decision-makers' anticipation of benefits and raise perceptions of costs (Xu et al., 2021).

Privacy calculus theory further posits that under certain conditions decision-makers overcome their a priori concerns and anxieties and decide to share sensitive information, for example, in compensation for extra benefits or lower prices (Dinev & Hart, 2006). Decision-makers aim for a level of data sharing that is economically fair to all parties involved, i.e., represent a win-win. This implies that a decision-maker's fairness assessment is based on his/her perceptions of value and the costs associated with potential privacy breaches. Furthermore, psychological ownership is an important aspect increasing users' privacy concerns and their reluctance to share data in the IoT as they feel the data belong to them (Cichy, Salge, & Kohli, 2021).

Privacy calculus research has mainly focused on consumer settings (e.g., Martin & Murphy, 2017) and on the individual level (e.g., Smith et al., 2011). However, its reasoning can be extended to PSS settings and business customers and the organizational level (Smith et al., 2011). Research on risk perceptions in adoption decisions of PSS, for example, confirms that business customers worry not only about the functioning of PSS, but also about privacy and data security (Hünerberg & Hüttmann, 2003; Paluch & Wunderlich, 2016). Such PSS-related privacy concerns will decrease customers' perceived benefits and increase perceived cost, which together will fuel their price sensitivity. As a result, these business customers will demand a lower price and/or insist on non-monetary compensation. They will ask for discounts in return for the data they provide and the risk they incur (see also Biener, Eling, & Lehmann, 2020).

Support for the notion that customers tend to focus on price in uncertain negotiation settings comes from judgment and decision-making literature. Research shows that decision-makers deal with uncertain by looking at easily observable and accessible cues, often tangible metrics, that can help them determine the benefits and costs of an action (Jones, Jones, & Frisch, 1995; Tversky & Kahneman, 1974). Consistent with this, marketing research has found that in seller–buyer exchanges the monetary value or price is the most salient and accessible cue for decision-making under uncertainty (Kumar, Petersen, & Leone, 2013; Xu et al., 2021). While uncertainty about future rents lowers the anticipated benefits, it does not affect the expected costs of the exchange (Xu et al., 2021), making costs relatively more salient. Consistent with this, Schaefers et al. (2021) highlight that customers put a strong emphasis on economics of deals in terms of price and costs in the context of complex contractual arrangements for PSS.

Alavi, Habel, Schwenke, and Schmitz (2020) also demonstrate that when business customers negotiate with sellers, the uncertainty related to *services* leads to higher aspiration in price negotiations (or stronger emphasis on discounts) than uncertainty associated with regular *products*. Their results show that this particularly holds for customized – and thus more uncertain – services, like PSS. Generally, customers prefer immediate benefits such as discounts, over future benefits such as high quality service, because delays in benefits are associated with higher risks (Weber & Chapman, 2005). Based on this, we contend that PSS purchases give way to privacy concerns that dispose customers to price sensitivity and negotiation, ultimately affecting the PSS provider's profitability.

2.3. Consequences of privacy concerns: a fairness perspective

Extending privacy calculus theory, we draw on Social Exchange Theory and Equity Theory to suggest that fairness is an important mechanism that can help prevent customers' overt sensitivity to price due to privacy concerns of the exchange. Fairness generally implies that exchange partners share the burden and revenues in a fair way (Cropanzano & Mitchell, 2005). This leads to an equitable exchange and long-term relationship. Research shows that business customers generally rely on such fairness heuristics in early stages of a B2B relationship, when they cannot evaluate all benefits and costs of the (future) relationship (Crosno & Dahlstrom, 2011). These fairness heuristics help decision-makers reduce the inherent uncertainty by highlighting potential benefits and/or safeguarding for potential costs of the exchange.

In this study, we introduce VBS as relational mechanism that emphasizes mutual benefit for the two exchange partners by demonstrating the contribution of the seller to the buyer's bottom line. VBS thus acts as a fairness tool from the PSS provider's perspective and as a fairness heuristic from the customer's vantage point (Crosno & Dahlstrom, 2011). By focusing customers' attention on the value of the PSS, the customer should better appreciate the entire deal and consider themselves compensated for data required for optimization of its PSS and business processes.

3. Conceptual framework and hypotheses

3.1. Overview of framework

Fig. 1 shows our conceptual framework. Central in this model is the baseline relationship between customer privacy concerns and PSS provider profitability that is mediated by customer price sensitivity. Customer privacy concerns reflect the degree to which customers assess the risk of (potential) damage by the PSS provider's use of customer-related data and information. Customer price sensitivity reflects the degree to which "customers rely on prices in choosing their suppliers" (Homburg, Jensen, & Hahn, 2012, p. 52). PSS provider profitability is the firm's financial performance relative to its competitors (Vorhies & Morgan, 2005).

We argue that privacy concerns are not the only cause of customers' price sensitivity, because customers' buying decisions and the role of price are affected by other (e.g., strategic) considerations also and involve many decision-makers (Mudambi, 2002). Consistent with this, empirical results of Homburg et al. (2012) show that customer price sensitivity is not negatively related to the supplier's performance. Thus, we do not anticipate privacy concerns to be the main driver of customer price sensitivity, and of customer price sensitivity on PSS provider profitability.

Instead, the nature of the baseline relationships in the model should depend on two contingencies: (1) the PSS provider's use of VBS, and (2) contract specificity. The PSS provider's use of VBS captures the degree to which the PSS provider demonstrates its contribution to the customer's business outcome in clear monetary terms (Terho et al., 2017). Contract specificity is the extent of detail in contract terms with respect to (1) technical specifications of the product, (2) implementation procedures, (3) financial and legal considerations, and (4) overall contractual features (Mooi & Ghosh, 2010, p. 107). In this study, we focus on the degree to which the supplier explicitly contracts on the value of the PSS for the customer, that is, on its performance outcomes in the customer's use context (Liinamaa et al., 2016; Schaefers et al., 2021; Suppatvech et al., 2019). In this respect, the contract entails the specification of performances, the design of incentive systems, and the risk transfer from the customer to the supplier (Kim, Cohen, & Netessine, 2007).

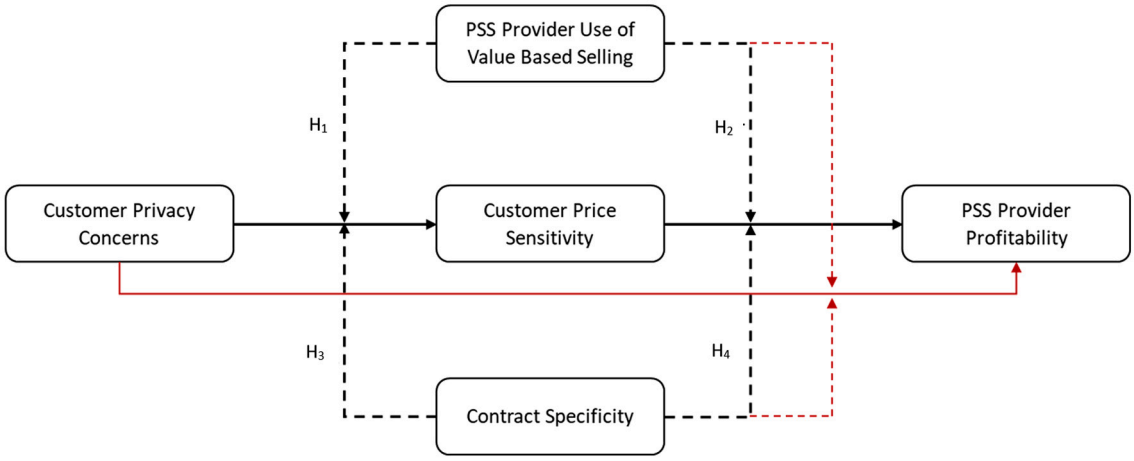

Fig. 1. Contingency Model of Customer Privacy Concerns and Price Sensitivity in PSS Selling*).
*) Red lines are controls; dashed lines refer to moderating effects. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

While contract specificity offers legal protection and a formal safeguard for undesirable costs (i.e., an optimization approach), VBS can highlight benefits (i.e., a maximization approach), for instance, by showing that the provider offers a solution to the customer of which the benefits outweigh the cost and information risk. We thus consider VBS and contract specificity as complementary arrangements that aim to secure data usage by the PSS provider.

3.2. Moderating role of VBS

VBS's approach aims to persuade the customer by demonstrating the contribution of the PSS to the customer's business processes and bottom line (Ulaga & Eggert, 2006). It "focuses on accomplishing goals and gaining valued outcomes through relationships with other entities" (Crosno & Dahlstrom, 2011, p. 317). Relying on close collaboration, a joint frame of reference is created, and routines are implemented so that the customer can fully realize the benefits of the solution (Macdonald, Kleinaltenkamp, & Wilson, 2016).

VBS thus primes customers on the value-in-use the provider delivers. It not only helps reduce customer risk but shifts the attention of the customer towards a complete and thorough evaluation of the offer. This should reduce the role of data sharing-, privacy-, and security issues in price negotiations, and thus will lower the customer's price sensitivity. Following this, we hypothesize,

H1. VBS changes the relationship between customer privacy concerns and customer price sensitivity to negative.

We further posit that VBS alters the way customer price sensitivity affects PSS provider profitability. Unable to identify and evaluate all benefits and costs of the (future) relationship, customers tend to rely on fairness heuristics, particularly in early stages of a relationship (Crosno & Dahlstrom, 2011). VBS acts as "fair information practice" as it signals to customers that the supplier wants to conduct business in a transparent manner improve the customer's overall performance. More specifically, by using VBS sellers should be able to "persuasively communicate the financial rationale for purchasing higher-value, higher price offerings" (Keränen, Salonen, & Terho, 2020, p. 390).

As such, VBS will add to customers' perceived (procedural and distributive) fairness, which positively affects customers' long-term orientation and relational behaviors towards the supplier (Griffith, Harvey, & Lusch, 2006). Customers should focus on reciprocating the provider's VBS-based relational investments, thereby shifting the attention away from price to benefits. As such, VBS decreases the effect of customer price sensitivity on the rents that the provider will earn from the exchange. Because VBS fosters the perception of a long-term win/win it weakens the impact of price sensitivity and PSS provider profits.

H2. VBS changes the relationship between customer price sensitivity and PSS provider profitability to positive.

3.3. Moderating role of contract specificity

Contracts are binding legal agreements that specify the obligations and roles of both parties in a relationship (Lusch & Brown, 1996; Vandaele, Rangarajan, Gemmel, & Lievens, 2007). Contracts are a proven concept to mitigate risk in exchange relationships (Lusch & Brown, 1996) – that is to control (undesired) costs of the exchange. In the PSS context, high contract specificity implies high levels of technical and legal complexity for customers (Liinamaa et al., 2016). In this respect, it is important for customers to critically evaluate the risks, benefits as well as the individual accountability for making the right decisions (Schaefers et al., 2021).

More specifically, contract specificity draws attention to details of a deal in terms of costs. As privacy calculus theory suggests, customers consider privacy issues rationally. They consider privacy issues as an important cost factor that has to be accounted for in their price decision of the PSS offer. High contract specificity highlights the importance of costs and thus strengthens this positive relationship. As a result, the customer will be more critical and negotiate harder both on price but also for non-monetary compensation. Thus,

H3. Contract specificity changes the relationship between customer privacy concerns and price sensitivity to positive.

The more complex transactions become, the more specific contracts get (Mooi & Ghosh, 2010). Such specific and detailed contracts aim to reduce customer risk, control undesired costs, and ensure a minimum level of satisfaction (i.e., prevent customer dissatisfaction). However, contracts generally shift risk to the PSS provider, who will incur a financial burden when things go wrong. So, contract specificity eliminates risk related to the performance of the PSS for the customer but shifts the burden to the PSS provider, who thus should experience a decrease in profitability.

In addition, specific contracts in which the PSS provider commits to specific customer outcomes draw customer attention to the cost/benefit aspect and the future distribution of rents and equity in the exchange. This implies a negative moderation by contract specificity of the relationship between price sensitivity and PSS provider profitability:

H4. Contract specificity changes the relationship between customer

price sensitivity and PSS provider profitability to negative.

4. Research methodology

4.1. Research context and data collection

To test our model, we collected data from US firms across a range of industries using an online survey instrument and a sample of the panel of a professional data collection agency. The US has one of the highest percentages (58%) of firms that combine manufacturing with service (Neely, 2008) and thus offers a suitable context for our empirical study. Only firms with more than 15 employees and at least 10% share of PSS in their sales were included. Of the 471 companies that were approached, 250 met this qualification criteria and completed the questionnaire (53.1%).

The unit of analysis is a firm or a business unit within a firm and its perceptions of its typical customers. As key informants, we used the supplier firms' sales, marketing, and service managers. They were considered most qualified to answer questions regarding their customers, but also their firm's PSS. With regard to the PSS-related questions, we asked informants to consider the most innovative and advanced PSS that their firm offered. Finally, it is worth mentioning that this study focuses on the key informants' general evaluation of their PSS business rather than a specific buyer-seller relationship or a specific sales episode. Although it is difficult for a key respondent of a provider to assess, for example, specific privacy concerns of individual customers, through the firm's sales reps there will be a general awareness of which types of customers are more and less sensitive, why, and for what kind of data. Firms typically act on such general beliefs to develop their marketing approach (Rosa, Porac, Runser-Spanjol, & Saxon, 1999).

Following best practices in survey research (Hulland, Baumgartner, & Marion Smith, 2018), we checked respondent versus non-respondent firms and found no significant difference in revenue and percentage sales of performance contracts in total turnover ($F = 1.26$, $p = .27$ and $F = 1.36$, $p = .25$). The non-significant differences between the two groups on these key firm characteristics suggest that non-response bias is not an issue in our data.

The questionnaire was developed in line with the procedures commonly recommended (e.g., Gerbing & Anderson, 1988). Because common method bias is a concern when using a survey instrument to measure both independent and dependent variables, we followed the procedures mentioned by Podsakoff, MacKenzie, Lee, and Podsakoff (2003) and assured respondents complete confidentiality for candid responses, varied scale formats to keep attention, and separated predictor and criterion variables to prevent halo effects.

Interviews with managers, several roundtable sessions, and an extensive review of previous studies were used to help contextualize constructs and frame the questionnaire well. The questionnaire was tested by administering it to a set of four managers of firms selling PSS to verify its wording, response formats, and clarity of instructions. Based on this feedback, we optimized questionnaire design. A subsequent pretest of the questionnaire with a sample of 30 respondents was successful and resulted in only a few minor changes to items for extra clarity.

4.2. Construct measurement

We operationalized our key constructs using multi-item measures borrowed or adapted from previous studies. Appendix A shows the constructs, their measurement items, and sources.

Customer privacy concerns. This construct was operationalized using a four-item scale of Martin et al. (2017). The customer perspective of the scale was changed to a B2B one, asking respondents about customers' attitude and behavior observed in exchanges. The items were measured on a Likert scale with anchors 1 = "strongly disagree" to 7 = "strongly agree".

Customer price sensitivity. The price sensitivity measure was borrowed from Homburg et al. (2012). The scale uses four items focusing on customers' price sensitivity and switching behavior with the anchors 1= "do not agree", and 7 = "fully agree".

PSS provider VBS. We operationalized this construct using seven items from Terho et al. (2017) with anchors 1=" strongly disagree", and 7 = "strongly agree". It measures the degree to which salespeople collaborate with the customer to develop an offer where benefits are translated into monetary terms. It focuses on an in-depth understanding of the customer's business model, thereby convincingly demonstrating the contribution of the provider's solution to the customer's profitability (Terho et al., 2017; Terho, Haas, Eggert, & Ulaga, 2012).

Contract specificity. This concerned a new measure that was based on Hünerberg and Hüttmann (2003) scale of price setting of a PSS seller to reduce customer uncertainty (five-points rating scale with anchors: 1 = "never" and 5 = "always"). However, instead of pricing arrangements, we referred to specific contractual guaranties offered by the seller to the customer. The items globally range from guaranteeing well-functioning, ensuring the agreed output, and securing the anticipated financial contribution to the customer's bottom-line. Based on a pretest with 5 sales managers the original long-list of 10 items was reduced to seven to ensure respondents saw the nuances between each performance-based arrangement.

Customer satisfaction and PSS provider profitability. The two dependent variables of customer satisfaction and PSS provider's financial performance were adopted from Vorhies and Morgan (2005). The measures used four and three items, respectively, and a seven-points rating scale with the anchors 1 = "much worse than competitors" and 2 = "much better than competitors" (7). Using the firm's competitors in the industry as a benchmark helped calibrate the performances and made it objective and meaningful.

Control variables. We identified several extra variables that could affect our model and its outcomes, and added them as controls to ensure correct model estimation. At the firm level, we identified and included the seller's level of PSS integration, PSS innovativeness, PSS modularity, cross-selling potential, and R&D spending. First, privacy concerns probably increase with more advanced types of PSS that have higher integration requirements and need more remote monitoring and extensive data sharing (and transmission). We measured PSS integration with three items based on Hünerberg and Hüttmann (2003).[1] We measured PSS innovativeness with one item from Langerak, Hultink, and Griffin (2008) capturing the seller's general evaluation of the novelty of the PSS relative to its competitors. As we had asked survey participants to focus on the most innovative PSS, the overall rating was rather high (M = 3.76, Median = 4 on a five-point rating scale). Thus, we recoded responses into a binary scale with the highest rating as highly innovative (18.4%) and all other ratings as not highly innovative (81.6%).

Second, although modularity of the PSS can add flexibility, offering more customization opportunities and after-sales extensions through cross-selling can add to feelings of over-paying for unused possibilities of the system and being locked in the relationship, respectively. We measured PSS modularity using Wang, Lee, Fang, and Ma's (2017) operationalization of product modularity. We borrowed the measure for cross-selling potential from Schmitz, Lee, and Lilian's (2014) share of customers' cross-buying potential scale, Finally, we controlled for R&D spending of the PSS provider. Higher investments may make a provider 'product leader', and thus potentially more desirable. It may make the customer take privacy concerns for granted.

At the industry level, we included competitive intensity and technological turbulence of the environment as controls. Competitive intensity may offer a customer more negotiation power and thus can reduce the need to accept a provider's terms. At the same time,

[1] We thank a reviewer for suggesting this variable as additional control.

technological turbulence may increase the need for strategic partnership with a provider. Finally, we controlled for customer satisfaction because it is a main driver of firm profitability. Including these controls helped account for alternative explanations and ensured a correct estimation of the unique effects of our focal variables.

4.3. Assessment of measurement model and analyses

We used SPSS 23 and Hayes PROCESS (Hayes, 2013) to analyze the data in two principal stages. First, we examined the descriptive statistics, used exploratory factor analyses, and computed internal consistencies to evaluate the properties of our constructs (Fornell & Larcker, 1981). All reliabilities exceed 0.70 (see Appendix A), with the lowest score being 0.82 (for the control variable PSS integration). Convergent validity is satisfactory, as the average variance extracted is higher than 0.5 for all study constructs. The measures also exhibited adequate discriminant validity because the average variance extracted of each construct is larger than its shared variance (squared intercorrelation) with other constructs in our study. Together these results suggest that the measures are acceptable and valid. Appendix B shows the correlation matrix and offers descriptive details of the study constructs.

Second, we estimated two different moderated-mediation models using Hayes process analysis (Hayes, 2013). First, Hayes' model 4 (template) for simple mediation effect was used. Its results showed no significant relationships for the central path from privacy concerns via price sensitivity to PSS provider profitability, as anticipated. It means that the central relationships of the model are completely contingent on our moderators, as expected. Next Hayes' model 76 was used to estimate the moderating effects of VBS and contract specificity on the mediated central relationship, *also* accounting for the moderation effects by our two focal variables of the *direct relationship* between privacy concerns and PSS provider profitability. Finally, post hoc, we estimated Hayes' model 73 to explore potential three-way moderation. Analyses were run at $p < .05$ and $p < .10$ level using bootstrap 5000.

To check and correct for possible endogeneity in our analyses we adopted Garen's (1984) control function procedure. In a first step, we regressed privacy concerns on a set of predictors to obtain the structural residual term (e). Specifically, we computed average privacy concerns per industry category and used this as our primary predictor (cf. Germann, Ebbes, & Grewal, 2015). The average value concerns the group-mean centered perceptions of the collective or group of companies of an industry rather than of the individual. The quality of this predictor rests on two premises. First, we argue that focal firm's customers face similar conditions as peers, i.e., customers of other suppliers operating in the same industry. Consequently, the predictor is relevant. Second, the predictor should meet the exclusion criterion, that is, it should be uncorrelated with the omitted variables affecting price sensitivity. It is met because the average price sensitivity of customers in an industry is unlikely to be correlated to any set of customers of a particular provider of another, random industry. Following Antonakis, Bendahan, Jacquart, and Lalive (2010), we also included addition predictors in step 1 to (i) prevent misspecification due to a possible weak instrument and (ii) enable the overidentification test to be conducted. In step two, we calculated the interaction term (e × privacy concerns) and (privacy concerns^2) to allow for the modeling of unobserved heterogeneity over the range of values of our endogenous variable, privacy concerns. Finally, we added these three variables — e, e × privacy concerns, and privacy concerns^2, to our model to obtain consistent estimates. The multivariate F test ($F = 22.53$ (df1 2, df2 231, $p < .001$)) of the model with privacy concerns as endogenous variable revealed that the instruments were sufficiently strong, and the Sargan test proved the exclusion criterion was satisfied ($\chi^2 = 0.1162$, df 1, $p = .73$). Finally, the Durbin (and Wu-Hausman) test confirmed that we cannot reject the null hypothesis of no systematic differences in coefficients between a model that corrects for endogeneity and one that does not ($\chi^2 = 0.1081$, df 1, $p = .74$). In other words, there is sufficient confidence that the current results are robust and reliable.

4.4. Model specification

The full model is specified with the following two equations:

$$PRICESENS_i = b_0 + b_1 PRIVCONC_i + b_2 CSPECIFI_i + b_3 VBS_i + b_4 (PRIVCONC_i \times VBS_i)_i + b_5 (PRIVCONC_i \times CSPECIFI_i)_i + Control\ Variables + \varepsilon_i \quad (1)$$

$$PROFIT_i = b_0 + b_1 PRIVCONC_i + b\beta_2 PRICESENS_i + b_3 CSPECIFI_i + b_4 VBS_i + b_5 (PRICESENS_i \times CSPECIFI_i)_i + b_6 (PRICESENS_i \times VBS_i)_i + Control Variables + \varepsilon_i, \quad (2)$$

where PRIVCONC = privacy concerns, PRICESENS = price sensitivity, PROFIT = PSS provider profits, CSPECIFI = contract specificity, and VBS = value-based selling.[2]

5. Findings

5.1. Main findings

Table 1 shows the PROCESS results for the full model. The model fit (see R^2) shows that our independent variables explain a fair amount of variance in our dependent variables, i.e. 34% of price sensitivity and 66% of provider profitability (Table 1). Thus, the model specification is adequate.

The detailed results show that VBS significantly moderates the relationship between customer privacy concerns and customer price sensitivity, turning it negative ($B = -0.16$, $p < .01$). This lends support to H1; under conditions of high VBS privacy concerns do not affect customer price sensitivity, whereas under low value-based selling a strong positive relationship between privacy concerns and price sensitivity exists. In other words, VBS deactivates the potential privacy calculus mechanism.

However, VBS does not moderate the customer price sensitivity–PSS provider profitability relationship ($B = 0.04$, $p > .10$). So, H2 is not supported.

Contract specificity positively moderates the privacy concerns–price

[2] Please note that moderations of the direct path of privacy concern–profit are considered part of control variables.

Table 1
Hayes PROCESS results – full model estimation.

Independent Variables	Customer Price Sensitivity			PSS Provider Profitability		
	B	SE	t-value	B	SE	t-value
Constant	−0.01	0.07	−0.11	0.07	0.05	1.25
Customer price sensitivity				0.05	0.05	0.92
Customer privacy concerns	0.04	0.14	0.27	0.07	0.10	0.66
Contract specificity (CS)	0.17	0.08	2.11*	−0.01	0.06	−0.09
Value-based selling (VBS)	−0.05	0.08	−0.59	0.02	0.06	0.27
Interactions						
Customer privacy concerns * CS	0.14	0.06	2.48*	−0.02	0.04	−0.49
Customer privacy concerns * VBS	−0.16	0.06	−2.52**	0.14	0.05	2.81**
Customer price sensitivity * CS				−0.13	0.05	−2.54**
Customer price sensitivity * VBS				0.04	0.06	0.73
Controls						
Customer satisfaction	−0.05	0.08	−0.63	0.56	0.06	9.45**
PSS integration	−0.02	0.08	−0.25	0.08	0.06	1.36
PSS innovativeness	−0.08	0.06	−1.20	0.08	0.05	1.65†
PSS modularity	0.11	0.08	1.25	−0.02	0.06	−0.39
PSS cross-selling potential	0.20	0.08	2.40*	0.19	0.06	3.10**
Competitive intensity	0.13	0.06	2.05*	0.03	0.05	0.70
Technological turbulence	0.10	0.07	1.40	0.00	0.05	0.05
PSS provider R&D spending	0.12	0.06	2.00*	0.12	0.04	2.68**
Customer privacy concerns^2	0.17	0.14	1.21	−0.11	0.11	−1.02
Error	0.15	0.15	1.04	−0.15	0.11	−1.38
Customer privacy concerns * error	−0.19	0.15	−1.24	0.02	0.11	0.22
R^2	0.34 (F = 7.40), $p < .001$			0.66 (F = 23.63), $p < .001$		
ΔR^2 (highest order uncond'l interaction)	0.03, (F = 4.49), $p < .02$			Front: 0.01, (F = 4.09), $p < .02$	Back: 0.01, (F = 3.72), $p < .03$	

Conditional direct effect(s) of X on Y at values of the moderator(s)

Condition						
Contract specificity	VBS	Effect	SE	t-value	LLCI	ULCI
−1.00	−1.00	−0.05	0.12	−0.41	−0.244	0.147
−1.00	0.00	0.09	0.11	0.80	−0.100	0.273
−1.00	***1.00***	***0.23***	***0.12***	***1.81***†	***0.019***	***0.432***
0.00	−1.00	−0.07	0.12	−0.59	−0.263	0.126
0.00	0.00	0.07	0.10	0.66	−0.104	0.241
0.00	***1.00***	***0.21***	***0.11***	***1.83***†	***0.020***	***0.391***
1.00	−1.00	−0.09	0.13	−0.68	−0.304	0.127
1.00	0.00	0.05	0.11	0.43	−0.141	0.235
1.00	1.00	0.19	0.11	1.62	−0.003	0.374

Conditional indirect effect(s) of X on Y at values of the moderator(s) (with price sensitivity as mediator):

Condition					
Contract specificity	VBS	Effect	Boot SE	Boot LLCI	Boot ULCI
−1.00	−1.00	0.01	0.03	−0.026	0.059
−1.00	0.00	−0.02	0.03	−0.057	0.031
−1.00	1.00	−0.06	0.05	−0.124	0.014
0.00	−1.00	0.00	0.03	−0.040	0.047
0.00	0.00	0.00	0.01	−0.009	0.022
0.00	1.00	−0.01	0.02	−0.037	0.015
1.00	−1.00	−0.04	0.05	−0.135	0.036
1.00	0.00	−0.01	0.02	−0.050	0.013
1.00	1.00	−0.00	0.01	−0.017	0.016

Notes: SE = standard error. † $p < .10$, * $p < .05$, ** $p < .01$. Two-tailed tests.
Notes: SE = standard error. Bootstrap $p < .10$, 5000 bootstrap samples. Significant effects in italics.

sensitivity relationship (B = 0.14, $p < .05$), as anticipated, which lends support to H3. It confirms that a focus on detailed contracts makes customers worry more about risk and become price sensitive. It makes them more aware of risk involved in the deal/ relationship and makes the calculative mechanism (privacy concerns—price sensitivity) salient.

In line with H4, contract specificity negatively moderates the price sensitivity–provider profitability relationship (B = −0.13, $p < .01$). In case of limited contract specificity, the price sensitivity–provider profitability relationship is positive, whereas under high contract specificity it turns negative. The latter causes inflexibility and shifts (recovery) costs to the provider, which negatively affects the provider's rent earning possibilities.

The results also show a significant moderating effect of VBS of the direct relationship between privacy concerns and provider profitability (B = 0.14, $p < .01$). So, instead of VBS moderating the price sensitivity – provider profitability relationship this path is significantly and positively influenced by VBS. It suggests that VBS has additional trust building capabilities (Korkeamäki & Kohtamäki, 2020) that reach further than the price sensitivity mechanism and financial benefit.

To interpret our results correctly we refer to the lower part of Table 1, which shows the direct and indirect effects at different values of the two moderators. The direct effect of privacy concerns on the final outcome is significantly positive when contract specificity is low or absent (scores −1, 0), and VBS is high (score 1). Therefore, high VBS is

Table 2
Hayes PROCESS results –Post hoc analyses 3-way interaction estimates.

Independent Variables	Customer Price Sensitivity			PSS Provider Profitability		
	B	SE	t-value	B	SE	t-value
Constant	0.01	0.08	0.13	0.09	0.05	1.59
Customer price sensitivity				−0.02	0.06	−0.37
Customer privacy concerns	0.05	0.15	0.37	0.12	0.11	−1.10
Contract specificity (CS)	0.19	0.08	2.24*	−0.02	0.06	−0.25
VBS	−0.07	0.09	−0.74	−0.01	0.07	−0.12
Moderations						
Customer privacy concerns * CS	0.14	0.06	2.31*	−0.00	0.04	−0.09
Customer privacy concerns * VBS	−0.18	0.07	−2.49*	0.10	0.06	−1.65†
Contract specificity * VBS	−0.03	0.06	−0.51	−0.03	0.05	−0.69
Customer privacy concerns * CS * VBS	−0.04	0.04	−0.81	−0.05	0.03	−1.55
Customer price sensitivity * CS				−0.16	0.05	−2.87**
Customer price sensitivity *VBS				0.10	0.06	1.55
Customer price sensitivity * CS * VBS				0.08	0.04	1.94†
Controls						
Customer satisfaction	−0.04	0.08	−0.53	0.58	0.06	9.53**
PSS integration	−0.01	0.08	−0.17	0.09	0.06	1.52
PSS innovativeness	−0.06	0.07	−0.93	0.08	0.05	1.70†
PSS modularity	0.11	0.08	1.32	−0.01	0.06	−0.21
PSS cross-selling potential	0.19	0.08	2.21*	0.19	0.06	3.10**
Competition	0.13	0.06	1.96*	0.03	0.05	0.64
Technological turbulence	0.11	0.07	1.52	−0.00	0.05	−0.07
PSS provider R&D spending	0.12	0.06	1.91†	0.11	0.04	2.48**
Customer privacy concerns^2	0.19	0.15	1.27	−0.11	0.11	−1.00
Error	0.16	0.15	1.08	−0.16	0.11	−1.50
Customer privacy concerns * error	−0.19	0.15	−1.27	0.03	0.11	0.28
R^2	0.34, (F = 6.58), $p < .00$			0.67, (F = 20.85), $p < .00$		
ΔR^2 (highest order uncond'l interaction)	0.001, (F = 0.65), $p < .42$		Front: 0.004, (F = 2.39), $p < .12$		Back: 0.006, (F = 3.75), $p < .05$	

Conditional direct effect(s) of X on Y at values of the moderator(s)

Condition						
Contract specificity	VBS	Effect	SE	t-value	LLCI	ULCI
−1.00	−1.00	−0.02	0.12	−0.19	−0.222	0.175
−1.00	0.00	0.12	0.11	1.07	−0.066	0.307
−1.00	***1.00***	***0.26***	***0.13***	***2.08****	***0.055***	***0.474***
0.00	−1.00	0.02	0.13	0.17	−0.187	0.231
0.00	0.00	0.12	0.11	1.10	−0.059	0.292
0.00	***1.00***	***0.21***	***0.12***	***1.84***†	***0.022***	***0.402***
1.00	−1.00	0.07	0.15	0.44	−0.186	0.318
1.00	0.00	0.11	0.12	0.96	−0.081	0.306
1.00	1.00	0.16	0.13	1.25	−0.052	0.371

Conditional indirect effect(s) of X on Y at values of the moderator(s) (with price sensitivity as mediator):

Condition					
Contract specificity	VBS	Effect	Boot SE	Boot LLCI	Boot ULCI
−1.00	−1.00	0.01	0.03	−0.022	0.065
−1.00	0.00	−0.01	0.02	−0.041	0.031
−1.00	1.00	−0.04	0.04	−0.102	0.029
0.00	−1.00	−0.03	0.04	−0.095	0.019
0.00	0.00	−0.00	0.01	−0.038	0.014
0.00	1.00	−0.01	0.01	−0.038	0.017
1.00	***−1.00***	***−0.15***	***0.10***	***−0.326***	***−0.017***
1.00	0.00	−0.03	0.04	−0.128	0.001
1.00	1.00	−0.00	0.01	−0.012	0.025

Notes: SE = standard error. Bootstrap $p < .10$, 5000 bootstrap samples. Significant effects in italics.
Notes: SE = standard error. † p < .10, * p < .05, ** p < .01. Two-tailed tests.

an important condition to turn the effect of privacy concerns on profitability positive. For the indirect relationship (via price sensitivity) we do not find a clear pattern, indicating that the moderated mediation and the interaction of VBS and contract specificity is complex, motivating further examination in a post hoc analysis (discussed later).

Finally, we discuss the results of the control variables, whose effects are much as anticipated. Customer satisfaction, cross-selling potential, and R&D spending are all positively correlated with provider profitability (B = 0.56, 0.19, and 0.12, $p < .01$, respectively). Companies with a smart portfolio of modules that allow customers to extend their system as their business evolves, and firms who invest heavily in innovation see their efforts rewarded. Interestingly, cross-selling potential and R&D spending are also significant in the relationship with the dependent variable of price sensitivity (B = 0.20 and 0.12, $p < .05$, respectively). It confirms our premise that many PSS -related dimensions have a double connotation: they evoke customer skepticism/distrust but also lead to higher provider profits and higher customer satisfaction. Finally, PSS innovativeness as further PSS-related control is positively related to provider profitability (B = 08, $p < .10$), and competitive intensity is positively related to customer price sensitivity (B = 0.13, $p < .10$). Although these two effects are only borderline, they add face validity to our results.

5.2. Post hoc analysis

Since we did not find the anticipated positive moderation effect of VBS on the price sensitivity—provider profitability link but, instead, a positive moderation of the direct relationship of privacy concerns on firm performance, we decided to explore the data further. We decided to use Hayes's model 73 to check for a potential three-way interaction of VBS, contract specificity, and price sensitivity on PSS provider profitability. These results are shown in Table 2. They largely match our original findings but do confirm a significant three-way interaction of privacy concerns—contract specificity—price sensitivity on provider profitability ($B = 0.08$, $p < .10$).

To correctly interpret our results, we again turn to the detailed results of the (in)direct effects at different values of the two moderators (see Table 2's lower part). The conditional direct effects correspond to our original results using Hayes's model 76. The detailed results for the conditional indirect effects are also similar. However, one significant effect is detected: high contract specificity (value = 1) without any value-based selling (value = −1) has a clear detrimental effect on provider profitability, and thus should be avoided.

6. Discussion

6.1. Theoretical implications

The key distinguishing feature of our study is its focus on customer privacy in the business context of PSS adoption. Recent research identified privacy risk as the most important but neglected concern of business customers of these systems: "Customers fear unauthorized access to machines and data in the same way as data espionage and data theft" (Paluch & Wunderlich, 2016, p. 2427). Still the literature has predominantly focused on consumer and not business privacy concerns. We contribute to the literature in three ways.

First, we add to the privacy literature by supporting implications of privacy calculus theory for business customers (Bélanger & Crossler, 2011). However, we show that increased price sensitivity from privacy issues of data sharing in PSS is contingent on the exchange context, in particular on the formal and informal arrangements that the parties use. Like consumers, business customers may experience privacy concerns, but the privacy calculus mechanism is only activated when contractual arrangements are discussed and selling approaches are implemented and effects unfold.

Second, VBS has important positive moderating effects on the impact of customer privacy concerns. VBS as a fair information practice is an effective strategy to overcome calculative risk perceptions by drawing customer attention to value in a transparent way. We thus fill a major research gap by identifying and developing "provider strategies of offering control and transparency, communicating guarantees and certifications, and establishing personal trust can lower privacy concerns for customers." (Paluch & Wunderlich, 2016, p. 2427). VBS disables the privacy concerns–price sensitivity mechanism and helps mitigate the negative effect of price sensitivity on PSS provider profitability. Thus, VBS is a powerful instrument for creating an equitable exchange that allows the PSS provider to obtain its rent and earn back its investment in PSS. VBS can counterbalance negative effects of high levels of contract specificity on profitability. From an ethical perspective, the results support a fair and transparent, and thus honest approach in the process of selling PSS and for dealing with its data privacy and security issues. It indeed is a fair information practice that effectively serves as a trust-building mechanism.

Third, we add to the PSS literature, particularly to recent work on contracts and VBS. "The detailed designs of performance-based contracts may be much more prevalent and significant success or failure factors in value-based solutions selling than previously understood." (Liinamaa et al., 2016, pp. 45–6). Our findings show that contract specificity draws attention to risk and caution involved. It makes customers more price sensitive. In contrast, VBS helps customer attention focus on the value of the solution the provider offers and builds trust. As a result, the privacy—price sensitivity relationship is increased and/or decreased, respectively. In a similar way, the effects of customer price sensitivity on PSS financial outcomes are contingent on contract specificity and the provider's VBS. Specifically, our findings imply that, in the context of PSS, contract specificity needs to be complemented with VBS to counteract potential negative effects of contracts in terms of customer price sensitivity and PSS provider profitability (Korkeamäki & Kohtamäki, 2020).

Both sales approaches and contractual arrangements are important contextual factors of PSS exchanges that should be used in a complimentary way. The detailed conditional findings for direct and indirect effects of privacy concerns on provider profitability supported this. It extends the qualitative work of Liinamaa et al. (2016). These authors note: "… even if the seller had a highly attractive offering, monetizing the offering will be impossible unless the seller is able to convince the prospective buyers that the contract structures it proposes are feasible." "…the pricing models with their concomitant contract structures will emerge as significant new sales objects." (p. 46). Based on the three-way interaction of our post hoc analysis we agree that VBS and contract negotiations should be integrated for maximum effect. This extends the VBS model of, for example, Terho et al. (2017) that does not include contract negotiations and details.

We urge future research to further explore the intricate relationship between VBS and contract specificity in PSS. It could be extended to negotiation practices, pricing models, and transparent use of information. The work could, for instance, build on recent work by Colm et al. (2020) regarding dynamic and relational governance mechanisms in the context of PSS. Furthermore, besides monetary costs (and hence price) customers may also consider non-monetary costs related to privacy in the PSS context. Our result that VBS also moderates the direct effect of customer privacy concerns on PSS provider profitability could be further explored by examining the roles of reputation and trust.

6.2. Managerial implications

Value-based selling is an important tool for helping address privacy concerns and resulting price sensitivity as it provides more flexibility for managers to adapt to changing circumstances. Especially when selling PSS, changes may be required that make contracts difficult to specify up front without losing flexibility. Therefore, managers should train their sales force in VBS, promoting transparency and fairness, and thus building trust. By emphasizing customer value, the focus will be on the provider's contribution for customer processes and customer profitability.

Generally, both providers and customers have to develop the capabilities necessary to management the complex contractual relationship associated with PSS (Storey et al., 2017). VBS is particularly important to overcome the customer's potential uncertainty and lack of capabilities. It can be used to educate the customer, and also help the customer develop the necessary capabilities in this domain.

Managers should combine contracts and VBS to attract and deal with customers effectively. It will help manage customer price sensitivity and while safeguarding provider profitability. Exclusive reliance on detailed contacts will cause inflexibility and will increase provider costs significantly. Therefore, the salespeople's VBS training should be expanded with knowledge of contract arrangements and contact negotiations. Based on best practices managers should seek out legitimate contractual infrastructures and help their salespeople sell not just the value of the solution but also the contract (Liinamaa et al., 2016).

6.3. Limitations and outlook

Our study has several limitations that are opportunities for future research. First, our cross-sectional design implies that we must be

careful when interpreting the causal relationships. Although the endogeneity check provided extra assurance, these remedies do have their limitations. Second, the sample was small and limited to the US context. Future studies could investigate differences in management's privacy concerns and price sensitivity between countries or cultures. Third, other strategies to overcome privacy concerns could be explored; for example, the impact of certification of PSS providers; or offering customers the control over the data used for PSS provision. These ideas could be used to extend our model. Fourth, we focused on the PSS providers' general evaluation of its customers. Thus, we did not examine specific buyer—seller relationships. For example, we did not examine how different members of the customer's buying center evaluate a PSS differently, or for which members privacy issues and the price of the PSS are particularly relevant. Future research could address this. Finally, differences in customers' privacy concerns over time could be studied. Colm et al. (2020) refer to dynamic governance mechanisms in relationships between providers and users of business solutions; different arrangements may better cater to different stages of relational development. For example, research into results of security breaches and their effect on privacy concerns would be of great interest (e.g., Martin et al., 2017).

Privacy issues in selling PSS to B2B customers is an important research area that deserves more research attention. It can help providers grow their business more quickly and ethically, and help prevent disappointing returns after investing heavily in new service development.

Appendix A. Measures of study constructs and controls

Construct	Items
Customer privacy concerns	(based on Martin et al., 2017; 1 = "strongly disagree" – 7 = "strongly agree") Our customers are very concerned about threats to their company data privacy. Our customers are extremely sensitive to the way our company handles their data. It is important for our customers to protect their privacy from our company. Our customers find data privacy very important.
Customer price sensitivity	(Homburg et al., 2012; 1 = "do not agree" – 7 ="do fully agree") For our customers in our market. Prices are very important.* Customers change suppliers even for small price differences. Our customers' buying centers decide mostly based on price. Customers in our market are very price sensitive.
Contract specificity	(based on Hünerberg & Hüttmann, 2003; 1 = "never" – 5 = "always") Our performance contracts include a guaranteed... ...performance level of the product. ...availability of the product* ...quality of the output. ...hassle free use of the product. ...cost-savings target for the customer. ...revenue gain for the customer ...profit target for the customer
Value-based selling	(Terho et al., 2017; 1 = "strongly disagree" – 7 = "strongly agree"). Our salesforce...: ...works closely with customers to find out what is needed to improve their performance. ...actively demonstrates to our customers the positive financial impact of working with our firm. ...focuses on proactively improving our customers' business performance. ...uses a value-based selling approach. ...shows how our products/services will improve their firm's performance. ...works towards improving our customers' bottom line. ...focuses on identifying opportunities to improve customers' business profits.
Customer satisfaction	(Vorhies & Morgan, 2005; 1 = "much worse than competitors" – 7 = "much better than competitors") Customer satisfaction. Delivering value to customers. Delivering what customers want. Retaining valued customers.
PSS provider profitability	(Vorhies & Morgan, 2005; 1 = "much worse than competitors" – 7 = "much better than competitors") Return on investment (ROI). Return on sales (ROS). Reaching financial goals.
PSS integration	(based on Hünerberg & Hüttmann, 2003; 1 = "never" – 5 = "always") Our firm's PSS offering... …integrates products and services into customers' business. …involves taking over the customer's activities / processes. …promises an outcome specified by customer-specific metrics.
PSS innovativeness	(based on Langerak et al., 2008; 1 = "strongly disagree" – 5 = "strongly agree") [coded 5 = 1, else = 0]. Our firm's PSS offering provides novel products / service features to customers which competitors do not offer
PSS modularity	(Wang et al., 2017; 1 = "strongly disagree" – 5 = "strongly agree") Our firm's PSS offering... …is composed of standardized product modules. …is composed of standardized service modules.

(*continued on next page*)

(*continued*)

Construct	Items
	…allows for changes in key components of the product without redesigning others. …allows for changes in key components of the service without redesigning others. …has product modules that fit together with little adjustment.
PSS cross-selling potential	(Schmitz et al., 2014; 1 = "strongly disagree"– 5 = "strongly agree") Our firm's PSS offering... …provides opportunities to sell additional products and/or services. …helps to increase customer share of wallet over time. …leads to insights on how to provide additional offerings to customers. …aids the further exploitation of customers' potential with regard to additional products/ services. …facilitates the sale of upgrades or other add-ons.
PSS provider R&D spending	What percentage of revenue did your company invest in R&D in the last 12 months?
Technological turbulence	(item from Jaworski and Kohli 1993; 1 = "strongly disagree" – 5 = "strongly agree") The technology in our industry is changing constantly.
Competitive intensity	(item from Jaworski and Kohli 1993; 1 = "strongly disagree" – 5 = "strongly agree") Competition in our industry is cutthroat.

[*] Excluded from analysis.

Appendix B. Means. standard deviations. Scale reliabilities. AVE and correlations

	Mean	SD	CR	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Customer privacy concerns	3.79	0.86	0.86	***0.61***	0.10	0.07	0.08	0.14	0.10	0.13	0.09	0.14	0.08	0.02	0.10	0.11
2. Customer price sensitivity	3.74	0.87	0.88	0.32	***0.70***	0.08	0.08	0.08	0.09	0.13	0.11	0.07	0.04	0.03	0.07	0.08
3. Customer satisfaction	5.63	1.18	0.93	0.27	0.28	***0.76***	0.36	0.22	0.23	0.22	0.15	0.09	0.13	0.02	0.08	0.10
4. PSS provider profitability	5.44	1.10	0.90	0.28	0.29	0.60	***0.76***	0.16	0.19	0.23	0.15	0.12	0.15	0.06	0.07	0.09
5. VBS	3.99	0.74	0.90	0.38	0.28	0.47	0.40	***0.56***	0.22	0.22	0.17	0.14	0.10	0.01	0.06	0.13
6. Contract specificity	3.82	0.82	0.85	0.31	0.31	0.48	0.44	0.47	***0.58***	0.21	0.13	0.12	0.14	0.05	0.03	0.06
7. PSS cross-selling potential	3.96	0.67	0.85	0.35	0.36	0.47	0.48	0.47	0.46	***0.53***	0.22	0.16	0.14	0.02	0.10	0.13
8. PSS modularity	3.70	0.79	0.91	0.29	0.34	0.39	0.39	0.42	0.36	0.47	***0.62***	0.21	0.14	0.05	0.05	0.08
9. PSS integration	3.75	0.82	0.82	0.38	0.26	0.30	0.35	0.38	0.34	0.40	0.46	***0.60***	0.08	0.03	0.06	0.04
10. PSS innovativeness	3.76[d]	.88[d]	NA[e]	0.29	0.21	0.36	0.39	0.32	0.38	0.38	0.37	0.29	***1.00***	0.04	0.06	0.06
11. PSS provider R&D spending (%)	27.74	13.28	NA	0.13	0.18	0.15	0.24	0.12	0.22	0.15	0.22	0.16	0.19	***1.00***	0.00	0.00
12. Competitive intensity	3.76	0.98	NA	0.31	0.27	0.28	0.27	0.24	0.19	0.32	0.22	0.25	0.24	0.04	***1.00***	0.14
13. Technological turbulence	3.88	0.99	NA	0.33	0.28	0.32	0.30	0.36	0.24	0.36	0.28	0.20	0.25	0.03	0.37	***1.00***

a CR = composite reliability; AVE = average variance extracted for each construct reported in bold/italics on the diagonal of the matrix.
b Kendal's tau b correlations are reported in the lower half of the matrix. All correlations ≥0.12 are significant at the 95% level (two-tailed).
c Shared variances are reported in the upper half of the matrix.
d mean and standard deviation of original item, before recoding.
e NA = Not Applicable.

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