AN EXPLORATORY INVESTIGATION OF THE EFFECTS OF CO-PRODUCTION AND CO-CONSUMPTION ON THE CHARACTERISTICS AND ADOPTION OF SERVICE INNOVATIONS: THE CUSTOMER'S PERSPECTIVE

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Customers play an active role throughout the marketing process. This dissertation concerns itself with customer's co-creation of value for self (co-production) and for other customers (co-consumption) during service production and delivery. With the servuction system as its overarching framework, this study explains how changes in the customer's perceived co-production and co-consumption, caused by a service innovation, influence her perceptions of service innovation characteristics and modify her adoption behavior. It draws on a multidisciplinary body of knowledge and develops a conceptual framework and a set of substantive propositions.

The empirical research was contextualized in three services: self check-out at grocery stores, Build-A-Bear stores, and meal assembly centers. It focused on members of Generations X and Y who were familiar with these services. The qualitative investigations and pilot study helped adapt the extant scales and construct new scales. In line with prior works, the focal service encounters were simulated through a series of consumption scenarios. The exploratory factor analysis in the pilot study and the confirmatory factor analysis in the main study indicated that the instruments were culturally informed, internally reliable, and construct-wise valid.

The results indicate that co-production and co-consumption play important roles in explaining innovation characteristics and adoption decisions. More specifically, the focal customer's co-production of the service for self (CPS), other customers' co-production of the service for the focal customer (OCP), the number and the nature of other customers (crowding

and homophily) can help to explain the focal customer's evaluation of service innovation characteristics as well as her adoption decision. The focal customer's disposition to participate (DTP) and its interaction with CPS are also useful explanatory constructs. Focal customer's co-production of the service for other customers (CPO) and its interaction with DTP emerged as non-significant. In comparing the high- and low-DTP groups, it was found that the former was more convenience-prone in two service contexts, and the latter in the third context.

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CHAPTER 1

INTRODUCTION

This research is about customers' role in the creation of value in service industries. Value is often co-created by the service firm and its customers who share the same service facility. Using customer's service experience as the surrogate for value, this research aims to understand how a customer's experience is influenced by her own role and by other customers' role in the production and delivery of service offerings. Consider the following hypothetical example.

> At his usual grocery store, Jeff is waiting to use one of the self check-out stations. He notices that the lady in front of him is having difficulty picking up and scanning her case of bottled water. He reaches for the water case, scans it, places it in her cart, and returns to his position in the queue. He wonders why store employees were not available to help the lady. Very quickly, he realizes that the store is very crowded and all employees are busy helping other customers. With a brief look over his shoulders, he feels that other customers surrounding him are not the type to offer help to someone with a problem. The lady completes her transaction and heads toward the exit. Jeff approaches the station and pulls up his first item, a pack of organic potatoes. He looks for its UPC bar, but he can't find one. He looks for the label for a second time, but no luck. Suddenly, a man from behind says, rather loudly, "You need to look it up in the computer." Jeff thanks the man cordially, but thinks to himself: "Why doesn't he keep his nose in his own business?" Jeff rings up the potatoes and scans the rest of his grocery items. Leaving the station, he turns around, gives a not-very-friendly look to the man, and proceeds to leave the store.

Several customer-related service experience issues are identifiable in this example. First, Jeff co-produces the check-out service for himself by scanning and bagging his items. This comprises Jeff's Co-Production for Self (CPS). Second, he helps the lady move and scan her case of water. This is Jeff's Co-Production for Other customers (CPO). Third, a man from behind instructs him on how to ring up organic potatoes. This constitutes Other customers' Co-Production (OCP) for Jeff. Lastly, the crowded condition of the store and unhelpfulness of other customers represent the number and nature of other customers. These two indirect effects of other customers are termed crowding and homophily, respectively.

CPS and CPO are the two dimensions of the focal customer's co-production role. Save for CPS, all of these issues arise because the focal customer shares the service facility with other customers, referred to as co-consumers. Co-production and co-consumption are two manifestations of customers' role in the creation of value. The present research examines the focal customer's attitudinal and behavioral responses to changes in required co-production and co-consumption. Since such changes are often due to firm-initiated innovations in technology and process, the study will revolve around service innovations.

Service Innovation and Co-Creation of Value

> Co-creation of value through personalized experiences is the emerging opportunity space. Welcome to the next practice and the future of innovation.
>
> (Prahalad and Ramaswamy 2003, p. 18)

Co-creation of value is a fundamental aspiration that marketers strive to achieve through service innovation programs. These programs seek to understand the customer's active role during service production and delivery. Although such an understanding is also pertinent to the marketers of goods, service marketers are particularly susceptible to the immediate and long-term implications of customer input (Andreasen 1983). Eiglier and Langeard (1977b) offer a telling description of the challenges that underlie service innovation:

> The active role played by the user means that an innovative policy is difficult to conceive and put into effect in the service area. In order for a [service innovation] to succeed, it must correspond very closely to a modification of the consumer's needs, without being too much ahead of that change…Performance will depend in great part on the length of the period of *apprenticeship* and the allegiance of the greatest number of consumers (p. 53).

It is now widely recognized that customers of services as well as goods can and do play an active role throughout the marketing process (Firat, Dholakia, and Venkatesh 1995; Vargo and Lusch 2004a; Wikstrom 1996a). The *marketing process* is defined as a set of activities that

make possible the conception, design, production, delivery, purchase, consumption, and disposal of offerings, during which value is co-created by customers, marketers, and other stakeholders (Wikstrom 1996b). The crucial point is that customers co-create value in each and every stage of the marketing process by providing information, effort, time, and other valuable resources (Prahalad and Ramaswamy 2004c). Consequently, the principal strategic task in any service firm is to reconfigure relationships and systems in order to enable customers to utilize all available resources to create value for themselves. Profiting from customers is being replaced by profiting from customers' value-creating activities (Normann and Ramirez 1993). In fact, facilitating customer co-creation of value is emerging as a new source of competence and competitive advantage (Prahalad and Ramaswamy 2000), and more importantly, as a new business philosophy.

Customers' role in the co-creation of value spans over all of the stages in the marketing process. Customers' inextricable link to the co-creation of value has long been acknowledged and researched among new product development scholars (Bonner 2002, 2005; Campbell and Cooper 1999; Joshi and Sharma 2004). In comparison, the curiosity about customer co-creation of value in other stages, especially in the stages of production and delivery, is more recent. As such, the present research focuses singularly on the customer's co-creation of value for herself and for other customers during the production and delivery stages.

With the servuction system as its overarching framework, this research attempts to link co-production and co-consumption to service innovation characteristics. It aims to understand how a customer's perception of service innovation characteristics is influenced (a) by her co-production of the service for self or for other customers and (b) by other customers who share the

same service environment. This chapter proceeds to establish the importance of the current study and to present the proposed conceptual model.

The Significance and Contribution of This Research

The importance of this research is evident with two observations. First, the constructs embedded in the proposed model have received widespread attention from social scientists. Second and more importantly, delineating the interplay between these constructs can illuminate, or at least stimulate attention to, discordances in the extant literature. For instance, as Meuter et al. (2005) indicate, relative advantage, a key innovation characteristic, has been found as irrelevant, as positively related, and as negatively related to customer adoption behavior, sometimes even within the same study (Venkatraman 1989). As another example, customers of services (as opposed to goods) face a higher level of perceived risk; and whether or not this higher risk is due to co-production and/or co-consumption is unknown (Bateson 1985).

In delineating the interplays between the focal constructs, the current research links two previously unrelated streams of research: Service characteristics and diffusion of innovations. The contribution of this study derives less from the novelty of this link and more from the urgency of the knowledge gap it exposes. This urgency is evident with the recently revitalized interest in two fundamental concepts (i.e., co-production and co-consumption) that not only distinguish services from goods, but also differentiate between diverse service industries (Eiglier and Langeard 1977b). The collection of writings on the Service-Dominant (S-D) Logic of marketing (Lusch and Vargo 2006), the several specialized conferences inspired by and revolving around this logic, and the related special issues of *Journal of Marketing* and *Journal of*

the Academy of Marketing Science underscore the import of co-production and co-consumption for various areas of marketing research, especially for service innovation.

Linking service characteristics to innovation characteristics has a two-sided advantage. On the one hand, it can broaden our understanding of service innovation, thereby extending the field of services marketing. Eiglier and Langeard's (1977b) assertion is still germane that "services marketing should take into account the major managerial problems within the service area and relate them to salient characteristics of services" (p. 36). Although service innovation issues do qualify as essential managerial problems in service firms, previous research has not looked at these issues in the light of service characteristics. Even scholars in the field of management recommend the utilization of service characteristics. Bowen (1990a), for instance, finds little value in merely contrasting services with goods, and calls upon marketing academe to employ service characteristics in order to understand the contingent nature of marketing issues across a variety of service industries.

On the other hand, linking service characteristics to innovation characteristics can help deepen diffusion of innovation research. A small fraction of diffusion studies have employed one or multiple service offerings as their study objects (Flynn and Goldsmith 1993; Green, Langeard, and Favell 1974; Kleijnen, Ruyter, and Wetzels 2004; Mills 1986). The findings of these studies, however, shed little light on the inherent factors that differentiate the diffusion patterns of tangible offerings from those of intangible offerings. The current study introduces two such factors: Co-production and co-consumption.

Next, the paper proceeds to establish the (a) dominance of services, (b) differences between services and goods, (c) selection of co-production and co-consumption, and (d) significance of these two constructs for service innovation research.

The Dominance of Services

From the outset of this introduction, the word 'services' has preceded the word 'goods'. This is not an accident; it is a deliberate demonstration of the dominant socioeconomic position of services among practitioners and academics alike. Today, the service sector overshadows other sectors in the U.S. as well as other industrialized and newly industrializing economies. Two indications of the service sector's dominance follow.

First, developed countries have largely transformed into predominantly service economies, and many other countries are speedily moving in that direction (Rust and Chase 1999). Several credible sources converge on this conclusion. For example, a longitudinal reading of *Economic Report of the President* (Council of Economic Advisors 1947-2004) and *Statistical Abstract of the United States* (U.S. Census Bureau 1900-2002) reveals that, since early 1900s, the service sector's share of the gross domestic product (GDP) and employment has steadily risen at the expense of the share of the other two sectors: Agriculture and manufacturing. Today, the service sector makes up over 75% of the U.S. economy, and Europe is not far behind (Rust and Chase 1999). The same sources also indicate exceedingly dissatisfactory price and productivity conditions in the service sector (Bateson 1985; Eiglier 1977; Lovelock and Young 1977, 1979). It is overwhelming to know that most of our GDP and employment come to pass in a sector characterized as the least productive and most inflationary. As another indication of the economic significance of services, the North American Industry Classification System (NAICS) is presently undergoing a major modification in order to account for the exponential increase in the breadth and depth of service industries (NTIS 2006).

Second, the rising academic interest in services is evident with the manifold growth of interdisciplinary service conferences around the world, such as Frontiers in Services Conference,

and the emergence of interdisciplinary service journals, such as the Journal of Service Research. A majority of the literature reviewed here attest to this fact.

Differences between Services and Goods

Goods and services belong to different logical categories (Hill 1977). The basic marketing process being effectively the same, service organizations manifest some specific characteristics, the consequences of which constitute problems unique to service firms and their customers (Eiglier 1977). Services differ from goods in nature and in the way they are produced and consumed. The distinction between services and goods pertains to both sides of the marketplace: Marketers as well as customers.

The literature suggests several differences between services and goods. Two of these differences, namely intangibility and production-consumption inseparability, are fundamental and all other characteristics, including perishability and heterogeneity (Zeithaml, Parasuraman, and Berry 1985), are derived from those two (Bateson 1985; Eiglier 1977; Hill 1977). Since comprehensive discussions of service characteristics and typologies exist elsewhere (Cook, Goh, and Chung 1999; Lovelock 1983; Zeithaml et al. 1985), attention will be directed to the two fundamental characteristics.

The first fundamental characteristic of services is intangibility (Shostack 1977; Zeithaml et al. 1985). As Bateson (1985) argues, “Services are doubly impalpable” (p. 8). First, they cannot be touched by the customer. Second, they are difficult for the customer to grasp mentally. Consider insurance. The core of this service is non-touchable and its consumption is hard to process mentally. A pair of shoes, on the other hand, is tangible and easier to picture mentally.

The second fundamental characteristic of services lies in the inseparability of production from consumption (Lovelock 1983; Zeithaml et al. 1985) simply because the two acts take place simultaneously (Clemes, Mollenkopf, and Burn 2000). For instance, whereas the production of a watch might precede its consumption by several weeks or months, every moment during a haircut might contain elements from both production and consumption. Production-consumption inseparability has two theoretical and practical implications. First, operational issues and marketing issues of service firms are intertwined in service firms. Second, customers are partial producers of service offerings.

Although the distinction between services and goods has been acknowledged and utilized in many disciplines including the various areas under Economics and Business, it probably has been most appreciated and echoed among marketing researchers and practitioners. The import of this distinction to the field of marketing is more apparent when one considers the nature of the marketing enterprise. *American Marketing Association* (2002) defines marketing:

> [A]n organizational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relationships in ways that benefit the organization and its stakeholders (p. 1).

The intangibility and production-consumption inseparability of services alter, sometimes drastically, the nature of the processes that service marketers employ to create, communicate, and deliver value to customers, and to benefit the organization and its stakeholders. Hence, marketing of services requires a different, if not a mirror-opposite, view of conventional goods approach (Shostack 1977). Consistently, marketing has always treated services and goods as qualitatively distinctive foci in both theory and practice (Shostack 1977).

Why Customer Co-Production and Co-Consumption?

Co-production and co-consumption are two central attributes of service offerings (Bateson 1985; Bowen 1990a; Bowen and Schneider 1989; Eiglier and Langeard 1977b; Goodwin 1988; Lovelock 1983; Mills, Turk, and Margulies 1987). They derive their significance from the production-consumption inseparability (Bessom 1973; Judd 1968; Rathmell 1974; Sasser 1976; Sasser and Arbeit 1976). As noted earlier, one of the two fundamental differences characterizing services is production-consumption simultaneity/inseparability, of which all other differences are derivatives.

Eiglier and Langeard (1977b) contend that ignoring co-production and co-consumption in service research will result in findings and recommendations that have less relevance and use for service managers. Other service characteristics enable us to better encompass the complex nature of services, but do not help us resolve it (Eiglier and Langeard 1977b). Since the nature of a service and its managerial consequences are mixed together, co-production and co-consumption are pivotal to service research (Eiglier and Langeard 1977b). Even if a hypothetical study incorporates all but these two service characteristics, the findings will provide service managers with little help in resolving their strategic problems (Eiglier 1977).

The question might arise: Why not focus on intangibility, the most fundamental characteristic of services? Eiglier and Langeard (1977b) provide the answer: Intangibility "is difficult to analyze because one cannot grasp it except in contrast to tangible goods; it is therefore imperfect in that it tells us what services are not but not what they are" (p. 36). Here, a second question arises: Now that production-consumption inseparability rather than intangibility is in focus, why not to study it directly? Why are co-production and co-consumption germane to this study? Bateson (1985) provides a viable answer: Production-consumption inseparability

resides at a high level of abstraction, which makes it difficult to refine propositions suitable for empirical investigation. Co-production and co-consumption are at a slightly lower level of abstraction and thus more amenable to testing (Bateson 1985).

Another reason for the selection of co-production and co-consumption is their relevance to service manager's short- and long-term problems. Generally speaking, service managers underestimate the pervasiveness and significance of these concepts (Eiglier 1977; Martin and Pranter 1989). Nevertheless, when co-production and co-consumption are employed to classify services, the majority of the problems that come to the fore are actually perceived as key issues by service managers (Eiglier and Langeard 1977a). Therefore, co-production and co-consumption are important topics also because they contain practical implications for decision makers. Moreover, both co-production and co-consumption are often cited as the two pervasive and increasingly important determinants of customer evaluation of service processes and outcomes including quality, value, customer satisfaction, and loyalty (Baker 1987; Hill 1977; Pranter and Martin 1991). If enabled effectively, not only co-producing, co-consuming customers can assimilate new customers and equip them with the *right* service expectations and scripts, also they can magnify and emphasize their own as well as other customers' positive attitudes and beliefs about the service firm's performance (Baron, Harris, and Davies 1996; Goffman 1959; Johnston 1989; Kelley, Donnelly, and Skinner 1990).

The Significance of Co-Production and Co-Consumption for Service Innovation Research

The relation of co-production and co-consumption with diffusion of innovation research is of great value to marketing academics and practitioners. In the academic circles, this claim is supported by at least two observations. Unlike the infantile status of co-production and co-

consumption research, diffusion of innovations comprises a mature body of knowledge contributed by multiple disciplines and numerous multidisciplinary studies. As Rogers (1997) notes, "No other field of behavior science research represents more effort by more scholars in more disciplines in more nations" (p. xv). By investigating whether and how co-production and co-consumption are associated with the well-established constructs of diffusion research, one can indirectly examine the validity of the claims made about the importance of these two constructs. Since co-production and co-consumption are central to the S-D Logic of marketing (Arnould, Price, and Malshe 2006), the present research could also serve as an operationalization plus extension of one of the fundamental tenets of that logic.

A careful review of the diffusion research during the last 65 years reveals that only a small fraction of diffusion studies has selected service offerings as (part of) their study objects (Gatignon and Robertson 1991; Peppers and Rogers 1997). It is hoped that the present research will provide directions and motivation for a more comprehensive approach to the diffusion of service innovations. Such research is especially important given the lower success rate of new services as compared to new goods (Henard and Szymanski 2001).

Co-production and co-consumption are essential concerns for service managers, especially those in charge of service innovation programs (Prahalad and Ramaswamy 2003; Pranter and Martin 1991). Co-production and co-consumption are malleable phenomena. They can be modified and engineered in line with service firm's objectives. Rather than accepting customer-to-service and customer-to-customer relations as inevitable and uncontrollable, astute service innovators can modify these relationships so effectively that not only customer satisfaction is maximized, but also the synergistic combination of these value-creating resources

lead to a sustainable competitive advantage (Barney 1991; Conner 1991; Karmarkar and Pitbladdo 1995; Prahalad and Hamel 1990).

The Conceptual Model

The overarching conceptual framework guiding this research is the servuction system developed by Eiglier et al. (1977) and Langeard et al. (1981). Combining the words service and production, servuction holds that the customer co-produces the service she consumes by interacting with the environment's visible parts (as opposed to the invisible internal organization), which encompass contact personnel, service facilities, and other customers (Bateson 1985).

Building on the notion of servuction, this research attempts to conceptualize the manner in which a customer's perceptions of service innovation characteristics are affected (a) by her role in the production of the service for self and for other customers, and (b) by other customers who are co-consuming the service. Next, service innovation characteristics will be used to predict adoption behavior. The roles played by back-office employees, customer-contact employees, and physical environment throughout the production and consumption of services are not addressed here. Note that the focal customer's co-production of the service for others can range from very passive (e.g., non-distracting and non-engaging presence of the customer when other customers consume the service) to very active (e.g., taking over the bulk of the service production for one or more other customers). This is true also of other customers' co-production of the service for the focal customer.

The objective of this research is to observe how changes in the customer's perceived co-production and co-consumption, caused by a service innovation, influence her perceptions of the

characteristics of that service innovation and modify her adoption behavior. As will be elaborated later, an abundance of implicit and explicit research findings within the fields of marketing, management, and operations stand to support these linkages. In addition, the propensity to co-produce will be incorporated as an interpersonal difference that might moderate some of the relations specified above. Figure 1 depicts the proposed conceptual model. This model provides normative insights for marketers to better appreciate customers' roles in the creation and consumption of value when they patronize innovated services.

CHAPTER 2

LITERATURE REVIEW AND PROPOSITIONS

This chapter begins by recapitulating the servuction system, a conceptual framework for incorporating co-production and co-consumption. It then presents the different meanings and views of co-production and co-consumption, and defines the constructs borrowed from diffusion of innovation research. Next, a set of propositions will be presented based on an interdisciplinary review of relevant literatures. Finally, customer propensity to co-produce will be introduced as an interpersonal difference and segmentation criterion.

Literature Review

The Servuction System

Eiglier et al. (1977), representing a team of French and American scholars, has been one of the most influential research projects in the field of services marketing. The main thesis in this work revolves around the inseparability of customers from the production and delivery of service offerings. It holds that perceptions about a service experience are rooted in the manifold interactions among the customer, service facilities, service personnel, and other customers (Green et al. 1974). Customers become part of the service production process through their interactions with the firm's service delivery system. This system of interactions was later referred to as servuction by the same team of scholars (Langeard et al. 1981).

The servuction approach divides the service firm into those parts that are visible to the customer and those that are not. The visible part of the service firm (i.e., contact personnel and service facilities) and customers (i.e., the focal customer and other customers) constitute the

servuction system (Bateson 1985). Langeard et al. (1981) argue that the servuction approach to services marketing "provide[s] a conceptual framework with which to consider the problems of marketing a 'product' which is produced and consumed…in real time" (p. 13). But why do we need a new term? The reason lies in the inadequacy of the terminology originated in manufacturing contexts. Langeard et al. (1981) avow,

> When speaking of service operations, most authors use the words "production" or "delivery" system. Both these words are inadequate, however, since they fail to convey the simultaneity of [production, delivery, and consumption] processes. Instead of relying on terminology drawn from production management for manufactured goods, we have opted to use a new word: "servuction" (p. 16).

Servuction offers at least three immediate insights: (a) our understanding of customer decision processes must be modified to account for her co-production and co-consumption roles; (b) service quality involves much more than a static view of employees and facilities; and (c) variation is a norm, not exception, in service operations (Langeard et al. 1981). Each of these three insights is a logical extension of the fact that services are produced and consumed through a system of interactions among the customer, service facilities, service personnel, and other customers.

These insights not only challenge much of our extant conceptualizations of customer evaluation of quality and decision-making, but also point to opportunities for deepening our understanding of services marketing. For instance, the very fact that customers are aware of their own co-production role (Bowers, Martin, and Luker 1990; Goodwin 1988) necessitates the rethinking of our existing approaches to service quality measurement, mainly because these approaches do not adequately address the interactive and dynamic nature of service quality. In support, Goodwin (1988) finds service quality to be a function of the customer's willingness to learn procedures and to interact cooperatively with other customers. Moreover, Bowers et al. (1990) advise that service firms should view customer as part of their human resources if they

aim to enhance customer and employee perceptions of service quality. The nature of interactions between customers and contact personnel demands viewing the traditional roles in a new light: Employees as customers and customers as employees (Bowers et al. 1990).

According to Eiglier et al. (1977) and Langeard et al. (1981), developing a comprehensive marketing strategy requires that we clearly define and adequately understand each element and relationship in the servuction system. Identifying their analysis as exploratory and general in nature, these researchers invite us to extend and adapt the servuction approach to specific sectors and situations.

Figure 2 is a depiction of servuction elements and relationships adopted and adapted from Langeard et al. (1981). The numerous interplays between the elements make it difficult, if not impossible, to tackle the entire servuction system in one study. A concerted, programmatic research is needed to understand this system of interactions. Consequently, the present research focuses on a subset of the interactions in servuction system, namely the customer's role in the production and delivery of the service for self and for others (i.e., co-production) and other customers' role in the production and delivery of the service for the focal customer (i.e., co-consumption).

Customer Co-Production

Meaning and Definition

Contemporary marketing thought suggests that suppliers and customers, together, create value (Firat and Venkatesh 1993; Vargo and Lusch 2004a). This holds in both consumer and industrial markets (Wikstrom 1996a). Value is co-created by suppliers and customers throughout

the marketing process, which includes the conception, design, production, delivery, purchase, consumption, and disposal of offerings (Wikstrom 1996a). Examples abound. Consider tax clients, individual or industrial. Both objective and subjective measures of the value created and consumed will in part depend on how accurately the client has maintained her tax records throughout the year. The client's input influences the value perceived by herself, by the CPA providing tax services, by government, and by any other related stakeholder. Other examples include movie theaters requesting customers to throw trash in trash cans and silence their cellular phones; schools assigning homework and expecting attendance and participation; recreation centers requesting customers to replace all barbells to racks when through and to wipe down all machines after use; and public transportation requesting customers to offer their seats to the elderly and people with disability (Bettencourt 1997; Chappell 1994).

If customers are co-creators of value, the mutual exclusivity between production and consumption is untenable; the dichotomy is unsustainable (Firat and Venkatesh 1995). Perhaps, a continuum with the end-points of 'total production' and 'mere consumption' is more plausible. Every offering falls somewhere on this continuum, depending upon the extent to which the customer participates in creating value throughout the marketing process. For example, salt is closer to the mere-consumption endpoint than cars; and fitness services are closer to the total-production endpoint than postal services. Generally speaking, customers of services play stronger co-production roles than customers of goods. Service customers have well-defined expectations regarding their role performance during the service encounter of what they should do and how they should act (Bettencourt 1997; Bettencourt et al. 2002; Kelley et al. 1990; Kelley, Skinner, and Donnelly 1992; Mills and Morris 1986; Solomon et al. 1985). Therefore, this research will focus on service offerings.

Kotler challenges the term 'consumer' because it signifies "the image of customers with their mouths open, waiting to be filled by marketers" (Sheth and Sisodia 2005, p. 12). Instead, he seconds Toffler's (1980) use of the term 'prosumer' to signify a combination of producer and consumer, defined in *Merriam-Webster Dictionary* (2006) as a consumer active in a product's development and production. Because customer is a broader construct than consumer, we propose the term 'prostomer' to capture both individual and industrial buying/consuming entities. Related to these concepts is the term 'prosumption', combination of production and consumption. Prosumption may be used to designate any mid-point on the mentioned continuum.

Researchers have used several labels to designate customer's input throughout the marketing process. Some of the widely used labels are contact, interaction, involvement, participation, co-creation, and co-production. In addition, the term *customerization* is used to designate the process of expanding customers' role (Sasser, Olsen, and Wyckoff 1978; Wind and Rangaswamy 2001). The first two labels (i.e., customer contact and customer-employee interaction) were popularized by Chase (1978) in operations research. Although useful, these two labels do not represent the rich and complex nature of the focal concept mainly because they portray a passive role for customers. In other words, these labels ignore the customer's propensity to actively work at getting the level of quality they desire by dynamically participating in service production and delivery (Kellogg et al. 1997).

Customer involvement can easily be confused with the long-established consumer research construct *involvement*, defined as personal relevance (Krugman 1967; Zaichkowsky 1985). Involvement as 'co-production' and involvement as 'personal relevance', although related, are distinct concepts in two ways. First, personal relevance is a customer disposition whereas co-production can be a disposition as well as a universal phenomenon (i.e., every

customer is the co-producer of all offerings she consumes). Second, even co-production as a customer disposition differs from the personal relevance disposition. An example is helpful here. Consider a customer who is generally highly concerned about what she eats and drinks and regularly compares the qualities and prices of various restaurants and bars. Although this customer illustrates strong personal relevance to dining, she might reject self-service restaurants and prefer to be served by someone else. Hence, 'involvement' might be(come) a misnomer.

Participation and co-creation extend well beyond the stages of production, and delivery and into the realms of conception, design, purchase, consumption, and disposal (Wikstrom 1996a). These labels can refer to any customer input that adds value throughout the marketing process. Co-production, however, is the customer input that adds value to an offering during the production, delivery, and consumption stages. Hereafter in the present study, the labels participation and co-creation will be restricted to the stages of production and delivery.

Co-production has been defined in more or less similar ways. Most definitions employ one of the following phrases: "the degree to which the customer is involved in…," "the extent of customer input to…," and "the magnitude of customer participation in…" (e.g., Bendapudi and Leone 2003, p. 14; Chase 1978, p. 139; Mills, Chase, and Marguiles 1983, p. 302). A consensus definition among earlier authors would present co-production as the degree to which the customer actively participates and provides input in producing and delivering an offering (Dabholkar 1990).

Significance: Past and Present

Up until the mid 1970s, most marketers viewed customers as passive buyers whose participation would disrupt organizational routines and procedures and constrain potential

operating efficiencies (Aldrich and Herker 1977; Bowen 1986; Danet 1984). Thompson (1967) went as far as advising firms to buffer their service delivery from customers' disturbances. Against this backdrop, Peters and Waterman (1982) and Wilson (1994) warned that there was still no theory that could explain co-production. This warning, together with the pioneering works of Eiglier and Langeard (1977a), Chase (1978) and Lovelock and Young (1979) directed research attention to customers' active role in the production and delivery of service offerings. Since then, interest in co-production has been gradually, but steadily, rising. Today, much is appreciated about the significance of co-production, though little is substantiated.

Co-production is now known as a "foundational premise" of marketing (Vargo and Lusch 2004a, p. 10); integral to "the marketing concept" (Kelley et al. 1990, p. 326); "the next frontier in competitive effectiveness" (Bendapudi and Leone 2003, p. 14); and "the key to creating value" (Normann and Ramirez 1993, p. 69; also see Oliver 2006; Wikstrom 1996a). Gummesson (1998) and Glynn and Lehtinen (1995) equate emphasis on co-production with advocacy of relationship marketing. It is the co-production (i.e., inseparability of markets from marketers and the marketed) that renders the focus on the customer and relationship inherent (Vargo and Lusch 2004a). Grönroos (2000) contends, "Value for customers is created throughout the relationship by the customer, partly in interaction between the customer and the supplier" (p. 24). Perhaps this is why many service industries are involving customers more and more in the production of their offerings (Bailey, Gremler, and McCollough 2001). Gummesson (1998) contends:

> If the customer is the focal point of marketing, value creation is only possible when a good or service is consumed. An unsold good has no value, and a service provider without customers cannot produce anything (p. 247).

As companies increasingly shift work to customers and incorporate more self-service technologies, customers will take on even greater role throughout the marketing process, especially in the production stage (Meuter et al. 2005; Tax, Colgate, and Bowen 2006). In fact,

customers, individual or industrial, are being viewed as important competitors of marketplace exchanges (Lusch, Brown, and Brunswick 1992; Prahalad and Ramaswamy 2000). All of these attest to the rising interest in co-production among marketing scholars. In short, exploring co-production is the key to understanding how customers behave in various contexts and domains (Andreasen 1983).

Typologies

Several researchers have attempted to classify co-production behaviors. Some of these classifications are based on the temporal/processual sequence of co-production behaviors while others tap the nature of such behaviors. Larsson and Bowen (1989), for instance, categorize co-production activities into three groups: (a) outcome expectation and desire; (b) body, mind, and/or goods to be serviced; and (c) actions. Mills and Morris (1986) also organize co-production activities into three, yet different, categories: (a) role readiness prior to encounter; (b) negotiation and acquisition of roles during encounter; and (d) termination of customer participation when the service is complete.

Youngdahl and Kellogg (1997) identify 4 classes of co-production behaviors: (a) preparing for the encounter including behaviors like seeking referrals, researching alternative providers, and gathering other types of information; (b) developing relationships that comprise a network of social support; (c) exchanging information to clarify customer needs and preferences, firm's offerings, and other service parameters in order to reduce uncertainty; and (d) intervening and assuming partial or full control of the service encounter when the customer loses faith in the service provider's ability to meet her expectations. Recent works on co-production generally agree with this classification (Tax et al. 2006).

Another classification dichotomizes co-production behaviors as either functional or symbolic (Durgee 2004). Functional co-production takes place when a customer performs a task provisioned as necessary for the bare completion of the service, primarily from the provider standpoint. Transporting to a movie theatre and following the specific service script (e.g., sitting, looking at the screen, and silencing cell phones) are examples of functional co-production. Symbolic co-production takes place when a customer assigns meaning to service stimuli (Booms and Nyquist 1981; Solomon et al. 1985) and contributes to the successful and effective completion of the service creation and delivery, primarily from the customer standpoint, but from the provider standpoint as well. In the movie-theatre example, customer's engagement or immersion in the ongoing story of the movie enables her to experience certain emotions and suspense, and thus qualifies as symbolic co-production. Functional and symbolic co-production roles might have distinct impact on customer perception and evaluation of service quality.

Functional/symbolic dichotomy is exemplified in a host of service encounters. A patient visiting a psychiatrist is usually required to provide her physical and mental health background (e.g., by filling out a form) and to elaborate the reason for her visit. These activities comprise functional co-production. However, the patient's perception of the psychiatrist's trustworthiness and expertise, trust in the psychiatrist's advice, and subsequent efforts to practice the advice are symbolic co-production. Such co-production, although crucial to the quality and effectiveness of the service, is not necessary for the bare completion of the service. Similarly, a visitor to a contemporary art museum understands and follows the specific service script of a museum visit (e.g., movement in space and attention to the objects on display). These and other functional co-production activities might fulfill the creation and consumption of the museum service. However, different customers will have slightly, or even drastically, different consumption

experiences depending in part on their own individual symbolic co-production (Joy and Sherry 2003). Compared to an art novice, an expert customer will attach different (and possibly deeper) meanings to those objects and draw greater satisfaction from her visit.

Two Views

Bendapudi and Leone (2003) provide a review of the research on co-production. This review is extended and updated here for two reasons. First, a careful literature search suggests that several relevant studies preceding Bendapudi and Leone (2003) do not appear in their review. Second, a number of important studies of co-production have been published since 2003. In particular, the Vargo and Lusch (2004a) work has enthused marketing scholars to pay closer attention to the nature and processes of co-production. As a result, the extended and updated review of co-production literature presented here contains over 120 studies.

A careful study of the resultant list of articles and book chapters points to two distinct views of co-production: The received view and the emerging view. A major difference between the two views is that the former is concerned with service offerings but the latter heeds the notion of value. Co-creation of value appears to be a broader concept than co-production of services. It subsumes co-production of services as well as co-production of goods. First, co-creation of value holds that all offerings, tangible and intangible (i.e., goods and services), are subject to co-production. Second, co-creation of value probably better accounts for that portion of customer participation that takes place prior to or after the purchase act and/or the service encounter.

Before proceeding to discuss the two views, it should be noted that the bulk of reviewed research has recognized co-production as (a) ubiquitous, though variable in extent (e.g., Vargo

and Lusch 2004a; Wikström 1996a); (b) proportional with the intangibility of offerings (e.g., Chase 1978; Shostack 1977); (c) dramatically facilitated by technology (e.g., Lindbeck and Wikström 2003; Xue and Harker 2002); and (d) central to marketing strategy (e.g., Bendapudi and Leone 2003; Prahalad and Ramaswamy 2000).

The Received View

The received view of co-production is characterized by two research foci: (a) distinction between services and goods, and (b) firm's operational (i.e., production) efficiency. A variety of factors gave rise to the popularity of this view among academics and practitioners alike. These factors included the trend toward deregulation in key service industries, breakthrough innovations in computation and communication technologies, crumbling of traditional industry boundaries (e.g., brokerage houses serving as commercial banks), emergence of new market segments and niches characterized by homogenous-within and heterogeneous-between needs and expectations, a boom in franchise sector as an ideal model for financial and geographic expansion, and changes in public attitude such as the decline in general satisfaction with and loyalty towards service firms (Langeard et al. 1981, pp. 8-12).

First, researchers entertaining the received view either pioneered, or significantly contributed to, the field of services marketing: The idea of approaching intangible offerings such as banking and education differently from tangible offerings such as mirrors and shoes (Campbell and Cooper 1999; Czepiel 1990; Judd 1968; Levitt 1972; Rathmell 1974; Shostack 1977; Solomon et al. 1985). A representative quote in this view states, "Using industrial models to manage service-based corporations makes as little sense as using farm models to run factories" (Davis 1983, p. 13).

Advocates of the received view helped establish the then-new sub-discipline of services marketing, delineated how services differed from goods in nature, and proposed marketing strategies to address those differences (Bateson 1985; Berry 1980; Zeithaml et al. 1985). There was concurrence that marketing had not yet played a satisfactory role in the management of service firms (Langeard et al. 1981, p. 8). The received view regards co-production as one of the key attributes of intangible offerings both explicitly and implicitly. Among others, Bowen (1990b), Eiglier and Langeard (1977a), Goodwin (1988), and Mills et al. (1987) have explicitly included customer participation in their lists of dimensions that distinguish services from goods.

Implicit allusion to customer participation has been more commonplace. A majority of researchers have indirectly alluded to customer participation in their discussions of the separability of production from consumption. Whereas goods are first produced and then preserved for consumption in some near or distant future, the production of services is simultaneous and inseparable from their consumption (Langeard et al. 1981; Shostack 1977; Zeithaml et al. 1985). Goods tend to be produced, inventoried, sold, and then consumed whereas services are first sold and then simultaneously produced and consumed (Berry 1980; Maister 1982). Put differently, customers of goods typically purchase already manufactured value embedded in tangible products, but providers and customers of a service jointly produce value (Lovelock and Young 1979). Still in other words, customers of services, but not customers of goods, are co-producers of the offerings they consume.

Second, many of the advocates of the received view have linked co-production to firm efficiency, and thereby to firm productivity. Productivity has always been a chief concern in the service sector (Langeard et al. 1981). Researchers have recommended diverging solutions to the problem of productivity. For example, whereas Levitt (1976) argued for industrialization of

services through standardization and mechanization, others such as Lovelock and Young (1977, 1979) saw the solution in getting customers to do more of the work themselves. This latter recommendation is essentially a case for increasing co-production.

Although most researchers agree that co-production–efficiency relation is present and significant, there is disagreement on whether it is positive or negative. On the one hand, Chase and Tansik (1983), Chase, Northcraft, and Wolf (1984), and Danet (1981) imply that service firms can enhance their efficiencies by keeping customers outside organizational boundaries, which translates into reducing co-production. They consider a service firm's potential operating efficiency to be an inverse function of the degree to which the customer is in direct contact with the service facility relative to total service creation time for that customer.

On the other hand, a majority of researchers have attempted to make a business case that substituting employee labor with customer labor could enhance firm efficiency and thereby result in productivity gains (e.g., Lovelock and Young 1979; Mills and Morris 1986; see also Bendapudi and Leone 2003, p. 15). Fitzsimmons (1985) argues that service productivity can be improved by expanding the role of customers and educating them on how to participate in service production and delivery efficiently. Mills and Morris (1986) suggest that customers "can be made more productive participants when there is a match between the required production-related skills, knowledge, and attitudes, and the degree [of participation] required of the customer in service production" (p. 734). A representative quote states, "The thoughtful service manager should ask: How can our customers become more productive inputs to the creation of the services that we produce for them?" (Lovelock and Young 1979, p. 175). Consistent with this line of thinking, Bowen and Schneider (1989), Eiglier and Langeard (1977b), Lovelock and Young (1979), and Mills et al. (1983) recommend that service firms co-opt customers and

empower them as *partial employees* in order to achieve higher efficiencies. Mills and Morris (1986) contend that customers can fill partial employee roles during the input, throughput, and transformation stages of service production.

Operations researchers have attempted to address these contradictory findings and recommendations. For example, Bowen and Jones (1986) use transaction cost economics and set forth a contingency approach to co-production management. As a result, operations research has been one of the generous contributors to the study of co-production (Rust and Chase 1999).

Co-production has proved to be an indispensable issue in service operations research, mainly due to its mixed effects on input uncertainty, efficiency, and productivity (Bowen and Jones 1986; Larsson and Bowen 1989). In fact, some operations researchers argue that research on customer participation during service production and delivery is better conceived as essentially an operations construct (Cook et al. 1999). In brief, this research stream suggests that (1) customers incur two types of costs – monetary and non-monetary – and (2) non-monetary costs are higher for services as opposed to goods (Youngdahl and Kellogg 1994). The latter observation is due to the fact that required participation is more extensive and essential for customers of services than customers of goods (Adelman, Ahuvia, and Goodwin 1994; Hart, Heskett, and Sasser 1990; Rosander 1985).

Advocates of the received view contend that services vary considerably in whether customers or employees are the principal performers (Bowen 1986). For instance, whereas employees are the principal producers in auto repair shops, customers provide most of the labor in supermarkets. Furthermore, co-production can be preventable or inevitable, depending on the nature of the offering. The preventability of co-production depends on whether the consumption of a focal offering is separable from its production. For instance, whereas the production and

consumption of a haircut are inevitably entwined, the production of a car insurance account can be separated from its consumption. In the former case, the marketer has no choice but embrace co-production. In the latter case, the marketer can choose to either prevent or alternatively welcome and capitalize on co-production.

The Emerging View

Compared to the received view, the emerging view of co-production (a) places more emphasis on the commonalities rather than differences between goods and services, and (b) brings in operational effectiveness, marketing efficiency, and marketing effectiveness, in addition to operational efficiency. First, marketing researchers now believe that co-production is important and worthy of research regardless of whether the focal offering is tangible or intangible (Peppers and Rogers 1997). Marketing scholars and practitioners alike are starting to understand the soul of marketing as one of providing services to customers even for highly standardized, mass-produced products (Eiglier and Langeard 1977a). This belief has prompted the endeavor to tap the fundamental commonality potent in both services and goods, namely value. Gummesson (1995) states:

> Customers do not buy goods or services…They buy offerings which render services which create value…The traditional division between goods and services is long outdated…The shift in focus to services is a shift from the means and the producer to the utilization and customer perspective (p. 250-1).

In their provocative new dominant logic for marketing, Vargo and Lusch (2004a) argue that customers are always involved in the creation of value regardless of the nature of offerings. They believe marketing, as a discipline, is "shifting toward a continuous process perspective, in which separation of production and consumption is not a normative goal, and toward…viewing the consumer as a co-producer" (p. 11). Therefore, the emerging view extends the inseparability

of production and consumption to tangible offerings because customers of such goods still create value by learning how to use, maintain, repair, and adapt them to their unique needs, usage situations, and behaviors (Lovelock 2000; Vargo and Lusch 2004a) often in ways unanticipated by marketers (Arnould et al. 2006). In other words, the benefits from goods and services alike are obtainable only and only when the customer consumes them (Vargo and Lusch 2004b). Vargo and Lusch (2004b, p. 330) go as far as asserting, "separability is not only undesirable, but also impossible."

Lindbeck and Wikström (2003), Peppers and Rogers (1997), and Sheth and Sisodia (2005) identify technology, especially the Internet, as the principal force that heightens the importance of co-production and extends its domain beyond the traditional borderlines of intangible offerings. As companies increasingly shift work to customers and incorporate more self-service technologies, customers will take on an even greater role in the production of services (Tax, Colgate, and Bowen 2006; Meuter et al. 2000).

Second, the focus in co-production research is shifting from an exclusive concern with production efficiency toward a more holistic interest in effectiveness-plus-efficiency in production as well as marketing activities; the shift is from substituting employee labor with customer labor toward co-opting customers as partial employees; from division of labor towards totally new production plots (Bendapudi and Leone 2003; Claycomb, Lengnick-Hall, and Inks 2001; Kelley et al. 1990; Lengnick-Hall 1996; Mills and Moberg 1982). Today, firms and customers go beyond negotiating production borderline and try to create new territories of joint production (Lindbeck and Wikström 2003). The quality of this joint production is at least as much, if not more, an issue of effectiveness as it is a matter of efficiency; and the key indicator of effectiveness in production and marketing of co-produced offerings is customer's attitudinal,

emotional, and behavioral responses and intentions (Bendapudi and Leone 2003). Representative research in this vein has focused on propensity to participate (Bateson 1985; Eiglier et al. 1977; Langeard et al. 1981), technology readiness (Dabholkar 1990), training adequacy (Goodwin 1988), antecedents to co-production (Bettencourt 1997), customer readiness (Meuter et al. 2000) and other related ideas. These concepts and measures were absent in the research under the received view. Proponents of the emerging view advise firms to engage in the so-called enabling strategy, in which firms offer systems and tools (capital) and customers provide labor.

Arnould et al. (2006) contribute a model of co-production. In their model, (a) firms create value propositions by deploying operant resources to mold their operand resources; (b) customers create value-in-use by deploying operant and operand resources; (c) and total value emerges as value-in-use and value propositions come together (d) within a context that encompasses four conditioning factors, including locus of control or 'relative power' (Oliver 2006), temporality, degree of rivalry among providers, and degree of co-consumption.

In summary, whereas the received view implies a simplified, dichotomous notion of production-consumption separability (i.e., either separable or inseparable), the emerging view strives to take a more sophisticated stance by treating it as a continuous variable (i.e., varying degrees of separability). Furthermore, researchers have augmented the mere-efficiency orientation by also incorporating an effectiveness-orientation (Chase and Erikson 1988; Wikstrom 1996b). Vargo and Lusch (2004a) find the emerging view to be more consistent with the marketing concept because it advocates "doing things not just for the customer but also in concert with the customer" (p. 11).

Customer Co-Consumption

Co-consumption arises when the customer consumes a service in coordination and cooperation with, or even at the mere presence of, other customers. The key is the sharing of the same service facility by two or more customers. Although customers of a service firm might belong to different market segments, they share the critical attribute of being an important and uncontrollable element in the service system (Eiglier and Langeard 1977a). Even stranger service customers help and hinder one another, and by so doing, breed empathy and enmity (McGrath and Otness 1995). Encounters among shoppers in a retail store, diners in a restaurant, passengers on a commercial flight, or any other group of customers who share the same service environment bring about co-consumption (Martin 1996). Throughout these encounters, co-consumption might comprise a variety of social exchanges; from duration of eye-contact and spatial proximity among users of an ATM machine (i.e., too little or too much eye contact between strangers) to extended, intensive interactions among participants of a boot camp.

Other customers exert substantial influence on the customer's satisfaction and service firm's efficiency, even when their influence is limited to mere presence (Baron et al. 1996). For example, by observing other customers' co-production and consumption, the customer comes to expect her service to be of at least equal quality compared with those of other customers' (Langeard et al. 1981). Diners in a restaurant would not be happy to find out that other comparable diners receive better, faster, or less expensive services. In this example, the quality of the service provided to other customers will influence the customer's attitudes, emotions, and behaviors. Moreover, customers' support of one another might play an important role in determining the outcomes of service production and consumption (Tax et al. 2006). Weight Watchers' meetings, where clients share success stories and support those having difficulties, is a

case in point (Dellande, Gilly, and Graham 2004). Bowers et al. (1990) argue that other customers can produce or facilitate the service for the customer in the form of mentoring or volunteering. 'Buddy of the day' at daycare centers and 'senior residents' in retirement communities are examples of such customers.

Co-consumption can also affect customer perceptions of employee performance. Rafaeli (1989), for instance, finds the presence of other customers to reduce the customer's perception of employees' expressions of positive emotions. Consistently, Bowers et al. (1990) believe that, when the customer receives help from the service firm's regular customers, who act as mentors and volunteers, she will subsequently interact with customer-contact employees in a more constructive and efficient way, thereby enhancing operational productivity as well as overall customer experience and satisfaction.

Martin and Pranter (1989) call attention to the rising number of service failures that customers attribute to their poor experiences with other customers. The rising significance of co-consumption is embedded in contemporary socioeconomic trends. The ongoing demographic and social trends (e.g., changes in the nature and composition of households, in-home shopping, and drive-through shopping) are contributing to customer fragmentation and isolation. As a result, when customers seek to satisfy their affiliation and identification needs in the marketplace, they experience deficiencies in interpersonal and social skills. It follows that, due to the abundance of patronage choices, customers intuitively gravitate toward those services that offer the most socially fit environments (Martin and Pranter 1989).

Given these socioeconomic trends, co-consumption will gain even greater prominence in the future. Such prominence is seemingly better appreciated among practitioners than academics, as both private and public service firms are trying to incorporate spatial competition and joint

consumption as key issues in servicescape design and urban architecture (Ohsawa 1990). Within academia, marketing scholars are suitably poised to exploit the opportunity of understanding co-consumption (Martin 1996).

Customers affect one another directly through specific interpersonal interactions, as well as indirectly by becoming part of the service environment (Baker 1987; Bitner 1992; Martin 1996; Martin and Pranter 1989; Pranter and Martin 1991). Therefore, co-consumption has two facets: Direct (i.e., interpersonal) and indirect (environmental). At the interpersonal level, one or more other customers might play a direct and active role in the production and delivery of the service for the focal customer (Pranter and Martin 1991). For example, a customer struggling with a check-in machine at an airport might be helped out by another who is waiting to use that machine. This help can range from providing valuable information to taking complete charge and interacting with the machine (Baron et al. 1996). Regardless of its specific nature, such help comprises co-consumption from the focal customer's viewpoint, but co-production from the other customer's standpoint. This research concerns itself with the former viewpoint.

As an environmental factor, the customer perceives co-consuming customers as part of the service environment (Bitner 1990; Johnston 1989; Martin and Pranter 1989). Service customers use the number and nature of other customers as tangible cues to predict the quality of the service (Berry and Clark 1986; Shostack 1977, 1987; Zeithaml, Berry, and Parasuraman 1993). The effect of the number of other customers in a service setting is analogues to that of a packaging cue for manufactured goods (Baker, Berry, and Parasuraman 1988; Kotler 1973/4; Meuter et al. 2005). When we walk into an unfamiliar restaurant and take a quick look at the dining or waiting-to-be-served customers, the role of these customers in forming our perceptions and decisions resembles the role of exterior and interior service facilities. For example, by seeing

other customers, we might perceive the restaurant as overcrowded, grungy, or 'not my kind of place'.

Interpersonal and environmental facets of co-consumption also diverge in terms of impact immediacy. The impact of interpersonal co-consumption is so direct and immediate that it resembles the impact of employees. After all, participative customers comprise partial employees of service firms (Bowen 1990a; Kelley et al. 1990; Mills et al. 1983; Mills and Morris 1986). In contrast, the impact of environmental co-consumption manifests in the customer's holistic evaluation of the service and its provider (Zeithaml 1981; Zimmer and Golden 1988).

Interpersonal Facet

A small subset of other customers often stands out for the customer as more directly linked to her service experience. This subset usually consists of one or two other customers, whom the customer perceptually brings to the service foreground (as opposed to the service background or environment). In other words, those other customers who directly contribute to focal customer's production and consumption of the service should not be classified together with other environmental factors. Rather, their role comes close to that of employees (Chase and Erikson 1988; Kelly et al. 1992; Youngdahl and Kellogg 1997). As such, we will treat this facet of other customers separately.

Environmental Facet

At the environmental level, other customers comprise part of the physical and social context of the service (Baker 1987; Bitner 1990; Booms and Bitner 1982). In this capacity, the impact of other customers is comparable, although not necessarily the same as, other tangible

and intangible environmental factors. For instance, the impact of other customers' appearance can be compared to those of furniture and employee uniforms; and their number interacts with the size of service facility to determine perceptions of crowding (Baker 1987).

The literature contains multiple conceptualizations of environmental factors, of which Bitner's (1992) *servicescape* is probably the most comprehensive since it brings together a large number of related factors. Servicescape consists of three dimensions: (a) ambient conditions, (b) spatial layout and functionality, and (c) signs, symbols, and artifacts (Bitner 1992). Each of these dimensions encompasses multiple components that, taken together, create a specific environment that influences customer perceptions and behaviors (Bitner 1990; 1992).

Baker (1987) offers a slightly different classification of service environment. She includes ambient factors, design factors, and social factors. The first two categories are similar to the first two dimensions of servicescape. The third category, however, is unique in that it isolates people (i.e., customers and employees) and regards their nature, number, and behavior as part of service environment. Our focus is on one of the social factors, namely other customers.

The environmental facet of other customers encompasses two factors. Their appearance and behavior help the customer perceive the social genre of the service environment; and their number forms customer perception of crowding (Martin and Pranter 1989).

The impact of the number of other customers is found to vary depending on service type. For instance, while a large number of other customers can enhance the customer's experience during college football games, a large crowd in grocery stores likely overwhelms her (Baker 1987). The nature of other customers encompassing their appearance, age, income, social class, and other comparable attributes is an integral constituent of the service atmosphere (Bitner 1990; Lovelock 1984), which is a determinant of service quality and customer experience. Other

customers' behaviors can also influence the customer's service experience (Baker 1987; Booms and Bitner 1981). For instance, if other customers in a hospital appear animated and energetic, the customer might feel a greater degree of comfort and wellbeing. Alternatively, if other customers show behaviors typical of indifferent and hopeless patients, the customer might experience greater anxiety and depression.

The Interplay between Co-Production and Co-consumption

The interplay between co-production and co-consumption is warranted both intuitively and empirically. One can view all of a service firm's customers as co-producers. Every customer is a co-producer of the service for self, for another customer, and for the pool of customers at large. In a similar vein, every customer can play a co-consumer role for another customer and for the pool of customers at large. Note that a customer is a co-producer, but not co-consumer, of the service for self. This is an obvious but nontrivial difference. As an implication, the customer is likely more attentive and sensitive to the impact of other customers than to her own impact as a co-consumer.

Co-consumption might exist as a byproduct of co-production. Services characterized by high co-production are at the mercy of time (Chase 1978) in that co-production makes their production scheduling a probabilistic, rather than deterministic, task. As a result, some degree of co-consumption is inevitable in such services (Chase and Stewart 1994).

Co-consumption might magnify the importance of co-production. Other customers, who utilize the same service facility simultaneously, serve as the audience of the customer's service production and consumption performance (Grove, Fisk, and Dorsch 1998; Harris, Harris, and Baron 2003). Other customers' vantage enables them to observe, assess, and sometime make

comments about the customer's technical and/or social skills. This can make the focal customer more conscious and apprehensive of her co-production role.

By the same token, co-consumption can enhance customer voice in service co-production simply because co-consuming groups represent a form of customer agency. Regardless of whether co-consumers consume the product within the same temporal, spatial, and social context (e.g., concert and sports events) or at different such contexts (e.g., Internet-based distributed games), co-consumers and marketers co-create the interconnected structure of relationships, sentiments and ritual activities that serve as the foundation of service provisions (Arnould et al. 2006). This co-creation sometimes takes the form of consumption communities (e.g., brand fests), the members of which exchange their experiences and information (Cova and Cova 2001).

Constructs From Diffusion of Innovation Research

Service Innovation Characteristics

Diffusion of innovation research consists of four broad elements of innovation, communication channels, time, and the social system. Each of these four elements is identifiable in every diffusion study (Peppers and Rogers 1997). Among these four elements, innovation is of prime importance in that innovation characteristics can explain 49% to 87% of the variation in customer adoption behavior (Henard and Szymanski 2001; Peppers and Rogers 1997). Intriguingly though, diffusion researchers in the past and present have tended to overlook the importance of innovation characteristics in two ways (Gatignon and Robertson 1991; Zaltman and Stiff 1973). First, they have regarded all innovations as nearly equivalent units of analysis (Zaltman and Lin 1971). Put differently, they have repeatedly held innovation characteristics

constant; a practice that Rogers (2003, p. 220) refers to as "a dangerous oversimplification." Second, they have devoted a disproportionate amount of time and resources to investigate adopter categories at the expense of neglecting innovation differences (Rogers 2003, p. 219).

Prior to 1980s, a vast majority of innovation characteristic research was conducted outside the field of marketing, in rural sociology (Feder 1982; Fliegel and Kivlin 1966; Kivlin and Fliegel 1967) and in organizational behavior (Zaltman, Duncan, and Holbek 1973). Moreover, within the field of marketing, individual (as opposed to industrial) customer's perception of innovation characteristics failed to attract deserved attention prior to 1980s. As Gatignon and Robertson (1985) note, marketing studies of innovation characteristics were by and large nested within the business-to-business sector (Booz-Allen & Hamilton 1981; Calantone and Cooper 1981; Campbell and Cooper 1999; Heany 1983; Hopkins 1980). An important exception was Ostlund (1974).

Since 1980s, however, important contributions have been made in the way of painting the big picture of diffusion of innovation research and understanding the nature and function of innovation characteristics. In addition to Rogers' (1997) classic summarization of diffusion findings, multiple seminal works in the 80s and 90s provided conceptual frameworks and charted the field for future research (Gatignon and Robertson 1985; Hirschman 1981; McFadden and Train 1995; Peppers and Rogers 1997). As far as innovation characteristics, several marketing researchers (Garcia and Calantone 2002; Hirschman 1981; Labay and Kinnear 1981; Meuter et al. 2005; Ostlund 1974; Venkatraman 1989) extended the state of the art of innovation research within marketing and moved the spotlight onto the individual (as opposed to industrial) customer's perception. A unique contribution in this latter group of works was to incorporate the construct 'risk' as a key innovation characteristic.

Despite these contributions, the leading figures in diffusion of innovation research have felt urgent need for new nomological and empirical elucidation (Gatignon and Robertson 1991; Rogers 2003, p. 265). The main reason for this call lies in the inconclusive and contradictory results across, and even within, many studies of innovation characteristics (Meuter et al. 2005). For instance, compatibility and complexity were found significant in some studies (e.g., Labay and Kinnear 1981) and insignificant in other studies (e.g., Venkatraman 1991). Moreover, relative advantage showed both negative and positive association with adoption decision depending on the object and context of the analysis (Tornatzky and Klein 1982; Venkatraman 1989).

It is important to understand why these mixed findings coexist. One way to provide clarification is through identifying antecedents to innovation characteristics and understanding their influence in the nomological network of diffusion constructs. To this end, we recommend antecedents to innovation characteristics and empirically examine the respective links. Innovation characteristics serve as indispensable constituents at the heart of our conceptual model. Before elaborating on this model, let us briefly review innovation and its characteristics.

An innovation is "an idea, practice, or object that is perceived as new" (Rogers 2003, p. 12). Who determines whether and to what extent a given idea, practice, or object is new? If this question is put forth by a marketer, Rogers (2003) would probably answer: The customer. This perspective has been adopted in many of previous studies and will also guide our research.

Another key question is: Exactly when is the idea, practice, or object no longer new? Authors diverge in answering this question. We leave this open to customer's subjective judgment. As such, an innovation adopted by a large majority of customers is still new to the

nonadopters no matter how many years have passed since its first introduction in the marketplace.

Innovations diffuse in the marketplace (i.e., are adopted by customers) at different rates. As noted before, a good portion of such variation is explainable by understanding how innovations differ from one another on a set of key characteristics. Just like the degree of newness, the key characteristics of an innovation reflect subjective judgments of customers.

Diffusion of innovation research has identified a parsimonious set of six innovation characteristics: Relative advantage, compatibility, complexity, observability, trialability, and perceived risk (Gatignon and Robertson 1985, 1991; Rogers 2003, p. 15; Tornatzky and Klein 1982). The selection of these six innovation characteristics is based on past writing and research, as well as on desire for maximal generality and succincy (Rogers 2003, p. 223). These characteristics are commonly investigated in the diffusion literature (Rogers 2003, p. 222) and thus have well-developed measures (Meuter et al. 2005; Moore and Benbasat 1991). The six characteristics are defined as follows (see Rogers 2003, p. 15-17 and Venkatraman 1989).

a) Relative advantage – the degree to which an innovation is perceived as better than the idea it supersedes. Relative advantage encompasses both economic and non-economic (e.g., social prestige, convenience, satisfaction) advantages.
b) Compatibility – the degree to which an innovation is perceived as being consistent with the existing values, past experiences, habits, and needs of potential adopters. An innovation that is incompatible with the customer's values and habits will not be adopted as rapidly as a compatible innovation.

c) Complexity – the degree to which an innovation is perceived as difficult to understand and use. Innovations that are simpler to understand are adopted more rapidly than complicated innovations.

d) Trialability – the degree to which an innovation may be experimented with on a limited basis. Innovations that can be tried on the installment plan will generally be adopted more quickly than innovations that are not divisible.

e) Observability – the degree to which the results of an innovation are visible to others. The easier it is for other customers to see the results of an innovation, the more quickly they will adopt that innovation.

f) Risk – the degree of uncertainty and negativity of the consequences that might result due to adopting an innovation. Generally speaking, compared to customers of goods, those of services face a higher level of perceived risk (Bateson 1985). Whether this higher risk is due to co-production and/or co-consumption is unclear.

The literature suggests that trialability and observability are not significant characteristics of service innovations (Bitner 1990; Fodness, Pitegoff, and Sautter 1993; Greco and Fields 1991; Hennig-Thurau, Walsh, and Wruck 2001; Kleijnen et al. 2004; Mills 1986; Siu and Cheng 2001). For example, Kleijnen et al. (2004) show that trialability and observability are irrelevant to the diffusion of wireless service innovations such as mobile gaming. Hence, the four service innovation characteristics to be considered here include relative advantage, compatibility, complexity, and risk.

Diffusion of innovation research has always treated innovation characteristics as exogenous variables, whose sources of variation are uninteresting. The current study employs innovation characteristics as the mediators of the impact of co-production and co-consumption

on adoption decisions. More specifically, it conceptualizes innovation characteristics as higher-order product attributes and proposes that first-order product attributes can serve as antecedents to innovation characteristics. Although this holds for both tangible and intangible products, service offerings provide an appropriate context for initial examination of our thesis. Hence, the focus will be on co-production and co-consumption as two key first-order service attributes that can in part explain the variation in perceptions of innovation characteristics. All of these characteristics, first or higher order, are seen from the customer's point of view.

Admittedly, the degree of discontinuity (i.e., newness) of an innovation does exert some influence on adoption behavior (Booz-Allen & Hamilton 1981; Garcia and Calantone 2002; Heany 1983; Robertson 1971). However, much of the variation introduced due to the degree of discontinuity can also be exerted by the four innovation characteristics included here. More specifically, any innovation perceived as highly discontinuous is also likely to be perceived as more complex, more risky to adopt, and less compatible with customer's values and past experiences/habits. Hence, the degree of discontinuity is excluded from the conceptual model.

Adoption of Innovations

Adoption research has a rich history and has been studied in a wide range of fields (Meuter et al. 2005). Adoption research has traditionally relied on the learning-oriented hierarchy of effects model. This model seems to be a reasonable representation of the adoption process under high-involvement conditions, where the customer engages in high cognitive processing (Gatignon and Robertson 1985). According to this model, adoption encompasses the stages of awareness, knowledge, attitude formation, trial, and adoption. Under conditions of low

involvement, cognitive processing encompasses the satges of awareness, trial, attitude formation, and adoption in that order (Grove et al. 1998; Krugman 1967; Robertson 1976).

Rogers (2003, p. 169) proposes the alternative model of 'innovation-decision process'. This model encompasses the stages of knowledge, persuasion, decision, implementation, and confirmation. The innovation-decision model is roughly comparable with the traditional high-involvement model.

Meuter et al. (2005) present a somewhat different conceptualization. They contend that potential customers of self-service technologies go through the stages of awareness, investigation, evaluation, trial, repeated purchase, and commitment. In line with meuter et al. (2005) and Kleijnen et al. 2004, we will incorporate the actual trial behavior as the focal dependent variable. As Meuter et al. (2005) note, this focus is vindicated by the fact that firms regard the first trial as a key barrier in customer adoption of service innovations. Although trial is our focal dependent variable, we will also capture self-reported repeat purchase and feelings of satisfaction as additional dependent variables.

The predictors of trial can be divided into mediator and antecedent constructs. Innovation characteristics are the mediators and co-production and co-consumption are the antecedents. A contribution of this model is the positioning of two key service characteristics, namely co-production and co-consumption, as antecedents of innovation characteristics. The close examination of direct and mediated relations in this model will influence our choice of measurement method and analysis technique.

Statement of Propositions

This section will delve into several streams of research to provide a set of new propositions that link co-production and co-consumption to innovation characteristics and adoption decisions. More specifically, the propositions relate the focal customer's perception of service innovation characteristics to her perception of the following five factors: Her co-production of the service for self (CPS), her co-production of the service for other customers (CPO), other customers' co-production of the service for her (OCP), the degree of crowding in the service environment, and the degree of homophily between her and other customers. The links between innovation characteristics and adoption behavior are well established and the relevant literature is easily accessible. Therefore, the discussion of these links will be epigrammatic. Before starting with the statement of propositions, it is useful to briefly explain the rationale behind studying co-production and co-consumption in the context of diffusion of innovations.

Innovations typically affect the nature and/or extent of co-production and co-consumption throughout the marketing process, which encompasses the conception, design, production, delivery, purchase, consumption, and disposal of both tangible and intangible offerings (Lovelock and Young 1979; Wikstrom 1996a). In service contexts, in particular, innovations can result in one or a combination of the following: (a) shifting some of the tasks performed at the presence of the customer to the back office or vice versa; (b) dividing employees into high-contact and no-contact employees; (c) modifying organizational structure for a narrower or broader set of tasks for each subunit of the service firm; (d) reducing the number of, or eliminating, other customer; (e) changing the frequency and significance of inter-customer interactions; and (f) providing a more culturally homogenous service environment

through segmentation (Chase and Tansik 1983; Martin and Pranter 1989; Pranter and Martin 1991; Youngdahl and Kellogg 1997).

When customers experience a change in the level of required co-production and/or co-consumption, they might revise their evaluations of the characteristics and benefits of that offering. In other words, customer perception of the required level of co-production and/or co-consumption influences her perceptions of innovation characteristics, which in turn affect the likelihood and timing of her adoption behavior. Lovelock and Young (1979) cite five different service innovations (i.e., Universal Product Code, postal code, automatic bank teller, transit service, and self-service gasoline station) and argue that negligence of the impact of these innovations on the nature and extent of co-production and co-consumption can leave customers susceptible to adversarial perceptions of innovation characteristics and subsequently dampen the speed with which innovations diffuse in the marketplace.

In summary, innovations affect customers' perceptions of co-production and co-consumption as two key characteristics of (service) offerings, which in turn input into the formation of innovation characteristics. The ensuing sections will discuss the influence of customers' perceptions of co-production and co-consumption on their perception of service characteristics and expose a set of related propositions.

A customer's role in the production of the service for others (CPO) has some undeniable consequences for the customer herself (Eiglier and Langeard 1977b). Since these consequences are in most cases similar to the impact of the customer's service co-production for self (CPS; Eiglier 1977; McGrath and Otnes 1995), the following sections will combine the discussions and propositions concerning these two categories of co-production.

Co-Production as a Predictor of Service Innovation Characteristics

Numerous studies from the fields of marketing, management, and operations research stand to support, either explicitly or by implication, that co-production can serve as an antecedent to innovation characteristics. We draw on these three fields to develop a set of substantively meaningful propositions.

CPS, CPO, Relative Advantage, and Risk

The 'co-production–relative advantage' and the 'co-production–risk' relations share much analytical and empirical rationales. These relations are supported by both financial and non-financial consequences of changes in the level of co-production. Moreover, past research has employed two long standing theories, namely agency theory and transaction-cost economics, to delineate how co-production relates to relative advantage and risk.

Financial Rationale

Literature suggests that an increase in the level of co-production (a) can reduce service provider costs, (b) which results in price discounts, (c) which in turn enhances customer evaluation of the service offering. Service firms usually encourage CPS and CPO in order to enhance their operating efficiency (Bowen 1986; Xue and Harker 2002). They accomplish this by substituting employee labor with self-service technology or with customer labor (Fitzsimmons 1985; Lovelock and Young 1979). Many service firms transfer at least some of their savings to the customer in the form of lower prices and/or via other promotional mechanisms.

Ha (1998), Kelley et al. (1990), and Song and Adams (1993) reach a similar conclusion. They find co-productive customers to dedicate greater resources to the service provider, who in turn reciprocates by passing some of the savings back to customers in the form of reduced prices. They argue that, with price reductions, customers perceive greater value in the innovated service.

Two facts about services intensify the effect of price reduction on customer evaluation of services. First, it is far more difficult for service firms, as compared to manufacturing firms, to reduce operational costs by cutting corners or through learning effect (Chase and Erikson 1988). This is primarily due to the slow process of standardization of intangible offerings, which makes it difficult to apply the production-line approach to services (Eiglier and Langeard 1977a). Hence, any price reductions on service offerings can have substantial influence on customers' perceptions of value.

Moreover, the psychological aspect of price has a stronger impact on customers of services, compared to those of goods (Eiglier and Langeard 1977a). In other words, price is a more decisive attribute of services than it is of goods. It follows that price reductions are expected to have a strong influence on service customers' perceptions of value.

Therefore, when a service innovation increases CPS and CPO and reduces service retail price, the customer is likely to perceive greater value in the service. Put differently, financial gains can get the customer perceive the service as more advantageous and favorable relative to pre-innovation type of the service and relative to competing services.

Non-Financial Rationale

Service providers have come to realize that an increase in their participation during service production and delivery can yield more benefits than the mere cost/price advantage. The

non-monetary rationale of the impact of CPS and CPO on relative advantage and risk is recognized in numerous studies. Among marketing scholars, Bateson (1985), Cermak, File, and Prince (1994), and Zeithaml (1981) have shown that an increase in CPS and CPO positively affects customer perception of quality and feeling of satisfaction. In a similar vein, Van Raaij and Pruyn (1998) argue that when customers participate in the production and delivery of service offerings, they are more likely to find service specification, production, and/or delivery processes to be valid and reliable; to grow feelings of satisfaction; and to attribute service failures to circumstances rather than to the provider.

Furthermore, Wikström (1996a) argues that customers' active participation in the creation and delivery of a given service can improve their perceptions of service benefits and attenuate their perceptions of uncertainty that surround the exchange act and the service offering. Higher levels of co-production enable the customer to exert more control over the course of service provision and to avoid feelings of uncertainty and risk (Kelley et al. 1990; Song and Adams 1993).

Bowers et al. (1990) and Goodwin (1988) provide a slightly different insight. They contend that when the customer is involved in the production of service offerings for self or others, she often feels partially responsible for the quality of the service as well as the value that customers ultimately receive. Hence, when a service innovation program increases CPS and CPO, the customer is likely to take an even greater responsibility for service outcomes. As a result, the customer is more likely to favorably evaluate the service provider's performance when it enhances CPS and CPO through technology or process innovation.

Bowers et al. (1990) and Langeard et al. (1981) believe that customers find their CPS and CPO throughout service production and delivery enjoyable activities, which can minimize the

boredom and anxiety that would otherwise surround the service consumption act, especially during waiting periods. They argue that co-productive customers have greater knowledge of service attributes and can better appreciate service provider's efforts. For instance, Bowers et al. (1990) observe that hospital patients who administer their own pain medication, rather than waiting for nurses, tend to consume less medicine and to prefer their health care providers over competitors. Further, these patients show lower perceptions of risk associated with unnecessary intake of medicine and possible side effects (Bowers et al. 1990). Moreover, Dellande et al. (2004) show how Weight Watchers' clients who share success stories and support those having difficulties tend to perceive greater benefits and lesser risks potent in the service offering. As a conclusion, when a service innovation entails greater co-production, increased knowledge and diminished negative feelings in customers propel them to perceive greater value in the form of superior benefits and lower uncertainty relative to competing services.

Another non-financial benefit for customers is identification with the firm (Eiglier 1977). Although customers might also identify with marketers of goods, customer identification is particularly intense with service firms, especially when customers directly and actively interact with service employees (Eiglier and Langeard 1977a). Generally speaking, as customers assume a stronger CPS and CPO role and engage in a wider variety of co-production activities, they are more likely to identify with the service firm (Eiglier and Langeard 1977b). Therefore, a service innovation that increases co-production can also strengthen the identification bond between the customer and the firm, thereby improving customer perception of value.

Scholars in the field of management have reached similar findings. Bowen (1986) and Mills and Morris (1986) observe that increases in co-production can increase customers' positive feelings such as satisfaction, and reduce their negative feelings such as uncertainty and doubt.

Mills and Moshavi's (1999) investigation in knowledge-based services reveals that when customers are held accountable for their input to, and participation in, the specification, production, and delivery of service offerings, three favorable outcomes are likely to accrue: (a) expectation disparity will likely diminish and the overall perceived quality will increase, (b) perceived information asymmetry diminishes and satisfaction with the service outcome increases, (c) perceived service risk diminishes and satisfaction and commitment to the firm increase. Furthermore, when unique customer competencies, such as information about her financial, legal, psychological, or physical statuses are necessary for successful production of a service, the customer will gladly take on a more active role (Larsson and Bowen 1989).

Bowen and Schneider (1988), Gartner and Reissman (1974), Holland (1985), and Matteis (1979) warn that service innovation programs aiming to reduce customer input and participation in service operations might have adversarial effects on customer perceptions of the quality and benefits of the service and might alienate her by risking the uniqueness that characterizes every single service encounter.

Operations researchers have also found empirical support for the above contentions. For example, Kellogg et al. (1997) and Hart et al. (1990) suggest that, just as fail-safing strategies can relieve service providers from service failure worries, increased customer participation in service creation and delivery processes might ease their fears of uncertainty and enable them to better perceive the benefits of the service. In a similar vein, Youngdahl and Kellogg (1997) report that customers' engagement in higher levels of information exchange and intervention behavior during service delivery likely enhances their satisfaction with service processes and outcomes. They find customers' levels of co-production effort to contribute to their perceptions of service value.

Interestingly, Youngdahl et al. (2003) find strong similarities in customer participation behaviors across different cultures. They observe that customers from different cultures converge in terms of the type and extent of participation behaviors, perceptions of the efforts they expend, and feelings of satisfaction with services given their type and extent of their participation behaviors.

Agency Theory

A stream of operations research, primarily attributed to Mills seminal works (1986, 1990), uses agency theory to understand service exchange relationships and encounters. The application of agency theory to the relationships during service encounters has been supported by several scholars (Bergen, Dutta, and Walker 1992; Lusch, Boyt, and Schuler 1996). According to this theory, two sources of uncertainty in principal-agent relationship (e.g., customer-service provider relationship) reduce the service quality and value that the customer perceives to have received and increase the risk associated with the service offering. These sources of uncertainty are adverse selection and moral hazard.

Adverse selection occurs when the customer is unable to ascertain one or both of the following: Provider's skills, knowledge, and motivation and the contingencies that can influence the provider's performance (Holstrom 1982). A good example is doctor-patient service encounters. Moral hazard emerges when the quantity and quality of the provider's efforts are difficult to verify and, thus, standards of practice are non-enforceable and meaningless (Pauley 1974). For instance, a disgruntled client might file in a lawsuit might hold that the attorney has shirked in representing her and has not done so effectively.

The two most common mechanisms for customers to cope with adverse selection and moral hazard are monitoring and bonding activities (Fama 1980). As customers elevate their monitoring and bonding activities, they necessarily increase their input during service production and delivery processes (Mills 1990; Mills and Morris 1986). Also with any increase in the expected level of monitoring activities, the price the customer will pay for the service declines (Mills and Morris 1986).

The customer principal monitors the service agent's fulfilling the service contract, and might decide to actively participate in service creation/delivery in order to guarantee quality and satisfaction (Mills 1990). Because monitoring activities are frequently costly and time-consuming, the customer as well as the provider might supplant it with bonding activities. On the one hand, customers might seek and nurture commercial and noncommercial relationships with providers, hoping to reduce or eliminate the provider's temptation to shirk on service quality. Service providers, on the other hand, might obtain credentials (e.g., CPA, MD), promote goodwill (e.g., donation and community involvement), offer guarantees, or proactively seek and nurture relationships with customers (Mills 1990).

The arguments above suggest that the implicit contract between the principal and the agent not only serves as a way of distinguishing types of service firms (Fama and Jensen 1983), but also indicates variability in the degree and nature of customer participation in service creation and delivery (Mills and Morris 1986). The agency view of service consumption recognizes co-production as a surrogate mechanism through which customers reduce the uncertainty associated with service encounters and elevate their satisfaction with, and evaluation of, service outcomes.

Transaction-Cost Economics

Bowen and Jones (1986) insightfully link co-production to the concept of performance ambiguity in Transaction Cost Economics (TCE). In TCE, the fundamental concern is efficiency, and the key question is whether a given value element should be produced in-house or bought from the market (i.e., 'make or buy'; Williamson 1985). Furthermore, TCE suggests that increased performance ambiguity translates into increased transaction costs, which in turn necessitate a 'make' decision (Rindfleisch and Heide 1997; Williamson 1985).

The notion of co-production is related to TCE in that the question of whether to increase or to reduce co-production is essentially a make-or-buy question (Bowen and Jones 1986). Increasing co-production and co-opting them as partial employees are analogous to a make (i.e., hierarchy expansion) decision; and reducing customer input in the production process comprises a buy decision (i.e., outsourcing). Since performance ambiguity is higher for firms with intangible, experiential, credential, and labor intensive offerings, such firms can partially alleviate performance ambiguity and enhance their efficiencies by co-opting customers and reinforcing their co-production role (Bowen and Jones 1986).

The above discussion has important implications for service innovation characteristics. A highly ambiguous offering has several adverse consequences, which service firms can partially alleviate by co-opting customers as partial employees (Bowen and Jones 1986; Larsson and Bowen 1989; Rogers 2003). Examples of adverse consequences include customer inability to measure the offering's relative value and benefits, and higher levels of perceived risk throughout the service production and delivery.

To reiterate, service innovations that increase the customer's service co-production for self or for others might boost customers' perceptions of relative advantage and attenuate their perceptions of risk associated with the service.

P-1: Shifts in CPS are positively related to relative advantage.

P-2: Shifts in CPO are positively related to relative advantage.

P-3: Shifts in CPS are inversely related to risk.

P-4: Shifts in CPO are inversely related to risk.

CPS, CPO, and Compatibility

There appears to be a propensity on the part of customers to work at getting the level of quality they desire by actively participating in service production (Kellogg et al. 1997). This propensity is best understood by the application of the role theory from social psychology to service encounters and from the notion of service script (Grove et al. 1998). A discussion of service encounters is integral to the issue of co-production because such relationships provide an essential, if not the only, mechanism through which customers participate in service production as partial employees (Mills 1990).

A distinctive feature of service encounters is their purposive, task-oriented nature and the agreement on short-term goals and codes of conduct among providers and customers (Solomon et al. 1985). Due to the behavioral consensus between providers and customers, ritualized behavior patterns evolve that govern the course of encounters to the extent that each party to the encounter has a role to play and a script from which to read (Eiglier and Langeard 1977a). A role is "a cluster of social cues that guide and direct an individual's behavior in a given setting (Solomon et al. 1985, p. 102) and a service script is a coherent sequence of events expected by the parties to the encounter involving them either as participants or observers (Abelson 1976; Smith and Houston 1985).

When an innovation takes place, the service script is subject to slight, and sometimes radical, modifications. Consequently, both the provider and the customer are expected to modify their roles accordingly (Eiglier and Langeard 1977a). It follows that customers might find the sudden changes in the service script to be incompatible with their expectations and behavioral habits, and thus exert resistance towards the innovated service. This perception of incompatibility and subsequent resistance behavior can take place both when the innovation increases CPS and CPO and when it reduces them.

To reiterate, when a service innovation causes a change in customer participation, the customer might perceive the service to be incompatible with her existing values, past experiences, and utilitarian and hedonic needs (Bowen 1986). The customer might then decide to delay the act of adoption or even to reject the innovation altogether (Rogers 1995, p.15). Lovelock and Young (1979) provide numerous examples of service innovations that customers have resisted mainly because customers find these innovations to be inconsistent with their existing customer roles (i.e., behavioral habits and past experiences).

Further support for this line of thinking comes from Langer's (1978) theory of mindless behavior. According to this theory, people interact with their environment in a passive manner with minimum cognitive activity. Similarly, most routine service encounters take place in an almost automatic style with little cognitive effort by the customer. As long as the structure of a service script is followed, mindless behavior prevails. However, when a service innovation causes change in the service script and roles, the customer is provoked into mindfulness (Langer, Blank, and Chanowitz 1978; Langer and Imber 1979). Suddenly the customer finds it necessary to expend cognitive effort due to the diminished consistency between past experience and new script (Solomon et al. 1985).

The theory of mindless behavior is well supported. For instance, the finding that people cannot accurately remember the obvious details of a given service interaction affords support for this theory (Solomon et al. 1985). Further, Swan et al. (2001) find that more than half of the buyers of low-involvement, frequently purchased goods do not recall forming any opinion at all about the purchase experience as there was no substantial deviation from expectations and subsequently little cognitive effort by the customer.

In applying employee socialization model to customers, Goodwin (1988) and Mills and Morris (1986) recommend that each of the four socialization processes is equally applicable to employees and customers. These processes include (a) learning new skills, (b) developing a new self image, (c) developing new relationships with providers and often with fellow customers, and (d) acquiring new values (Gross 1981). When a service innovation changes the level of participation required of the customer, the service provider and the customer together make modifications to one or more of the learned skills, self image, relationships, and values. These required modifications result in a decline in perceived compatibility of the service with past experiences and habits.

Bowers et al. (1990) contend that effective management of the service encounter, including employee behavior and customer input, might prevent the perceptions of the incompatibility between the customer and the service. If one relaxes the assumption of 'effective management' in Bowers et al. (1990) argument, the position taken here will be supported: Customers will likely find structural changes in CPS and CPO as incompatible with their behavioral habits (Eiglier and Langeard 1977a). In summary, (a) service innovation changes service script and expected roles, (b) which translate into perceived incompatibility, and (c) propel the customer to expend more cognitive effort.

P-5: Upward and downward shifts in CPS reduce compatibility.

P-6: Upward and downward shifts in CPO reduce compatibility.

CPS, CPO, and Complexity

The literature contains mixed findings as to how changes in the customer's service co-production for self due to service innovations affect perceptions of innovation complexity. On the one hand, Bowen (1986) and Mills and Morris (1986) imply a positive association between CPS and perceived service complexity. These authors contend that, with increased co-production, customers find purchasing, consuming, and evaluating the offering to be more complex. Eiglier and Langeard (1977b) concur with this perspective and introduce CPS as one of the five factors that cause a service offering to be perceived as more complex in the mind of the customer. On the other hand, Wikström (1996a, 1996b) suggests that customers' active participation in the creation and/or delivery of a given service eases their perceptions of the complexity that surround the exchange act and the service offering.

Using agency theory to explain service exchange relationships, Mills (1990) suggests that as the two sources of uncertainty (i.e., adverse selection and moral hazard) intensify, the principal customer perceives greater complexity in the process of service production, delivery, and consumption. To cope with increased complexity, both customers and service providers engage in monitoring and bonding activities. These activities, in turn, motivate the customer to exert greater co-productive role in order to bring the degree of complexity down to a more manageable level (Mills 1990)

As is implied above, CPS and complexity are related to each other in a circular manner (Eiglier 1977). First, an increase in complexity prompts the principal customer and the agent

provider to allow for greater CPS. This comprises the positive link 'complexity→CPS'. Second, as CPS grows, some of the complexity associated with the service offering disappears. This signifies the negative link 'CPS→complexity'.

We believe that the latter directionality is of greater theoretical and practical significance to marketing community, and proceed to propose a negative 'CPS→complexity' relation for two reasons. First, the arguments underlying the positive relation between co-production and complexity are essentially anecdotal assertions that lack empirical support. Second, the burden of evidence is stronger on the negative relation.

P-7: Shifts in CPS are inversely related to complexity.

The reviewed literature (Bowen 1986; Eiglier 1977; Mills and Morris 1986) offers more resolute insight into the 'CPO→complexity. As a service innovation increases the level of CPO, the customer tends to experience more complexity in the production, delivery, and consumption of the innovated service. Hence, depending on whether the customer co-produces the service for self or for others, the relation between co-production and complexity might be either negative or positive.

P-8: Shifts in CPO are positively related to complexity.

Co-Consumption as a Predictor of Service Innovation Characteristics

As noted earlier, co-consumption has two facets: Interpersonal and environmental. Whereas the latter influences customer perceptions of crowding and homophily in the service environment, the former represents the dynamic role that one or more other customers play in the production and delivery of the service for the focal customer. The latter facet is referred to as other customers' co-production of the service for the focal customer (OCP). What sets OCP apart

from crowding and homophily is the direct and active nature of the role OCP plays in shaping the focal customer's service experience.

OCP and Service Innovation Characteristics

The reviewed literature (Bitner 1990; Grove et al. 1998; Johnston 1989; Martin 1996; Martin and Pranter 1989) points to discrepant customer evaluations of co-production, depending on who the co-producer is. Whereas typical customers derive satisfaction from their role in service production, they often associate others' service co-production with negative sentiments and dissatisfaction. Put simply, the typical customer welcomes her, but not others', co-production of the services she consumes.

Grove et al. (1998) classify the theatrical components of a service encounter into actors, audience, setting, and performance. They find empirical support that audience is the foremost source of dissatisfaction. In their own words, "Only 19.5 per cent of the total number of events associated with the theatre components were attributed to the service audience, yet it accounted for 30.1 per cent of the dissatisfying ones" (Grove et al. 1988, p. 125). Furthermore, Martin (1996) classifies co-consumption behaviors as seen by customers into 7 types: Gregarious, grungy, inconsiderate, crude, violent, malcontent, and leisurely. Note that only one of these seven behavior classes, namely gregariousness, might be interpreted in a positive manner.

These findings suggest that the impact of OCP on relative advantage, risk, and complexity is opposite to that of co-production. Customer A's response to customer B's co-production of service A tends to move in opposite direction compared to customer A's response to a change in her own co-production role. In other words, when a service innovation program alters the level of co-production, the customer is likely to develop diverging perceptions of

relative advantage, risk, and complexity, depending upon whether the change modifies her own or others' level of co-production. As such, the propositions related to OCP are the mirror image of those related to CPS. Perceived compatibility is an exception. The impact on perceptions of compatibility remains constant.

P-9: Shifts in OCP are inversely related to relative advantage.

P-10: Shifts in OCP are positively related to risk.

P-11: Upward and downward shifts in OCP reduce compatibility.

P-12: Shifts in OCP are positively related to complexity.

Crowding and Service Innovation Characteristics

The number of other customers instigates perceptions of crowding. Although the direction and strength of crowding effect varies by service type (Hill 1977), it can be argued that a majority of service industries such as restaurants, supermarkets, recreational centers, and repair shops are characterized by an inverse relation between crowding and service quality (Baron et al. 1996; Eroglu, Machleit, and Barr 2005; Martin and Pranter 1989). In other service industries such as sport events and concerts, bigger crowds might in fact translate into superior service performance and experience (Harrell, Hutt, and Anderson 1980; Machleit, Eroglu, and Mantel 2000). The ensuing discussion and propositions pertain to the former class of services.

The number of other customers is important because it is the main determinant of the customer's subjective perception of crowding in service environments (Baker 1987; Baker et al. 1988; Bitner 1990; Harrell and Hutt 1976). Perceived crowding is a psychological state that occurs when a person's demand for space exceeds the supply (Stokols 1972). Perceptions of crowding are individual and subjective in nature; two different customers in the same service

environment may perceive different levels of crowding (Eroglu and Machleit 1990; Machleit and Eroglu 2000).

Customer's perception of crowding is associated with her feelings of satisfaction with the service and with her evaluation of service-related risk (Machleit, Kellaris, and Eroglu 1994). When the customer repeatedly finds too many other customers in the service environment, she is likely to view the service offering as poor and more risky compared to competing service offerings (Eroglu and Harrell 1986). It follows that, when a service innovation increases the level of crowding in the service environment, the customer is likely to perceive the innovated service less advantageous and more risky relative to the pre-innovation type of the service and other competing service offerings.

P-13: Shifts in crowding are inversely related to relative advantage.

P-14: Shifts in crowding are positively related to risk.

As mentioned earlier, the agreement on short-term goals and codes of conduct among providers and customers (Solomon et al. 1985). Ritualized behavior patterns and service scripts evolve that govern employee and customer interactions (Eiglier and Langeard 1977a). When an innovation modifies the extent of crowding, the customer perceives the service script and ritualized behavior patterns to also have changed (Eiglier and Langeard 1977a). Customers likely find such modifications to be incompatible with their expectations and preferences. This perception of incompatibility and subsequent resistance behavior exist both when the innovation increases perceived crowding and when it reduces it.

P-15: Upward and downward shifts in crowding reduce compatibility.

Perceptions of crowding and control have an inverse interrelation (Baron et al. 1996; Hui and Bateson 1990, 1991). In other words, higher levels of crowding reduce the customer's ability

to exert control over the course of service provision (Baker 1987). As noted earlier, perceived control is inversely related to perceptions of complexity (Bateson 1985; Hui and Bateson 1991). Therefore, perceptions of crowding are positively correlated with complexity. In other words, when a service innovation results in higher perceived crowding, the customer is likely to find the service innovation to be more complex. Eiglier and Langeard (1977a) reach similar conclusions and assert that the complexity of the firm-client relationship in services is further complicated by the multiplicity of individuals with whom the client interacts in a given spatial, temporal, and social context (Eiglier and Langeard 1977a).

P-16: Shifts in crowding are positively related to complexity.

Homophily and Service Innovation Characteristics

The nature (e.g., appearance, age, income, and social class) of other customers comprise part of the physical as well as symbolic or social servicescape (Grove et al. 1998; Rosenbaum 2005; Tombs and McColl-Kennedy 2003). Symbolic servicescape is any sociocultural symbol that is contained within a service environment and shared by members of a certain social group such as a subculture, a social class, or even a profession. As alleged by Rosenbaum (2005), when the customer perceives greater homophily with other customers present in the service environment, she will likely experience more comfort, less worries, greater feelings of detachment from the general population, and stronger feelings of belongingness to these other customers.

These positive experiences emerge because other customers, as part of the symbolic servicescape, provide cues that help the customer make inferences about service type and develop expectations of service quality (Bitner 1990; Mehrabian and Russell 1974). When the

customer is better capable of determining what service components at what quality to expect, some of the complexity and uncertainty surrounding the service offering is already washed away (Bateson 1985; Cermak et al. 1994; Zeithaml 1981).

Feelings of comfort, relief from worries, and belongingness qualify as added benefits and value of any service. As such, as the perceived homophily between the focal customer and other customers co-consuming the service increases, the customer might perceive the service to contain more benefits and value and might find it advantageous relative to other competing services. Furthermore, since comfort and lack of worries are inversely related to perceptions of complexity and uncertainty (Paswan and Ganesh 2005), a rise in perceived homophily will be accompanied by a decline in perceived complexity and risk associated with the service. If the rise in perceived homophily is due to a service innovation, the customer will perceive the service innovation as more advantageous, less complex, and less risky. Moreover, Baron et al. (1996) find that other customers constitute a powerful, credible, and reliable source of information, which can strongly influence perceptions of complexity and risk as well as evaluations of service benefits. This holds, they contend, even in technology-based self-service contexts.

P-17: Shifts in homophily are positively related to relative advantage.

P-18: Shifts in homophily are inversely related to risk.

P-19: Shifts in homophily are inversely related to complexity.

It is generally agreed that, as the degree of homophily between the customer and other customers grows, the customer is likely to find the service more compatible with her values and past experiences/habits (Kellogg et al. 1997; Martin and Pranter 1989; McGrath and Otness 1995; Mills 1990; Rust, Zeithaml, and Lemon 2004). As noted earlier, service encounters are purposive and normative sets of interactions (Solomon et al. 1985), which instigate ritualized

behavior patterns and expectations (Eiglier and Langeard 1977a). As the homophily of other customers with the focal customer rises, their mutual, ritualized behaviors within the context of service encounter strengthen and multiply.

The desire for homophily in the marketplace is an ever increasing phenomenon, and customers are more than ever seeking to satisfy their affiliation and identification needs in the marketplace rather than the more traditional interpersonal arenas (Martin and Pranter 1989). Therefore, when a service innovation enables the customer to perceive an elevated level of homophily with other customers who share the same service environment, she is likely to find the service innovation more compatible with her values and past experiences/habits.

P-20: Shifts in homophily are positively related to compatibility.

Co-Production and Co-Consumption as Predictors of Trial

The conceptual model poses service innovation characteristics as mediators of the impact of co-production and co-consumption on trial. No mediation, however, is possible without a direct link between antecedent predictors and the outcome variable (Baron et al. 1996). Therefore, it is necessary to incorporate and examine co-production and co-consumption's direct relations with trial.

The literature suggests a positive, direct link between co-production and patronage intentions (e.g., Bateson 1985; Cermak et al. 1994; Mills and Morris 1986; Tax et al. 2006; Zeithaml 1981). Unlike co-production, other customers' direct co-production of the service for the focal customer likely discourages her trial (Baker et al. 2002; Grove et al. 1998; Keh and Teo 2001; Martin 1996; Martin and Pranter 1989). While homophily is positively related to patronage intention (e.g., Martin 1996; Rosenbaum 2005), crowding is shown to encourage avoidance

rather than approach (Eroglu and Harrell 1986; Eroglu, Machleit, and Davis 2001b; Hui and Bateson 1991).

P-21: Shifts in CPS are positively related to (a) first-trial timing and (b) use intention.

P-22: Shifts in CPO are positively related to (a) first-trial timing and (b) use intention.

P-23: Shifts in OCP are inversely related to (a) first-trial timing and (b) use intention.

P-24: Shifts in crowding are inversely related to (a) first-trial timing and (b) use intention.

P-25: Shifts in homophily are positively related to (a) first-trial timing and (b) use intention.

Innovation Characteristics as Predictors of Trial

The state of the art in diffusion research within marketing (see Gatignon and Robertson 1991; Henard and Szymanski 2001; Rogers 2003, pp. 15-16) warrants two generalizations about innovation characteristics. First, the focal innovation characteristics form two groups of variables that move in opposite directions. One of the groups includes relative advantage, compatibility, observability, and trialability. The other group consists of perceived risk and complexity. Second, the constructs within each of these groups are highly positively interrelated. Typical correlations among the constructs in the first group range between .55 and .80; and in the second group, the typical correlation between perceived risk and complexity is .65 (e.g., Meuter et al. 2005; also see Rogers 2003, p. 223).

Furthermore, the correlations across these two groups of constructs are strong and negative, clustering around -.50. Although empirical findings support strong interrelations, diffusion literature strongly espouses the conceptual distinction between each pair of these constructs (Rogers 2003, p. 223). Keeping with these generalizations, we posit that adoption

decision is positively associated with relative advantage, compatibility, and negatively with perceived risk and complexity.

Disposition to Participate (DTP)

We explicated the usefulness of co-production and co-consumption in explaining service innovation characteristics and adoption behavior. The main thesis so far revolves around the associations of co-production and co-consumption with service innovation characteristics. Our understanding nevertheless is incomplete unless we also incorporate interpersonal differences evident among customers (Eiglier and Langeard 1977a). Are all customers willing and/or able to increase their own and other customers' co-production and co-consumption roles? The answer is negative. There is general agreement that Disposition to Participate (DTP) can vary from one customer to another (Bateson 1985; Langeard et al. 1981; Larsson and Bowen 1989; Whitaker 1980). In fact, one of the drawbacks to pro–co-production and pro–co-consumption strategies is that a portion of customers show aversion towards such strategies (Bowers et al. 1990; Bateson 1985).

DTP is defined as the degree of customer tendency to play an active role in supplying labor or information inputs to the service production and delivery process (Larsson and Bowen 1989). Unlike Chase's (1981) high versus low customer contact which emphasizes the nature of services, DTP taps customer disposition to participate in service production and delivery. DTP is rooted in customers' a priori expectations, life styles, and personalities, and can strongly influence perceptions of quality and feelings of satisfaction during and after service encounters (Eiglier and Lnageard 1977b).

The Profile of DTP Categories

In their seminal work, Langeard et al. (1981, p. 33) demonstrated that DTP could be used to tease out five qualitatively different market segments. They identified five groups of maximum, high, medium, low, and non-participators. These groups accounted for an average of 13.4%, 25.1%, 19.7%, 23.4%, and 18.4% of total customers, respectively. The latter two groups, comprised a quite sizable segment (24%-62% of all customers) and indicated willingness to engage in a given service co-production on all occasions, even after situational factors, time, and cost differentials were controlled for. Apparently, co-production is inherently attractive to some customers and inherently unattractive to others.

Since Langeard et al. (1981) classified respondents according to actual and intended use of service innovations; it makes sense to compare the profiles of their participator categories with those of adopter categories. There are five adopter categories including innovators, early adopters, early majority, late majority, and laggards, which comprise 2.5%, 13.5%, 34%, 34%, 16% of all customers, respectively (Rogers 2003, p. 281). Although the generalizability of the distribution properties of participator categories observed in Langeard et al. (1981) is moot, there is exploratory value in comparing the distribution of participator categories with that of adopter categories. Such comparison points to an interesting observation: Like that of adopter categories, the distribution of participator categories approaches normality. The latter, however, is characterized by a slight positive skew (i.e., skew towards maximum participators).

Across a range of services, high DTP customers tend to be younger, more educated, more convenience prone (e.g., impatient with waiting lines), and more interested in playing with new machines than low DTP customers (Langeared et al. 1981). Wikström (1996a, 1996b) asserts that increased demand for co-production is in part due to improved education and greater interest

in technology evident among younger customers. We will replicate these findings. Since other demographic and psychographic differences between high and low DTP customers are moot, our proposition is limited to age, education, and convenience proneness.

P-26: Compared to low-DTP customers, high-DTP customers tend to be (a) younger, (b) more educated, and (c) more convenience prone.

DTP as a Moderator of Customer Co-Production Effects

Langeard et al. (1981, p. 40) show that, as one moves from low-DTP customers to high-DTP customers, an increase in the level of required co-production is more strongly associated with perceptions of efficiency, time and effort saving, and personal control over the process and outcome of the service. Since customers view time, effort, efficiency, and control as non-financial dimensions of relative advantage (Bowen 1986; Mills and Morris 1986; Kelley et al. 1990; Song and Adams 1993), it can be argued that, as one moves from low-DTP customers to high-DTP customers, an increase in the level of required co-production results in higher perceptions of relative advantage. In other words, compared to low participators, high participators perceive the service alternative that requires more co-production to be advantageous over other service alternatives. This line of thinking is supported by Bateson's (1985) finding that time and personal control are the primary determinants of customer perception of self-service options. Since we will divide respondents into low-DTP and high-DTP groups, we postulate:

P-27: The positive associations of (a) CPS and (b) CPO with relative advantage are stronger among high-DTP customers than low-DTP customers.

An increase in the level of required co-production is more strongly associated with perceptions of risk reduction and risk manageability, as one moves from low-DTP customers to high-DTP customers (Bateson 1985, Langeard et al. 1981). In other words, compared to low

participators, high participators find less risk in service alternatives that require more co-production.

P-28: The negative associations of (a) CPS and (b) CPO with risk are stronger among high-DTP customers than low-DTP customers.

With a decline in human contacts due to service mechanization, both the provider and the customer are expected to modify their roles accordingly (Eiglier and Langeard 1977a). This can comprise a slight, moderate, or even radical modification of the service script (Solomon et al. 1985). Consequently, customers might find the changes in the service script incompatible with their expectations and behavioral habits and, hence, exert resistance towards the innovated service. Such perceptions of incompatibility and subsequent resistance behavior can take place also when customers perceive a rise is the level of human contact and decline in service mechanization.

As one moves from low-DTP customers to high-DTP customers, any increase (reduction) in the level of required co-production is less strongly associated with perceptions of reduced (increased) human contact and increased (reduced) mechanization of the service (Bateson 1985, Langeard et al. 1981). Compared to low participators, high participators perceive less incompatibility in the innovated service.

P-29: Upward and downward shifts in (a) CPS and (b) CPO reduce compatibility to a lesser extent among high-DTP customers than low-DTP customers.

The literature does not provide insights as to how high-DTP customers differ from low-DTP customers in terms of their perceptions of the influence of increased co-production on service innovation complexity. We know that, as one moves from low-DTP customers to high-DTP customers, an increase in the level of required co-production is more strongly associated with feelings of personal control over the process and outcomes of the service (Bateson 1985, Langeard et al. 1981). Because feelings of control and perceptions of complexity are inversely

related (Bateson 1985; Hui and Bateson 1991), one might make the following indirect inference: An increase in the level of required co-production will be less strongly associated with perceptions of complexity, as one moves from low-DTP customers to high-DTP customers. In other words, compared to low participators, high participators find service alternatives that require more co-production to be less complex.

P-30: The negative association of CPS with complexity is stronger among high-DTP customers than low-DTP customers.

P-31: The positive association of CPO with complexity is weaker among high-DTP customers than low-DTP customers.

CHAPTER 3

METHOD

This chapter elaborates on the research design employed for determining the service innovations to be considered as study contexts, identifying the target populations and samples, operationalizing and measuring the constructs of interest, refining the measures in a pilot study, collecting data for the main study, and analyzing the collected data.

Service Innovations

In selecting service innovations, three criteria were considered. First, it was necessary to allow customers to have a choice between the innovated and non-innovated types of the service offering (Langeard et al. 1981; Meuter et al. 2005). Second, it was important to find service innovations adopted by some, not all, of target customers so that both adopters and non-adopters could be captured. Third, it was desired to select innovations from different service types so that the findings pertain to more than a single industry.

The selected service innovations are self check-out at grocery stores, consumer-initiated meal preparation at gourmet-to-go stores, and teddy bear customization at Build-A-Bear retail outlets. These innovations are relevant and timely consumer involvement contexts where individuals take an active role in service co-production. Consistent with previous studies, co-production need not be confined to new hardware and machines. Creative service processes such as those selected here are also important service innovations (Fitzsimmons 1985).

In some grocery stores, the customer can choose between employee-rendered check-out and automated self check-out. Although many customers use self check-out routinely, some have not tried it yet. Build-A-Bear is a workshop-retail outlet where customers create their own teddy

bears or other stuffed toys. There are now over 300 such stores. Building stuffed toys at a Build-A-Bear store is contrasted with purchasing already-assembled toys at traditional toy stores. Meal assembly, although a recent service innovation, has grown rapidly. In March 2006, there were over 700 meal assembly centers in the U.S., representing a $270 million industry (ABC News 2006). These centers handle part of meal-preparation tasks such as shopping, washing, chopping, and recipe. Assembling a meal is contrasted with buying a prepared meal from a grocery store.

Target Population and Samples

The target population for self check-out at grocery stores is broad and encompasses all customers who patronize grocery stores where self check-out is an option. The target population for toy assembly includes any individual who has bought toys before and has some familiarity with Build-A-Bear. The target population for meal assembly encompasses professional adults responsible (at least partially) for preparing meals in their households.

Since the majority of Baby Boomers is at least 50 years of age (MetLife Mature Market Institute 2002) and might represent a general unwillingness and ineptitude with technology and process innovations, they are not part of the target population. Therefore, the focus is on the members of Generations X and Y who are between 18 and 45 years of age. No other demographic classification (e.g., gender, ethnicity, income) was used to identify target populations.

Instrumentation

Developing a customized instrument for each service type involves a number of challenges. There exists a paucity of well-established measurement scales to address the focal

constructs introduced in the preceding chapters. In addition, some of the extant scales were not suitable for testing the propositions in this research. Therefore, extant scales were slightly-to-highly modified to meet current measurement goals; and new scales were developed for constructs that have not been effectively measured.

Since service consumption decisions are highly situation-specific (Zolfagharian and Paswan, forthcoming), it was important to account for main situational variables. Given this consideration and consistent with previous works (Hui and Bateson 1991; Eroglu et al. 2005; Langeard et al. 1981), focal service encounters were simulated through a series of consumption scenarios. Bateson (1985) expresses a favorable judgment of scenario-based surveys and argues that scenarios can "place the customer in as close a simulation of the real choice as possible" (p. 56).

The modifications of the extant scales, construction of new scales, and development of simulated situations were based upon the findings from a series of qualitative investigations as well as a quantitative pilot study. The scale items and scenarios were written and revised using the findings from participant observation and shadowing of naturally occurring service encounters. These scales and scenarios were then corroborated and augmented through in-depth interviews and focus groups with members of target populations. The scales were designed for the respondents to compare the innovative service with either the pre-innovation service or some meaningfully competing service. The scenarios were designed to hold constant the key situational variables without making the situation totally unrealistic (Langeard et al. 1981). Scenarios help respondents relate to the situation and avoid 'it all depends' responses (Bateson 1985). Finally, these scales and scenarios were subjected to reliability and validity checks based upon the quantitative data collected in the pilot study. The objective was to prepare a set of

culturally informed, theoretically sound, and empirically reliable and valid measurement scales in order to effectively test the substantive propositions in the main study.

Adapted Scales

All of the constructs in the conceptual model pertain to the customer's subjective perceptions and evaluations. There are well-established scales to measure customer perception of innovation characteristics (Meuter et al. 2005; Moore and Benbasat 1991), crowding (Machleit et al. 1994), and homophily (McCroskey, McCroskey, and Richmond 2006; Simpson et al. 2000). DTP (i.e., disposition to participate) was captured using the surrogate 'self-empowerment' measure developed in an unpublished dissertation in the field of social psychology (Bramucci 1977). Table 3-1 provides the coefficients of reliability (Cronbach's α) of these scales. Although the dimensions conceptualized in each of these scales were maintained, the anchors and the items were modified to various degrees to best serve the current measurement goals. The need for these modifications emerged during the qualitative investigations as well as the pilot study.

New Scales

Since none of the extant scales measuring customer's service co-production for self (CPS) was suitable for testing the related propositions in this research, developing a new scale was inevitable. The new CPS scale consists of some items modified from the extant scales (see table 3-2) and other items discovered through the qualitative investigations. Since no scales that measured customer's service co-production for others (CPO) and other customers' service co-production for the focal customer (OCP) were found, new scales were developed for these constructs. CPO and OCP scales are informed by the customer-to-customer interactions literature

(cf., Grove et al. 1998; Martin and Pranter 1989; McGrath and Otness 1995; see table 3-2) as well as the current qualitative investigations.

Qualitative Investigations

After consulting with the respective literatures and compiling the available measurement scales, a series of qualitative investigations were conducted in order to (a) familiarize the author with the focal services and innovations, (b) develop new scales or identify new items to tailor the adopted scales to each of the focal services, (c) design scenarios describing a typical encounter for each service type, and (d) get feedback on the resultant instruments prior to the pilot study.

The author started with semi-distanced participant observation and, shortly after, with shadowing of customer experiences and behaviors during naturally occurring service encounters (Kvale 1983). After these research activities were completed, however, a brief analysis of the data pointed to the ubiquitous nature of CPS, CPO, and OCP constructs. More and different types of qualitative investigations were needed to substantiate and augment the first data set. Next, a set of in-depth interviews and focus groups were planned and executed. The qualitative investigations encompassed 30 participant observations in service locations, 11 shadowing trips, 12 in-depth interviews, and 6 focus groups with active members of each service innovation. The investigations began with the observation of automated self check-out in popular grocery stores in August 2006 and ended with a focus group with Build-A-Bear customers in February 2007.

In each of the four investigations, data collection continued until new data produced only minor thematic variations from previous pool of data (McQuarrie 1993). Throughout the research activity, the goal was an understanding of the phenomenon, not representation of a population (McCracken 1988).

Observation with Limited Role Playing

Participant observation was conducted as a part of qualitative investigation in order to improve and contextualize the author's familiarity with the services and the innovations. The author visited a total of 5 grocery retailers that supported automated self check-out, 3 meal assembly centers, and 3 Build-A-Bear workshops in the states of Florida, Georgia, and Texas. Each of these stores was observed once to four times. Each visit lasted 35–55 minutes. During the visits, conversations with customers or employees were not sought, although the author responded naturally when others initiated conversations or asked questions. These visits may qualify as limited role playing observations (Hirschman 1986). Since the role played was limited to that of a customer browsing in the service environment, there was a conscious attempt to divagate the ethical and practical problems typical of semi-distanced observations (Hirschman 1986). For example, no employee or customer time or energy was wasted as neither of the two groups was observed in an interruptive or noticeable manner. All author comments and notes that arose during the observations were recorded using a digital device.

Shortly after each observation, the author's memories and recorded comments and notes were used to develop and/or revise service patronage scenarios. These scenarios were meant to (a) describe a typical customer trip to the service provider and (b) operationalize customer choices between the innovative and the competing types of the service. Observations also pointed to opportunities to reword or rewrite some of the items in the adopted scales. Therefore, the adopted scales will be referred to as adapted scales hereafter. These modifications helped account for the peculiarities that characterize service innovations (as opposed to tangible innovations).

Shadowing

The author shadowed 3–5 customers per service context while they patronized the respective service. These informants were friends or acquaintances of the author or of his friends and agreed to be accompanied the next time they would visit the service provider. Almost half of the informants were male. Two informants were graduate students and ten were professional adults. All were between the ages of 21 and 49, and identified with middle social class. Three were married with children and nine were never-married singles. Together, they represented a variety of educational fields and occupations. The author conducted all of the shadowing trips, which lasted 25–80 minutes each. No incidence of shadowing refusal or incompletion was encountered.

Shadowing proved to be necessary and complementary to the findings of participant observation. The limited-role-playing observations were as non-interruptive and unobtrusive as possible and contained very little conversation with the observed customers. Thus, observation findings were limited to the author's observations and speculations. The ongoing conversations between the author and the informants during shadowing trips, however, made possible a richer understanding of, and familiarity with, the nature and culture of the consumption act in each service environment. Similar to the comments and notes from observations, conversations during shadowing were recorded and used in subsequent qualitative analysis. After each shadowing trip, the author's memories and recorded conversations were used to improve and/or revise service patronage scenarios as well as the items in the adapted scales.

In-Depth Interview

Four pre-qualified customers of each service innovation were interviewed. Previous informants helped recruit these twelve individuals, who were familiar with neither the research nor the author. Seven of the informants were female. All were professional adults in their twenties, thirties, or forties; identified with middle social class; and were never-married singles, except two who had a spouse and two children each. Together, they represented a variety of educational fields and occupations. The author conducted all of these interviews.

The interviews were nondirected, nonstructured, long, in-depth, each lasting 55–110 minutes. This practice is consistent with precedent research (see Fournier 1998; McCracken 1988; Price, Arnould, and Curasi 2000; Zolfagharian and Jordan, forthcoming). The interviews took place at the informants' homes. Interview probes individuated each interview (Price et al. 2000). The aim was to situate service innovations and related meanings within the broader context of informants' economic and social lives (Kvale 1983). The interviews, probably due to their format and length, were characterized by stronger rapport and more affable conversation and narration. The informants generally expressed interest in the study. No incidence of interview refusal or incompletion was encountered. In one case, the interview was rescheduled and completed at a later time. In addition, the author contacted two of the informants for short (20 minutes) follow-up interviews because a preliminary analysis of the data revealed grave need for further illumination by informants.

Focus Groups

Two focus group sessions were conducted with pre-qualified customers of each service innovation. In each session, almost one third of the informants were undergraduate students of marketing and others were professional adults in their twenties or thirties. Student participation

was voluntary and in return for no incentive. Almost half of the attendants in all sessions were male. All of the informants but one identified themselves with middle social class. Five informants were married with one or no child; others were never-married single. Together, these informants represented a variety of educational fields and occupations. The author moderated all of the sessions, which were held in a private, silent room at the author's current university. Each session lasted 75–135 minutes.

Each of the first focus group sessions included four to five participants, the majority of whom expressed interest in the study. The aim of these sessions was similar to that of in-depth interviews. All the same, the nature of the data produced in these sessions was qualitatively different from that produced by in-depth interviews. The difference was due, in the main, to the group dynamics typical of focus groups but absent from one-on-one interviews. There were several instances when a comment by an informant reminded another informant of a point that would probably never come to mind in a one-on-one interview. Another common observation related to how some informants constructed opinion spaces to be occupied by themselves and by others and how others acquiesced or deviated. So that each participant voiced her own true opinion, polarization was observed and controlled to the extent that so doing did not interfere with the normal course of discussion. No incidence of incompletion was encountered.

Each of the second focus group sessions had seven to eight participants. The aim of these sessions was different. Whereas the data captured in previous investigations were used to develop and revise scale items and design simulated scenarios, the goal of the second focus groups was to administer the entire instrument in a controlled environment and capture participants' immediate feedbacks. These sessions sought to identify and possibly resolve problems and issues not identified during item/scale development.

Data Analysis

In order to reach a fairly comprehensive use and interpretation of the data, the analysis was carried out in an iterative and systematic fashion over an extended period of time (Spiggle 1994). With the exception of the focus group data that remained in audio format, all of the recorded data were transcribed verbatim by an experienced graduate student of Anthropology. The combined database includes over 280 pages of transcripts and 14 hours of recorded focus groups. These were perused several times prior to attempting any data organization. The text data (i.e., transcripts) was organized, axial-coded (Miles and Huberman 1994), and sorted using Atlas.ti 5.0 in order to identify and arrange emerging patterns, which were drawn out into themes. At this stage, the emerging patterns and themes were cross-checked and validated with the non-transcribed, focus group data. Additional themes emerged as the analysis progressed and as the focus group data was incorporated, signaling the increasing understanding of the phenomena and the data. The four types of data (i.e., observation, shadowing, interview, and focus group) complimented each other, so themes often were repeated, with the resulting overlap validating their importance and relevance to the underlying research aims. After developing a comprehensive thematic outline using all of the available data, the author applied the bracketing procedure (Denzin 1989; Price et al. 2000; Thompson, Locander and Pollio 1989) and developed a thematic outline, created a separate computer file for each theme, revisited the transcripts and audio files for clarification, and augmented each theme file with pertinent supporting, contrasting, and otherwise relevant data.

A total of 39 theme files were identified. The largest theme was the 'customer-to-customer interactions' that contained over 129 quotes and excerpted from 52 of the 59 investigation episodes. By analyzing the qualitative (non numeric) data, the author feels that he

has reached a relatively rich understanding of instances and patterns of behavior typical of the focal service encounters.

Results

The qualitative investigations were undertaken to develop a culturally informed and theoretically sound instrument per service context. Therefore, the chief result of these investigations is the instruments. The qualitative investigations pointed to numerous opportunities for improving both the adapted and the new scales. Two examples of such improvements are explained below.

An important improvement involved the choice of a common anchor for the adapted scales. Using a common anchor can reduce the cognitive effort required of respondents and simultaneously increase the consistency and readability of the instrument. The qualitative data seemed to favor the anchoring practice in Langeard et al. (1981) as it could suit the current measurement goals better than any other system within the respective literature. Langeard et al. (1981) used a 5-point Likert system with 'a lot less' = 1; 'somewhat less' = 2; 'same' = 3; 'somewhat more' = 4; and 'a lot more' = 5. Take the 5-point Likert system with the end-points of 'strongly disagree' to 'strongly agree' as a point of comparison. With this system, one does not know whether or not a respondent who disagrees with a statement like 'When I use self check-out, I spend a lot *more* mental effort', is actually in agreement with the statement: 'When I use self check-out, I spend a lot *less* mental effort'. In other words, a respondent's disagreement with a statement is not equal to her agreement with the converse of that statement. The Langeard et al. (1981) system, however, removes the determiners/adverbs 'less' and 'more' from the statements and positions them within scale anchors. The respondent no longer has to agree or disagree with

only one of the two determiners/adverbs. S/he can now evaluate the two service types more explicitly. Therefore, all of the scales were designed following the anchoring practice in Langeard et al. (9181). The exception was the DTP scale simply because it was the section in which respondents would not compare two service types.

Another important improvement was the identification of a shorter DTP measure, a subset of the original 55-item scale developed by Bramucci (1977). This need, which did not surface prior to the focus groups, was based on participants' voluntary suggestion and was not probed or anticipated by the author. Upon participants' expression of fatigue due to the length of the DTP scale, they were asked to mark the items that seemed redundant to them. The non-redundant subset included 21 items, with each 4–5 items tapping one of the five underlying dimensions of DTP (Bramucci 1977). An epigrammatic list of other main lessons learnt from the qualitative investigations and directions taken is provided in table 3-4.

Pilot Study

The goal of the pilot study was to observe the structure and assess the reliability and validity of the measurement scales used in the instrument. This pre-study was necessary for two reasons: (a) to assess the performance of the new CPS, CPO, and OCP scales, and (b) to check how the various changes made to the adapted scales influence the properties of these scales.

Data Collection

After going through the necessary modifications suggested by the qualitative findings, each of the three instruments (i.e., one per service context) was administered to 50 undergraduate and 50 graduate students enrolled in a major public university located in the Southwest region of

the U.S. Caution was taken to select those students who had direct experience or at least prior familiarity with the focal service innovations. The author started with the students in the college of business administration and proceeded to seek responses from students in other academic units in order to reach the intended number of responses. Respondents self-administered the instrument in a paper-and-pencil format. After tabulating and organizing the data, the author sought nine new respondents (i.e., 3 self check-out, 2 toy assembly, and 4 meal assembly) to compensate for the nine partially completed questionnaires. Table 3-5 presents the demographic information of these 300 respondents.

Exploratory Factor Analysis

The inter-item correlation matrices pertaining to the CPS, CPO, OCP, crowding (hereafter CROWD), homophily (hereafter HOMO), innovation characteristics, and DTP scales were factor-analyzed using Principal Components Analysis (PCA). Varimax rotation (Kaiser 1958) was employed to enhance the interpretation of the factors by simplifying the item-factor structure (Hair, Anderson, Tatham and Black 1998). Initially, the number of factors was determined on the basis of the following criteria: (a) each factor should have an eigenvalue greater than one; (b) a significant dip in the Scree plot should follow the last factor; (c) the resultant factors should be meaningful, rich, and interpretable; and (d) the emerging factors should explain a high level of variance (at least .70) in the respective scale. The dimensionalities of the adapted scales (i.e., those for CROWD, HOMO, innovation characteristics, and DTP) were confirmed.

The qualitative investigations identified five dimensions for each of the CPS, CPO, and OCP scales regardless of the service context. This was confirmed in two of the three service

contexts, namely grocery shopping and meal assembly. In toy assembly, however, the mentioned procedure returned four dimensions for each of the three scales. When the number of factors to be returned was set at five for toy assembly, the resultant solution agreed with those in the other two service contexts. Because both the qualitative findings and the EFA in two of the service contexts point to the existence of 5 underlying dimensions for each of the CPS, CPO, and OCP scales, the five-factor solution will be used for all the three service contexts.

As indicated in table 3-6, all of the 19 CPS items showed high loadings (.78–.93) on one of the five factors and low loadings (< .43) on the other four factors. Across the three service contexts, the patterns of loadings and communalities exhibited adequate stability; and the coefficients of reliability, signified by α, ranged between .88 and .96. These results suggest that each of the five CPS dimensions enjoys a sufficient degree of reliability and that all of the 19 items should be retained.

All but one of the 26 CPO items had high loadings (.71–.93) on one of the five factors and low loadings (< .41) on the other four factors. Similarly, all but one of the 26 OCP items showed high loadings (.70–.90) on one of the five factors and low loadings (< .42) on the other four factors. Conceptually speaking, the problematic item in the CPO scale was the equivalent of the problematic item in the OCP scale. Since their highest loadings were less than .40, these two items were dropped and the PCA was rerun for both CPO and OCP scales with 25 items each (Nunnally 1978). The resulting structures exhibited stability in item loadings and factor communalities (see tables 3-7 and 3-8). Reliability α ranged between .88 and .96 for CPO dimensions, and between .90 and .96 for OCP dimensions. Therefore, each of the five dimensions of CPO and each of the five dimensions of OCP is sufficiently reliable and both sets of 25 items will be maintained in further studies.

All of the eight CROWD items and the 14 HOMO items had high loadings (.84–.91 and .82–.89, respectively) on one of the two factors and low loadings (< .42 and <.42, respectively) on the other factor (see table 3-9). The 17 items tapping innovation characteristics exhibit an interesting loading pattern: While all of the main loadings are in the anticipated direction and on the anticipated factors (.77–.88), there is not a single cross loading greater than .26 (see table 3-10). The adapted scale to measure DTP also showed an acceptable structure. All of the 21 DTP items had high loadings (.74–.91) on one of the five factors and low loadings (<.43) on the other four factors (see table 3-11). The adapted scales are characterized by stable patterns of loadings and satisfactory communalities across the three service contexts. The values of α for the two dimensions of CROWD (i.e., spatial and human), the two dimensions of HOMO (i.e., background and attitude), the four dimensions of innovation characteristics (relative advantage, compatibility, complexity, and perceived risk), and the five dimensions of DTP (awareness, purpose, concepts, skills, and information) ranged between .81 and .97.

These results indicate that the adapted scales as well as the developed scales that make up the bulk of the instruments are characterized by reasonable factor structures and acceptable degrees of reliability. In order to assess the two common indicators of construct validity, namely convergent validity and discriminant validity, the average of each set of concentric items measuring a factor was computed and then these composite scores were inter-correlated with one another. A comparison of within-construct correlations (e.g., within CPS, within CPO, and so on) with the respective factor reliabilities represented by α values reveals that α values are significantly larger. Since this pattern holds for all of the constructs across the three service contexts, the convergent validity of each construct and its dimensions is reasonably satisfied (Churchill 1979). Furthermore, comparing within-construct correlations to inter-construct

correlations indicates that the correlation values within each construct are significantly larger than those across constructs. Since this pattern holds for all of the within- and inter-construct comparisons across the three service contexts, each construct and its dimensions appear to enjoy acceptable degrees of discriminate validity (Churchill 1979).

The findings from the pilot study indicate a high degree of correspondence with those from the qualitative investigations, especially on the dimensionality and structure of CPS, CPO, and OCP scales. Therefore, the instruments appear to be sufficiently reliable and valid for use in the main study. Each of the three instruments will consist of 130 items measuring the aforementioned constructs, two items capturing the first-trial timing, one item asking for use intention, 6 items representing control variable, seven demographic questions, and one item tapping the extent of convenience-proneness.

Main Study

The measures used in the instrument were developed, refined, and validated during the qualitative investigations and the pilot study. Subsequent to these research efforts, the instruments were ready for collecting data that would be used to test the 31 propositions of this research.

Data Collection

The samples were drawn from the residents of a major city in Southeast United States during a *Home and Garden Show*. The show is a business-to-consumer event open to general public and held annually. The author has used similar shows for drawing samples in the past and expects a relatively high (i.e., around 30%) response rate. Every respondent was given only one

of the three instruments. Caution was taken by ensuring that every respondent was in fact familiar with the respective service innovation. Since the objective is to understand customer choice processes rather than the relative size of adopter categories, stratified sampling was used to capture enough respondents for each service context. Stratification was performed by intercepting and asking potential respondents whether or not they were familiar with the service context and the respective innovation. To systematize this, a probe schedule (see table 3-12) was designed and utilized when intercepting potential respondents. In so doing, it was hoped that proportionate groups of adopters and knowledgeable non-adopters would be reached.

The data was collected through three scenario-based surveys, one per service context. Prior to the scenario, respondents were asked if and when they had adapted the service innovation. After reading a scenario designed to simulate a typical service encounter, respondents stated how often they would use the innovative rather than the competing type of the service in future. They were then asked to compare the innovative and the competing types of the service in terms of CPS, CPO, OCP, CROWD, HOMO, and innovation characteristics using a 5-point Likert scale with endpoints of ‘a lot less’ and ‘a lot more’. Finally, the general DTP scale measured on a 5-point Likert scale with endpoints of ‘strongly disagree’ and ‘strongly agree’ preceded demographic questions. Some of the items related to control variables were at the beginning and some close to the end of the instruments. Respondents self-administered the instrument in a paper-and-pencil format. The effective sample size, after excluding the 27 incomplete responses, was 218, 199, and 187 for self check-out, toy assembly, and meal assembly, respectively.

Data Analysis

Data analysis began by checking two sources of systematic variation (i.e., non-response bias and day-of-data-collection effect) and sample demographics, and continued with Confirmatory Factor Analysis (CFA) to substantiate the scale dimensionalities and structures observed under the qualitative investigations and EFA. Finally, hierarchical multiple regression and nonlinear multiple regression techniques were used to test the substantive propositions. The results of these tests are presented in the next chapter.

CHAPTER 4

RESULTS

This chapter begins with an assessment of two sources of systematic variation, non-response bias and day-of-data collection effect. Then, confirmatory factor analysis (hereafter, CFA) is used to assess the internal consistency of measurement scales employed in the main study. Both convergent and discriminate validation checks are reported. To assess the research propositions developed in the preceding chapter, both hierarchical multiple regressions and nonlinear multiple regressions are applied. This chapter reports the outcomes of these data analytics with a bent toward empirically assessing the posited conceptual framework. The demographic information of the three samples is provided in table 3-5.

Sources of Systematic Variation

Two sources of systematic variation were checked: Non-response bias and day-of-data-collection effect. To check the non-response bias, two research personnel approached a random sample of potential respondents who had initially refused to participate, and offered them a sandwich and a shopping bag in return for participation. To randomize the selection of these late respondents, every fourth such respondent was intercepted for the second time. This decision was based on the conservative estimate of an effective response rate of 20%, which was slightly lower than the observed effective response rate of 22%. Of the 146 secondary interceptions across the three service contexts, 98 (33 self check-out; 33 toy assembly; and 32 meal assembly) agreed to complete the survey in return for the incentives.

The non-response check was performed by comparing the 98 responses against other responses in terms of the following variables: (a) whether or not the respondents had tried the

service innovation, (b) intention to use the service innovation, (c) overall DTP score, and (d) overall CPS, CPO, OCP, CROWD, and HOMO scores. Due to its dichotomous nature, the first variable (i.e., whether or not the respondents had tried the service innovation) required a χ^2-test. For all other variables, *t*-tests were performed to compare the mean value of early respondents with that of late respondents.

The early respondent group had a significantly higher DTP score than the late respondent group under grocery shopping ($t = 2.14$; $p = .030$) and meal assembly ($t = 2.05$; $p = .042$) but not under toy assembly ($t = 1.89$; $p = .054$). For these three tests, the assumption of the equality of variances was met as none of Levene's tests appeared significant.

The DTP scale seems to be measuring what it purports to measure as the majority of respondents characterized by higher degrees of disposition to participate actually participated in the survey the first time they were intercepted and without expecting any incentive. Conversely, most of the respondents characterized by lower degrees of disposition to participate did not accept to participate in the survey unless an incentive was offered the second time they were approached. This finding strengthens the confidence in the way the moderator variable (i.e., DTP) was operationalized and measured.

The early respondent group also showed a significantly higher OCP score than the late respondent group under grocery shopping ($t = 1.97$; $p = .050$). The two groups did not differ significantly on other variables. Although these findings do not explain away all facets of non-response bias, they increase the author's confidence in the collected data so as to continue with subsequent analyses.

To check the day-of-data-collection effect, the data collected on the first day (52 grocery shopping, 45 toy assembly, and 42 meal assembly), second day (85, 93, and 87, respectively),

and third day (81, 61, and 58, respectively) were compared against one another using the same criteria as in non-response bias check and the same test statistics (i.e., t and χ^2). Since three groups were involved (i.e., data was collected in three days), Scheffe's conservative statistic was used to examine the ensuing contrasts. No significant contrast was observed. For these tests, the assumption of the equality of variances was met as none of the Levene's tests was significant.

Confirmatory Factor Analysis

The EFA performed in the pilot study suggested that the instruments were sufficiently reliable and valid. The goal of CFA was to discover the extent to which the observed underlying structures of the adapted and developed scales replicate when the new data collected in the main study were used. Once CFA was complete, consistent with the current practice (e.g., Aaker 1997; Bagozzi and Heatherton 1994), the main study data would be subjected to EFA to reconfirm that the patterns observed in a confirmatory fashion in fact would emerge if an exploratory procedure was employed.

The author posits that a restricted five-factor model can account for the covariance matrices pertaining to (a) the 19 CPS items, (b) the 25 CPO items, (c) the 25 OCP items, and (d) the 21 DTP items, with each item reflective only of a single dimension (i.e., each item loading significantly only on one factor). It is further posited that the covariance matrices pertaining to the eight CROWD items, the 14 HOMO items, and the 17 innovation characteristic items, respectively, can be accounted for by restricted two-factor, two-factor, and four-factor models, with each item in each scale reflective only of a single dimension.

Prior to the analysis, the data for each construct was checked for factorability using Bartlett's test of sphericity and KMO's measure of sampling adequacy (MSA). Bartlett's χ^2 tests

appeared all significant at $p < .001$, and MSA indices were all larger than .80. Therefore, the data was appropriate for EFA and CFA (Hair et al. 1998, p. 99; Kaiser 1974). Upon confirming the multivariate normality of the data for each adapted and developed scale, a confirmatory factor analysis using the maximum likelihood method was employed to estimate the parameters of each model. A total of 21 CFAs were run since there were seven constructs (i.e., CPS, CPO, OCP, CROWD, HOMO, innovation characteristics, and DTP) and three service contexts. The factors within each construct were allowed to correlate (i.e., φ values were freed and estimated). To estimate all of the arcs, factor variances were set to unity in all models.

Subsequently, the 21 CFAs were rerun, this time with the inter-factor correlations fixed. The results of the first and second sets of the 21 CFAs were roughly comparable, with the correlated models indicating slightly superior fit indices and more consistent λ and δ values. As such, the results of the correlated-factor models will be presented and discussed here. The λ, δ, and φ values appear in figures 4-1 through 4-6, and the fit indices in table 4-1. To objectify the conclusions (Kohli et al. 1993), the observed fit indices were compared against the cutoff points suggested by Hu and Bentler's (1999) review of thresholds.

Figure 4-1 depicts the results of the CFA performed on CPS. The λ values ranged from .70 to .84 and δ values from .13 to .41 across the three service contexts. Figure 4-2 provides the results of the CFA performed on CPO. The λ values ranged from .65 to .87 and δ values from .11 to .23 across the three service contexts. Figure 4-3 shows the results of the CFA performed on OCP. The λ values ranged from .65 to .84 and δ values from .16 to .50 across the three service contexts. The results of the two separate CFAs performed on CROWD and HOMO are presented in Figure 4-4. For CROWD, the λ values ranged from .68 to .78 and δ values from .13 to .30 across the three service contexts. For HOMO, the λ values ranged from .87 to .97 and δ values

from .16 to .36 across the three service contexts. Figure 4-5 contains the results of the CFA performed on innovation characteristics. The λ values ranged from .59 to .84 and δ values from .11 to .35 across the three service contexts. Lastly, the results of the CFA performed on DTP are shown in figure 4-6. The λ values ranged from .70 to .80 and δ values from .14 to .41 across the three service contexts. In all of these models and across the three service contexts, the standard errors of λ and δ estimations ranged from .04 to .22. These observations suggest that the scale items in each model do form independent clusters (McDonald and Ho 2002).

Table 4-1 contains key fit indices including confirmatory fit index (*CFI*, Bentler 1990); goodness-of-fit index (*GFI*, Jőreskog and Sőrbom 1989); root mean square error of approximation (*RMSEA*); normed fit index (*NFI*, Bentler and Bonett 1980); non-normed fit index (*NNFI*); expected cross-validation index (*ECVI*) as a percentage of the saturated-model *ECVI* (denoted by *ECVI%* here); and the χ^2 statistic. All χ^2 values were significant at $p < .01$. Since χ^2 is generally high and significant given a large enough sample size, other fit indices are given more weight (Bagozzi and Heatherton 1994).

For CPS across the three service contexts, *CFI* ranged .97–.98; *GFI* ranged .86–.88; *RMSEA* ranged .074–.081; *NFI* remained at .95; *NNFI* remained at .97; *ECVI%* ranged 1.03–1.15; and χ^2 ranged 294–343 (with $df = 142$; $p < .01$). For CPO, *CFI* ranged .96–.97; *GFI* ranged .85–.88; *RMSEA* ranged .061–.074; *NFI* ranged .93–.94; *NNFI* ranged .95–.97; *ECVI%* ranged .87–1.08; and χ^2 ranged 447–583 (with $df = 265$; $p < .01$). For OCP, *CFI* ranged .93–.98; *GFI* ranged .84–.90; *RMSEA* ranged .012–.067; *NFI* ranged .84–.94; *NNFI* ranged .92–.98; *ECVI%* ranged .59–.98; and χ^2 ranged 249–520 (with $df = 265$; $p < .01$). Since these *GFI* values are reasonably close to the recommended threshold and granted that all other indices are adequate, it

is concluded that the models representing CPS, CPO, and OCP have satisfactory fits and the respective scales are acceptable.

For CROWD across the three service contexts, *CFI* remained at .96; *GFI* ranged .89–.92; *RMSEA* ranged .120–.140; *NFI* remained at .95; *NNFI* ranged .93–.94; *ECVI%* ranged 1.58–1.83; and χ^2 ranged 78–98 (with $df = 19$; $p < .01$). For CROWD the contentious values pertain to *RMSEA*, which are not very far from the recommended threshold. Since all other indices are adequate, it is concluded that the CROWD model has a satisfactory fit and the respective scale is acceptable.

For HOMO across the three service contexts, *CFI* ranged .96–.98; *GFI* ranged .84–.86; *RMSEA* ranged .983–.104; *NFI* ranged .95–.97; *NNFI* ranged .96–.97; *ECVI%* ranged 1.36–1.42; and χ^2 ranged 228–240 (with $df = 76$; $p < .01$). The controversial indices here pertain to *GFI*. The *RMSEA* values are right on the cut-off point. Since all other indices are adequate, it is concluded that the models representing HOMO has a satisfactory fit and the respective scale is acceptable.

For innovation characteristics across the three service contexts, *CFI* ranged .96–.98; *GFI* ranged .89–.90; *RMSEA* ranged .055–.070; *NFI* ranged .94–.95; *NNFI* ranged .96–.97; *ECVI%* ranged .84–1.03; and χ^2 ranged 177–234 (with $df = 113$; $p < .01$). For OCP, *CFI* ranged .89–.95; *GFI* ranged .90–.93; *RMSEA* ranged .068–.088; *NFI* ranged .88–.92; *NNFI* ranged .91–.94; *ECVI%* ranged .96–1.00; and χ^2 ranged 337–452 (with $df = 179$; $p < .01$). Therefore, the models representing innovation characteristics and DTP have satisfactory fits and the respective scales are acceptable.

The within-construct inter-factor correlations represented by φ values are shown in figures 4-1 through 4-6. The range of φ values for CPS, CPO, OCP, CROWD, HOMO, innovation characteristics, and DTP were .19–.31, .11–.33, .07–.35, .25–.27, .26–.31, -.09–.07,

and .24–.38, respectively. The standard errors of φ estimates ranged between .04 and .07. To match and complement the within-construct inter-factor correlations represented by φ values, tables 4-2 through 4-4 were prepared to present regular correlation matrices that include inter-factor correlations of both within constructs (e.g., within CPS, within CPO) and across constructs (e.g., CPS-CPO inter-factor correlations). A comparison of φ values with regular correlations in tables 4-2 through 4-4 supports two observations. First, φ values are typically smaller than their corresponding regular correlations. Second, within each construct the pattern of φ values is similar to that of the corresponding regular correlations.

Relying on these findings and drawing on the guidelines in the extant CFA research (Bagozzi 1994; Bentler 1990; Jőreskog and Sőrbom 1993), it can be argued that the resultant λ, δ, and φ estimates and their respective standard errors were all in order, and each of the 21 CFAs exhibited an acceptable fit. Moreover, the largest *Critical N* (*CN)* confronted across all of the 21 CFAs was 171, which is smaller than the smallest sample size (i.e., 187 for meal assembly). Therefore, the three samples were sufficiently large.

Consistent with the current practice (e.g., Aaker 1997; Bagozzi and Heatherton 1994), convergent support was sought and found for the robustness of factor structures by subjecting the correlation matrix of each construct to exploratory principal component analysis using Varimax rotation. The procedure was similar to that in the pilot-study EFA. The resultant models were generally in agreement with those in the pilot study as well as those in CFA. The underlying factor structures also remained highly comparable across the three service contexts.

Within all constructs, factor reliabilities (α) ranged from .84 to .97. Patterns of α values not only remained consistent with those observed in the pilot study but also replicated across the three service contexts. A comparison of α values with the inter-construct correlations (tables 4-2

through 4-4) shows that internal reliabilities are sufficiently higher and significantly stronger than the inter-construct correlations. In addition, the correlation values within each construct are significantly larger than those across constructs. Therefore, the underlying structures of the CPS, CPO, OCP, CROWD, HOMO, innovation characteristics, and DTP satisfy convergent and discriminant validities (Churchill 1979). The inter-item correlation matrices (not shown here) confirmed these findings.

Explaining the Variations in Innovation Characteristics

The propositions 1-20 specify the ways in which innovation characteristics are associated with CPS, CPO, OCP, CROWD, and HOMO. In addition, the propositions 27-31 stipulate the modifying effects of DTP on the associations captured in the former propositions. Table 4-5 illustrates the contexts in which the substantive propositions are supported.

This section examines propositions 1-20 and 27-31 using a 2-stage hierarchical multiple regression (Cohen et al. 2003, p. 164). In stage 1, CPS, CPO, OCP, CROWD, and HOMO will explain the variation in each of innovation characteristics. In stage 2, three variables representing DTP and its interactions with CPS and CPO will be added to the pool of independent variables. Since the model with compatibility as the dependent variable involves nonlinear variables, it will require a 3-stage hierarchical regression. The results of these tests are presented in table 4-6 and 4-8.

Stage 1: Main and Quadratic Effects

Four multiple regressions were performed to test the propositions 1-20, each using one of the four innovation characteristics as the dependent variable. These four regressions were repeated across the three service contexts.

Relative Advantage

Propositions 1, 2, 9, 13, and 17 specified the associations of relative advantage with CPS, CPO, OCP, CROWD, and HOMO, respectively. As indicated in table 4-6, the five antecedent variables explained a significant portion of the variation (signified by the adjusted coefficient of determination) in relative advantage under self check-out ($\check{R}^2$ = .37), toy assembly ($\check{R}^2$ = .34), and meal assembly ($\check{R}^2$ = .38).

In the self check-out context, CPS (t = 6.18; p < .001) and HOMO (t = 7.02; p < .001) were positive and significant; and OCP (t = -2.09; p = .037) was negative and significant. CPO and CROWD turned out non-significant. In the toy assembly context, CPS (t = 7.44; p < .001) was positive and significant; and OCP (t = -4.78; p < .001) and CROWD (t = -4.54; p < .001) were negative and significant. CPO and HOMO turned out non-significant. In the meal assembly context, CPS (t = 7.45; p < .001) and HOMO (t = 3.94; p < .001) were positive and significant; and OCP (t = -2.02; p = .046) was negative and significant. CPO and CROWD turned out non-significant.

Across the three service contexts, CPS and OCP emerged as significant in the anticipated directions, while CPO remained non-significant. Therefore, propositions 1 and 9 are supported in all of the contexts, but proposition 2 is not supported in any of the three contexts. Proposition 17 (i.e., positive association between HOMO and relative advantage) is supported in the self check-

out context. Proposition 13 (i.e., negative association between CROWD and relative advantage) is supported in the toy assembly context.

Compatibility

Propositions 5, 6, 11, and 15 posited nonlinear (inverted-U shape) associations between compatibility and each of CPS, CPO, OCP, and CROWD, respectively. Proposition 20 predicted a linear positive association between compatibility and HOMO. To test these propositions, a 2-stage hierarchical regression was applied.

In stage 1, compatibility was regressed on the five main antecedents to observe the linear associations therein. As indicated in table 4-7, the five antecedent variables explained a significant portion of the variation in compatibility under self check-out ($\check{R}^2 = .53$), toy assembly ($\check{R}^2 = .56$), and meal assembly ($\check{R}^2 = .59$).

In the self check-out context, CPS ($t = 2.28$; $p = .024$), OCP ($t = 2.28$; $p = .024$), CROWD ($t = 3.06$; $p < .001$), and HOMO ($t = 15.31$; $p < .001$) were positive and significant. CPO turned out non-significant. In the toy assembly context, CPS ($t = 2.21$; $p = .029$), OCP ($t = 12.91$; $p < .001$), CROWD ($t = 2.22$; $p = .023$), and HOMO ($t = 14.83$; $p < .001$) appeared as positive and significant. CPO turned out non-significant. In the meal assembly context, HOMO ($t = 15.31$; $p < .001$) was positive and significant. CPS, CPO, OCP, and CROWD turned out non-significant.

Across the three service contexts, HOMO remained significant in the anticipated direction, while CPO remained non-significant. Each of CPS, OCP, and CROWD were significant in the anticipated direction in two of the three contexts. As the qualitative investigations indicated, it is unlikely for grocery, toy assembly, and meal assembly consumers

to find the service more compatible as the service environment gets more crowded and as other consumers place more influence on one another's service experience. Therefore, the findings above are incomplete unless used in conjunction with those involving quadratic terms.

In stage 2, compatibility was regressed on a pool of nine variables, of which five represented the main effects (i.e., the five main antecedent variables) and four stood for the quadratic effects. The quadratic variables were created by squaring CPS, CPO, OCP, and CROWD in order to account for their non-linear associations with compatibility. Since quadratic terms tend to introduce multicollinearity, all of the variables were mean-centered (Cohen et al. 2003, p. 425). The largest variance inflation factors (VIF) observed were 7.44, 6.03, and 7.98 respectively for self-check-out, toy assembly, and meal assembly. As indicated in table 4-7, the inclusion of the quadratic terms improved the variation explained in compatibility under self check-out ($\check{R}^2$ = .56), toy assembly ($\check{R}^2$ = .59), and meal assembly ($\check{R}^2$ = .63).

In the self check-out context, CPS (t = 2.90; p < .001), OCP (t = 6.69; p < .001), CROWD (t = 3.77; p < .001), OCP^2 (t = -2.92; p = .002), and $CROWD^2$ (t = -3.32; p < .001) were significantly associated with compatibility. In addition, HOMO (t = 33.00; p < .001) was positive and significant. CPO, CPS^2, and CPO^2 turned out non-significant. In the toy assembly context, OCP (t = 4.01; p < .001), CROWD (t = 3.30; p < .001), OCP^2 (t = -3.80; p < .001), and $CROWD^2$ (t = -3.12; p < .001) were significantly associated with compatibility. Further, CPS (t = 1.98; p = .039) and HOMO (t = 15.26; p < .001) were positive and significant. CPO, CPO^2, and CPS^2 turned out non-significant. In the meal assembly context, OCP (t = 3.04; p < .001), OCP^2 (t = -3.25; p < .001), and HOMO (t = 14.74; p < .001) were significantly associated with compatibility. CPS, CPS^2, CPO, CPO^2, CROWD, and $CROWD^2$ turned out non-significant.

Across the three service contexts, OCP, OCP^2, and HOMO appeared significant in the anticipated directions (i.e., inverted-U shape), while CPO, CPO^2, and CPS^2 remained non-significant. Therefore, propositions 11 and 20 are supported in all of the contexts, but propositions 5 and 6 are not supported in any of the three contexts. The main CPS effect was significant in two contexts, indicating that it might be linked to compatibility in a linear manner. Proposition 15 (i.e., inverted-U shape association between CROWD and compatibility) is supported in the self check-out and toy assembly contexts.

Four nonlinear multiple regressions were performed post hoc to observe the individuated relations of compatibility with CPS, CPO, OCP, and CROWD, each paired with its quadratic term. Figure 4-7 presents the respective estimated regression equations as well as the regression lines using $\hat{Y}$ values. All of the regression lines representing CPO, OCP, and CROWD across the three service contexts resemble an inverted U, and their main and quadratic terms are significant at $\alpha = .05$. These observations are consistent with propositions 6, 11, and 15. The inverted-U relation between CPS and compatibility was observed in the self check-out context. In the other two contexts, the main CPS effect was significant but the quadratic term CPS^2 was non-significant. This is consistent with the thesis that the nature of CPS-compatibility relation, although varying across service contexts, might primarily be linear.

Complexity

Propositions 7, 8, 12, 16, and 19 specified the associations of complexity with CPS, CPO, OCP, CROWD, and HOMO, respectively. As indicated in table 4-6, the five antecedent variables explained a significant portion of the variation in complexity under self check-out ($\check{R}^2 = .12$), toy assembly ($\check{R}^2 = .15$), and meal assembly ($\check{R}^2 = .17$).

In the self check-out context, CPS (t = -1.95; p = .051) was negative and significant; and CPO (t = 2.81; p = .005), OCP (t = 2.42; p = .016), and CROWD (t = 3.37; p < .001) were positive and significant. HOMO was not significant. In the toy assembly context, CPS (t = -2.72; p = .007) was negative and significant; and OCP (t = 3.31; p < .001) and CROWD (t = 3.46; p < .001) were positive and significant. CPO and HOMO turned out non-significant. In the meal assembly context, CPS (t = -1.93; p = .052) and HOMO (t = -2.48; p = .014) were negative and significant; and OCP (t = 3.07; p = .002) and CROWD (t = 4.35; p < .001) were positive and significant. CPO turned out non-significant.

Across the three service contexts, CPS, OCP, and CROWD emerged as significant in the anticipated directions. Therefore, propositions 7, 12, and 16 are supported in all of the contexts. Proposition 8 (i.e., positive association between CPO and complexity) is supported in the self check-out context. Proposition 19 (i.e., negative association between CROWD and complexity) is supported in the meal assembly context.

Risk

Propositions 3, 4, 10, 14, and 18 specified the associations of risk with CPS, CPO, OCP, CROWD, and HOMO, respectively. As indicated in table 4-6, the five antecedent variables explained a significant portion of the variation in risk under self check-out ($\check{R}^2$ = .18), toy assembly ($\check{R}^2$ = .15), and meal assembly ($\check{R}^2$ = .22).

In the self check-out context, CPS (t = -5.08; p < .001) was negative and significant; and OCP (t = 2.68; p = .008) was positive and significant. CPO, CROWD, and HOMO turned out non-significant. In the toy assembly context, CPS (t = -2.33; p = .021) was negative and significant; and OCP (t = 3.97; p < .001) and CROWD (t = 5.32; p < .001) were positive and

significant. CPO and HOMO turned out non-significant. In the meal assembly context, CPS (t = -2.89; p = .004) was negative and significant; and OCP (t = 4.41; p < .001) and CROWD (t = 5.80; p < .001) were positive and significant. CPO and HOMO turned out non-significant.

Across the three service contexts, CPS and OCP showed significance in the anticipated directions, while CPO and HOMO remained non-significant. Therefore, propositions 3 and 10 are supported in all contexts, but propositions 4 and 18 are not supported in any of the three contexts. Proposition 14 (i.e., positive association between CROWD and risk) is supported in the toy assembly and meal assembly contexts.

Stage 2: Main, Quadratic, and Interaction Effects

Propositions 27 through 31 posit that DTP modifies the effects of CPS and CPO on innovation characteristics. To account for these effects, each of the four innovation characteristics was regressed on the independent variables from stage 1 plus the three variables representing DTP and its interaction terms. Since interaction terms tend to introduce multicollinearity, all of the variables were mean-centered (Cohen et al. 2003, p. 425). Mean-centering was especially needed when the dependent variable was compatibility due to the existence of both quadratic and interaction terms in addition to the five main antecedent variables. Across the four dependent variables, the largest VIF values observed were 8.35, 6.11, and 9.27 respectively for self-check-out, toy assembly, and meal assembly.

Since propositions 27 through 31 involve comparisons between two groups of respondents, one with a high mean DTP score and the other with a low mean DTP score, a cluster analysis was performed to assign respondents to one of the high or low groups (i.e., the number of clusters was set at 2 a priori). The low-DTP groups had mean scores of 2.51, 2.65, and

2.59 in the self check-out, toy assembly, and meal assembly contexts, respectively. The mean score for the high-DTP groups were 3.48, 3.60, and 3.64, respectively. The resultant interaction terms are referred to as DTPCPS and DTPCPO.

Relative Advantage

Propositions 27a and 27b posit that the positive associations of relative advantage with CPS and CPO are stronger in the high-DTP group compared to the low-DTP group. To test these propositions, relative advantage was regressed on a pool of eight independent variables (the five main antecedent variables and the three DTP variables). As indicated in table 4-6, the addition of the three DTP variables improved the adjusted coefficient of determination under self check-out ($\check{R}^2$ = .41), toy assembly ($\check{R}^2$ = .43), and meal assembly ($\check{R}^2$ = .40).

In the self check-out context, consistent with the results from stage 1, CPS (t = 2.20; p = .029), OCP (t = -2.06; p = .041), and HOMO (t = 6.96; p < .001) appeared significant in the anticipated directions, while CPO and CROWD remained non-significant. In addition, DTP (t = 2.14; p = .034) and DTPCPS (t = 2.58; p = .012) were positive and significant in stage 2. DTPCPO was not significant.

In the toy assembly context, consistent with stage 1, CPS (t = 2.76; p = .006) and OCP (t = -2.03; p = .048) appeared significant in the anticipated directions, and CPO remained non-significant. Unlike stage 1, HOMO (t = 4.49; p < .001) instead of CROWD was significant in the anticipated direction. Again, DTP (t = 2.17; p = .031) and DTPCPS (t = 2.62; p = .010) were positive and significant in stage 2. DTPCPO was not significant.

In the meal assembly context, consistent with stage 1, CPS (t = 2.49; p < .010), OCP (t = -3.02; p < .003), and HOMO (t = 6.18; p < .001) were significantly positively associated with

relative advantage, CPO and CROWD were not significant. Other non-significant variables were DTP, DTPCPS, and DTPCPO.

Across the three service contexts, CPS, OCP, and HOMO emerged as significant in the anticipated directions, while CPO and CROWD remained non-significant. These findings confirm the support that was found for propositions 1, 9, and 17. Proposition 2 (i.e., positive association between CPO and relative advantage) is again not supported in any of the three contexts. Proposition 13 (i.e., negative association between CROWD and relative advantage), which was supported in the toy assembly context in stage 1, was not supported in any of contexts in stage 2.

DTP and DTPCPS were significant and positive in the self check-out and toy assembly contexts. Therefore, proposition 27a is supported in two of the three contexts. DTPCPO was not significant in any of the three contexts. Proposition 27b is not supported.

Compatibility

Propositions 29a and 29b posit that the upward and downward shifts in CPS and CPO reduce compatibility to a lesser extent in the high-DTP group compared to the low-DTP group. In other words, these propositions state that the negative β weights of CPS^2 and CPO^2 are larger in the low-DTP group than in the high-DTP group. To test these propositions, compatibility could be regressed on DTP, DTPCPS, DTPCPO, $DTPCPS^2$, and $DTPCPO^2$ in addition to the five main antecedent variables and the four quadratic terms. However, the simultaneous inclusion of the 14 independent variables would instigate unacceptable spuriousness and suppression effects. Therefore, the model was run without $DTPCPS^2$, and $DTPCPO^2$. The logic was, only if CPS, CPO, CPS^2, and CPO^2 turned out significant, then the individuated

associations of compatibility with CPS and CPO would be tested separately for high- and low-DTP groups, and the results would be compared across the two groups. As indicated in table 4-7, the addition of the three DTP variables improved the adjusted coefficient of determination under self check-out ($\check{R}^2$ = .58), toy assembly ($\check{R}^2$ = .65), and meal assembly ($\check{R}^2$ = .65).

In the self check-out context in stage 3, consistent with the results from stage 2, CPS (t = 7.45; p = .002), CPS^2 (t = -2.07; p = .041), OCP (t = 3.21; p = .002), OCP^2 (t = -3.17; p = .006), and HOMO (t = 14.31; p < .001) appeared significant in the anticipated directions, while CPO and CPO^2 were not significant. Unlike stage 2, CROWD and $CROWD^2$ were not significant in stage 3. In addition, DTP (t = 1.96; p = .050) and DTPCPS (t = 2.12; p = .023) were significantly positively associated with compatibility. DTPCPO was not significant.

In the toy assembly context in stage 3, consistent with the results from stage 2, OCP (t = 3.15; p = .002), OCP^2 (t = -3.05; p = .003), and HOMO (t = 13.44; p < .001) appeared significant in the anticipated directions, while CPS^2, CPO, and CPO^2 remained non-significant. Unlike stage 2, CPS, CROWD, and $CROWD^2$ were not significant in stage 3. In addition, DTP (t = 2.02; p = .045) and DTPCPS (t = 2.40; p = .018) were significantly positively associated with compatibility. DTPCPO was not significant.

In the meal assembly context in stage 3, consistent with the results from stage 2, HOMO (t = 3.94; p = .002), and OCP^2 (t = -9.60; p < .001) were significant in the anticipated directions, while CPS, CPS^2, CPO, CPO^2, CROWD, and $CROWD^2$ remained non-significant. Unlike stage 2, OCP was not significant in stage 3. Since the main OCP effect was not significant, OCP^2 is not interpretable. DTP (t = 1.99; p = .046) and DTPCPS (t = 1.94; p = .052) were significantly positively associated with compatibility. DTPCPO was not significant.

Across the three service contexts, HOMO and OCP^2 appeared significant in the anticipated directions, while CPO, CROWD, CPO^2, and $CROWD^2$ remained non-significant. These findings confirm the support that was found for proposition 20 (i.e., positive association between HOMO and compatibility). Proposition 5 (i.e., the inverted-U shape association between CPS and compatibility), which was not supported in any of the three contexts in stage 2, is supported in the self check-out context in stage 3. Proposition 11 (inverted-U shape association between OCP and compatibility), which was supported in all of the three contexts in stage 2, was supported in two of the three contexts in stage 3. Since this phenomenon was due to the addition of the three DTP variables, it is safe to consider proposition 11 to be generally supported. Proposition 15 (i.e., inverted-U shape association between CROWD and compatibility), which was supported in two of the contexts in stage 2, was not supported in any of the three contexts in stage 3. Proposition 6 (i.e., the inverted-U shape association between CPO and compatibility) is again not supported as CPO^2 was not significant in any of the three contexts.

DTP and DTPCPS were positive and significant in all of the three contexts. CPS and CPS^2 were significant in the self check-out context. To test proposition 29a, the data was split into high- and low- DTP groups, and nonlinear multiple regressions were performed post hoc to observe the individuated relations of compatibility with CPS and CPS^2. Figure 4-8 presents the respective estimated regression equations as well as the regression lines using $\hat{Y}$ values. Since the simultaneous significance of CPS, CPS^2, DTP, and DTPCPS was observed only in the self check-out context, proposition 29a was tested in that context. The procedure suggested by Cohen et al. (2003) indicated that the negative β of CPS^2 in the low-DTP group was significantly stronger than that in the high-DTP group (t = -2.11; p = .018). This difference is also

comprehensible through eyeballing: In the self check-out context, the curve representing the low-DTP group has a sharper slope on either side of the turning point. Therefore, proposition 29a is supported in the self check-out context. CPO, CPO^2, and DTPCPO were not significant in any of the three contexts. Proposition 29b is not supported.

Complexity

Proposition 30 posits that the inverse association between CPS and complexity is stronger in the high-DTP group compared to the low-DTP group. Proposition 31 posits that the positive association between CPO and complexity is stronger in the high-DTP group compared to the low-DTP group. To test these propositions, complexity was regressed on a pool of eight independent variables (the five main antecedent variables and the three DTP variables). As indicated in table 4-6, the addition of the three DTP variables improved the adjusted coefficient of determination under self check-out ($\check{R}^2$ = .16), toy assembly ($\check{R}^2$ = .17), and meal assembly ($\check{R}^2$ = .17).

In the self check-out context, consistent with the results from stage 1, CPS (t = -2.35; p = .020), OCP (t = 2.44; p = .015), and CROWD (t = 3.61; p < .001) appeared significant in the anticipated directions, while HOMO remained non-significant. Unlike stage 1, CPO was not significant. In addition, DTP (t = -2.16; p = .032) and DTPCPS (t = -1.89; p = .055) were significantly inversely associated with complexity. DTPCPO was not significant.

In the toy assembly context, consistent with stage 1, CPS (t = -2.08; p = .039), OCP (t = 3.36; p < .001), and CROWD (t = 3.72; p < .001) appeared significant in the anticipated directions, and CPO and HOMO remained non-significant. Again, DTP (t = -1.99; p = .048) and

DTPCPS (t = -1.94; p = .053) were significantly inversely associated with complexity, but DTPCPO was not significant.

In the meal assembly context, consistent with stage 1, CPS (t = -2.31; p < .022), OCP (t = 3.15; p = .002), and CROWD (t = 4.83; p < .001) were significant in the anticipated directions, and CPO was not significant. Unlike stage 1, HOMO was not significant. Other non-significant variables were DTP, DTPCPS, and DTPCPO.

Across the three service contexts, CPS, OCP, and CROWD emerged as significant in the anticipated directions, while CPO remained non-significant. These findings confirm the support that was found for propositions 7, 12, and 16. Propositions 8 (i.e., positive association between CPO and complexity) and proposition 19 (i.e., inverse association between CPO and complexity), which were each supported in one of the three contexts in stage 1, were not supported in any of the three contexts.

DTP and DTPCPS were negative and significant in the self check-out and toy assembly contexts. Therefore, proposition 30 is supported in two of the three contexts. DTPCPO was not significant in any of the three contexts. Proposition 31 is not supported.

Risk

Propositions 28a and 28b posit that the inverse associations of risk with CPS and CPO are stronger in the high-DTP group compared to the low-DTP group. To test these propositions, risk was regressed on a pool of eight independent variables (the five main antecedent variables and the three DTP variables). As indicated in table 4-6, the addition of the three DTP variables improved the adjusted coefficient of determination under self check-out ($\check{R}^2$ = .20), toy assembly ($\check{R}^2$ = .19), and meal assembly ($\check{R}^2$ = .24).

In the self check-out context, consistent with the results from stage 1, CPS (t = -.2.61; p = .010) and OCP (t = 5.01; p < .001) appeared significant in the anticipated directions, while CPO, CROWD, and HOMO remained non-significant. DTP (t = -6.73; p < .001) and DTPCPS (t = -2.20; p = .031) were significantly inversely associated with risk. DTPCPO was not significant.

In the toy assembly context, consistent with stage 1, CPS (t = -2.21; p = .028), OCP (t = 3.90; p < .001), and CROWD (t = 5.27; p < .001) appeared significant in the anticipated directions, while CPO and HOMO remained non-significant. Again, DTP (t = -4.19; p < .001) and DTPCPS (t = -2.71; p = .007) were significantly inversely associated with risk, but DTPCPO was not significant.

In the meal assembly context, consistent with stage 1, CPS (t = -2.83; p < .005), OCP (t = 4.35; p < .001), and CROWD (t = 5.73; p < .001) were significant in the anticipated directions, and CPO and HOMO were not significant. DTP, DTPCPS, and DTPCPO were all non-significant.

Across the three service contexts, CPS and OCP emerged as significant in the anticipated directions, while CPO and HOMO remained non-significant. These findings confirm the support that was found for propositions 3 and 10. Propositions 4 and 18 are again not supported in any of the three contexts. Proposition 14 (i.e., positive association between CROWD and risk), which was supported in two of the three contexts in stage 1, were again supported in the same two contexts.

DTP and DTPCPS were negative and significant in the self check-out and toy assembly contexts. Therefore, proposition 28a is supported in two of the three contexts. DTPCPO was not significant in any of the three contexts. Proposition 28b is not supported.

Explaining the Variation in Adoption Decisions

As noted in chapter 2, diffusion of innovation research suggests that innovation characteristics are the primary explanatory antecedents of customer adoption decision in that they can explain 49% to 87% of its variation (Henard and Szymanski 2001; Peppers and Rogers 1997). This body of knowledge suggests that adoption decision is positively associated with relative advantage and compatibility, and inversely with complexity and risk (see Gatignon and Robertson 1991; Henard and Szymanski 2001; Rogers 2003, pp. 15-16).

Propositions 21-25 link the five antecedent variables (i.e., CPS, CPO, OCP, CROWD, and HOMO) to two indicators of adoption decisions, namely first-trial timing and use intention. To test these propositions, it is imperative to first account for the variation in adoption decisions that innovation characteristics can explain. Therefore, two 2-stage hierarchical multiple regressions were performed, one for each of the two adoption indicators. In each of these hierarchical regressions, the adoption indicator was regressed on the four innovation characteristics in stage 1; and on the four innovation characteristics plus the five antecedent variables in stage 2 (Cohen et al. 2003, p. 164).

First-Trial Timing

A 2-stage hierarchical regression was performed to test the extent to which CPS, CPO, OCP, CROWD, and HOMO explain the variation in first-trial timing after the contribution of innovation characteristics is accounted for (i.e., propositions 21a, 22a, 23a, 24a, and 25a). The results of these tests are presented in table 4-8.

Stage 1: The Role of Innovation Characteristics

The four innovation characteristics explained a significant portion of the variation in first-trial timing under self check-out ($\check{R}^2$ = .39), toy assembly ($\check{R}^2$ = .35), and meal assembly ($\check{R}^2$ = .32). In the self check-out context, complexity (t = -4.65; p < .001) and risk (t = -4.97; p < .001) were significantly inversely associated with first-trial timing, while relative advantage and compatibility were not significant. In the toy assembly context, compatibility (t = 6.18; p < .001) and risk (t = -5.40; p < .001) were significant in the anticipated directions, while relative advantage and complexity were not significant. In the meal assembly context, complexity (t = -7.70; p < .001) and risk (t = -6.91; p < .001) were significantly inversely associated with first-trial timing, while relative advantage and compatibility were not significant.

Stage 2: The Role of CPS, CPO, OCP, CROWD, and HOMO

The inclusion of the five antecedent variables improved the explanatory power of the model under self check-out ($\check{R}^2$ = .48), toy assembly ($\check{R}^2$ = .41), and meal assembly ($\check{R}^2$ = .38). Probably, more important was the fact that the improvements in $\check{R}$ were not accompanied with suppression and substitution effects among variables.

In the self check-out context, consistent with the results from stage 1, complexity (t = -1.97; p = .050) and risk (t = -2.35; p = .019) were significantly inversely associated with first-trial timing, while relative advantage and compatibility were not significant. In addition, CPS (t = 2.49; p = .013) and HOMO (t = 3.38; p = .003) turned out positive and significant. CPO, OCP, and CROWD were not significant.

In the toy assembly context, consistent with stage 1, compatibility (t = 2.43; p = .015) and risk (t = -2.78; p = .008) were significant in the anticipated directions, while relative advantage

and complexity were not significant. Again, CPS ($t = 2.91$; $p < .005$) and HOMO ($t = 3.17$; $p = .004$) turned out positive and significant, but CPO, OCP, and CROWD were not significant.

In the meal assembly context, consistent with the results from stage 1, complexity ($t = -2.21$; $p = .028$) and risk ($t = -1.99$; $p = .046$) were significantly inversely associated with first-trial timing, while relative advantage and compatibility were not significant. In addition, HOMO ($t = -3.58$; $p = .002$) was negative and significant, but CPS, CPO, OCP, and CROWD were not significant.

The inclusion of the co-production and co-consumption variables enhanced the explanatory power of the models without introducing spurious or suppressive effects. HOMO was significantly positively associated with first-trial timing in all of the three contexts, providing support for proposition 25a. CPS was significant in the self check-out and toy assembly contexts. Therefore, proposition 21a is supported in two of the three contexts. CPO, OCP, and CROWD were not significant in any of the contexts, indicating the lack of any support for propositions 22a, 23a, and 24a.

Use Intention

A 2-stage hierarchical regression was performed to test the extent to which CPS, CPO, OCP, CROWD, and HOMO explain the variation in use intention after the contribution of innovation characteristics is accounted for (i.e., propositions 21b, 22b, 23b, 24b, and 25b). The results of these tests are presented in table 4-8.

Stage 1: The Role of Innovation Characteristics

The four innovation characteristics explained a significant portion of the variation in use intention under self check-out ($\check{R}^2$ = .26), toy assembly ($\check{R}^2$ = .20), and meal assembly ($\check{R}^2$ = .18). In the self check-out context, relative advantage (t = 2.58; p = .010), compatibility (t = 2.43; p = .013), complexity (t = -5.33; p < .001), and risk (t = -8.16; p < .001) were all significant in the anticipated directions. In the stuffed toy context, compatibility (t = 2.27; p = .024), complexity (t = -6.93; p < .001), and risk (t = -6.98; p < .001) were significant in the anticipated directions, while relative advantage was not significant. In the meal assembly context, all four were significant: Relative advantage (t = 2.40; p = .017), compatibility (t = 2.61; p = .009), complexity (t = -7.45; p < .001), and risk (t = -6.38; p < .001).

Stage 2: The Role of CPS, CPO, OCP, CROWD, and HOMO

The inclusion of the five antecedent variables improved the explanatory power of the model under self check-out ($\check{R}^2$ = .38), toy assembly ($\check{R}^2$ = .29), and meal assembly ($\check{R}^2$ = .31), although some suppression and substitution effects were observed.

In the self check-out context, consistent with the results from stage 1, compatibility (t = 2.00; p = .044) and risk (t = -4.01; p < .001) appeared significant in the anticipated directions. Unlike stage 1, relative advantage and complexity were not significant. Instead of these two innovation characteristics, CPS (t = 2.87; p = .003) and CROWD (t = -3.45; p < .001) turned out significant in the anticipated directions. CPO, OCP, and HOMO were not significant.

Similar results were obtained in the toy assembly context. Consistent with stage 1, compatibility (t = 2.05; p = .040) and risk (t = -3.69; p < .001) appeared significant in the anticipated directions. Unlike stage 1, relative advantage and complexity were not significant.

Instead of these two innovation characteristics, CPS (t = 2.60; p = .010) and OCP (t = -2.29; p = .024) turned out significant in the anticipated directions. CPO, CROWD, and HOMO were not significant.

In the meal assembly context, consistent with stage 1, complexity (t = -2.15; p = .032) and risk (t = -2.75; p < .006) appeared negative and significant. Unlike stage 1, relative advantage and compatibility were not significant. Instead of these two innovation characteristics, CPS (t = 3.29; p = .003) and HOMO (t = 3.78; p < .001) were positive and significant. CPO, OCP, and CROWD were not significant.

Although the inclusion of the co-production and co-consumption variables changed the pattern of the effects of innovation characteristics, it enhanced the explanatory power of the models. CPS appeared significant in all of the three contexts, providing support for proposition 21b. Each of OCP, CROWD, and HOMO was significant in one and a different context. Therefore, each of propositions 23b, 24b, and 25b are supported in one of the three contexts. CPO was not significant in any of the contexts, indicating the lack of any support for proposition 22b.

Differences between High- and Low-DTP Groups

Propositions 26a, 26b, and 26c posit that the high-DTP group is younger, more educated, and more convenience-prone than the low-DTP group. Convenience-proneness was captured by the single measure: 'In deciding where to shop, convenience is an important factor for me' on a 5-point Likert scale. A cross-tab test was run for age and education differences. The two groups did not differ in terms of age in any of the contexts: Self check-out (χ^2 = 7.29; df = 4; p = .121), toy assembly (χ^2 = 6.52; df = 4; p = .164), and meal assembly (χ^2 = 2.47; df = 4; p = .650).

Neither did they differ in terms of education: Self check-out (χ^2 = 7.37; df = 4; p = .195), toy assembly (χ^2 = 5.61; df = 4; p = .347), and meal assembly (χ^2 = 5.78; df = 4; p = .328). Therefore, propositions 26a and 26b are not supported in any of the contexts.

To examine whether the two groups differ in their extent of convenience-proneness, an independent-sample t-test was performed. The high-DTP group appeared more convenience-prone in the self check-out (t = 2.66; df = 216; p = .004) as well as meal assembly (t = 2.32; df = 185; p = .019) contexts. In the toy assembly context, the low-DTP group was actually more convenience-prone (t = -4.11; df = 197; p < .001). Therefore, while proposition 26c is supported in two of the contexts, the reverse of that proposition is observed in the toy assembly context.

Conclusion

The results presented in this chapter support that customer evaluation of service innovation characteristics and customer adoption decisions may be explained and predicted by the following co-production and co-consumption constructs: Focal customer's co-production of the service for self (CPS); other customers' co-production of the service for the focal customer (OCP); the number of other customers in the service environment (CROWD); the nature of other customers (HOMO); and focal customer's disposition to participate (DTP) and its interaction with CPS. Focal customer's co-production of the service for other customers (CPO) and its interaction with DTP failed to emerge as significant predictors. In addition, high-DTP customers were more convenience-prone in two service contexts while low DTP customers were more convenience-prone in the third context.

CHAPTER 5

RESEARCH IMPLICATIONS AND LIMITATIONS

This chapter begins by presenting a summary and conclusion of the research. Then, it discusses the practical and academic implications of the empirical results. Finally, it exposes several limitations associated with the research design and sampling methodology.

Summary

Conceptual Framework

Customers play an active role throughout the conception, design, production, delivery, purchase, consumption, and disposal of market offerings (Firat et al. 1995; Vargo and Lusch 2004a; Wikstrom 1996a, 1996b). This dissertation has focused on with the customer's co-creation of value for self (co-production) and for other customers (co-consumption) during the production and delivery stages. With the servuction system (Eiglier et al. 1977; Langeard et al. 1981) as an overarching framework, it explains how changes in the customer's perceived co-production and co-consumption, caused by a service innovation, may influence her perceptions of service innovation characteristics and modify her adoption behavior. The conceptual framework that bears the substantive propositions developed and tested here is based on a multidisciplinary body of knowledge.

Method

After the multidisciplinary literature review and the conceptual development, the methodological challenge was multifold: (a) to find and/or create culturally informed, reliable,

and valid operational definitions/measurement scales for the constructs of interest, (b) to refine those measures, and (c) to collect data for the empirical testing of the propositions.

Self check-out at grocery stores, Build-A-Bear stores, and meal assembly centers were selected as the service contexts for the empirical analysis. The target population included members of Generations X and Y who were between 18 and 45 years of age and who had some familiarity with one of the three service innovations.

With the literature review as their backdrop, a series of qualitative investigations as well as a pilot study were undertaken to adapt the extant scales and construct new scales. In line with Hui and Bateson (1991), Eroglu et al. (2005), and Langeard et al. (1981), the focal service encounters were simulated through a series of consumption scenarios. Using 100 students per service context, the exploratory factor analysis (EFA) indicated that the instruments had sufficient degrees of internal reliability and construct validity. Data for the main study were drawn from 218, 199, and 187 consumer visitors of a business-to-consumer event (*Home and Garden Show*) for the three service contexts, respectively. Confirmatory factor analysis of these data validated the results of EFA.

Conclusions

Overall, the results indicate that the five co-production and co-consumption constructs conceived here play pivotal roles in explaining innovation characteristics and adoption decisions. More specifically, the focal customer's co-production of the service for self (CPS), other customers' co-production of the service for the focal customer (OCP), the number of other customers in the service environment (CROWD), and the nature of other customers (HOMO) may explain the focal customer's evaluation of service innovation characteristics as well as her

first-trial timing and use intention. In addition, the focal customer's disposition to participate (DTP) and its interaction with CPS are instrumental in explaining innovation characteristics. Focal customer's co-production of the service for other customers (CPO) and its interaction with DTP do not seem to be mechanisms for understanding the perceived characteristics and adoption of service innovations. In comparing the high- and low-DTP groups, it was found that the former was more convenience-prone in two service contexts, and the latter in the third context. Table 5-1 demonstrates which and to what extent propositions are supported.

Although all are important constructs in the conceptual framework, CPS, OCP, CROWD, HOMO, DTP, and DTPCPS differ in four ways. First, each of the four innovation characteristics is explained by a different combination of these constructs (see table 5-2). In explaining relative advantage, CPS and OCP were important regardless of the service context, while HOMO, DTP, and DTPCPS were important in two, and CROWD in one, of the three service contexts. In explaining compatibility, OCP, OCP^2, HOMO, DTP, and DTPCPS were important regardless of the service context, while CPS, CROWD and $CROWD^2$ were important in two of the three service contexts. In explaining complexity, CPS, OCP, and CROWD were important regardless of the service context, while DTP and DTPCPS were important in two, and CPO and CROWD in one, of the three service contexts. In explaining risk, CPS and OCP were important regardless of the service context, while CROWD, DTP, and DTPCPS were important in two of the three service contexts.

Second, each of the two indicators of adoption decisions is explained by a different combination of co-production and co-consumption constructs, after having accounted for the effects of innovation characteristics (see table 5-2). In explaining the first-trial timing, HOMO was important regardless of the service context, while CPS was important in two of the three

service contexts. In explaining use intention, CPS was important regardless of the service context, while OCP, CROWD, and HOMO were each important in one of the three service contexts.

Third, the significance pattern of co-production and co-consumption constructs in explaining innovation characteristics was also dependent upon the service context (see table 5-2). In the self check-out context, OCP, OCP^2, DTP, and DTPCPS were significant antecedents of the four innovation characteristics, while CPS was a significant antecedent of three, and CROWD, $CROWD^2$, and HOMO of two, innovation characteristics. In the toy assembly context, CPS, OCP, OCP^2, CROWD, $CROWD^2$, DTP, and DTPCPS were significant antecedents of the four innovation characteristics, while HOMO was a significant antecedent of one innovation characteristic. In the meal assembly context, CPS, OCP, and OCP^2 were significant antecedents of the four innovation characteristics, while HOMO was a significant antecedent of three, and CROWD and $CROWD^2$ of two, innovation characteristics. In this context, DTP and DTPCPS were significant antecedents of compatibility only.

Fourth, the significance pattern of co-production and co-consumption constructs in explaining the two indicators of adoption decisions, after having accounted for the effects of innovation characteristics, was also dependent upon the service context (see table 5-2). In the self check-out context, CPS was an important antecedent of both first-trial timing and use intention, while CROWD and HOMO were each an important antecedent of one of these two adoption indicators. In the toy assembly context, CPS was again an important antecedent of both first-trial timing and use intention, while OCP and HOMO were each an important antecedent of one of these two adoption indicators. In the meal assembly context, HOMO was an important

antecedent of both first-trial timing and use intention, while CPS was an important antecedent of one adoption indicator.

Of the 41 propositions (i.e., some propositions had multiple items), 12 were supported in all of the three contexts, 7 in two contexts, 7 in one context, and 15 in no context. In explaining the four innovation characteristics across the three service contexts, OCP was the most pervasively significant antecedent (in 12 of 12 cases), followed by CPS (in 11 cases), DTP and DTPCPS (each in 9 cases), CROWD (in 8 cases), HOMO (in 6 cases), and CPO (in one case). In explaining the two adoption indicators across the three service contexts, the most pervasively significant antecedent after having accounted for the effects of innovation characteristics was CPS (in 5 of 6 cases), followed by HOMO (in 4 cases), and OCP and CROWD (each in 1 case).

Combining the per-construct and per-context significance patterns provides another conclusion. CPS and OCP are the most important constructs under the rubric of co-production and co-consumption as conceived here. They explained almost all of the four innovation characteristics across all of the three contexts. CROWD and HOMO are the next two in terms of explanatory power and pervasiveness.

Discussion of the Findings

The production-consumption dichotomy is taken literally and too far among mainstream marketers (Wikstrom 1996a). There is rarely, if at all, a pure consumer. Customers always co-produce what they purchase and consume (Vargo and Lusch 2004); and marketers have just started viewing customer co-production as an undeniable, strategically consequential fact (Prahalad and Ramaswamy 2003). Further, the assumption of 'customer in vacuum' is untenable. Customer decisions are always subject to contextual factors. Marketers, now more than ever, are

putting the customer back in the context, where temporal, spatial, economic, cultural, and other influencers come into play (Arnould and Thompson 2005).

The present research has examined exchange relationships characterized by co-production and co-consumption. The focus was on intangible offerings where co-production and co-consumption are more easily perceptible by customers and measurable by researchers. Since innovations in service processes and technologies often modify the level and nature of co-production and co-consumption (Lovelock and Young 1979), the study has revolved around service innovations. The principal research question was: How do customers evaluate service innovations that modify the level and nature of their co-production and co-consumption roles?

The conceptual framework developed in this research, together with the empirical testing of its substantive propositions, suggests that the extent of co-production and co-consumption (i.e., the five antecedent constructs) required of services customers may influence their evaluation of innovation characteristics and subsequently their adoption decisions. Moreover, customer disposition to participate modifies the strength of the associations between co-production and consumption constructs on the one hand and innovation characteristics on the other.

Implications for Practitioners

As companies increasingly shift work to customers and incorporate more self-service technologies, customer will play more significant roles in the production of services (Meuter et al. 2000; Tax et al. 2006). As such, the findings of this research might be of paramount importance to service managers.

CPS and OCP are indispensable antecedents of service innovation characteristics in service contexts similar to those included here. Whereas an increase (decrease) in the customer's input to the production of her own service can improve (exacerbate) her evaluation of service innovation characteristics, an increase (decrease) in other customers' input to the focal customers' service experience can exacerbate (improve) her evaluation of service innovation characteristics. The customer's input to other customers' service experience failed to be associated with service innovation characteristics, although it might have performed better in the absence of other co-production and con-consumption constructs.

In comparison, the effects of crowding and homophily were more construct- and context-specific. An increase (decrease) in the level of spatial and human crowding can aggravate (ameliorate) customer perception of the complexity, and less pervasively, riskiness and compatibility of the service innovation. In contrast, an increase (decrease) homophily can better (worsen) customer perception of the compatibility and, less pervasively, relative advantage of the service innovation. Whereas, the effect of crowding was primarily pronounced in the toy assembly context, the effect of homophily was the least evident in that context and more prominent in the other two contexts.

Customers evaluate service innovation characteristics differently also due to their interpersonal DTP differences. The effect of DTP is twofold. First, highly participative customers tend to more favorably evaluate the four service innovation characteristics (i.e., the main effect). The second effect works through modifying the associations between CPS and service innovation characteristics. Highly participative customers tend to amplify the constructive effects of CPS on service innovation characteristics. The effects of DTP and

DTPCPS were more strongly manifest in the self check-out and toy assembly contexts, but the least in the meal assembly context.

As far as first-trial timing, homophily and CPS may be two key determinants. When a service innovation propels a customer to perceive greater (lesser) background and attitudinal homophily with other customers in the service environment, she likely tries the service innovation sooner (later). Likewise, a customer who perceives the service innovation to have increased (reduced) her input to the production of her own service production tends to try it sooner (later) than others who perceive the opposite to be the case.

CPS is the sole pervasively important determinant of use intention. An increase (decrease) in the customer's input to the production of her own service can strengthen (weaken) her intention to use the service innovation. Other less pervasively important antecedents of use intention include OCP, crowding, and homophily.

Implications for Researchers

Research on co-production and co-consumption is nascent. Although some researchers have taken isolated looks at the concepts of CPS (e.g., Langeard et al. 1981; Wikstrom 1996a), OCP (e.g., Grove et al. 1998; Martin and Pranter 1998), crowding (e.g., Eroglu, Machleit, and Davis 2001a; Machleit, Meyer, and Eroglu 2005), and homophily (e.g., McCroseky et al. 2006; Simpson et al. 2000), the current study incorporates these concepts and provides some unique and useful insights as to their importance and behavior. Apart from the fact that more integrative research on all co-production and co-consumption constructs is needed, the following are probably of special curiosity and provide fruitful directions for future research.

First, the current research concerns three different service innovations, which represent three service contexts. Although the findings provide insights for like services, they should not be generalized to all services. Having said this, beyond the peculiarities of each service, there exists a body of shared problems, and therefore findings in one service context can be transferred to another with slight adjustment (Eiglier 1977). "This fact opens the way to a new, non-sectional view of the marketing of services. This is a global view of services in themselves and of the specific problems they create in proportion to tangible benefits" (Eiglier et al. 1977, p. 82). It is the author's belief that co-production and co-consumption constructs make for a prolific soil from which such non-sectional view can grow. To assess the validity of this contention, researchers are encouraged to replicate this research across a cross-section of service industries.

Second, the problem of production is the most immediate problem that the service business has to resolve (Eiglier and Langeard 1977a) simply because both employees and customers of the service firms are important constituencies in the production process (Eiglier and Langeard 1977b). Due to this multitude of production problems, service firms are posed to have a strong production (as opposed to marketing) orientation (Eiglier and Langeard 1977b). The current research has focused on intra- and inter-customer relationships during production and delivery stages of service production. Future research can expand this focus to encompass customer-employee interactions.

Third, it has been acknowledged that the strategy of differentiation is much more difficult to achieve in service firms (e.g., Eiglier and Langeard 1977a, p. 39). Be disentangling, conceptualizing, and empirically testing some of the designable facets of co-production and consumption, the current research might point to opportunities to overcome some of the difficulties that service businesses in the same sector have in differentiating themselves.

Research is needed to operationalize and explicate the ways in which the findings of this research may translate into planning and executing differentiation strategies.

Fourth, DTP can serve the strategy of segmentation. Once it is acknowledged that the most fundamental element of a service encounter, the customer, is also a co-producer of the service experience and outcomes, the interpersonal differences in terms of DTP in the production of services shines as a potential segmentation variable (Eiglier and Langeard 1977b). Although the composition of the participator categories varies from one service to another, a relatively small proportion of customers can be categorized as participative or non-participative across all service industries (Langeard et al. 1981, p. 51). Standing on the shoulders of 'consumer innovativeness' researchers, one could isolate two genres of DTP: Global and domain-specific.

Customer's disposition to engage in production and delivery may well transcend particular service industries (Bateson 1985; Langeard et al. 1981). Generally speaking, there are customers who would choose the self-service option even if the usual monetary or convenience incentives were withdrawn (Bateson 1985). Global DTP can be defined as a lasting and context-general personality trait that motivates customers to participate in the production and delivery of service offerings they consume. As an example, a customer who prefers buffets over full-service restaurants, ATMs over employee-rendered services, self-checkout over employee-operated registers, and several other service alternatives requiring high co-production, is probably high on global co-production.

Domain-specific DTP, in contrast, is a context-specific disposition that motivates customer, if situated in the right context, to participate in the production of a certain service offering. An example of domain-specific co-production would be a customer who uses an

automatic self-check-in machine when traveling as a tourist, but expects to receive the boarding pass from an employee when traveling on business.

Limitations

The limitations of the empirical research conducted in this dissertation should factor into any interpretations of its findings. These limitations are, in the main, rooted in three methodological decisions: (a) inclusion of three service contexts, (b) selection and recruitment of respondents, and (c) application of scenario-based survey.

The service innovations selected for this dissertation were self check-out at grocery stores, consumer-initiated meal preparation at gourmet-to-go stores, and teddy bear customization at Build-A-Bear retail outlets. The service contexts that offer these innovations had three attributes in common, although to varying degrees. First, they allow customers to have a choice between the innovated and non-innovated types of the service offering. Second, they were adopted by some, not all, of target customers. Third, they were likely to instigate a rise in the magnitude of co-production. There is a need to replicate and extend the analyses and findings of this dissertation on other types of service innovations and/or in different service contexts.

Although the possibilities are countless, certain service contexts provide fertile contexts for studying customer co-production and co-consumption of service innovations. Healthcare services are one such context. An advantage of selecting this context is the existence of some prior work. For instance, Bowers et al. (1990) have found that hospital patients who administer their own pain medication, rather than waiting for nurses, tend to consume less medicine and to prefer their health care providers over competitors. Further, these patients show lower perceptions of risk associated with unnecessary intake of medicine and possible side effects

(Bowers et al. 1990). Another example is the Dellande et al. (2004) work that shows how Weight Watchers' clients who share success stories and support those having difficulties tend to perceive greater benefits and lesser risks potent in the service offering. Another prolific context is online services, in which customers are an integral constituency in the production and delivery of services for themselves and for one another.

The data for this study came from the members of Generations X and Y who were between 18 and 45 years of age and who visited a business-to-consumer *Home and Garden Show* held in the convention center of a major city in Southeast United States. No other demographic classification (e.g., gender, ethnicity, income) factored into the selection of respondents. To replicate and extend the analyses and findings of this dissertation, future research is needed to address the sampling limitation in one of the following two ways: (a) recruit a similar but more representative sample, or (b) recruit a different and representative sample.

Lastly, the data was collected through a scenario-based paper-and-pencil questionnaire. This data, by nature, does not afford us to conduct causal analyses or make causal inferences. It is recommended that future research consider the use of other methods, such as experimental designs, so that the collected data could support the testing and delineating of causal relationships incorporated in the conceptual framework.

TABLE 3-1
COEFFICIENT OF RELIABILITY (CRONBACH'S α) OF THE ADAPTED SCALES

Scale	Dimension	Study 1	Study 2[a]	Study 3	Study 4
Innovation Characteristics					
Moore and Benbasat (1991)	Relative advantage	.89	.90	.95	.92
	Compatibility	.52	.81	.88	.83
	Complexity	.79	.83	.81	.80
Meuter et al. (2005)	Relative advantage	.95	.97		
	Compatibility	.95	.95		
	Complexity	.83	.88		
	Risk	.85	.87		
Crowding					
Machleit et al. (1994)	Human	.90	.79	.93	.89
	Spatial	.93	.83	.86	.69
Machleit et al. (2000)	Human	.90			
	Spatial	.84			
Eroglu et al. (2005)	Human	.89	.92		
	Spatial	.80	.79		
Homophily					
McCroskey et al. (2006)	Background	.81	.84		
	Attitude	.95	.92		
McCroskey and Richmond (1979)	Single-dimension	.92			
Simpson et al. (2000)	Single-dimension	.91			

[a] Most of the works cited here had conducted two or more empirical studies.

TABLE 3-2
ITEMS/WORDS ADAPTED FOR CPS, CPO, AND OCP SCALES

Scale	Source	Dimension	Item in original format
CPS			
	Langeard et al. (1981)	Consumer participation	Total amount of time required Amount of effort required from you
	Kelley et al. (1992)	Customer technical quality	I understand the procedures associated with this service.
		Organizational socialization	I understand the policies of this organization. I understand the values that are important to this organization.
	Bettencourt (1997)	Cooperation	I carefully observe the rules and policies of this store.
CPO and OCP			
	Claycomb et al. (2001)	Information provision	I am willing to give of my time to help others.
		Organizational socialization	I understand the responsibilities of the employees of the YMCA.
	McGrath and Otness (1995)	NA	Smile, greet, information, help
	Martin and Pranter (1989)	NA	Eye-contact, opinion
	Grove et al. (1998)	NA	Laugh, advice

TABLE 3-3
FREQUENCY AND RATIONALE OF QUALITATIVE INVESTIGATIONS

Type	Purpose	Check-out at grocery stores	Stuffed-toy retailers	Meal assembly centers	Duration (min)
Participant observation with limited role playing	Familiarize researcher with innovations; modify adopted scales; develop new scales; simulate service encounters	9	10	11	35-55
Shadowing	Expand and enrich findings from observations	3	3	5	25-80
In-depth interview	Discuss customers' lived expereinces; revise the scales and scenarios	4	4	4	55-110
Focus group	Revise the scales and scenarios; administer the instrument and capture immediate feedback	2	2	2	75-135

TABLE 3-4
MAJOR LESSONS AND DIRECTIONS FROM QUALITATIVE INVESTIGATIONS

Lesson learnt	Action taken
Observations	
- A formative CPS scale consists of three dimensions: time, knowledge, and effort.	Adopted items were modified, new items were added, and CPS scale was organized around these dimensions.
- Formative CPO and OCP scales consist of three dimensions: offer, response, and request.	Multiple items were written per CPO and OCP dimension based on observation findings.
Shadowing	
- Every service involves multiple idiosyncratic and common control variables.	A different subset of control variables was tailored for each service.
- Common control variables are price; distance; crowding; and complementary, substitute, and unrelated products.	Common control variables were included in scenarios.
- All but CPS's 'partial employee' scale items apply when the service innovation increases or reduces, but not when it eliminates, customer co-production and co-consumption.	Focus is on service innovations that increase (not reduce) customer co-production and co-consumption. Thus, CPS's 'partial employee' scale remains the same across services.
In-depth interviews and first focus groups	
- There are CPS-, CPO-, and OCP-related meanings and experiences that formative scales do not capture.	The formative scales were expanded and the possibility of mixed formative-reflective measures was considered.
- CPS can be reflected in two dimensions: service production and partial employee.	Items measuring the two reflective dimensions were added to the formative CPS scale.
- CPO and OCP can be reflected in two dimensions: service experience and partial employee.	Items measuring the two reflective dimensions were added to the formative CPO and OCP scales.
Second focus groups	
- CPS, CPO, and OCP scales are more readable when they involve a "fill the blank" task, with the blank at the end of each item. (10/3)[a]	CPS, CPO, and OCP items were revised so that respondents could easily "fill the blank" using one of the anchor options 1 through 5.
- Respondents might circle a number on the wrong row in the scale. (6/6)	Shading every other item in each scale and reducing content per page alleviate such errors.
- The instrument is cramped. Number of pages is less important than the readability of items. (19/5)	For each instrument, content per page was reduced by increasing the number of pages from 3 to 4.

[a] First/second numeral represents number of participants in agreement/disagreement with the issue (n =31).

TABLE 3-5
DEMOGRAPHICS OF THE PILOT- AND MAIN-STUDY RESPONDENTS

		Pilot Study			Main Study		
		Self Check-Out	Toy Assembly	Meal Assembly	Self Check-Out	Toy Assembly	Meal Assembly
Gender	Female	52.3	41.9	48.8	48.6	43.2	44.4
	Male	47.7	58.1	51.2	51.4	56.8	55.6
Age	18-25	49.4	49.8	51.3	15.1	11.1	12.3
	26-30	38.8	39.2	36.7	19.3	18.6	19.3
	31-35	6.2	5.9	7.1	33.0	32.2	27.3
	36-40	3.1	3.5	2.7	18.8	28.1	29.9
	41-45	2.5	1.6	2.2	13.8	10.1	11.2
Income	Below $30K	56.5	57.7	62.8	19.7	25.1	21.4
	$30-60K	32.6	32.9	29.0	32.6	27.1	32.6
	$60-90K	6.1	5.0	4.8	39.0	37.2	39.0
	$90-120K	2.7	2.9	2.3	6.9	9.0	4.8
	Above $120K	2.1	1.5	1.1	1.8	1.5	2.1
Social Class	Lower	14.3	16.2	13.7	11.5	11.1	10.2
	Lower middle	24.1	23.6	21.7	23.9	18.1	21.4
	Middle	36.8	38.0	37.6	40.4	46.2	42.8
	Upper middle	23.5	20.7	26.2	21.6	20.6	23.5
	Upper	1.3	1.5	0.8	2.8	4.0	2.1
Education	Some high school	0.0	0.0	0.0	3.2	3.0	1.6
	High school diploma	0.0	0.0	0.0	21.6	18.1	20.9
	Some college	50.0	50.0	19.3	22.9	33.2	19.3
	Bachelor's	49.3	48.7	50.0	37.2	30.2	39.6
	Master's	0.7	1.3	0.0	12.8	12.1	13.9
	Doctorate	0.0	0.0	0.0	2.3	3.5	4.8
Ethnicity	White	44.6	37.7	40.9	46.8	42.2	41.2
	Black	6.2	4.1	8.3	6.9	6.0	11.2
	Hispanic	9.6	12.2	10.0	8.7	15.6	10.2
	Native	0.7	2.6	2.6	0.9	2.0	2.1
	Asian	21.4	24.1	20.8	17.4	17.6	18.7
	Other	17.5	19.3	17.4	19.3	16.6	16.6
Religion	Christian	70.2	70.7	74.2	73.9	72.9	72.2
	Jewish	3.9	4.0	2.2	3.7	3.0	1.6
	Muslim	5.5	7.1	6.2	4.1	2.0	4.3
	Buddhist	1.3	1.8	3.1	0.5	1.5	1.6
	Hindu	0.9	1.3	0.3	0.0	2.5	0.5
	No religion	9.6	3.4	5.8	11.0	10.1	12.8
	Other	8.6	11.7	8.2	6.9	8.0	7.0

Note: All numbers in %.

TABLE 3-6
PRINCIPAL COMPONENT ANALYSIS – CPS

	Principal Components														
	Self Check-Out					Toy Assembly					Meal Assembly				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Chronbach's α	.92	.96	.88	.90	.88	.91	.93	.90	.90	.89	.90	.93	.90	.91	.88
1. Time															
I wait	.87					.85					.84				
The time that elapses before I leave the store is	.86		.36			.84		.36			.82		.38		
The time I take to complete my shopping is	.85					.84		.37			.81				
2. Familiarity															
I need familiarity with store policies		.93					.90					.90			
I need familiarity with store procedures		.90					.89					.89			
I need familiarity with store values		.90					.88					.89			
I need familiarity with store equipment		.89					.88					.87			
I need familiarity with store products		.87	.41		.37		.84	.37		.36		.84	.40		.35
3. Effort															
I spend physical effort			.85					.84					.85		
I spend mental effort			.82		.38			.84		.35			.84		.37
I spend emotional effort			.78					.82					.83		
4. Service production															
I involve myself in carrying out my shopping			.37	.90				.35	.88				.39	.85	
My input to fulfilling my shopping is				.89					.87					.83	
My role in completing my own shopping is				.88					.86					.83	
I work for myself while I am shopping				.86					.84					.81	
5. Partial employee															
My understanding of the responsibilities of store employees is					.85					.86					.87
I perform tasks that store employees would normally perform				.36	.84	.37			.35	.85					.85
I save employee time for the store by helping myself	.41		.38		.82	.43		.35		.83	.39		.42		.84
I feel like a partial employee of the store					.80					.82					.84

Note: Main loadings are underlined in tables 3-6 through 3-11.

TABLE 3-7
PRINCIPAL COMPONENT ANALYSIS RESULTS – CPO

	Principal Components														
	Self Check-Out					Toy Assembly					Meal Assembly				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Chronbach's α	.97	.96	.94	.92	.92	.96	.96	.94	.93	.90	.98	.96	.90	.91	.88
1. Offer															
I initiate eye-contact with other customers	.93	.36				.91	.33				.89				
I smile at other customers	.93					.90					.88		.34		
I verbally greet other customers	.92					.90					.87				
I laugh with other customers	.92					.89					.87				
I give of my time to help other customers	.92				.38	.89				.35	.87				.38
I provide information to other customers	.91					.87					.86				
I offer advice to other customers	.90					.87					.84				
I extend my opinion to other customers	.90					.86					.83				
I provide help to other customers	.89					.85					.82				
2. Response															
I reciprocate other customers' eye-contacts		.94		.40			.90		.40			.87			
I smile back at other customers		.93					.90		.35			.86		.41	
I respond to other customers' verbal greetings		.92		.36			.90		.38			.86		.36	
I answer other customers' questions		.92		.37			.89		.37			.85		.35	
I honor other customers' request for physical assistance		.91					.88					.85			
3. Request															
I request information from other customers			.90					.87					.86		
I seek advice from other customers			.89					.87					.85		
I ask other customers for their opinions	.35		.86			.37		.78		.35	.36		.83		
I request physical assistance from other customers	.35	.38	.85				.38	.78			.37		.81		
4. Service experience															
I influence other customers' shopping experiences				.87					.79		.39			.82	
I involve myself in other customers' shopping experiences	.38			.84					.78					.80	
I provide input to other customers' shopping experiences	.37		.37	.84		.36		.36	.74				.40	.77	
My impact on other customers' shopping experiences is				.81		.36			.74		.35			.77	
5. Partial employee															
I interact with other customers like store employees			.35		.74			.37		.75			.38		.79
I save employee time for the store by helping other customers	.38	.36	.40		.73	.37		.35		.74		.37	.37		.77
I feel like a partial employee interacting with other customers		.37		.35	.72		.36		.35	.71		.37		.39	.73

TABLE 3-8
PRINCIPAL COMPONENT ANALYSIS RESULTS – OCP

	Principal Components														
	Self Check-Out					Toy Assembly					Meal Assembly				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Chronbach's α	.96	.94	.93	.90	.91	.96	.95	.95	.92	.90	.96	.93	.93	.90	.92
1. Offer															
Other customers initiate eye-contact with me	.90	.37				.85					.85				
Other customers smile at me	.89					.83					.84			.38	
Other customers verbally greet me	.88	.35				.83	.39				.83				
Other customers laugh with me	.88					.82					.82		.37		
Other customers give of their time to help me	.87					.82					.82				
Other customers provide information to me	.87			.35		.81			.36		.82			.41	
Other customers offer advice to me	.86					.81					.81				
Other customers extend their opinions to me	.86					.80					.81				
Other customers provide help to me	.85					.80					.81				
2. Response															
Other customers reciprocate my eye-contact		.88					.83	.35				.85			
Other customers smile back at me		.86			.39		.82			.38		.83			.36
Other customers respond to my verbal greeting		.84					.79					.77			
Other customers answer my questions		.78		.37			.79		.35			.75		.36	
Other customers honor my request for physical assistance		.75					.77					.73			
3. Request															
Other customers request information from me	.38		.85			.35		.82			.38		.79		
Other customers seek advice from me			.79		.37			.81		.35	.36		.78		.42
Other customers ask me for my opinions			.76					.78			.35		.74		
Other customers request physical assistance from me	.35		.74			.38		.78					.72		
4. Service experience															
Other customers influence my shopping experience				.84		.38			.83					.80	
Other customers involve themselves in my shopping experience	.39			.79		.38			.80		.36			.78	
Other customers provide input to my shopping experience	.37		.40	.74				.38	.79		.39		.42	.73	
Other customers' impact on my shopping experience is				.70					.74					.71	
5. Partial employee															
Other customers interact with me like store employees	.36		.39		.80			.35		.81		.38	.35		.84
Other customers save employee time for the store by helping me		.36	.40		.76	.39	.35	.35		.77	.37	.35	.36		.83
Other customers act like partial employees interacting with me		.34		.39	.75		.42			.76		.37		.37	.81

TABLE 3-9
PRINCIPAL COMPONENT ANALYSIS RESULTS – CROWDING AND HOMOPHILY

	Principal Components					
	Self Check-Out		Toy Assembly		Meal Assembly	
	1	2	1	2	1	2
Crowding						
Chronbach's α	.91	.89	.90	.88	.89	.87
1. Human						
The store seems crowded to me	.91		.89		.90	
The store is busy	.90		.88		.88	
There is traffic during my shopping	.87	.35	.88	.36	.86	.38
The number of shoppers is	.85	.41	.85	.36	.84	.40
2. Spatial						
The store seems spacious		.90		.90		.88
I feel cramped shopping in the store		.89		.88	.35	.88
The open feeling of the stores is *R*	.37	.84	.39	.86	.37	.87
The store feels confining to shoppers	.39	.84		.85		.84
Homophily						
Chronbach's α	.90	.87	.91	.87	.89	.87
1. Background						
The customers are from a social class similar to mine.	.89	.37	.89	.39	.88	.37
The customers have a status different from mine.	.89	.38	.86	.35	.88	.39
The customers are from an economic situation similar to mine.	.89	.41	.86	.36	.87	.35
The customers have a background similar to mine.	.88	.37	.86		.86	.40
The customers come from the same geographic area as do I.	.88	.35	.85	.35	.83	.35
The customers have a childhood similar to mine.	.86	.35	.84	.35	.82	.38
2. Attitude						
The customers think like me.	.36	.89	.38	.89	.36	.88
The customers behave like me.	.38	.88	.37	.87	.37	.88
The customers are different from me.	.35	.88	.38	.86	.39	.86
The customers share my values.	.35	.87	.41	.86	.38	.86
The customers treat people like I do.	.37	.87	.40	.86	.40	.85
The customers have thoughts and ideas that are similar to mine.	.40	.87	.36	.86	.35	.84
The customers express attitudes different from mine.	.35	.87	.35	.85	.35	.84
The customers have a lot in common with me.	.35	.86	.38	.83	.38	.83

TABLE 3-10
PRINCIPAL COMPONENT ANALYSIS RESULTS – INNOVATION CHARACTERISTICS

	Principal Components											
	Self Check-Out				Toy Assembly				Meal Assembly			
	1	2	3	4	1	2	3	4	1	2	3	4
Chronbach's α	.95	.97	.94	.94	.93	.96	.94	.92	.93	.97	.94	.94
1. Relative advantage												
I have control over the shopping process	.83				.81				.83			
Shopping is favorable	.82				.81				.81			
I have added convenience	.82				.80				.80			
I can do things at my own pace	.80				.78				.80			
2. Compatibility												
Shopping is compatible with my lifestyle		.87				.87				.86		
Shopping is compatible with my needs		.87				.85				.86		
Shopping fits with the way I like to get things done		.85				.83				.85		
3. Complexity												
Shopping involves difficult procedures			.82				.83				.80	
Successful shopping requires clear and understandable interactions			.82				.82				.78	
The shopping task is simple to deal with			.81				.82				.77	
Shopping is cumbersome to do			.81				.81				.77	
4. Perceived risk												
The confidentiality of my information is respected				.88				.87				.88
I might end up with unsatisfactory results				.87				.85				.87
My privacy is infringed upon				.87				.85				.86
Shopping is risky				.86				.85				.86
Shopping involves uncertainty				.85				.83				.86

TABLE 3-11
PRINCIPAL COMPONENT ANALYSIS RESULTS – DTP

	Principal Components														
	Self Check-Out					Toy Assembly					Meal Assembly				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Chronbach's α	.88	.81	.91	.86	.83	.86	.90	.92	.86	.85	.84	.81	.88	.86	.85
1. Awareness															
I can easily identify my feelings and tell the difference between fear, anger, and hurt.	.86			.42		.87			.37		.86			.38	
At times I get depressed for no special reason.	.84					.85					.84				
Some people manage to manipulate me without me knowing it before it's too late.	.81	.39				.85					.82	.35			
Sometimes I dislike a person without really being able to say why.	.78	.35				.82	.38				.79	.35			
2. Purpose															
I'm dissatisfied with my life but I'm not sure how to go about changing it.		.91		.36			.88		.38			.90			
If I should die today, I feel that my life has been worthwhile.		.87					.86					.89			
I usually take time to think things out before deciding to do something.		.86		.37			.86		.38			.86		.37	
I try to consider all sides of an issue before I form an opinion.		.85		.35			.83		.37			.85			
3. Concepts															
Even with skilled salesmen, if I don't want a product, I say no and stick to it.			.88	.38				.87	.41				.88	.36	
I tend to be passive.		.37	.88				.35	.87				.38	.85		
When I am irritated, I let it be known.			.87	.37				.85	.41				.85		
Whenever I am in a new group, I take the initiative to introduce myself.			.85					.84					.83		
I have found that what is going to happen will happen.			.82					.81					.80		
4. Skills															
When I go to the store, I often come home with things I had not intended to buy.	.36	.41		.83			.37		.82		.35	.37		.81	
When it comes to breaking a habit like smoking and drinking, I have self-control.				.81					.81		.39			.81	
When provoked, I'm not the type who loses his/her temper.		.35		.80			.38		.80			.35		.80	
It is usually quite easy for me to admit I am wrong.				.77					.78					.76	
5. Information															
If one is satisfied with one's car, it makes sense to buy the same make next time.	.36				.81					.81	.38				.79
First impressions, as a rule, are lasting ones.					.80					.80					.77
When facing a problem, I know how to analyze the situation in a scientific way.				.42	.77				.35	.78				.38	.76
If I don't know something, I'm accustomed to looking up the answer.				.36	.76				.36	.75				.40	.74

TABLE 3-12
THE INITIAL PROBE SCHEDULE

	If Yes	If No	If Not Sure
1) Are you between 18 and 45 years old?	Ask question 2	Thank her and approach next one	NA
2) Are you familiar with meal assembly centers?	Ask her to participate	Ask question 3	Elaborate and repeat the question
3) Are you familiar with Build-A-Bear?	Ask her to participate	Ask question 4	Elaborate and repeat the question
4) Are you familiar with automated self check-out at grocery stores?	Ask her to participate	Thank her and approach next one	Elaborate and repeat the question

TABLE 4-1
CFA FIT INDICES FOR ALL MODELS

	df	χ^{2} [a]	*ECVI%* [b]	*RMSEA*	*NFI*	*NNFI*	*CFI*	*GFI*	*CN*
CPS									
Self check out	142	343	1.15	.081	.95	.97	.97	.86	127
- Null Model [c]	171	6,517					.26		
Stuffed toy		298	1.04	.074	.95	.97	.98	.88	136
		5,816					.30		
Meal assembly		294	1.03	.076	.95	.97	.98	.86	129
		5,505					.27		
CPO									
Self check out	265	583	1.08	.074	.93	.95	.96	.88	101
	300	10,087					.29		
Stuffed toy		496	.95	.066	.94	.96	.96	.87	112
		9,013					.28		
Meal assembly		447	.87	.061	.94	.97	.97	.85	120
		8,106					.27		
OCP									
Self check out	265	520	.98	.067	.93	.96	.96	.84	126
	300	8,568					.31		
Stuffed toy		326	.69	.034	.89	.92	.93	.88	171
		1,818					.30		
Meal assembly		249	.59	.012	.84	.98	.98	.90	127
		1,801					.25		
CROWD									
Self check out	19	78	1.58	.120	.95	.94	.96	.92	83
	28	2,082					.28		
Stuffed toy		98	1.83	.140	.95	.94	.96	.89	73
		1,899					.26		
Meal assembly		93	1.74	.137	.95	.93	.96	.89	70
		1,801					.30		
HOMOPH									
Self check out	76	239	1.41	.100	.97	.97	.98	.86	100
	91	7,170					.27		
Stuffed toy		228	1.36	.104	.96	.97	.97	.86	89
		6,743					.26		
Meal assembly		240	1.42	.098	.95	.96	.96	.84	74
		5,567					.29		
Innovation Characteristics									
Self check out	113	234	1.03	.070	.94	.96	.96	.89	127
	136	4,326					.28		
Stuffed toy		199	.91	.062	.95	.97	.97	.89	142
		3,936					.28		
Meal assembly		177	.84	.055	.95	.97	.98	.90	148
		3,720					.30		
DTP									
Self check out	179	360	1.00	.068	.92	.94	.95	.93	117
	210	5,094					.27		
Stuffed toy		452	1.21	.088	.90	.91	.89	.91	63
		4,816					.29		
Meal assembly		337	.96	.069	.90	.93	.94	.92	97
		4,421					.29		

[a] All model χ^2 values significant at $p < .01$. [b] Model ECVI as a percentage of the saturated-model ECVI.

[c] For each CFA run, χ^2, *df*, and *CFI* of the null model appears undeneath the corresponding row.

Notes: 1. All Bartlett's sphericity χ^2 significant at $p < .01$. 2. All KMO sampling adequacy indeces > .81.

3. N = 218, 199, and 187 respectively for self check-out, stuffed toy, and meal assembly.

TABLE 4-2
DESCRIPTIVE STATISTICS AND CORRELATION MATRICES – SELF CHECK-OUT

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
M	2.98	2.94	3.01	3.06	3.06	2.89	2.99	3.05	2.95	2.97	2.91	2.95	2.96	2.89	2.97	3.01	2.98	2.98	3.07	2.99	2.97	3.10	3.04	2.97	NA	NA
SD	.82	1.04	.99	1.00	.99	.93	.94	.93	.90	.86	.95	.98	.89	.88	1.02	.90	.99	1.01	.87	.99	.92	.98	.91	1.00	NA	NA
% Var	.21	.18	.16	.14	.11	.26	.19	.15	.12	.09	.27	.21	.15	.11	.06	.39	.35	.41	.39	.21	.16	.18	.22	NA	NA	NA
1. CPSTIME	.93																									
2. CPSFAMIL	.70	.95																								
3. CPSEFFOR	.70	.72	.86																							
4. CPSPRODU	.69	.71	.76	.89																						
5. CPSPARTI	.76	.75	.74	.73	.88																					
6. CPOOFFER	.18	.30	.21	.24	.23	.95																				
7. CPORESPO	.11	.20	.10	.13	.19	.70	.95																			
8. CPOREQUE	.18	.16	.19	.14	.25	.73	.70	.93																		
9. CPOEXPER	.18	.21	.21	.26	.25	.76	.70	.74	.94																	
10. CPOPARTI	.15	.21	.16	.19	.22	.76	.73	.72	.76	.91																
11. OCPOFFER	.09	.07	.13	.18	.06	.20	.19	.13	.13	.12	.96															
12. OCPRESPO	.12	.08	.09	.13	.08	.20	.17	.14	.12	.08	.71	.93														
13. OCPREQUE	.05	.09	.05	.16	.05	.16	.16	.06	.06	.05	.73	.69	.92													
14. OCPEXPER	.06	.10	.09	.08	.06	.19	.19	.16	.12	.10	.70	.76	.74	.92												
15. OCPPARTI	.12	.12	.12	.22	.08	.24	.24	.17	.16	.13	.70	.72	.73	.70	.90											
16. CROWDHUM	-.13	-.12	-.14	-.09	-.11	-.05	.03	.03	-.03	-.04	.07	.15	.13	.05	.14	.90										
17. CROWDSPA	-.06	-.10	-.05	-.01	-.02	-.08	-.06	-.08	-.10	-.02	.08	.10	.10	.00	.10	.76	.89									
18. HOMOBACK	.22	.29	.25	.36	.26	.00	.08	.03	-.01	.04	.10	.07	.13	.01	.06	.13	.10	.91								
19. HOMOATTI	.19	.25	.25	.33	.21	.00	.03	-.01	-.02	.04	.06	.03	.08	-.03	-.04	.21	.18	.73	.88							
20. ADVANT	.41	.40	.42	.42	.42	.00	-.04	.03	.00	.04	-.02	-.06	-.05	-.07	-.10	-.03	-.01	.46	.48	.94						
21. COMPAT	.11	.15	.13	.26	.12	.05	.04	.03	.02	.04	.12	.09	.15	.04	.09	.23	.19	.69	.68	.11	.93					
22. COMPLEX	-.12	-.10	-.12	-.11	-.11	.13	.18	.12	.15	.18	.16	.20	.18	.14	.18	.21	.21	-.08	-.11	-.20	.03	.92				
23. RISK	-.13	-.13	-.07	-.13	-.12	-.04	-.05	-.03	-.02	-.12	.14	.15	.12	.22	.19	.36	.28	-.07	-.05	-.08	-.05	.10	.95			
24. USEFIRST	.35	.31	.36	.33	.37	.02	-.04	.10	.02	.08	.04	-.02	-.05	-.07	-.04	-.02	.01	.26	.28	.75	.05	-.23	-.14	NA		
25. USEINTEN	.20	.18	.15	.16	.15	.04	-.01	.05	.04	-.01	-.08	-.15	-.15	-.13	-.12	-.35	-.40	.02	.00	.27	-.10	-.45	-.41	.28	NA	
26. DTP	.13	.03	.06	.08	.02	-.01	.02	.02	-.05	-.04	.01	.02	-.05	-.01	.00	-.03	.03	-.01	.02	.10	-.06	-.13	-.02	.07	.08	NA

Notes: 1. The values on the diagonal are Cronbach's α. 2. Correlations > or = .174 and .136 are significant at $p < 0.01$ and $p < .05$, respectively (2-tailed).
3. $N = 218$ 4. USEFIRST and USEINTEN are the two indicators of adoption.

TABLE 4-3
DESCRIPTIVE STATISTICS AND CORRELATION MATRICES – TOY ASSEMBLY

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
M	3.08	2.92	3.03	3.05	3.10	2.97	3.03	2.98	3.04	2.93	2.92	2.98	3.00	3.00	2.98	2.91	2.96	3.07	2.94	3.04	3.02	3.04	3.03	2.94	NA	NA
SD	1.10	.96	.91	1.00	1.13	.90	.93	.95	1.09	1.06	1.12	.95	.98	1.03	.72	.76	.90	1.03	.75	.94	.72	1.00	.93	.86	NA	NA
% Var	22	.17	.17	.12	.10	.23	.20	.14	.11	.08	.24	.22	.15	.10	.07	.42	.38	.38	.37	.20	.19	.19	.20	NA	NA	NA
1. CPSTIME	.92																									
2. CPSFAMIL	.69	.94																								
3. CPSEFFOR	.68	.70	.89																							
4. CPSPRODU	.68	.69	.74	.91																						
5. CPSPARTI	.75	.72	.71	.70	.90																					
6. CPOOFFER	.18	.30	.18	.24	.21	.96																				
7. CPORESPO	.12	.21	.08	.14	.19	.68	.96																			
8. CPOREQUE	.20	.16	.19	.14	.26	.72	.67	.93																		
9. CPOEXPER	.14	.16	.15	.22	.20	.77	.72	.78	.91																	
10. CPOPARTI	.11	.16	.09	.14	.17	.75	.74	.74	.74	.88																
11. OCPOFFER	.09	.10	.17	.22	.08	.21	.17	.11	.13	.14	.94															
12. OCPRESPO	.12	.11	.13	.16	.10	.20	.15	.12	.12	.09	.62	.96														
13. OCPREQUE	.04	.12	.08	.19	.07	.17	.15	.02	.07	.06	.66	.61	.91													
14. OCPEXPER	.05	.13	.13	.10	.08	.20	.18	.14	.14	.12	.62	.70	.67	.93												
15. OCPPARTI	.12	.16	.17	.27	.10	.27	.25	.16	.19	.17	.62	.63	.66	.61	.90											
16. CROWDHUM	-.14	-.12	-.13	-.08	-.10	-.05	.03	.03	-.02	-.03	.04	.12	.09	.01	.11	.88										
17. CROWDSPA	-.06	-.09	-.03	.01	.00	-.08	-.06	-.09	-.09	-.01	.04	.07	.06	-.05	.06	.74	.87									
18. HOMOBACK	.26	.30	.27	.38	.27	.02	.10	.04	-.02	.05	.20	.16	.22	.09	.17	.16	.13	.85								
19. HOMOATTI	.25	.28	.28	.38	.24	.01	.04	.00	-.01	.05	.15	.13	.17	.05	.06	.25	.22	.72	.86							
20. ADVANT	.52	.46	.48	.48	.48	.03	-.03	.05	.01	.05	.12	.08	.08	.06	.05	.00	.03	.41	.42	.90						
21. COMPAT	.12	.13	.12	.26	.11	.07	.05	.02	.03	.04	.16	.13	.18	.06	.14	.24	.20	.70	.69	.08	.94					
22. COMPLEX	-.18	-.16	-.20	-.17	-.18	.06	.11	.05	.09	.11	.16	.21	.19	.13	.19	.22	.22	-.07	-.11	-.21	.00	.91				
23. RISK	-.09	-.08	-.01	-.07	-.07	-.04	-.05	-.02	.02	-.10	.17	.19	.16	.27	.24	.37	.27	-.05	-.04	-.05	-.03	.13	.90			
24. USEFIRST	.41	.35	.40	.37	.41	.04	-.01	.10	.03	.09	.08	.01	.00	-.02	.00	-.03	.02	.27	.29	.76	.05	-.23	-.12	NA		
25. USEINTEN	.19	.16	.14	.15	.14	.03	-.02	.03	.03	-.02	-.13	-.20	-.20	-.18	-.17	-.40	-.44	.03	.00	.24	-.11	-.48	-.44	.26	NA	
26. DTP	.15	.05	.08	.07	.03	-.04	.00	.00	-.06	-.06	.00	.02	-.05	-.01	-.01	-.01	.03	-.02	.02	.09	-.07	-.14	-.01	.05	.09	NA

Notes: 1. The values on the diagonal are Cronbach's α. 2. Correlations > or = .174 and .136 are significant at $p < 0.01$ and $p < .05$, respectively (2-tailed).
3. $N = 199$ 4. USEFIRST and USEINTEN are the two indicators of adoption.

TABLE 4-4
DESCRIPTIVE STATISTICS AND CORRELATION MATRICES – MEAL ASSEMBLY

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
M	3.03	3.02	2.95	2.99	3.01	3.01	2.95	3.09	3.02	3.00	3.04	2.97	2.95	3.06	2.94	3.04	3.03	3.07	3.07	3.00	3.02	3.00	2.95	3.04	NA	NA
SD	.82	1.12	.98	.89	.75	.89	.94	.95	.93	.82	.79	.96	.97	1.05	1.07	.95	.92	1.12	.95	.88	.94	1.04	.80	.99	NA	NA
% Var	.25	.18	.14	.10	.07	.24	.18	.14	.12	.10	.26	.20	.14	.13	.09	.40	.37	.40	.33	.22	.21	.19	.21	NA	NA	NA
1. CPSTIME	.92																									
2. CPSFAMIL	.70	.95																								
3. CPSEFFOR	.70	.68	.97																							
4. CPSPRODU	.71	.71	.76	.90																						
5. CPSPARTI	.77	.72	.71	.72	.87																					
6. CPOOFFER	.21	.30	.18	.19	.20	.96																				
7. CPORESPO	.12	.22	.10	.18	.18	.74	.94																			
8. CPOREQUE	.21	.17	.21	.15	.28	.72	.70	.92																		
9. CPOEXPER	.16	.17	.17	.23	.20	.75	.71	.78	.90																	
10. CPOPARTI	.12	.17	.10	.14	.16	.74	.74	.73	.71	.88																
11. OCPOFFER	.10	.09	.16	.20	.07	.14	.18	.07	.11	.10	.94															
12. OCPRESPO	.12	.09	.10	.13	.08	.13	.13	.08	.08	.04	.62	.95														
13. OCPREQUE	.06	.12	.07	.14	.06	.09	.17	-.02	.02	.01	.65	.61	.93													
14. OCPEXPER	.04	.11	.10	.07	.04	.16	.18	.13	.13	.09	.62	.71	.69	.93												
15. OCPPARTI	.12	.15	.15	.24	.08	.21	.26	.13	.16	.13	.60	.62	.65	.60	.90											
16. CROWDHUM	-.15	-.13	-.13	-.09	-.12	-.03	.03	.05	-.02	-.01	.05	.14	.12	.03	.13	.88										
17. CROWDSPA	-.07	-.12	-.05	-.02	-.04	-.07	-.07	-.07	-.11	.00	.05	.07	.07	-.04	.07	.74	.89									
18. HOMOBACK	.28	.34	.31	.42	.31	-.03	.06	.00	-.04	.00	.22	.18	.25	.11	.19	.16	.13	.87								
19. HOMOATTI	.25	.30	.31	.40	.26	.02	.04	.00	.00	.05	.17	.15	.19	.08	.08	.24	.21	.73	.84							
20. ADVANT	.51	.48	.50	.52	.50	.03	-.05	.05	.01	.05	.13	.09	.09	.05	.06	-.03	.01	.43	.41	.90						
21. COMPAT	.13	.17	.16	.27	.13	.01	.05	-.02	.02	.01	.17	.14	.18	.06	.14	.24	.20	.72	.72	.08	.96					
22. COMPLEX	-.18	-.17	-.20	-.19	-.19	.00	.05	-.02	.02	.03	.13	.19	.17	.13	.17	.27	.28	-.13	-.13	-.23	-.02	.93				
23. RISK	-.12	-.07	.00	-.08	-.07	.02	-.02	.00	.05	-.06	.19	.22	.20	.32	.27	.39	.31	-.06	-.05	-.08	-.05	.17	.92			
24. USEFIRST	.14	.03	.13	.04	.14	-.03	-.13	.21	-.03	.02	-.08	-.06	-.27	-.22	-.14	.14	.03	-.04	-.05	.66	-.06	-.22	-.28	NA		
25. USEINTEN	.29	.20	.07	.14	.11	.08	-.02	.09	.11	.06	.03	.09	-.09	-.06	.05	.02	-.07	-.08	-.10	.55	-.14	-.33	-.27	.50	NA	
26. DTP	.30	.06	.11	.13	.04	.00	.09	.06	-.08	-.02	.03	.09	-.10	.00	.04	-.09	.04	.00	.05	.24	-.09	-.21	-.15	.16	.05	NA

Notes: 1. The values on the diagonal are Cronbach's α. 2. Correlations > or = .174 and .136 are significant at $p < 0.01$ and $p < .05$, respectively (2-tailed).
3. $N = 187$ 4. USEFIRST and USEINTEN are the two indicators of adoption.

TABLE 4-5
SUPPORT FOUND FOR EACH PROPOSITION ACROSS CONTEXTS

		Self Check-Out	Toy Assembly	Meal Assembly
P-1.	Shifts in CPS are Positively related to relative advantage.	S	S	S
P-2.	Shifts in CPO are Positively related to relative advantage.	NS	NS	NS
P-9.	Shifts in OCP are inversely related to relative advantage.	S	S	S
P-13.	Shifts in crowding are inversely related to relative advantage.	NS	NS	NS
P-17.	Shifts in homophily are positively related to relative advantage.	S	NS	S
P-5.	Upward and downward shifts in CPS reduce compatibility.	NS	NS	NS
P-6.	Upward and downward shifts in CPO reduce compatibility.	NS	NS	NS
P-11.	Upward and downward shifts in OCP reduce compatibility.	S	S	S
P-15.	Upward and downward shifts in crowding reduce compatibility.	S	S	NS
P-20.	Shifts in homophily are positively related to compatibility.	S	S	S
P-7.	Shifts in CPS are inversely related to complexity.	S	S	S
P-8.	Shifts in CPO are positively related to complexity.	NS	NS	NS
P-12.	Shifts in OCP are positively related to complexity.	S	S	S
P-16.	Shifts in crowding are positively related to complexity.	S	S	S
P-19.	Shifts in homophily are inversely related to complexity.	NS	NS	NS
P-3.	Shifts in CPS are inversely related to risk.	S	S	S
P-4.	Shifts in CPO are inversely related to risk.	NS	NS	NS
P-10.	Shifts in OCP are positively related to risk.	S	S	S
P-14.	Shifts in crowding are positively related to risk.	NS	S	S
P-18.	Shifts in homophily are inversely related to risk.	NS	NS	NS
P-27a.	The positive association between CPS and relative advantage is stronger in the high-DTP group.	S	S	NS
P-27b.	The positive association between CPO and relative advantage is stronger in the high-DTP group.	NS	NS	NS
P-29a.	Upward and downward shifts in CPS reduce compatibility to a lesser extent in the high-DTP group.	S	S	S
P-29b.	Upward and downward shifts in CPO reduce compatibility to a lesser extent in the high-DTP group.	NS	NS	NS
P-30.	The negative association between CPS and complexity is stronger in the high-DTP group.	S	S	NS
P-31.	The positive association between CPO and complexity is weaker in the high-DTP group.	NS	NS	NS
P-28a.	The negative association between CPS and risk is stronger in the high-DTP group.	S	S	NS
P-28b.	The negative association between CPO and risk is stronger in the high-DTP group.	NS	NS	NS
P-21a.	Shifts in CPS are positively related to first-trial timing.	S	S	NS
P-22a.	Shifts in CPO are positively related to first-trial timing.	NS	NS	NS
P-23a.	Shifts in OCP are positively related to first-trial timing.	NS	NS	NS
P-24a.	Shifts in crowding are positively related to first-trial timing.	NS	NS	NS
P-25a.	Shifts in homophily are positively related to first-trial timing.	S	S	S
P-21b.	Shifts in CPS are positively related to use intention.	S	S	S
P-22b.	Shifts in CPO are positively related to use intention.	NS	NS	NS
P-23b.	Shifts in OCP are positively related to use intention.	NS	S	NS
P-24b.	Shifts in crowding are positively related to use intention.	S	NS	NS
P-25b.	Shifts in homophily are positively related to use intention.	NS	NS	S
P-26a.	The high-DTP group is younger.	NS	NS	NS
P-26b.	The high-DTP group is more educated.	NS	NS	NS
P-26c.	The high-DTP group is more convenience-prone.	S	NS	S

TABLE 4-6
HIERARCHICAL REGRESSIONS – RELATIVE ADVANTAGE, COMPLEXITY, AND RISK

Dependent Variable	**RELATIVE ADVANTAGE**						**COMPLEXITY**						**RISK**					
	Stage 1			Stage 2			Stage 1			Stage 2			Stage 1			Stage 2		
	β	*Sβ*	*P*	*β*	*Sβ*	*P*	*β*	*Sβ*	*P*	*β*	*Sβ*	*P*	*β*	*Sβ*	*P*	*β*	*Sβ*	*P*
Self Check-Out	*(R = .62; Ř² = .37)*			*(R = .62; Ř² = .40)*			*(R = .38; Ř² = .12)*			*(R = .42; Ř² = .16)*			*(R = .45; Ř² = .18)*			*(R = .46; Ř² = .20)*		
Intercept	1.75		.000	1.74		.000	2.06		.000	2.67		.000	1.60		.000	1.32		.000
CPS	.34	.37	**.000**	.41	.44	**.029**	-.13	-.14	**.051**	-.25	-.67	**.020**	-.33	-.33	**.000**	-.21	-.17	**.010**
CPO	-.07	-.08	.178	-.21	-.23	.246	.18	.19	**.005**	-.03	-.11	.824	-.05	-.05	.440	-.10	-.10	.556
OCP	-.13	-.12	**.037**	-.13	-.11	**.041**	.18	.16	**.016**	.18	.16	**.015**	.21	.17	**.008**	.34	.33	**.000**
CROWD	-.05	-.05	.353	-.04	-.05	.390	.21	.22	**.001**	.23	.24	**.000**	.08	.07	.292	.04	.04	.831
HOMO	.29	.41	**.000**	.29	.41	**.000**	-.08	-.11	.112	-.15	-.15	.356	-.09	-.11	.106	-.08	-.10	.144
DTP				.13	.12	**.034**				-.22	-.21	**.032**				-.83	-.92	**.000**
DTPCPS				.27	.27	**.012**				-.20	-.52	**.055**				-.12	-.14	**.031**
DTPCPO				.05	.21	.410				-.17	-.18	.290				-.06	-.15	.592
Toy Assembly	*(R = .59; Ř² = .34)*			*(R = .67; Ř² = .43)*			*(R = .41; Ř² = .15)*			*(R = .43; Ř² = .17)*			*(R = .41; Ř² = .14)*			*(R = .45; Ř² = .19)*		
Intercept	1.32		.000	1.31		.000	2.17		.000	2.70		.000	1.12		.004	.94		.000
CPS	.43	.42	**.000**	.51	.56	**.006**	-.19	-.20	**.007**	-.22	-.60	**.039**	-.13	-.17	**.021**	-.13	-.16	**.028**
CPO	-.08	-.16	.129	-.22	-.25	.226	.10	.11	.117	-.21	-.22	.191	-.07	-.07	.289	-.01	-.01	.974
OCP	-.21	-.20	**.000**	-.19	-.20	**.048**	.29	.23	**.001**	.29	.23	**.001**	.37	.27	**.000**	.36	.26	**.000**
CROWD	-.20	-.20	**.000**	.00	-.01	.929	.22	.24	**.001**	.24	.26	**.000**	.36	.36	**.000**	.36	.36	**.000**
HOMO	.01	.02	.877	.20	.29	.124	-.09	-.13	.091	-.18	-.48	.094	-.01	-.01	.902	-.02	-.02	.884
DTP				.28	.32	**.031**				-.11	-.15	**.048**				-.33	-.32	**.000**
DTPCPS				.29	.30	**.010**				-.20	-.20	**.053**				-.21	-.18	**.007**
DTPCPO				.05	.21	.411				-.08	-.08	.624				-.03	-.08	.777
Meal Assembly	*(R = .63; Ř² = .38)*			*(R = .65; Ř² = .40)*			*(R = .43; Ř² = .17)*			*(R = .44; Ř² = .17)*			(R = .49; Ř² = .22)			*(R = .50; Ř² = .24)*		
Intercept	1.32		.000	1.30		.000	2.20		.000	2.58		.000	.85		.000	.87		.000
CPS	.45	.49	**.000**	.17	.26	**.010**	-.13	-.14	**.052**	-.38	-.40	**.022**	-.16	-.21	**.004**	-.16	-.21	**.005**
CPO	-.09	-.20	.103	-.31	-.33	.133	.03	.03	.680	-.27	-.28	.111	-.04	-.04	.603	-.02	-.02	.888
OCP	-.10	-.11	**.046**	-.22	-.23	**.003**	.27	.21	**.002**	.27	.22	**.002**	.40	.30	**.000**	.40	.29	**.000**
CROWD	-.01	-.02	.853	.00	.00	.992	.28	.31	**.000**	.31	.34	**.000**	.39	.39	**.000**	.39	.40	**.000**
HOMO	.18	.18	**.000**	.63	.68	**.000**	-.14	-.19	**.014**	-.17	-.16	.110	-.02	-.02	.822	-.04	.04	.821
DTP				.15	.22	.200				-.05	-.08	.409				-.01	-.01	.928
DTPCPS				.06	.23	.675				.00	-.01	.941				-.02	-.04	.881
DTPCPO				.07	.32	.268				-.29	-.78	.008				-.01	-.02	.936

Notes: 1. Coefficient of multiple correlation (*R*) and adjusted coefficient of determination (*Ř²*) are reported above each model. 2. Across all contexts, standard errors of the β's ranged from .051 to .756. 3. Max *VIF* indices were 7.44, 6.03, and 7.98 respectively for self-check-out, stuffed toy, and. meal assembly. 4. Significant *β* and *P* values are in bold. 5. Underlined values indicate likely suprression effect.

TABLE 4-7
HIERARCHICAL REGRESSIONS – COMPATIBILITY

	Stage 1			Stage 2			Stage 3		
	β	*Sβ*	*P*	*β*	*Sβ*	*P*	*β*	*Sβ*	*P*
Self Check-Out	*(R = .75; $\check{R}^2$ = .53)*			*(R = .76; $\check{R}^2$ = .56)*			*(R = .78; $\check{R}^2$ = .58)*		
Intercept	-1.40		.000	-2.34		.000	-1.52		.000
CPS	.21	.12	**.024**	1.45	.29	**.001**	1.33	.81	**.002**
CPO	.00	.00	.986	-.10	-.03	.810	-.09	-.06	.841
OCP	.21	.12	**.024**	.63	.22	**.000**	1.39	.85	**.002**
CROWD	.51	.18	**.003**	.43	.15	**.001**	.04	.02	.938
HOMO	1.04	.81	**.000**	1.09	.37	**.000**	.90	.71	**.000**
CPS^2				.06	.02	.349	-.88	-.73	**.041**
CPO^2				-.04	-.01	.687	-.02	-.08	.734
OCP^2				-.22	-.08	**.002**	-.21	-.14	**.006**
$CROWD^2$				-.31	-.11	**.001**	.01	.05	.878
DTP							.25	.14	**.050**
DTPCPS							.23	.36	**.023**
DTPCPO							-.16	-.25	.228
Toy Assembly	*(R = .76; $\check{R}^2$ = .56)*			*(R = .78; $\check{R}^2$ = .59)*			*(R = .82; $\check{R}^2$ = .65)*		
Intercept	-1.29		.000	-3.66		.000	-3.16		.000
CPS	.20	.12	**.029**	1.11	.16	**.039**	.05	.19	.470
CPO	-.07	-.04	.388	-.04	-.01	.692	-.50	-.30	.296
OCP	.96	.81	**.000**	1.94	.29	**.000**	1.36	.84	**.002**
CROWD	.20	.12	**.023**	1.42	.26	**.001**	1.34	.60	.120
HOMO	1.00	.77	**.000**	.96	.14	**.000**	.96	.74	**.000**
CPS^2				.06	.01	.428	.02	.08	.775
CPO^2				.00	.00	.942	-.02	-.09	.710
OCP^2				-.29	-.05	**.001**	-.22	-.80	**.003**
$CROWD^2$				-.23	-.07	**.002**	-.21	-.56	.140
DTP							.26	.14	**.045**
DTPCPS							.33	.50	**.018**
DTPCPO							-.03	-.10	.518
Meal Assembly	*(R = .79; $\check{R}^2$ = .59)*			*(R = .80; $\check{R}^2$ = .63)*			*(R = .82; $\check{R}^2$ = .65)*		
Intercept	1.60		.000	-3.99		.000	-3.28		.000
CPS	.07	.04	.423	.01	.01	.815	.08	.05	.885
CPO	.00	.00	.986	-.39	-.08	.356	-.57	-.33	.234
OCP	.07	.04	.423	.30	.09	**.001**	.35	.20	.512
CROWD	.09	.06	.254	.09	.02	.277	1.19	.52	.161
HOMO	1.04	.81	**.000**	.10	.02	**.000**	.21	.77	**.002**
CPS^2				-.16	-.03	.279	-.02	-.08	.753
CPO^2				.07	.01	.339	.06	.21	.386
OCP^2				-.23	-.06	**.001**	-.99	-.77	**.000**
$CROWD^2$				-.04	-.01	.520	-.20	-.51	.166
DTP							.23	.13	**.046**
DTPCPS							.24	.37	**.052**
DTPCPO							-.16	-.23	.261

1. Coefficient of multiple correlation (R) and adjusted coefficient of determination ($\check{R}^2$) are above each model.
2. Across the three contexts, standard errors of the β estimates ranged from .082 to .491.
3. Max *VIF* indices were 7.44, 6.03, and 7.98 respectively for self-check-out, stuffed toy, and meal assembly.
4. Significant β and P values are in bold.
5. Underlined values indicate likely suprression effect.

TABLE 4-8
HIERARCHICAL REGRESSIONS – FIRST-TRIAL TIMING AND USE INTENTION

Dependnet Variable	FIRST TRIAL TIMING						USE INTENTION					
	Stage 1			Stage 2			Stage 1			Stage 2		
	β	*Sβ*	*P*	*β*	*Sβ*	*P*	*β*	*Sβ*	*P*	*β*	*Sβ*	*P*
Self Check-Out	*(R = .64; $\check{R}^2$ = .39)*			*(R = .71; $\check{R}^2$ = .48)*			*(R = .52; $\check{R}^2$ = .26)*			*(R = .63; $\check{R}^2$ = .38)*		
Intercept	1.23		.000	1.23		.000	4.87		.000	2.71		.000
ADVANT	.00	.01	.896	.08	.07	.133	.15	.14	**.010**	.05	.05	.446
COMPATI	.08	.07	.133	.00	-.01	.896	.12	.12	**.013**	.18	.23	**.044**
COMPLEX	-.45	-.35	**.000**	-.15	-.25	**.050**	-.31	-.30	**.000**	-.02	-.11	.378
RISK	-.49	-.39	**.000**	-.31	-.51	**.019**	-.43	-.45	**.000**	-.47	-.77	**.000**
CPS				.37	.61	**.013**				.39	.52	**.003**
CPO				.07	.06	.196				.06	.05	.687
OCP				-.04	-.04	.584				-.01	-.05	.683
CROWD				-.08	-.05	.440				-.52	-.67	**.001**
HOMO				.51	.84	**.003**				.08	.20	.719
Toy Assembly	*(R = .60; $\check{R}^2$ = .35)*			*(R = .65; $\check{R}^2$ = .41)*			*(R = .46; $\check{R}^2$ = .20)*			*(R = .55; $\check{R}^2$ = .29)*		
Intercept	1.24		.000	1.24		.000	4.87		.000	2.04		.000
ADVANT	.01	.01	.861	.08	.07	.100	.01	.02	.123	.10	.10	.395
COMPATI	.48	.41	**.000**	.35	.57	**.015**	.07	.13	**.024**	.20	.26	**.040**
COMPLEX	-.08	-.08	.112	-.01	-.01	.861	-.38	-.39	**.000**	-.01	-.05	.703
RISK	-.43	-.36	**.000**	-.42	-.50	**.008**	-.35	-.39	**.000**	-.54	-.69	**.001**
CPS				.46	.59	**.005**				.40	.51	**.010**
CPO				.04	.04	.582				.00	.00	.983
OCP				-.04	-.03	.620				-.28	-.36	**.024**
CROWD				-.05	-.04	.601				-.01	-.03	.883
HOMO				.49	.80	**.004**				.01	.02	.926
Meal Assembly	*(R = .58; $\check{R}^2$ = .32)*			*(R = .63; $\check{R}^2$ = .38)*			*(R = .43; $\check{R}^2$ = .18)*			*(R = .57; $\check{R}^2$ = .31)*		
Intercept	1.23		.000	.96		.000	5.02		.000	1.84		.000
ADVANT	.14	.08	.471	.03	.05	.546	.14	.14	**.017**	.01	.05	.854
COMPATI	.00	.00	.968	.21	.13	.170	.08	.14	**.009**	.03	.07	.753
COMPLEX	-.89	-.74	**.000**	-.26	-.33	**.028**	-.43	-.43	**.000**	-.24	-.31	**.032**
RISK	-1.03	-.67	**.000**	-.17	-.28	**.046**	-.33	-.36	**.000**	-.44	-.56	**.006**
CPS				.09	.08	.104				.50	.64	**.003**
CPO				.08	.08	.112				.01	.05	.845
OCP				-.01	-.01	.836				-.04	-.11	.846
CROWD				-.07	-.06	.374				-.05	-.07	.542
HOMO				.53	.87	**.002**				.55	.90	**.000**

1. Coefficient of multiple correlation (R) and adjusted coefficient of determination ($\check{R}^2$) are above each model.
2. Across the three contexts, standard errors of the β estimates ranged from .082 to .491.
3. Max *VIF* indices were 7.44, 6.03, and 7.98 respectively for self-check-out, stuffed toy, and meal assembly.
4. Significant β and P values are in bold.
5. Underlined values indicate likely suprression effect.

TABLE 5-1
THE EXTENT OF SUPPORT FOUND FOR EACH PROPOSITION

Number of contexts in which support was found	Criterion: Innovation Characteristics				Criterion: Adoption		DTP
	Relative advantage	Compatibility[a]	Complexity	Risk	First-trial timing	Use intention	High /Low
First Stage							
3 contexts	1, 9	11, 20	7, 12, 16	3, 10			-
2 contexts	-	15	-	14			26c [b]
1 context	13, 17	-	8, 19	-			-
No context	2	5, 6		4, 18			26a,b
Second Stage							
3 contexts	1, 9, 17	20	7, 12, 16	3, 10	25a	21b	
2 contexts	27a	11	30	14, 28a	21a	-	
1 context	13	29a	3	-	-	23b, 24b, 25b	
No context	2, 13, 27b	5, 6, 15, 29b	8, 19, 31	4, 18, 28b	22a, 23a, 24a	22b	

[a] Individuated relation of compatibility with each of CPO, OCP, and crowding was quadratic.

[b] This proposition is supported in two contexts; in the third context its reverse is supported.

TABLE 5-2
PER-CONSTRUCT AND PER-CONTEXT SUMMARIES OF RESULTS

Per-Construct:

	Criterion: Innovation Characteristics					Criterion: Adoption		
	Relative advantage	Compati-bility	Complexity	Risk	*Total*	First trial timing	Use intention	*Total*
CPS	3 [a]	2 [c]	3	3	*11*	2	3	*5*
CPO	-	-	1	-	*1*	-	-	*0*
OCP	3	3 [d]	3	3	*12*	-	1	*1*
CROWD	1	2 [d]	3	2	*8*	-	1	*1*
HOMO	2	3	1	-	*6*	3	1	*4*
DTP	2	3	2	2	*9*			
DTPCPS	2	3	2	2	*9*			
DTPCPO	-	-	-	-	0			
Relative advantage						-	2	*2*
Compatibility						1	3	*4*
Complexity						2	3	*5*
Risk						3	3	*6*

Per-Context:

	Criterion: Innovation Characteristics [e]				Criterion: Adoption			
	Self Check-Out	Toy Assembly	Meal Assembly	Total	Self Check-Out	Toy Assembly	Meal Assembly	*Total*
CPS	3 [b]	4	4	*11*	2	2	1	*5*
CPO	1	-	-	*1*	-	-	-	*0*
OCP	4	4	4	*12*	-	1	-	*1*
CROWD	2	4	2	*8*	1	-	-	*1*
HOMO	2	1	3	*6*	1	1	2	*4*
DTP	4	4	1	*9*				
DTPCPS	4	4	1	*9*				
DTPCPO	-	-	-	*0*				
Relative advantage					1	-	1	*2*
Compatibility					1	2	1	*4*
Complexity					2	1	2	*5*
Risk					2	2	2	*6*

[a] Read: CPS was significantly associated with relative advantage in three service contexts.
[b] Read: In the slef check-out context, CPS was significantly associated with three of the four innovation characteritics.
[c] Main, but not quadratic, term was significant.
[d] Both main and quadratic terms were significant.
[e] In explaining compatibility, OCP and CROWD were counted if their main and quadratic terms were both significant.

FIGURE 1-1
THE PROPOSED CONCEPTUAL MODEL

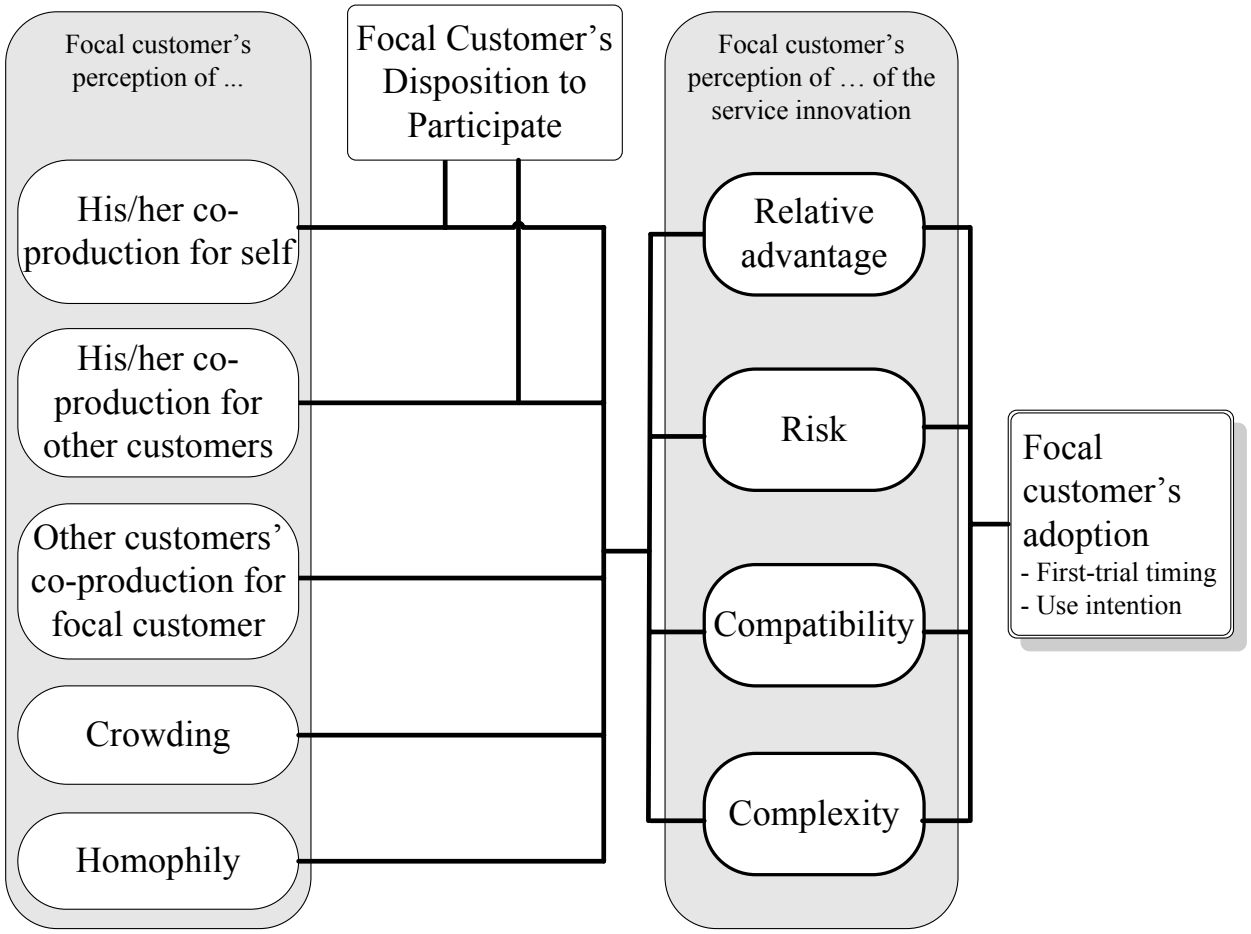


FIGURE 2-1
THE CONCEPTUAL MODEL TOGETHER WITH THE SERVUCTION SYSTEM

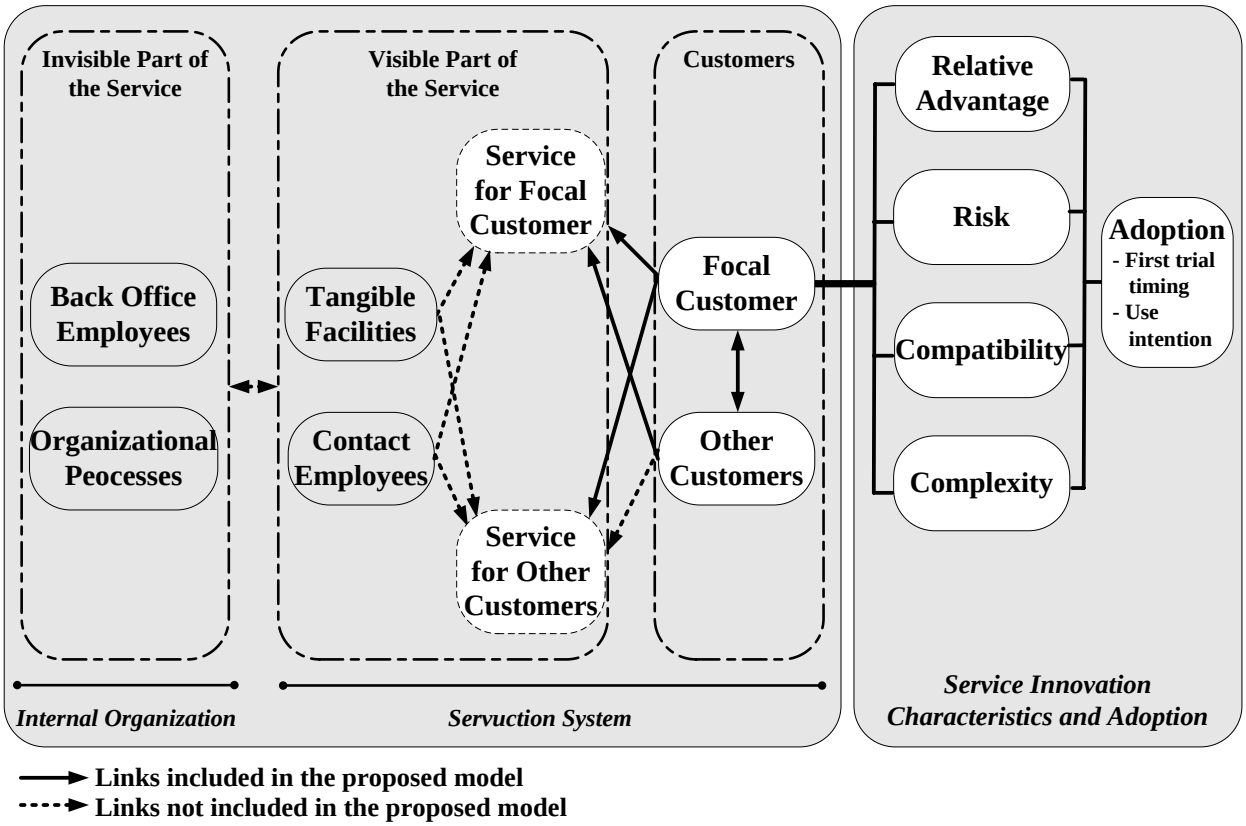
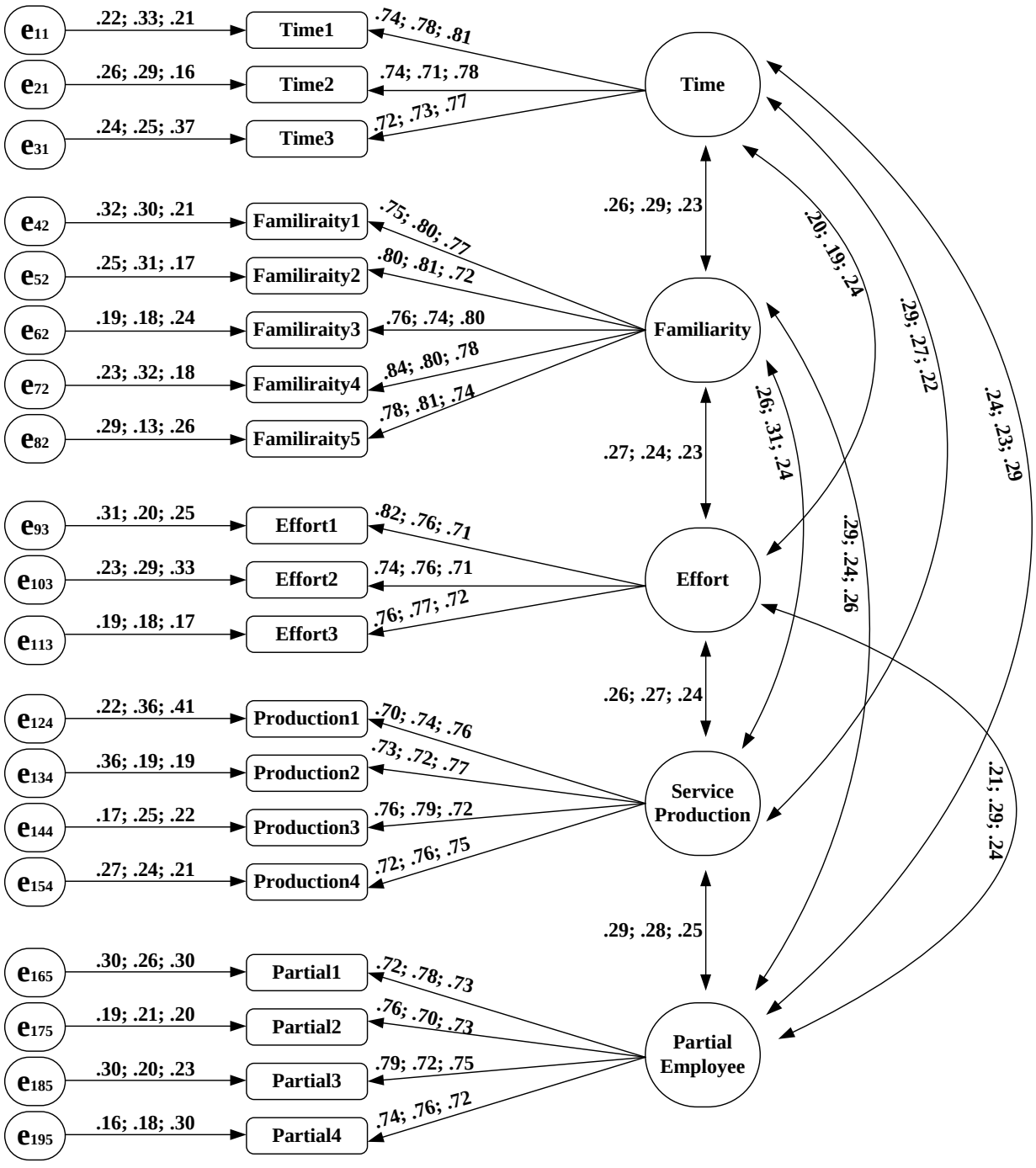


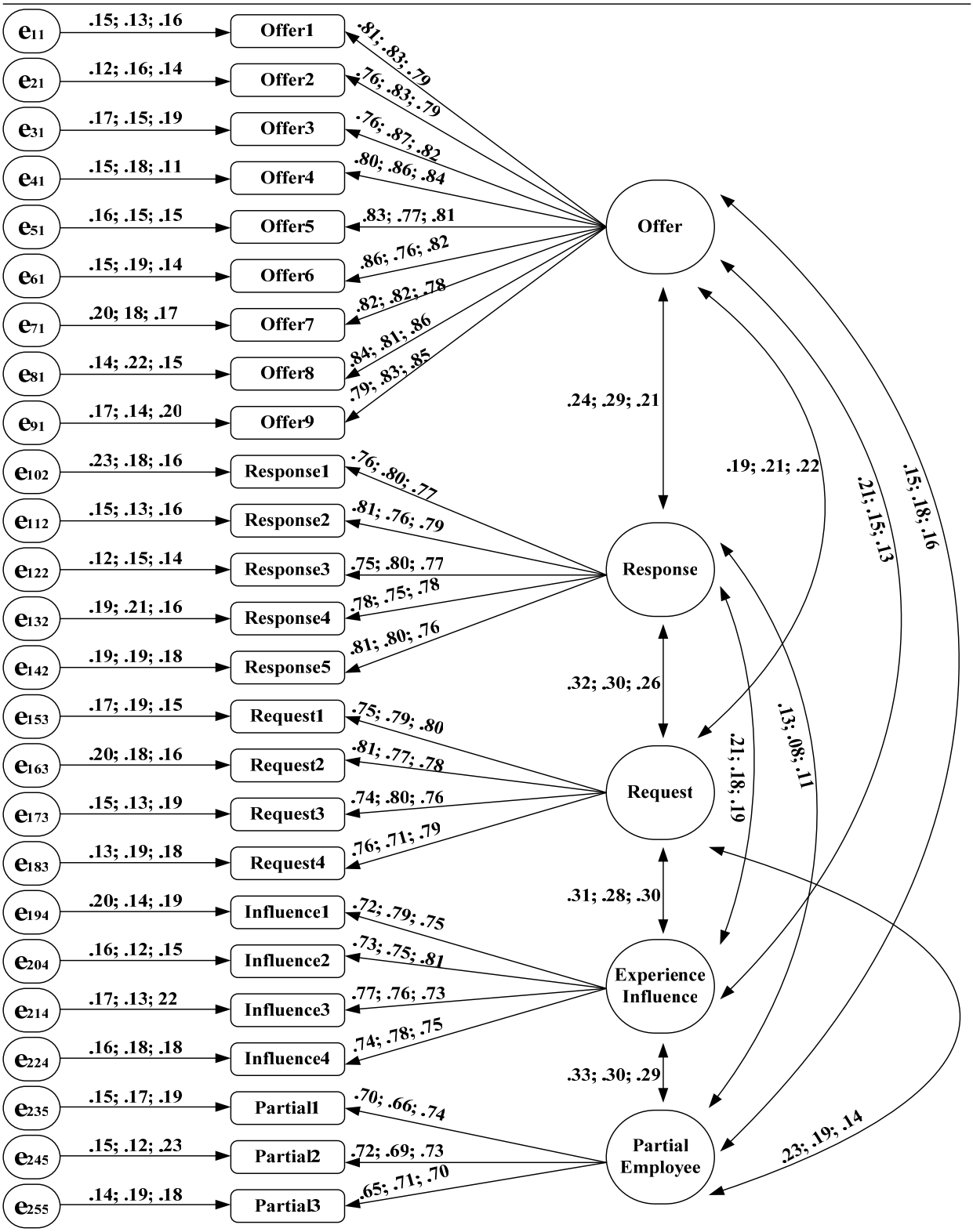
Figure adapted from Langeard, Eric, John E. G. Bateson, Christopher H. Lovelock, and Pierre Eiglier (1981, p. 15), *Services Marketing: New Insights from Consumers and Managers*, Cambridge, MA: Marketing Science Institute (MSI), with written permission from MSI.

FIGURE 4-1
CFA RESULTS – THE FIVE-FACTOR MODEL OF CPS



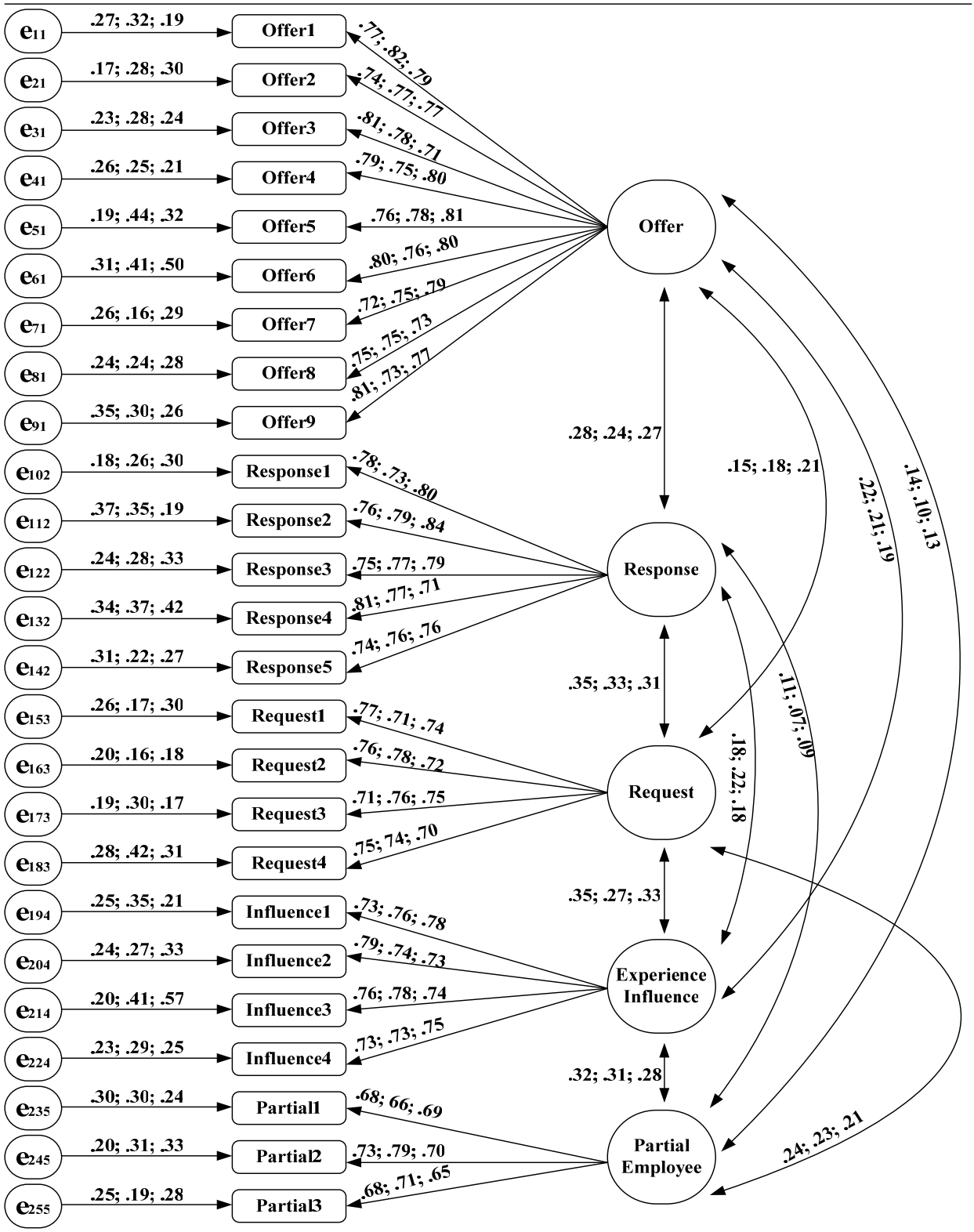
The 1st, 2nd, and 3rd estimate belongs to the self check-out, toy assembly, and meal assembly context, respectively.

FIGURE 4-2
CFA RESULTS – THE FIVE-FACTOR MODEL OF CPO



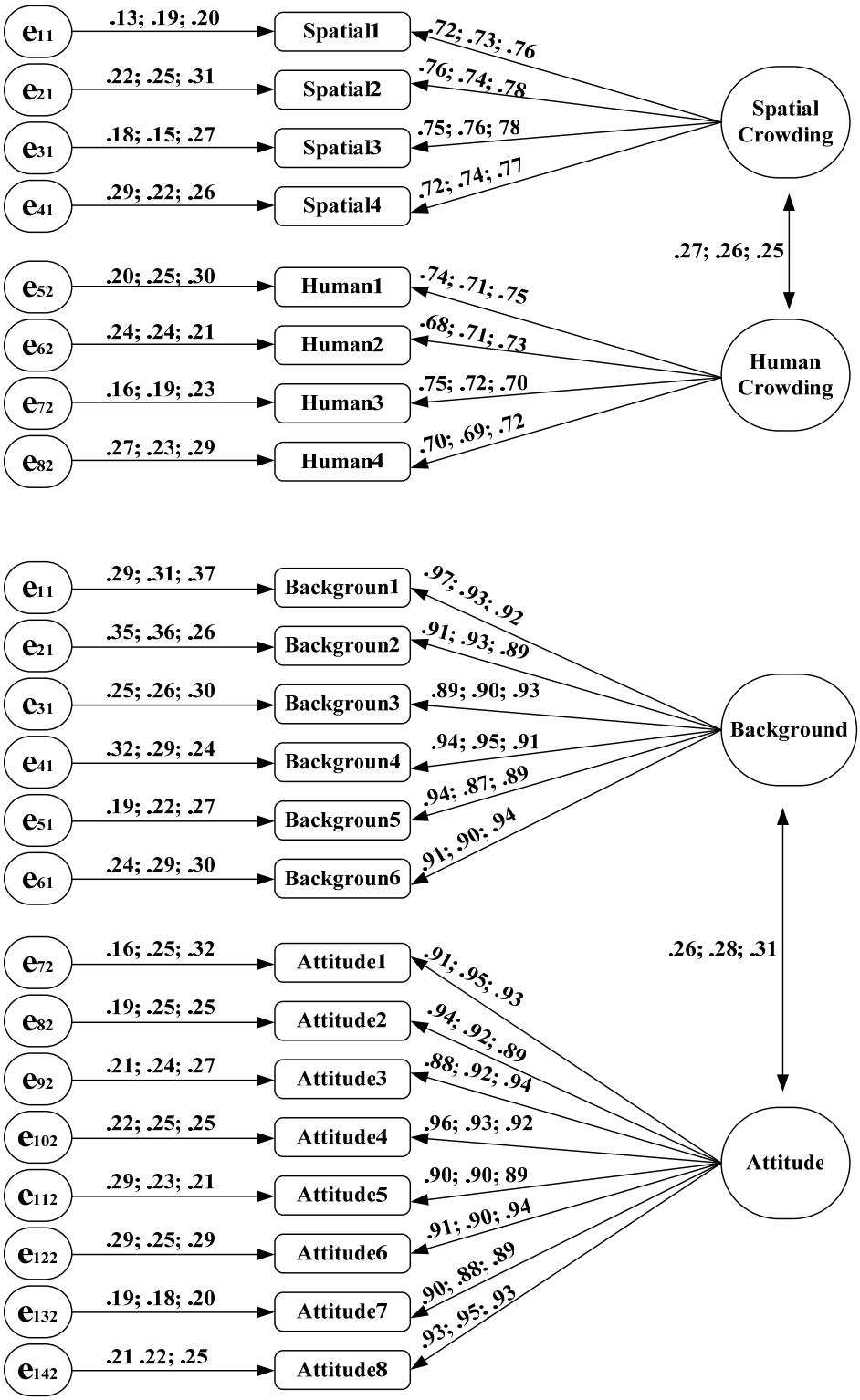
The 1st, 2nd, and 3rd estimate belongs to the self check-out, toy assembly, and meal assembly context, respectively.

FIGURE 4-3
CFA RESULTS – THE FIVE-FACTOR MODEL OF OCP



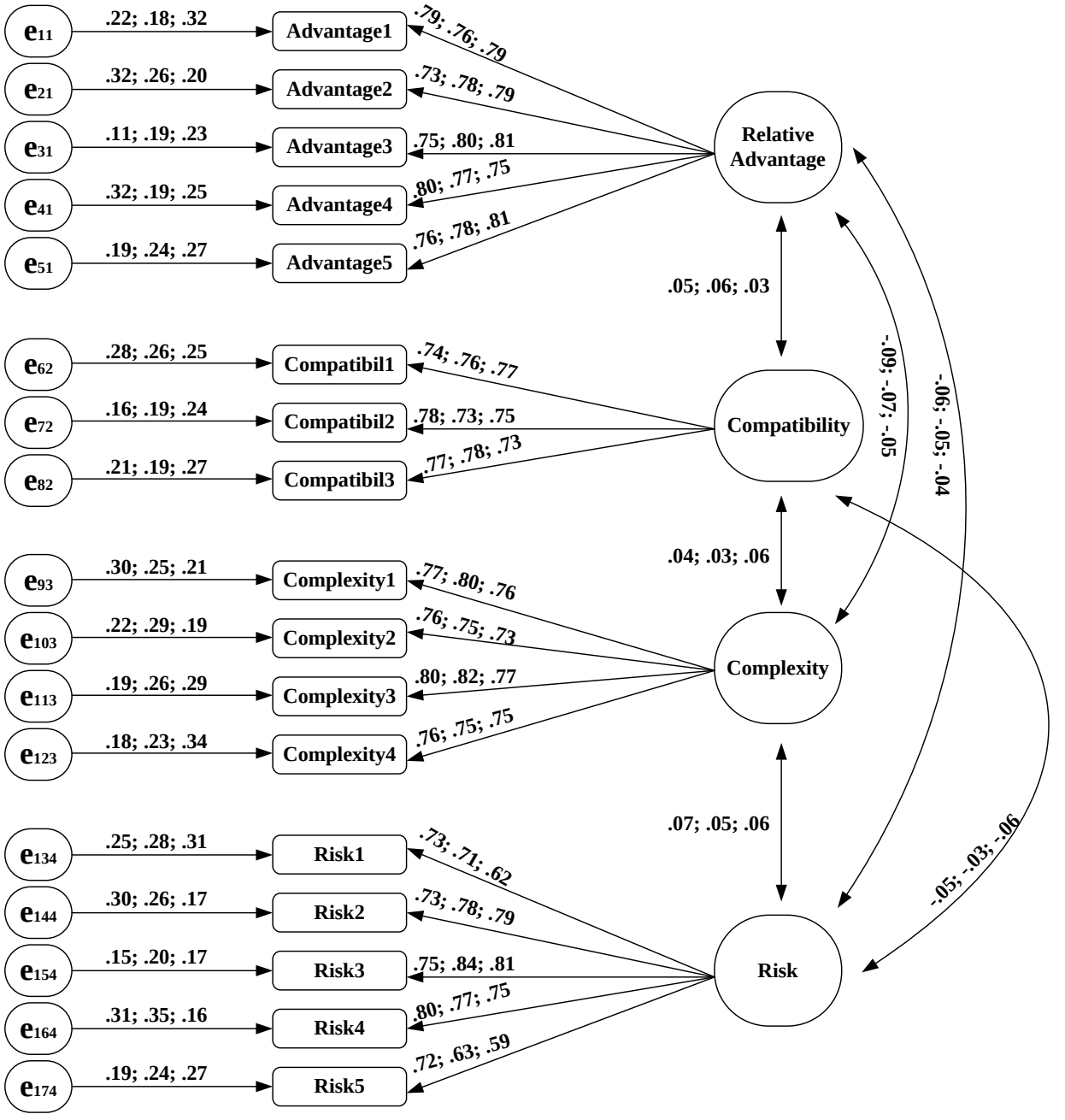
The 1st, 2nd, and 3rd estimate belongs to the self check-out, toy assembly, and meal assembly context, respectively.

FIGURE 4-4
CFA RESULTS – THE TWO-FACTOR MODELS OF CROWDING AND HOMOPHILY



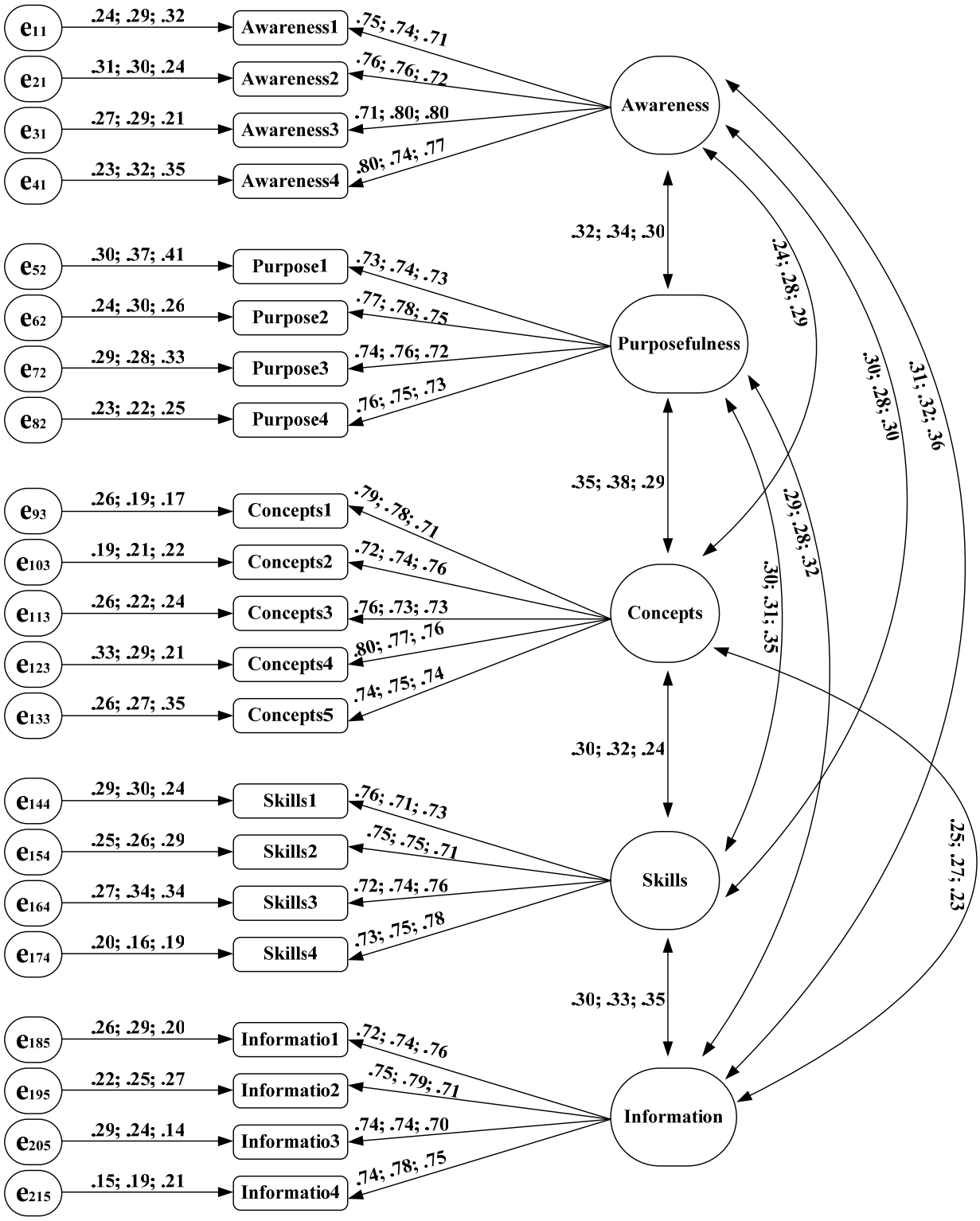
The 1st, 2nd, and 3rd estimate belongs to the self check-out, toy assembly, and meal assembly context, respectively.

FIGURE 4-5
CFA RESULTS – THE FOUR-FACTOR MODEL OF INNOVATION CHARACTERISTICS



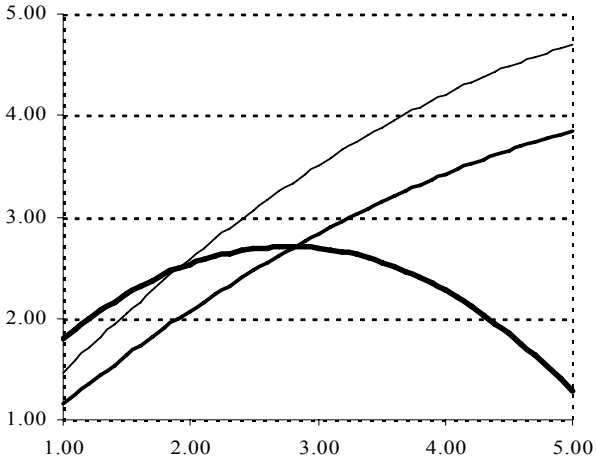
The 1st, 2nd, and 3rd estimate belongs to the self check-out, toy assembly, and meal assembly context, respectively.

FIGURE 4-6
CFA RESULTS – THE FIVE-FACTOR MODEL OF DTP



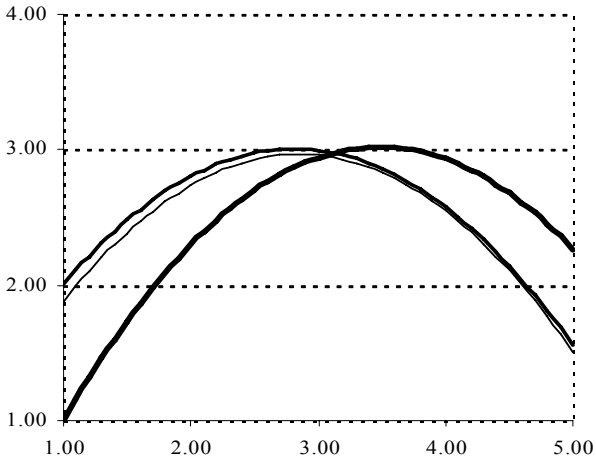
The 1st, 2nd, and 3rd estimate belongs to the self check-out, toy assembly, and meal assembly context, respectively.

FIGURE 4-7
CURVILINEAR RELATIONS OF COMPATIBILITY WITH CPS, CPO, OCP, CROWDING



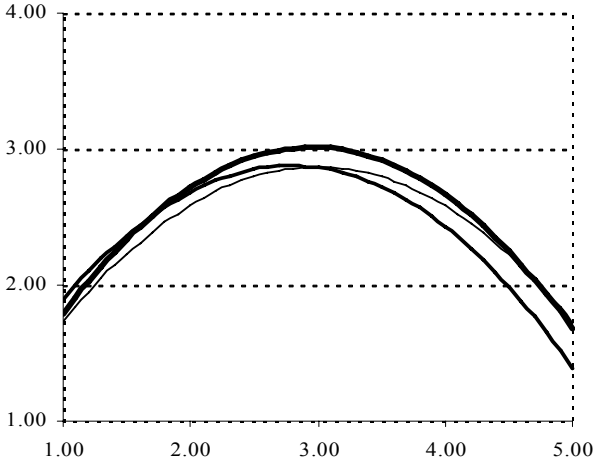
CPS

Self check-out: $\hat{Y}$ = .485 + 1.600 X - .288 X^2
Toy assembly: $\hat{Y}$ = .062 + 1.172 X - **.083** X^2
Meal assembly: $\hat{Y}$ = .132 + 1.438 X - **.105** X^2



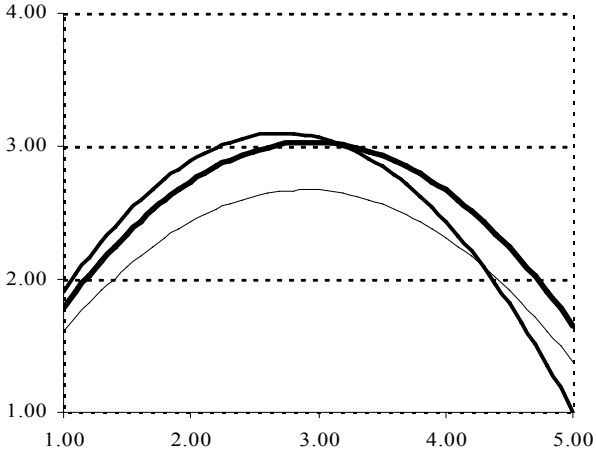
CPO

Self check-out: $\hat{Y}$ = -.950 + 2.278 X - .327 X^2
Toy assembly: $\hat{Y}$ = .599 + 1.711 X - .304 X^2
Meal assembly: $\hat{Y}$ = .391 + 1.804 X - .316 X^2



OCP

Self check-out: $\hat{Y}$ = .219 + 1.890 X - .319 X^2
Toy assembly: $\hat{Y}$ = .496 + 1.704 X - .305 X^2
Meal assembly: $\hat{Y}$ = .302 + 1.714 X - .276 X^2

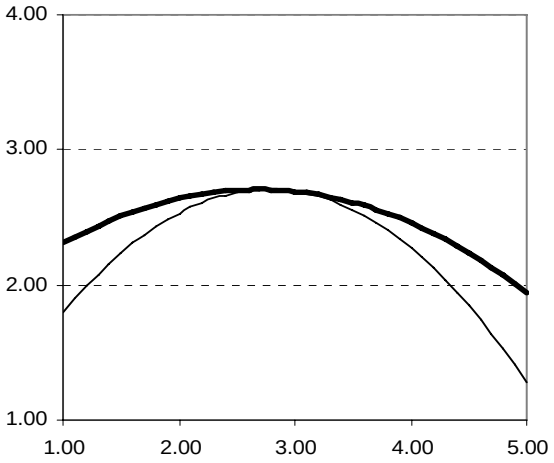


CROWDING

Self check-out: $\hat{Y}$ = .185 + 1.930 X - .327 X^2
Toy assembly: $\hat{Y}$ = .121 + 2.187 X - .402 X^2
Meal assembly: $\hat{Y}$ = .092 + 1.712 X - .295 X^2

Notes: 1. Dependent variable depicted on *Y*-axes is *compatibility*. 2. Self check-out, toy assembly, and meal assembly are respectively represented by the thick, medium, and thin lines. 3. The omnibus *F*-test in all of the 12 models was significant at $\alpha = .05$. 4. Except those of the CPS quadratic terms under toy assembly and meal assembly, all coefficients were significant at $\alpha < .05$.

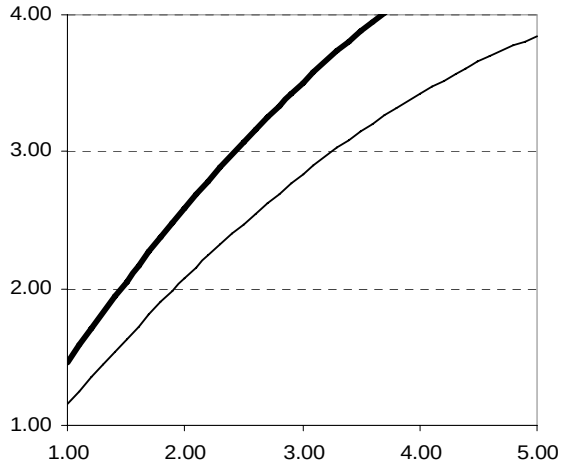
FIGURE 4-8
INDIVIDUATED CPS-COMPATIBILITY RELATIONS IN HIGH- AND LOW-DTP GROUPS



Self Check-Out

High DTP: $\hat{Y} = .318 + 1.525\ X - .178\ X^2$

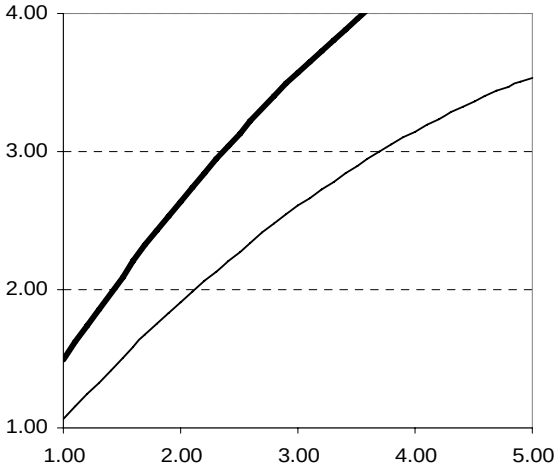
Low DTP: $\hat{Y} = .116 + 1.056\ X - .284\ X^2$



Toy Assembly

High DTP: $\hat{Y} = .188 + 1.817\ X - .019\ X^2$

Low DTP: $\hat{Y} = .149 + 1.132\ X - .014\ X^2$



Meal Assembly

High DTP: $\hat{Y} = .215 + 1.452\ X - .021\ X^2$

Low DTP: $\hat{Y} = .140 + 1.074\ X - .028\ X^2$

Notes: 1. Dependent variable depicted on Y-axes is compatibility. 2. High- and low-DTP groups are respectively represented by the thick and thin lines. 3. The omnibus F-test in all of the 6 models was significant at $\alpha = .05$. 4. The coefficients of all of the quadratic terms were significant at $\alpha < .05$.

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