



European Business Review

Emerald Article: Differentiating market offerings using complexity and co-creation: Implications for customer decision-making uncertainty

Olaf Plötner, Jan Lakotta, Frank Jacob

Article information:

To cite this document: Olaf Plötner, Jan Lakotta, Frank Jacob, (2013), "Differentiating market offerings using complexity and co-creation: Implications for customer decision-making uncertainty", *European Business Review*, Vol. 25 Iss: 1 pp. 65 - 85

Permanent link to this document:

<http://dx.doi.org/10.1108/09555341311287745>

Downloaded on: 09-01-2013

References: This document contains references to 118 other documents

To copy this document: permissions@emeraldinsight.com

Access to this document was granted through an Emerald subscription provided by EUROPEAN SCHOOL OF MANAGEMENT AND TECHN

For Authors:

If you would like to write for this, or any other Emerald publication, then please use our Emerald for Authors service.

Information about how to choose which publication to write for and submission guidelines are available for all. Please visit www.emeraldinsight.com/authors for more information.

About Emerald www.emeraldinsight.com

With over forty years' experience, Emerald Group Publishing is a leading independent publisher of global research with impact in business, society, public policy and education. In total, Emerald publishes over 275 journals and more than 130 book series, as well as an extensive range of online products and services. Emerald is both COUNTER 3 and TRANSFER compliant. The organization is a partner of the Committee on Publication Ethics (COPE) and also works with Portico and the LOCKSS initiative for digital archive preservation.

*Related content and download information correct at time of download.



Differentiating market offerings using complexity and co-creation

Implications for customer decision-making uncertainty

Differentiating
market offerings

65

Olaf Plötner

European School of Management and Technology (ESMT), Berlin, Germany

Jan Lakotta

*Department of Strategy and Transformation, Capgemini Consulting,
Berlin, Germany, and*

Frank Jacob

Department of Marketing, ESCP Europe, Berlin, Germany

Abstract

Purpose – Customer decision-making uncertainty (DMU) is a persistent phenomenon in business-to-business markets. However, there is substantial variation in the degree to which customers perceive DMU and how suppliers should react to it. The purpose of this paper is to explain variation in customer decision-making uncertainty.

Design/methodology/approach – Based on existing industrial buying typologies, this paper proposes a new classification scheme to explain variance in customer decision-making uncertainty. Market offering complexity and co-creation are used as defining dimensions in the construction of four archetypal types of industrial market offerings.

Findings – The paper demonstrates on a theoretical level that customer decision-making uncertainty is especially prevalent in complex offerings characterized by high degrees of co-creation.

Practical implications – This typology helps to provide a more nuanced understanding of the effects of co-creation on customer value. Firms should adapt their selling approaches to the degree of complexity and co-creation that they offer their customers.

Originality/value – The originality of the paper rests in explaining customer decision-making uncertainty in relation to complexity and co-creation. Thus, it sheds light on the dark side of co-creating market offerings.

Keywords Decision making, Consumer behaviour, Uncertainty management, Decision-making uncertainty, Industrial market offerings, Complex solutions, Typology

Paper type Conceptual paper

1. Introduction

This adage conveys the power of brand names in business-to-business procurement. Put differently, business-to-business “buyers often find it difficult or impossible to logically evaluate and compare offerings” (Aaker and Jacobson, 2001, p. 487) in the marketplace on the basis of product characteristics alone but, instead, rely on brand cues when deciding which product to buy. On what grounds do industrial buyers experience these difficulties in their decision making? Our paper addresses this research question by examining two contingent factors of customers’ decision-making uncertainty (DMU) in B2B procurements.



DMU is an established concept in the social sciences (Downey and Slocum, 1975) and in business marketing (Gao *et al.*, 2005; Bunn, 1993): coping with uncertainty is seen as “the essence of the administrative process” (Thompson, 1967, pp. 9 and 159; Cyert and March, 1963). Transaction cost theory posits that the degree of environmental and behavioral uncertainty between transaction partners influences the “make or buy” decision (Rindfleisch and Heide, 1997).

Likewise, from a practitioner’s standpoint, management under uncertainty has become increasingly important for companies in the last years (Lowell and Farrell, 2008). Especially those managers involved with the procurement of industrial market offerings face high uncertainty (Bello and Zhu, 2006). To define DMU, we adhere to Gao *et al.* (2005, p. 397):

Decision-making uncertainty in organizational buying decisions refers to the difficulty experienced by the decision maker in predicting the outcomes of a purchase decision in terms of the likely benefits and costs.

The purpose of this paper is to classify industrial market offerings and to draw conclusions regarding the resulting degree of customers’ DMU, since industrial market offerings may entail varying degrees of DMU. Analyzing the consequences of different market offerings on DMU in a nuanced light is important for practitioners and academics alike, considering the negative impact of DMU on purchase behaviors (Gao *et al.*, 2005).

Matching specific types of industrial market offerings to different facets of DMU allows for a more realistic view of the behavioral obstacles for exchange partners. To the best of our knowledge, research has failed to do so. Our paper intends to:

- examine these obstacles (namely the various dimensions of DMU that may be at play);
- classify industrial market offerings using co-creation and market-offering complexity as dimensions for a new conceptual typology; and
- establish links between specific facets of customer DMU and industrial market offerings.

Thereby we aim to contribute to extant research in two ways.

First, we offer a theoretical rationale for co-creation as a contributor to DMU. This differs from extant research and theory, which has focused solely on the positive outcomes of co-creation[1]. For instance, Chan *et al.* (2010) showed that within a consumer market setting, not only customer value but also employee value can be enhanced through customer participation. On the other hand, looking into research in business-to-business settings, we find that the effects of co-creation on customer value have been analyzed predominantly theoretically (Lusch *et al.*, 1992; Normann and Ramirez, 1993; Ulaga, 2003). Our conceptual paper seeks to elucidate potential downside risks for business firms engaging in co-creation.

Second, our paper advances existing classification schemes on industrial market offerings by consolidating previously analyzed factors into the overall “market-offering complexity” dimension and adding a new dimension, co-creation, which is gaining prominence in marketing practice and research.

Acknowledging the implications of a given market offering for customer decision making also yields benefits for suppliers and customers. With respect to customers,

our typology enables them to realize the intricateness of their decision-making process. Regarding suppliers of industrial market offerings, the benefits of our typology result from the following rationale: information (or lack thereof) is hypothesized to be one key variable explaining DMU. Moreover, human information processing capabilities can be seen as the second “scissor-blade” (besides the environment, i.e. incoming information) shaping decision making, thus DMU[2]. Relationship marketing has established that the cumbersome process of overcoming the information problem can be mitigated by relational means. That is to say, by establishing a bond between customer and supplier that induces trust, the burdensome screening and evaluation of available market offerings is made obsolete (see for instance Jayachandran *et al.*, 2005, for a review). However, before deciding on the kind of relationship to build with prospects, industrial suppliers ought to know what kind of DMU their customers are facing. Answering this question will help in deciding which selling approach to apply.

The paper is structured as follows. A comprehensive review of the various facets of DMU; followed by a presentation of the two constitutive dimensions (complexity and co-creation) defining industrial market offerings; based on which we develop a conceptual typology of industrial market offerings and link each industrial market offering type to specific DMU-outcomes; and, finally, guidance to suppliers regarding the type of DMU their customers likely face and an outlook for further research.

2. Facets of decision-making uncertainty

In a first step of our analysis, we differentiate between facets of DMU in order to later delineate which facets apply to which market offering and to give a nuanced picture of the type of market offerings especially prone to high degrees of DMU.

In doing so, we depart from classical choice models, such as the expected utility framework (von Neumann and Morgenstern, 1944). The latter emanates from complete information, in other words from riskless choice, “in which the outcomes are known with certainty” (Qualls and Puto, 1989, p. 180). Such a buying situation pertains to the case in which an industrial buyer chooses between alternatives “for which every aspect of performance is known with certainty (e.g. guaranteed price, known quality, and reliable delivery performance)” (Qualls and Puto, 1989). This ideal assumption may best be approximated for market offerings, which compete by price.

Consequently, we adhere to the research tradition in behavioral decision making that is predicated on incomplete information, i.e. a lack of information about aspects of performance of alternatives, attributes, and their value entailing uncertainty[3]. The challenge at this point of analysis is the fact that there are manifold facets of a market offering that may be marked by uncertainty. Consequently, literature on uncertainty is replete with classifications of uncertainty that are overall partially redundant. In finding dimensions of uncertainty, we screened a variety of typologies. We aimed at building a concise classification of facets of uncertainty, pertaining to industrial buying decision making.

We divide extant types of DMU into three facets:

- (1) DMU related to the specific market offering;
- (2) DMU related to the specific supplier of the market offering; and
- (3) DMU related to the customer.

In the following, we consolidate findings from a review of uncertainty typologies.

2.1 Market offering-related decision-making uncertainty

We draw from conceptual work in operations management (Gerwin, 1988) and business marketing (Håkansson *et al.*, 1976) to ascertain market offering-related facets of DMU. In the course of a review of relevant literature, we group technical-, financial-, social-, transaction-, and market uncertainty in this class.

Technical uncertainty. Technical uncertainty refers to the “difficulty in determining the precision, reliability, and capacity of new processes, and whether still newer technology may soon appear to make the equipment obsolete” (Gerwin, 1988, p. 90). Gerwin bore “computer-aided manufacturing technology” in mind when reasoning about the different kinds of uncertainties that may hamper its adoption. More generally, Lehmann and O’Shaughnessy (1974) define technical uncertainty “as the chance that the product will not perform as expected” (Wilson *et al.*, 1991, p. 453). In that sense, technical uncertainty has also been described as “performance risk” (Sweeney *et al.*, 1999).

Financial uncertainty. Financial uncertainty “includes whether return on investment should be the major criterion and whether net future returns can be accurately forecasted” (Gerwin, 1988, p. 90). Besides technical uncertainty, financial uncertainty is generally considered the most prevalent type of uncertainty in industrial procurement decisions. Both types of uncertainty decrease the perceived value of a market offering (Sweeney *et al.*, 1999). Whereas normally various kinds of warranties may be applied to mitigate perceptions of uncertainty, warranties are not able to entirely remove perceived technical and financial uncertainties (Bearden and Shimp, 1982).

Transaction uncertainty. “The transaction uncertainty has to do with problems of getting the product (physically, legally, on time, etc.) from the seller to the buyer” (Håkansson *et al.*, 1976, p. 321). Transaction uncertainty may be particularly problematic for industrial buying situations, in which the transaction object is of strategic importance to the buyer and, thus, the aspect of intactness is predominant. Generally speaking, transaction uncertainty refers to the degree of “easy-to-use procedures for doing business, processing orders accurately, and providing reliable and timely deliveries” (Anderson and Narus, 2004, p. 120).

Market uncertainty. Market uncertainty is defined as the “degree of difference between the suppliers (heterogeneity) and how these differences change over time (dynamism)” (Håkansson *et al.*, 1976, p. 321). This proposition has been supported by research showing that market characteristics, such as heterogeneous and rapidly changing technologies, positively influence uncertainty (Heide and Weiss, 1995; Glazer, 1991; Norton and Bass, 1987; Teece, 1986), in that rapid change makes collected information time-sensitive (Heide and Weiss, 1995; Eisenhardt and Bourgeois, 1988).

2.2 Supplier-related decision-making uncertainty

Apart from the uncertainties induced by the characteristics of the market offering, customers may feel varying degrees of uncertainties regarding their counterpart in the market. Thus, the following facets of DMU stem from the interaction with industrial suppliers.

Social uncertainty. Social uncertainty is geared towards predicting another person’s behavior (Messick *et al.*, 1987). Social uncertainty is fostered by information asymmetry between two parties (Messick, 1993, p. 289). It may be alleviated by trust by “limiting the range of behavior expected from another” (Sniezek and van Swol, 2001, p. 290). In other words, social uncertainty depends on the information attributes of the

market offering. If a market offering is dominated by experience and credence qualities (that is, customers ascertain the quality of the market offering only after having purchased it), there is “opportunity for deception due to the information asymmetry between the buyers and sellers” (Sniezek and van Swol, 2001; based on Kollock (1994)).

In the research context of international alliances, we found the notion of “goal uncertainty.” Goal uncertainty is “the uncertainty concerning the similarities and differences in the goals of the alliance partners” (Sharma, 1998, p. 514). Thus, goal uncertainty is an equivalent of social uncertainty. Likewise *et al.* (2003, p. 962) speak of relationship uncertainty:

[...] due to the bounded rationality of decision makers, inter-firm cooperation is exposed to uncertainty regarding the future behavior of the counterparts, and the future outcome of the present cooperation.

Resource uncertainty. Given the fact that certain market offerings are co-created, there is no finished good to be evaluated by a buyer prior to purchase. Therefore, the buyer needs to consider the to-be deployed resources in order to gauge the future market offering’s quality. More specifically, the customer lacks knowledge “of the resources controlled by the other party, as well as their importance and usefulness” in delivering the market offering (Sharma, 1998, p. 514). Hence, uncertainty may stem from the resources a supplier deploys to create a market offering.

Process uncertainty. Closely related to resource uncertainty is the notion of process uncertainty which has been put forward by Sharma. It is defined as the:

[...] uncertainty concerning the manner in which the resources of alliance partners can be combined to achieve a mission. This type of uncertainty arises because the resources of the [...] partners are heterogeneous (Alchian and Demsetz, 1972; Sharma, 1998, p. 514).

2.3 Customer-related decision-making uncertainty

Finally, DMU may neither stem from the characteristics of the market offering nor from the supplier but from the procurement manager himself. In this case, a manager experiences need uncertainty. Moreover, as kind of overarching construct, with regards to all abovementioned facets of DMU, managers perceive varying degrees of choice uncertainty.

Need uncertainty. In defining need uncertainty, we draw from Håkansson *et al.* (1976, pp. 320-1):

There are often difficulties in interpreting the exact nature of the needs for materials, machines, tools, services, etc. in the firm. The buyer’s perceived need uncertainty is a function of these difficulties in combination with the importance of the actual need[4].

Need uncertainty may result in choice uncertainty (Anderson, 2003).

Choice uncertainty. Choice uncertainty is defined as the “uncertainty regarding which alternative to choose” (Urbany *et al.*, 1989, p. 208)[5]. Behavioral decision-making research found that product complexity (defined by its number of attributes, number of respective values, and the negative interdependence of attributes)[6], market complexity (number of alternative products), and decision importance, among other factors, are positively related to choice uncertainty. As such, choice uncertainty results from all previously considered facets of DMU. Although choice uncertainty is rather innate to the customer, it is triggered by external factors, such as the different facets of DMU mentioned above.

3. Dimensions of industrial market offerings

Previous classification schemes have focused on the industrial buying situation and have developed a fundamental understanding of organizational purchase behavior (Hunter *et al.*, 2004; Robinson *et al.*, 1967). However, our paper stresses the influence of the characteristics of the industrial market offering specifically on DMU, as opposed to the buying situation as a whole. Extant classification schemes on industrial market offerings have focused on establishing the service-goods distinction (Grönroos, 1998; Fisk *et al.*, 1993; Shostack, 1977), as well as various objectively measurable characteristics (such as replacement rate or personal delivery; Boyt and Harvey, 1997). These classification schemes and others (Shostack, 1987; Thomas, 1978) likewise explicitly or implicitly stress complexity as a distinguishing dimension, among others. Yet, another important dimension in the classification of market offerings is their degree of co-creation. This notion has continuously been recognized in service marketing (Mersha, 1990; Haywood-Farmer, 1988; Bell, 1981; Mills and Margulies, 1980; Chase, 1978; Fuchs, 1986). Although some classification schemes proposed dimensions similar to our understanding of market-offering complexity and co-creation (Silvestro *et al.*, 1992; Haynes, 1990; Wemmerlöv, 1990; Bowen, 1990; Bell, 1986), none have established the link to DMU. However, this body of knowledge supports our understanding that industrial market offerings ought to be classified along the dimensions of market-offering complexity and co-creation. We deem both dimensions crucial for explaining customers' DMU, as the following paragraphs will show.

3.1 Market-offering complexity

Different research streams have demonstrated a positive effect of complexity on DMU, such as research on organizational buying behavior (McQuiston, 1989), marketing channels (Dwyer and Welsh, 1985), consumer buying behavior (Heitmann *et al.*, 2007; Wilson *et al.*, 2001; Bunn and Liu, 1996), information processing (Keller and Staelin, 1987; Jacoby *et al.*, 1974), and organizational research (Homburg *et al.*, 1999; Downey and Slocum, 1975). Heiner (1983, p. 565) posits that "in general, there is greater uncertainty as either an agent's perceptual abilities become less reliable or the environment becomes more complex." We concur with Duncan (1972) and Pfeffer and Salancik (1978) that complexity is defined in terms of the perception of decision makers. Individuals have different perceptions and tolerance levels for ambiguity and uncertainty (Adorno *et al.*, 1950; Berlyne, 1968). Therefore, testing an objective state of market-offering complexity would not be conducive to our research purpose (Achrol *et al.*, 1983).

Although the analysis of the effects of complexity on decision making is far from innovative, studies in business-to-business contexts are rare. As Wynstra *et al.* (2006, p. 475) succinctly note: "Finally, hardly any research is published that deals with the variety of business services from the buyer's perspective, and which examines how buyers deal with this variety." Note, that – according to our understanding – variety is only one facet of market-offering complexity.

3.2 Co-creation

Our second defining element of industrial market offerings is the degree to which production processes are split between supplier and customer. This phenomenon has been labeled as "co-production" (Auh *et al.*, 2007; Ramirez, 1999; Normann and Ramirez, 1993), "customer participation" (Dabholkar, 1990), "co-constructing"

(Sawhney, 2006), “co-creation” (Cova and Salle, 2007; Vargo and Lusch, 2004), and “customer integration” (Kleinaltenkamp and Jacob, 2002). Interestingly, co-creation has mainly been researched in the context of consumer markets, with minimal findings from business markets (Payne *et al.*, 2008). This is an important point because, whereas in consumer markets co-creation is an opportunity for a firm to achieve competitive advantage (Auh *et al.*, 2007), in industrial markets customer integration is oftentimes a necessity (Dhar *et al.*, 2004); since customers “often demand special value-adding activities from their suppliers, such as joint product development, advanced personal interaction, or consulting services” (Stock, 2006, p. 588).

Research on co-creation can be classified according to three research questions:

- RQ1. Research focusing on the benefits, in terms of productivity gains by customer participation for the firm (Blazevic and Lievens, 2008; Payne and Frow, 2005).
- RQ2. Research focusing on when and which customers should participate in the production processes (Meuter *et al.*, 2005).
- RQ3. The psychological effects of participation in production processes on customers (Bendapudi and Leone, 2003, p. 14).

According to the latter authors, research “has not addressed customers’ potential psychological responses to participation.” Even if we were to apply research on co-creation to consumer markets, its effects on DMU or its interplay with market-offering complexity would still need to be tested (Hsieh *et al.*, 2004). We argue that co-creation has a positive impact on customers’ DMU via:

- increasing information load; and
- increasing preference uncertainty.

It can be argued that the more a customer is involved with the production process of a market offering, the more information he or she needs to process. We refer to the information load hypothesis (Jacoby *et al.*, 1974), according to which surpassing an individual threshold of information load leads to individually perceived uncertainty. In other words, customers that are integrated within the production process of a market offering are more likely to experience DMU due to higher information processing demands, as compared to customers purchasing a ready-made industrial market offering.

Second, we draw from research on preference construction and preference expression – two research streams conveying that individuals lack the ability to form *ex ante* preferences. First of all, research on preference construction maintains that customers oftentimes do not have *ex ante* specified preferences but that these are instead highly dependent on the options presented (Anderson, 2003, p. 141). Since the final market offering is co-created, there are theoretically an infinite number of available options, thereby hampering preference construction. Second and moreover, even if customers have preferences, they may simply lack insight into these preferences (Kramer, 2007). Managers oftentimes have to operate in an environment where forming *ex ante* preferences is not possible since they cannot convey exactly what they (on behalf of a firm) are looking for (Dhar *et al.*, 2004), i.e. they have a problem expressing their preferences (see Franke *et al.*, 2009 in the case of product customization). We argue

that both phenomena are more salient in buying situations with high co-creation. Thus, highly integrated customers are more prone to preference uncertainty, which in turn increases overall DMU.

4. Classifying industrial market offerings

We are interested in the perceived DMU of buying center members at a particular point in time. In other words, we follow a “static” orientation and the unit of analysis is the individual decision maker within a buying center. Furthermore, we employ a conceptual typology, i.e. a deductive method of classification, as opposed to developing a taxonomy as inductive method of classification. Figure 1 shows our conceptual typology of industrial market offerings based on the dimensions “co-creation” and “market offering complexity.” Each of the resulting four quadrants is described in detail based on the following attributes:

- customers’ abstractness of goals/needs;
- degree of standardization/customization of the market offering;
- the market offering’s information-economical profile (i.e. preponderance of search-, experience-, or credence attributes);
- value/price considerations of the customer; and
- the regularity of procurement of the market offering.

Concerning the cases of the typology we support the argument of Bailey (1994, p. 19): “I would wish for the clearest and purest example of the type, with no dull or damaged features. In short, I would like to have a perfect specimen.” In that sense, the ideal type cannot be found “in its conceptual purity” in reality (Bailey, 1994). Each bar illustrates the pertinence of DMU in the different industrial buying situations, with higher bars indicating greater pertinence of DMU.

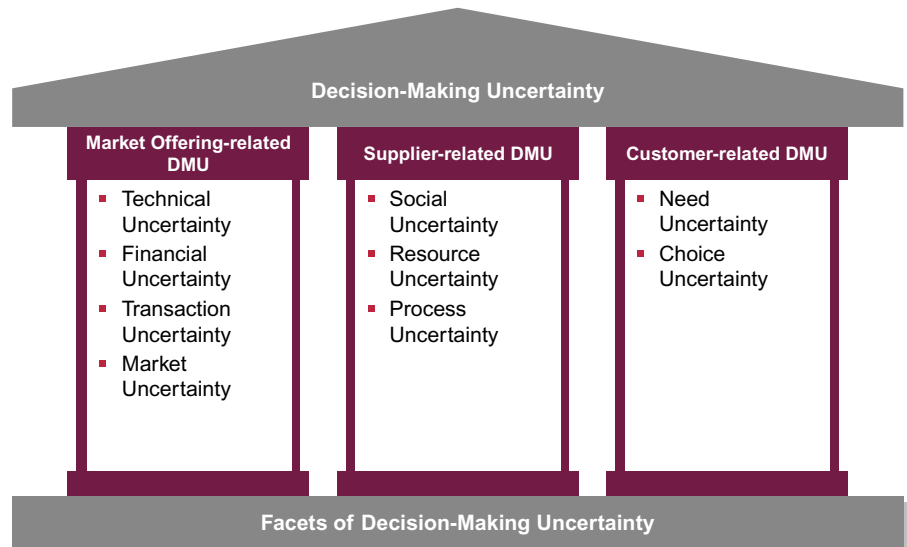


Figure 1.
Facets of DMU

Source: Authors’ own creation

4.1 High market offering complexity/high co-creation (HH): complex solutions

We labeled the fourth quadrant “complex solutions,” which are characterized by both high degrees of perceived market offering complexity and co-creation. This type of market offering is gaining prominence in a variety of industries; for instance, technology companies have shifted (e.g. IBM by acquiring PriceWaterhouseCoopers) or are in the process of shifting (e.g. note HP’s major strategic shift towards services by acquiring service firms such as EDS and Autonomy, Dell acquired Parot Systems) from competing based on product differentiation to competing based on solution customization (*Businessweek*, 2009; Srivastava *et al.*, 1999). Dell for instance gives its sales division incentives “to offer a broad range of solutions, instead of just hardware” (Edwards, 2009, p. 40). Another case in point is the photovoltaic market where major players such as Q-Cells shift from providing large-volume “solar farm” products to delivering building integrated photovoltaic solutions. The latter market is characterized by “increasingly higher barriers to entry that often depend upon intangible tacit knowledge or intellectual capital” (In *et al.*, 2011, p. 31) allowing for higher profit margins by moving suppliers’ market offerings from a commodity to integrated solutions status.

We draw from qualitative research by Tuli *et al.* (2007, p. 9), who state that:

[...] one of the key aspects of solutions is their complexity as compared to most products. This complexity can create problems as oftentimes, it’s not clear what are the requirements, what are the goals, etc. This is especially important for solutions due to the duration of solution development and implementation.

Thus, complex solutions arise from the high abstractness of customer needs. Due to their abstract needs, the market offering is specified in an interactive way between supplier and customer. In other words, a clear specification broken down into specific metrics is not possible prior to the purchase of the market offering since the customer does not know how his or her abstract needs would translate into concrete and tangible needs. For such market offerings, customer preferences are learned rather than predefined (Dhar *et al.*, 2004, p. 259). The market offering production process is indistinguishable from customers’ input and likewise indistinguishable are creation and demand fulfilment. When implementing a solution, an “iterative process, driven by trial and error” sets in (Thomke and Fujimoto, 2000, p. 130). In other words, market offerings are jointly created by suppliers and customers. On this note, Silvestro (1999, p. 402) states that “in professional services, the customer often actively participates in the process of defining the service specification, detailing his/her individual requirements.” Typical examples are engineering project management and certain types of management consulting.

Therefore, complex solutions are not standardized but are unique with a high degree of customization. Thus, complex solutions are “people-based,” as opposed to “equipment-based” (Thomas, 1978). Regarding operations, this implies that suppliers need to invest in the expertise of their workforce. On this note, a major account of Hewlett Packard’s service unit describes the choice of Aviva to choose HP over IBM for a \$1 billion, ten-year outsourcing contract in Britain: “[...] what you’re buying is tremendous expertise” (Vance, 2009, p. B4). Consequently, it becomes very difficult for customers to inspect the market offering prior to purchase, i.e. complex solutions are dominated by experience and credence attributes. Finally, in industrial buying situations, a clear-cut transfer of the market offering from the supplier to the customer is oftentimes hardly discernible.

4.1.1 DMU implications for complex solutions. We argue that customers of complex solutions will experience high degrees of DMU since they will experience both market offering-related and supplier-related uncertainties. Due to the market offering's high complexity, procurement managers are more likely to perceive high degrees of technical uncertainty (Achrol and Stern, 1988; Dwyer and Welsh, 1985). Simply due to the fact that the market offering possesses so many attributes and respective values, it becomes more likely that a decision maker is not knowledgeable across all attributes. Technical uncertainty is difficult to cope with if management lacks the technical expertise to understand the market offering and the consequences of its purchase for the company. Tatikonda and Montoya-Weiss (2001, p. 155) explain that technical uncertainty is influenced by "product and process novelty." In buying situations of high technical and need uncertainty, customers will rely on known suppliers or, in the case of a new purchase, on known brands in the market (Mudambi *et al.*, 1997). In the case of technical uncertainty, customers will especially value "attributes like delivery stability, adaptability, degree of service, etc." (Bengtsson and Servais, 2005, p. 708). Likewise, the more complex the market offering, the more difficult it is to estimate the financial impact of a purchase on company performance.

Also, transaction uncertainty is particularly prevalent in complex solutions since these are co-produced between supplier and customer. In fact, for complex solutions, there is oftentimes no physical transfer of the market offering. Take for example the "production" of an outsourcing project. Whereas certain areas of a given department of the customer company may be outsourced, others may stay within the company. Likewise, the "transfer" of a consultancy project from supplier (e.g. the management consultancy) to customer is mainly intangible and does not take place at a certain point in time but over the course of a period of time. In other words, the transferability of complex solutions is not clear-cut and may evoke transaction uncertainty.

Due to their high degree of co-creation, complex solutions are rarely pre-specified. That means that at the outset of the cooperation between customer and supplier, the specifications of the final market offering have to jointly be made. Oftentimes, this collaborative specification develops throughout the co-creation process. Consequently, there is theoretically an abundance of possible market offering attributes and respective values. Moreover, it is likely that the more attributes a market offering possesses, the more negative correlations between some attributes may emerge (i.e. one has to trade-off one product attribute for another). It has been empirically demonstrated that these three criteria increase choice and need uncertainty: "[...] our experience suggests that customer solution preferences are steeped in uncertainty and ambiguity rather than pure product functionality and benefits" (Dhar, 1997, p. 260).

Given the dominance of "experience and credence attributes" over "search attributes" for complex solutions, industrial customers are also prone to social uncertainty. As Sniezek and van Swol (2001) have established, social uncertainty stems from information asymmetry. Consistent with our argument concerning technical and financial uncertainty, it is likely that procurement managers of complex solutions (especially in the case of a first purchase) have an informational disadvantage compared to the supplier.

For the successful co-creation of the market offering, resources need to be pooled. Consequently, another facet of DMU is concerned with the availability and usefulness of the supplier's resources. Since complex solutions are "people-based," resource uncertainty

mainly applies to the supplier's human resources. Whereas resource uncertainties pertaining to tangible resources are relatively easy for the customer to evaluate, the cognitive resources of the supplier's workforce are much more difficult to assess. Industrial suppliers of complex solutions might counter resource uncertainty by referring to signals. However, being able to examine the quality of the supplier's resources does not resolve the issue of how well the pooled resources of customer and supplier will work together. Especially for complex solutions, achieving customer value depends on how smoothly the resources of both parties, for instance their workforce, different information technologies, etc. interact. Thus, regarding complex solutions, process uncertainty may also be an issue, as the supplier's resources are rich in experience and credence attributes.

Based on this argumentation, it follows that customers of complex solutions focus on the value aspect of the market offering, rather than price considerations. Put differently, solutions are especially demanded in markets where the cost of failure is high. In those markets, customers tend to prefer service and quality over price considerations (Baker, 2009, p. 58). Considering the variety of facets of DMU that are at play, we may conclude that in-suppliers and companies with a strong reputation will dominate markets for complex solutions (see Bengtsson and Servais, 2005; Heide and Weiss, 1995, p. 31, for a similar rationale).

4.2 Low market-offering complexity/low co-creation (LL): commodities

The LL quadrant denotes market offerings of low perceived complexity and low co-creation. Market offerings are typically purchased regularly and in large quantities. This indicates that even if the market offering possesses characteristics of objective complexity, due to the gained experience of procurement management, they are no longer perceived as complex. This point highlights the subjective character of the complexity of a market offering. In other words, complexity is in the eye of the beholder; the same market offering may be perceived as variably complex for different customers. For instance, the purchase object, "consultancy project," is commonly considered complex. Yet, large corporations procure "consultancy projects" several times a year. For these corporations, even if the consultancy project is considered complex upon initial purchase, due to recurring purchases, it may slip from the HH to the LL quadrant.

Further examples for this kind of market offerings are raw materials, items, such as maintenance parts, and office suppliers, as well as services, such as postal services. For these kinds of market offerings, the production process is highly specified and experienced. The interaction between both parties is rather brief and most likely characterized by arm's length transaction-style relationships. Customers have well-defined, concrete requirements and needs and thus choice uncertainty is low. Moreover, transparency is easily achieved since the market offerings are standardized with few differentiations along only a few criteria. That being said, commodities are typically dominated by search attributes. Due to their simple evaluation, market offerings are easier to compare; this, in turn, will foster price competition. Thus, a customer's dependency on the supplier is limited. As a result, markets for commodities are price-driven and companies try to establish economies of scale. Various industrial e-business concepts are demonstrating the overriding importance of price considerations, such as Covisint in the automotive industry, MetalSite.com in the metal industry, and Contractors eSource in the construction sector.

4.2.1 DMU implications for commodities. Since commodities are low in complexity, there are no high requirements for the gathering and processing of information for the procurement manager. Therefore, commodities' technical aspects can rather easily be assessed. Also, commodities' financial impact on the company is predictable. Transactions can be expected to follow a standardized pattern. Moreover, commodities are dominated by search attributes. Consequently, information symmetry is established and hence there is little room for deception or opportunism on the side of the supplier. However, social, resource, and process uncertainty may still be an issue if the customer commits him or herself to long-term order-contracts with a supplier. In that case, the customer could fall prey to the supplier's will. However, this risk is neither a function of market-offering complexity nor of co-creation and thus does not fall within the scope of our framework.

To sum up, DMU for commodities is relatively low since the market offering is easy to evaluate and to specify.

4.3 High market-offering complexity/low co-creation (HL): supplier-centric market offerings

The HL quadrant denotes market offerings that are high in perceived complexity and low in co-creation; examples are purchases of IT-hardware or software. For instance, anti-virus software is a market offering perceived as complex. However, generally no customer will have the opportunity to co-produce the software. Instead, companies may offer different versions of software, among which customers can decide. Considering the dominance of the supplier in the production process, we label this kind of market offering "supplier-centric." These market offerings are of high importance to the purchasing company and due to such importance, a lot of information is exchanged between both parties. The market offerings are purchased in low quantities and irregularly. Customers' requirements and needs are rather vague. Due to the market offerings' complexity, procurement managers will face similar problems in assessing the market offering prior to purchase, as previously described for complex solutions. Thus, the market offering is dominated by experience and credence attributes.

4.3.1 DMU implications for supplier-centric market offerings. When reviewing our classification of facets of DMU, it becomes apparent that supplier-centric market offerings are rich in uncertainties stemming from the market offering and less susceptible to uncertainties stemming from the supplier. Since there is virtually no co-creation, i.e. no interaction between both parties throughout the production process, doubts about the supplier's resources and processes do not concern prospective customers. Nevertheless, due to high perceived complexity of the market offerings, information asymmetries prevail, thus making the procurement manager susceptible to social uncertainties. The complexities of the market offerings raise questions of technical, financial, and transaction uncertainties. In addition, comparisons between market offering alternatives are hampered due to the potential lack of the assortment (Gourville and Soman, 2005).

The market offering's complexity and the lack of assortment may lead to increased market uncertainty for the customer. Furthermore, due to both the variety of choice (emanating from the various and sometimes conflicting product attributes and from the consequential nature of the choice), as well as the abstract requirements and needs of the customer, need and choice uncertainty may arise. Although the production process of the market offering is not closely linked to the customer, its high importance

to the customer and the involved high risk of the purchase evoke customers' interest in developing a relationship to the supplier. Moreover, customer value has a relatively more important role than in the case of commodities.

4.4 Low market-offering complexity/high co-creation (LH): customer-centric market offerings

The LH quadrant is characterized by a relatively low degree of perceived market-offering complexity and a high degree of co-creation of the market offering. Examples are "high contact services" (Chase, 1978), like diverse customer services (e.g. taxi, eat as you go, call center services, software and systems training and support), hospitality and tourism. With respect to these services, the customer is constantly involved in the production process, i.e. a high degree of co-creation takes place. Therefore, we label this kind of market offering "customer-centric." On the other hand, perceived complexity of the market offering is limited. Customers have well-defined requirements and needs. Due to straightforward comparisons and evaluations of the market offering delivery, price plays an important role in the purchase decision. Likewise, the supplier is able to deliver the service to a large amount of customers. Consequently, market offerings are delivered in a standardized way, although they are "people-based." It is normally impossible to examine the market offering prior to consumption. Customer-centric market offerings are instead dominated by experience attributes.

4.4.1 DMU implications of customer-centric market offerings. Since customer-centric market offerings are low in perceived complexity by the customer, technical-, financial-, and transaction uncertainty are also relatively low. Likewise, social uncertainty is only of concern to inexperienced customers. Since customer-centric market offerings are purchased on a regular basis, information asymmetry would not be maintained for long and is in this case thus relatively irrelevant; the same holds true for process and resource uncertainty. Since the customer is able to rapidly gain experience, he or she will also be able to quickly evaluate the supplier. Imagine that a company uses the service of a caterer for its cafeteria; the quality of the caterer will become quickly apparent to the customer and, upon contract renewal, the customer is flexible to opt for an alternative caterer. Relationships with suppliers of such market offerings are evaluated constantly. Due to its low perceived complexity, the dominance of experience attributes, and regular purchases, price considerations are as equally important as value considerations.

5. Conclusion

Drawing from the Buygrid model of Robinson *et al.* (1967) (Anderson and Narus, 2004, pp. 123-4), Figure 2 shows the varying degrees of uncertainty across different phases of the procurement process, i.e. need recognition, determination of characteristics needed, product specification, supplier search, supplier selection, set-up procedures, and formal performance review of the supplier. However, we did not incorporate "proposal solicitation" since, on a theoretical note, this level does not seem to contribute to the varying degrees of DMU. On a conceptual level and in line with our argumentation, the ideal purchase of a complex solution shows high degrees of uncertainties across a greater amount of phases in the procurement process, as compared to in the remaining three ideal buying situations. The lowest level is exhibited by commodity-like market offerings (Figure 3).

Uncertainty has been discussed for decades as one of the shaping forces of consumer decision-making and buying behavior. The aim of this paper was to show that for

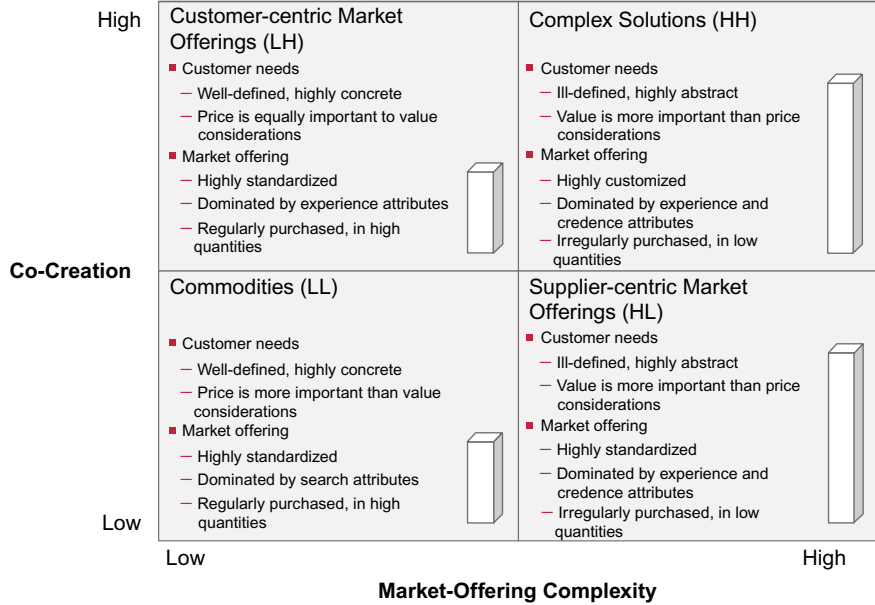


Figure 2. A market-offering complexity/co-creation typology for industrial market offerings

Source: Authors' own creation

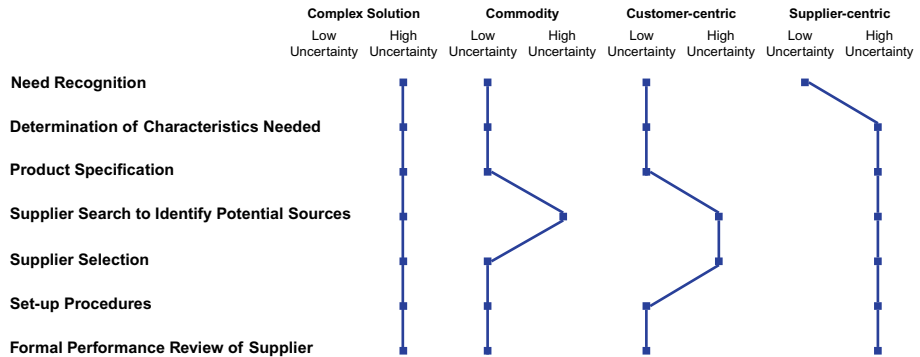


Figure 3. Customer DMU across buying phases

industrial buying behavior, this premise calls for a differentiated view, depending on the characteristics of the market offering. To this end, the authors have theoretically demonstrated how market-offering complexity and co-creation interact to influence the degree of DMU experienced by industrial buyers. Likewise, managers may draw from our typology, which explains that DMU-reducing strategies are more important for certain market offerings than for others. More specifically, the sale of complex solutions calls for DMU-reducing strategies, whereas in the opposite case, namely the sale of commodities, DMU-reducing strategies are not similarly necessary. Indeed, suppliers may use this framework as a guideline to optimize their resource allocation in terms of relationship marketing.

Research has shown that the advice of salespeople is more appreciated in high-risk buying situations (which are similar to high DMU buying situations) than for low-risk market offerings (Sweeney *et al.*, 1999, p. 84). More specifically, “in industrial buying situations, Henthorne *et al.* (1993) found that external salespeople were one of the most important informal, personal sources of information” (quoted from Sweeney *et al.*, 1999). Consequently, one may hypothesize that rather personal, DMU-reducing contact (i.e. expensive resources) ought to be directed towards customers of complex solutions, rather than towards customers of commodities, in which case fairly impersonal contact should be maintained to economize on resources (Reinartz *et al.*, 2005). Future research should aim to empirically validate the proposed contingency framework and find ways to mitigate customer DMU.

Notes

1. We find many terms in research closely related to “co-creation,” e.g. “joint production,” “customer production” (Meuter *et al.*, 2005; Meuter and Bitner, 1998), or “customer participation” (Chan *et al.*, 2010).
2. Newell and Simon (1972, p. 55): “Just as a scissors cannot cut paper without two blades, a theory of thinking and problem solving cannot predict behavior unless it encompasses both an analysis of the structure of task environments and an analysis of the limits of rational adaptation to task requirements.”
3. Downey and Slocum (1975, p. 570): “Reviewing the manner in which uncertainty has been employed, Duncan (1972) identified three basic definitions in the literature, all of which are explicitly or implicitly grounded in the concept of information as a counterpart of uncertainty.” Uncertainty has been similarly defined by McQuiston (1989, p. 70): “Organizational buying theory states that when members of a decision-making unit are faced with uncertainty, they seek to reduce it through the gathering of more information” (Sheth, 1973; Webster and Wind, 1972; Cyert and March, 1963). See also Dawes *et al.* (1998), Bunn (1993), Puto *et al.* (1985), More (1984), Anderson (1982), Spekman and Stern (1979), Assmus (1977), Sheth (1973) and Hickson *et al.* (1971).
4. Psychological research speaks of preference uncertainty.
5. Psychological research speaks of selection difficulty (Anderson, 2003).
6. Imagine that you want to buy a car; on the one hand, you would like to economize (in terms of miles per gallon or purchase price), yet on the other hand, you prefer strong engines. Both attributes are negatively correlated.

References

- Aaker, D.A. and Jacobson, R. (2001), “The value relevance of brand attitude in high-technology markets”, *Journal of Marketing Research*, Vol. 38, pp. 485-93.
- Achrol, R.S. and Stern, L.W. (1988), “Environmental determinants of decision-making uncertainty in marketing channels”, *Journal of Marketing Research*, Vol. 25, pp. 36-50.
- Achrol, R.S., Reve, T. and Stern, L.W. (1983), “The environment of marketing channel dyads: a framework for comparative analysis”, *Journal of Marketing*, Vol. 47, pp. 55-67.
- Adorno, T.W., Frenkel-Brunswick, E. and Levinson, D.J. (1950), *The Authoritarian Personality*, Harper & Row, New York, NY.
- Anderson, C.J. (2003), “The psychology of doing nothing: forms of decision avoidance result from reason and emotion”, *Psychological Bulletin*, Vol. 129, pp. 139-67.

-
- Anderson, J.C. and Narus, J.A. (2004), *Business Market Management: Understanding, Creating, and Delivering Value*, Prentice-Hall, Upper Saddle River, NJ.
- Anderson, P.F. (1982), "Marketing, strategic planning and the theory of the firm", *Journal of Marketing*, Vol. 46, pp. 15-26.
- Assmus, G. (1977), "Bayesian analysis for the evaluation of marketing research expenditures: a reassessment", *Journal of Marketing Research*, Vol. 14, pp. 562-8.
- Auh, S., Bell, S.J., McLeod, C.S. and Shih, E. (2007), "Co-production and customer loyalty in financial services", *Journal of Retailing*, Vol. 83, pp. 359-74.
- Bailey, K.D. (1994), *Typologies and Taxonomies: An Introduction to Classification Techniques*, Sage, Thousand Oaks, CA.
- Baker, S. (2009), "Timken plits a rust belt resurgence", *The Businessweek*, October 22, p. 58.
- Bearden, W.O. and Shimp, T.A. (1982), "The use of extrinsic cues to facilitate product adoption", *Journal of Marketing Research*, Vol. 19, pp. 229-39.
- Bell, M.L. (1981), "A matrix approach to the classification of marketing goods and services", in Donnelly, J.H. and George, W.R. (Eds), *Marketing of Services*, American Marketing Association, Chicago, IL.
- Bell, M.L. (1986), "Some strategy implications of a matrix approach to the classification of marketing goods and services", *Journal of the Academy of Marketing Science*, Vol. 14 No. 1, pp. 13-20.
- Bello, D.C. and Zhu, M. (2006), "Global marketing and procurement of industrial products: institutional design of interfirm functional tasks", *Industrial Marketing Management*, Vol. 35, pp. 545-55.
- Bendapudi, N. and Leone, R.P. (2003), "Psychological implications of customer participation in co-production", *Journal of Marketing*, Vol. 67, pp. 14-28.
- Bengtsson, A. and Servais, P. (2005), "Co-branding on industrial markets", *Industrial Marketing Management*, Vol. 34, pp. 706-13.
- Berlyne, D.E. (1968), "The motivational significance of collative variables and conflict", in Abelson, R.P., Aronson, E., McGuire, W., Newcomb, T., Rosenberg, M. and Tennenbaum, P. (Eds), *Theories of Cognitive Consistency: A Sourcebook*, Rand McNally, Chicago, IL.
- Blazevic, V. and Lievens, A. (2008), "Managing innovation through customer coproduced knowledge in electronic services: an exploratory study", *Journal of the Academy of Marketing Science*, Vol. 36, pp. 138-51.
- Bowen, J. (1990), "Development of a taxonomy of services to gain strategic marketing insights", *Journal of the Academy of Management Science*, Vol. 18 No. 1, pp. 43-9.
- Boyt, T. and Harvey, M.G. (1997), "Classification of industrial services: a model with strategic implications", *Industrial Marketing Management*, Vol. 26, pp. 291-300.
- Bunn, M.D. (1993), "Taxonomy of buying decision approaches", *Journal of Marketing*, Vol. 57, p. 19.
- Bunn, M.D. and Liu, B.S.-C. (1996), "Situational risk in organizational buying: a basis for adaptive selling", *Industrial Marketing Management*, Vol. 25, p. 14.
- (The) *Businessweek* (2009), "Mark hurd of HP isn't resting on his laurels", *The Businessweek*, October 5, pp. 17-18.
- Chan, K.W., Yim, C.K.B. and Lam, S.S.K. (2010), "Is customer participation in value creation a double-edged sword? Evidence from professional financial services across cultures", *Journal of Marketing*, Vol. 74, pp. 48-64.

-
- Chase, R.B. (1978), "Where does the customer fit in a service operation?", *Harvard Business Review*, Vol. 56, pp. 137-42.
- Cova, B. and 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*, Vol. 36, pp. 135-266.
- Cyert, R.M. and March, J.G. (1963), *A Behavioral Theory of the Firm*, Prentice-Hall, Englewood Cliffs, NJ.
- Dabholkar, P. (1990), "How to improve perceived service quality by improving customer participation", in Dunlap, B.J. (Ed.), *Developments in Marketing Science*, Academy of Marketing Science, Cullowhee, NC.
- Dawes, P.L., Lee, D.Y. and Dowling, G.R. (1998), "Information control and influence in emergent buying centers", *Journal of Marketing*, Vol. 62, pp. 55-78.
- Dhar, R. (1997), "Context and task effects on choice deferral", *Marketing Letters*, Vol. 8, pp. 119-30.
- Dhar, R., Menon, A. and Maach, B. (2004), "Toward extending the compromise effect to complex buying contexts", *Journal of Marketing Research*, Vol. 41, pp. 258-62.
- Downey, H.K. and Slocum, J.W. (1975), "Uncertainty: measures, research, and sources of variation", *Academy of Management Journal*, Vol. 18, pp. 562-77.
- Duncan, R. (1972), "Characteristics of organizational environments and perceived environmental uncertainty", *Administrative Science Quarterly*, Vol. 17, pp. 313-27.
- Dwyer, F.R. and Welsh, A. (1985), "Environmental relationships of the internal political economy of marketing channels", *Journal of Marketing Research*, Vol. 22, pp. 397-414.
- Edwards, C. (2009), "Dell's do-over", *The Businessweek*, October 22, pp. 37-40.
- Eisenhardt, K.M. and Bourgeois, L.J. III (1988), "Politics of strategic decision making in high-velocity environments: toward a midrange theory", *The Academy of Management Journal*, Vol. 31 No. 4, pp. 737-70.
- Fisk, R.P., Brown, S.W. and Bittner, M.J. (1993), "Tracking the evolution of the services marketing literature", *Journal of Retailing*, Vol. 69, pp. 61-103.
- Franke, N., Keinz, P. and Steger, C.J. (2009), "Testing the value of customization: when do customers really prefer products tailored to their preferences?", *Journal of Marketing*, Vol. 73, pp. 103-21.
- Fuchs, V.R. (1986), "Productivity in services: three case studies", in Fuchs, V.R. and Leveson, I.F. (Eds), *The Service Economy*, UMI, Fukuoka, pp. 99-127.
- Gao, T., Sirgy, J.M. and Bird, M.M. (2005), "Reducing buyer decision-making uncertainty in organizational purchasing: can supplier trust, commitment, and dependence help?", *Journal of Business Research*, Vol. 58, pp. 397-405.
- Gerwin, D. (1988), "A theory of innovation processes for computer-aided manufacturing technology", *IEEE Transactions on Engineering Management*, Vol. 35, pp. 90-100.
- Glazer, R. (1991), "Marketing in an information-intensive environment: strategic implications of knowledge as an asset", *Journal of Marketing*, Vol. 55 No. 4, pp. 1-19.
- Gourville, J.T. and Soman, D. (2005), "Overchoice and assortment type: when and why variety backfires", *Marketing Science*, Vol. 24, p. 14.
- Grönroos, C. (1998), "Marketing services: the case of a missing product", *Journal of Business & Industrial Marketing*, Vol. 13, pp. 322-38.
- Håkansson, H., Johanson, J. and Wootz, B. (1976), "Influence tactics in buyer-seller processes", *Industrial Marketing Management*, Vol. 5, pp. 319-32.

- Haynes, R.M. (1990), "Service typologies: a transaction modelling approach", *International Journal of Service Industry Management*, Vol. 1 No. 1, pp. 15-26.
- Haywood-Farmer, J. (1988), "A conceptual model of service quality", *International Journal of Operations & Production Management*, Vol. 8 No. 6, pp. 19-29.
- Heide, J.B. and Weiss, A.M. (1995), "Vendor consideration and switching behavior for buyers in high-technology markets", *Journal of Marketing*, Vol. 59 No. 3, pp. 30-43.
- Heiner, R.A. (1983), "The origin of predictable behavior", *American Economic Review*, Vol. 73, pp. 560-95.
- Heitmann, M., Lehmann, D.R. and Herrmann, A. (2007), "Choice goal attainment and decision and consumption satisfaction", *Journal of Marketing Research*, Vol. 44, pp. 234-50.
- Henthorne, T.L., LaTour, M.S. and Williams, A.J. (1993), "How organizational buyers reduce risk", *Industrial Marketing Management*, Vol. 22, pp. 41-8.
- Hickson, D.J., Hinings, C.R., Lee, C.A., Schneck, R.E. and Pennings, J.M. (1971), "A strategic contingencies theory of intraorganizational power", *Administrative Science Quarterly*, Vol. 16, pp. 216-29.
- Homburg, C., Workman, J.P. Jr and Krohmer, H. (1999), "Marketing's influence within the firm", *Journal of Marketing*, Vol. 63, pp. 1-17.
- Hsieh, A.-T., Yen, C.-H. and Chin, K.-C. (2004), "Participative customers as partial employees and service provider workload", *International Journal of Service Industry Management*, Vol. 15, pp. 187-99.
- Hunter, L.M., Kasouf, C.J., Celuch, K.G. and Curry, K.A. (2004), "A classification of business-to-business buying decisions: risk importance and probability as a framework for e-business benefits", *Industrial Marketing Management*, Vol. 33, pp. 145-54.
- In, W., Foster, S., Kim, D., Wong, K., Rameau, K. and Shin, E. (2011), *Solar Spotlight*, BNP Paribas Industry Overview, Paris.
- Jacoby, J., Speller, D.E. and Kohn, C.A. (1974), "Brand choice behavior as a function of information load", *Journal of Marketing Research*, Vol. 11, pp. 63-9.
- Jayachandran, S., Sharma, S., Kaufman, P. and Raman, P. (2005), "The role of relational information processes and technology use in customer relationship management", *Journal of Marketing*, Vol. 69, pp. 177-92.
- Keller, K.L. and Staelin, R. (1987), "Effects of quality & quantity of information on decision effectiveness", *Journal of Consumer Research*, Vol. 14, pp. 200-13.
- Kleinaltenkamp, M. and Jacob, F. (2002), "German approaches to business-to-business marketing theory – origins and structure", *Journal of Business Research*, Vol. 55, pp. 149-55.
- Kollock, P. (1994), "The emergence of exchange structures: an experimental study of uncertainty, commitment, and trust", *The American Journal of Sociology*, Vol. 100, pp. 313-45.
- Kramer, T. (2007), "The effect of measurement task transparency on preference construction and evaluations of personalized recommendations", *Journal of Marketing Research*, Vol. 44, pp. 224-33.
- Lehmann, D.R. and O'Shaughnessy, J. (1974), "Difference in attribute importance for different industrial products", *Journal of Marketing*, Vol. 38, pp. 36-42.
- Lowell, B. and Farrell, D. (2008), "Leading through uncertainty", *The McKinsey Quarterly*, December, available at: www.mckinseyquarterly.com
- Lusch, R.F., Brown, S.W. and Brunswick, G.J. (1992), "A general framework for explaining internal vs external exchange", *Journal of the Academy of Marketing Science*, Vol. 20, pp. 119-34.

-
- McQuiston, D.H. (1989), "Novelty, complexity, and importance as causal determinants of industrial buyer behavior", *Journal of Marketing*, Vol. 53, pp. 66-80.
- Mersha, T. (1990), "Enhancing the customer contact model", *Journal of Operations Management*, Vol. 9 No. 3, pp. 391-405.
- Messick, S.J. (1993), "Validity", in Linn, R.L. (Ed.), *Educational Measurement*, 2nd ed., American Council on Education and the Oryx Press, Phoenix, AZ.
- Messick, D.M., Allison, S.T. and Samuelson, C.D. (1987), "Framing and communication effects on group members' responses to environmental and social uncertainty", in Maital, S. (Ed.), *Economics and Psychology*, North-Holland, Amsterdam.
- Meuter, M.L. and Bitner, M.J. (1998), "Self-service technologies: extending service frameworks and identifying issues for research", in Grewal, D. and Pechmann, C. (Eds), *AMA Winter Educators' Conference: Marketing Theory and Applications*, American Marketing Association, Chicago, IL.
- Meuter, M.L., Bitner, M.J., Ostrom, A.L. and Brown, S.W. (2005), "Choosing among alternative service delivery modes: an investigation of customer trial of self-service technologies", *Journal of Marketing*, Vol. 69, pp. 61-83.
- Mills, P.K. and Margulies, N. (1980), "Toward a core typology of service organizations", *The Academy of Management Review*, Vol. 5 No. 2, pp. 255-65.
- More, R.A. (1984), "Timing of market research in new industrial product situations", *Journal of Marketing*, Vol. 48, pp. 84-94.
- Mudambi, S.M., Doyle, P. and Wong, V. (1997), "An exploration of branding in industrial markets", *Industrial Marketing Management*, Vol. 26, pp. 433-46.
- Newell, A. and Simon, H.A. (1972), *Human Problem Solving*, Prentice-Hall, Englewood Cliffs, NJ.
- Normann, R. and Ramirez, R. (1993), "From value chain to value constellation: designing interactive strategy", *Harvard Business Review*, Vol. 71, pp. 65-77.
- Norton, J.A. and Bass, F.M. (1987), "A diffusion theory model of adoption and substitution for successive generations of high-technology products", *Management Science*, Vol. 33 No. 9, pp. 1069-86.
- Payne, A.F. and Frow, P. (2005), "A strategic framework for customer relationship management", *Journal of Marketing*, Vol. 69, pp. 167-76.
- Payne, A.F., Storbacka, K. and Frow, P. (2008), "Managing the co-creation of value", *Journal of the Academy of Marketing Science*, Vol. 36, pp. 83-96.
- Pfeffer, J. and Salancik, G.R. (1978), *The External Control of Organizations: A Resource Dependence Perspective*, Harper & Row, New York, NY.
- Puto, C.P., Patton, W.E. and King, R.H. (1985), "Risk handling strategies in industrial vendor selection decisions", *Journal of Marketing*, Vol. 49, pp. 89-98.
- Qualls, W.J. and Puto, C.P. (1989), "Organizational climate and decision framing: an integrated approach to analyzing industrial buying decisions", *Journal of Marketing Research*, Vol. 26, p. 14.
- Ramirez, R. (1999), "Value co-production: intellectual origins and implications for practice and research", *Strategic Management Journal*, Vol. 20, pp. 49-65.
- Reinartz, W., Thomas, J.S. and Kumar, V. (2005), "Balancing acquisition and retention resources to maximize customer profitability", *Journal of Marketing*, Vol. 69, pp. 63-79.
- Rindfleisch, A. and Heide, J.B. (1997), "Transaction cost analysis: past, present, and future applications", *Journal of Marketing*, Vol. 61, pp. 30-54.

- Robinson, P.J., Faris, C. and Wind, Y. (1967), *Industrial Buying and Creative Marketing*, Allyn & Bacon, Boston, MA.
- Sawhney, M. (2006), "Going beyond the product: defining, designing, and delivering customer solutions", in Vargo, S.L. and Lusch, R.F. (Eds), *The Service-dominant Logic of Marketing: Dialog, Debate, and Directions*, M.E. Sharpe, Armonk, NY.
- Sharma, D.D. (1998), "A model for governance in international strategic alliances", *Journal of Business & Industrial Marketing*, Vol. 13, pp. 511-28.
- Sheth, J.N. (1973), "A model of industrial buyer behavior", *Journal of Marketing*, Vol. 37, pp. 50-6.
- Shostack, G.L. (1977), "Breaking free from product marketing", *Journal of Marketing*, Vol. 41, pp. 73-80.
- Shostack, G.L. (1987), "Service positioning through structural change", *Journal of Marketing*, Vol. 51, pp. 34-43.
- Silvestro, R. (1999), "Positioning services along the volume-variety diagonal: the contingencies of service design, control and improvement", *International Journal of Operations & Production Management*, Vol. 19, pp. 399-421.
- Silvestro, R., Fitzgerald, L., Johnston, R. and Voss, C. (1992), "Towards a classification of service processes", *International Journal of Service Industry Management*, Vol. 3 No. 3, pp. 62-75.
- Sniezek, J.A. and van Swol, L.M. (2001), "Trust, confidence, and expertise in a judge-advisor system", *Organizational Behavior and Human Decision Processes*, Vol. 84, pp. 288-307.
- Spekman, R.E. and Stern, L.W. (1979), "Environmental uncertainty and buying group structure: an empirical investigation", *Journal of Marketing*, Vol. 43, pp. 54-64.
- Srivastava, R.K., Shervani, T.A. and Fahey, L. (1999), "Marketing, business processes, and shareholder value: an organizationally embedded view of marketing activities and the discipline of marketing", *Journal of Marketing*, Vol. 63, pp. 168-79.
- Stock, R.M. (2006), "Interorganizational teams as boundary spanners between supplier and customer companies", *Journal of the Academy of Marketing Science*, Vol. 34, pp. 588-99.
- Sweeney, J.C., Soutar, G.N. and Johnson, L.W. (1999), "The role of perceived risk in the quality-value relationship: a study in a retail environment", *Journal of Retailing*, Vol. 75, pp. 77-105.
- Tatikonda, M.V. and Montoya-Weiss, M.M. (2001), "Integrating operations and marketing perspectives of product innovation: the influence of organizational process factors and capabilities on development performance", *Management Science*, Vol. 47, pp. 151-72.
- Teece, D.J. (1986), "Profiting from technological innovation: implications for integration, collaboration, licensing and public policy", *Research Policy*, Vol. 15 No. 6, pp. 285-305.
- Thomas, D.R.E. (1978), "Strategy is different in service businesses", *Harvard Business Review*, Vol. 56, pp. 158-65.
- Thomke, S. and Fujimoto, T. (2000), "The effect of 'front-loading' problem-solving on product development performance", *Journal of Product Innovation Management*, Vol. 17, pp. 128-42.
- Thompson, J.D. (1967), *Organizations in Action*, McGraw-Hill, New York, NY.
- Tuli, K.R., Kohli, A.K. and Bharadwaj, S.G. (2007), "Rethinking customer solutions: from product bundles to relational processes", *Journal of Marketing*, Vol. 71, pp. 1-16.
- Ulaga, W. (2003), "Capturing value creation in business relationships: a customer perspective", *Industrial Marketing Management*, Vol. 32, pp. 677-93.
- Urbany, J.E., Dickson, P.R. and Wilkie, W.L. (1989), "Buyer uncertainty and information search", *Journal of Consumer Research*, Vol. 16, pp. 208-15.

-
- Vance, A. (2009), "Consuming E.D.S.", *The New York Times*, p. B1.
- Vargo, S.L. and Lusch, R.F. (2004), "Evolving to a new dominant logic for marketing", *Journal of Marketing*, Vol. 68, pp. 1-17.
- von Neumann, J. and Morgenstern, O. (1944), *Theory of Games and Economic Behavior*, Princeton University Press, Princeton, NJ.
- Webster, F.E. and Wind, Y. (1972), "A general model for understanding organizational buying behavior", *Journal of Marketing*, Vol. 36 No. 2, pp. 12-19.
- Wemmerlöv, U. (1990), "A taxonomy for service processes and its implications for system design", *International Journal of Service Industry Management*, Vol. 1 No. 3, pp. 20-40.
- Wilson, E.J., Lilien, G.L. and Wilson, D.T. (1991), "Developing and testing a contingency paradigm of group choice in organizational buying", *Journal of Marketing Research*, Vol. 28, p. 15.
- Wilson, E.J., McMurrian, R.C. and Woodside, A.G. (2001), "How buyers frame problems: revisited", *Psychology & Marketing*, Vol. 18, pp. 617-55.
- Wynstra, F., Axelsson, B. and van der Valk, W. (2006), "An application-based classification to understand buyer-supplier interaction in business services", *International Journal of Service Industry Management*, Vol. 17, pp. 474-96.

Further reading

- Anderson, J.C., Thomson, J.B.L. and Wynstra, F. (2000), "Combining value and price to make purchase decisions in business markets", *International Journal of Research in Marketing*, Vol. 17, pp. 307-29.
- Eriksson, K. and Sharma, D.D. (2003), "Modeling uncertainty in buyer-seller cooperation", *Journal of Business Research*, Vol. 56, pp. 961-70.
- Kohli, A.K. (1989), "Determinates of influence in organizational buying: a contingency approach", *Journal of Marketing*, Vol. 53, pp. 50-65.

Corresponding author

Jan Lakotta can be contacted at: jan.lakotta@capgemini.com