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Technology-Based Self-Service: From Customer Productivity Toward Customer Value

İsmet Anıtsal
University of Tennessee - Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by İsmet Anıtsal entitled "Technology-Based Self-Service: From Customer Productivity Toward Customer Value." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

David W. Schumann, Major Professor

We have read this dissertation and recommend its acceptance:

Ann E. Fairhurst, Pratibha A. Dabholkar, Daniel J. Flint

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Daniel J. Flint

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Accepted for the Council:

Anne Mayhew

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Vice Chancellor and
Dean of Graduate Studies

(Original signatures are on file with official student records.)

TECHNOLOGY-BASED SELF-SERVICE: FROM CUSTOMER PRODUCTIVITY TOWARD CUSTOMER VALUE

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

İsmet Anıtsal
May 2005

DEDICATION

This dissertation is dedicated to my mother Necla Anıtsal, the memory of my father İ. Hakkı Anıtsal, my sister Dr. İnci Anıtsal, my wife M. Meral Anıtsal, my daughter Selin Anıtsal, my mother-in-law Saime Paşarel, the memory of my father-in-law Dr. Ahmet Paşarel and my sister-in-law H. Canan Paşarel for their continuous courage and sacrifices for my lifetime education.

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I am also indebted to my parents, Necla Anıtsal and İ. Hakkı Anıtsal, who instilled in me the value of learning and education since my early childhood. My parents and my sister, Dr. İnci Anıtsal, made every imaginable sacrifice since the beginning of my education at the primary school and encouraged me in reaching my life-long career objectives. I am also very fortunate to have the support of my wonderful wife, M. Meral Anıtsal, who gave me a joy of my life, Selin. Her constant encouragements for my career in the last 18 years allowed me to attempt and accomplish many challenging goals in both industry and academia.

I would also like to thank all other people, who supported me in different phases of the dissertation on

numerous matters. I especially thank to Dr. Ernest R. Cadotte for helping me in the scale development; Cheryl Handler for conducting some of the in-depth interviews; and particularly my Chinese student interviewer Ping "John" Song for supporting me with screening interviews.

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ABSTRACT

The purpose of this dissertation is to investigate the concept of customer productivity in a technology-based self-service context (e.g., self-checkouts in grocery stores) to understand how customer productivity and customer value are related to each other. A preliminary qualitative study initially explored the meaning of customer productivity and the labor provided by customers in self-service shopping and TBSS environments. Based on these exploratory insights and the extant literature, a conceptual framework was developed to identify the relationships between customer inputs into a TBSS option and customer outputs from that option influenced by customer perceptions of self-service technology (SST) and contact employee performance. Two adopter categories were employed for comparison purposes: enthusiastic adopters and reluctant adopters.

The quantitative study utilized a survey research design. After pre-testing the scale items with a large student sample, the latent variable structural equation model was tested by data collected from both enthusiastic

and reluctant adopters who were customers of a large national grocery chain.

There were 27 hypotheses in total. Besides testing the proposed hypotheses, the dissertation also investigated a total of seven potential relationships between the exploratory construct of emotional effort and the SST performance, contact employee performance, effort saving, time saving, quality of customer labor, quality of service and customer productivity.

This research regarding the customer productivity and its relationship to customer value has made important contributions to managers and researchers by filling gaps in the productivity, retailing and services marketing literatures.

It fills certain gaps in the literature by:

- introducing the new concept of customer productivity in services marketing area,
- providing an understanding the concept of customer productivity in a technology-based self-service environment,
- incorporating both quantity and quality dimensions into inputs by customer and outputs for customer in testing multiple links toward customer productivity,

- empirically testing a conceptual framework on customer productivity,
- predicting links based on the antecedents of customer productivity, retailer support (SST and contact employee) and the overall outcome,
- establishing the link between customer productivity and customer value,
- exploring the concept of emotional effort and introducing it as a viable construct in customer productivity,
- differentiating between enthusiastic and reluctant adopters of TBSS options in general and self-checkouts in particular.

This dissertation research also provides important implications for managers. It contributes to the existing practical business applications in terms of retail strategies and tactics as concerns customers usage of technology-based self-service by:

- presenting the emerging concept of customer productivity as a new source of competitive advantage,
- providing a unique way to create and deliver customer value based on the concept of customer productivity – the self-productivity as perceived by customer,

- differentiating between the input and output sides of the system for customer productivity to provide further tactical details that can be used in implementation phase of the crafted strategy,
- differentiating between quality of customer labor and quality of service, and suggesting that the significant link between them can potentially be used to develop a customer training program to accelerate the adoption of self-checkouts by reluctant adopters,
- underlining the importance of emotional effort as a viable concept that can be used as a competitive tool to increase perceived quality levels for both customer labor and service,
- providing ideas on how new generation SSTs can successfully be developed based on a number of consequences such as contact employee performance, quality of customer labor and emotional effort,
- differentiating between enthusiastic and reluctant adopters to understand what can potentially be done at strategic and tactical levels with regard to introducing, targeting and positioning self-checkout systems, other TBSS options and even technology-based business-to-business self-services.

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CHAPTER 1

INTRODUCTION

Certain demographic trends (e.g., rise in number of working woman and increase in single-person households) appear to strengthen American core values such as individualism, efficiency, effectiveness, convenience and practicality. Technological trends appear to be shaping customer values that are consistent with the emerging demographic trends (Schiffman and Kanuk 2000; Sheth and Mittal 2004; Solomon and Rabolt 2004). Consistent with these trends, there is an accelerating shift toward retailers utilizing more technology in their overall operations in general (Walley and Amin 1994), and more technology-based self-service (TBSS) options (e.g., self-checkout in retail stores) in their store activities in particular (Dabholkar 1994; Anitsal, Moon, and Anitsal 2002a). This has helped retailers become more efficient, and in some ways more effective, by improving customer throughput while reducing labor costs (Rodie and Kleine 2000; Dabholkar, Bobbitt, and Lee 2003). However, some customers may not be comfortable with this transition (Walker, Craig-Lees, Hecker, and Francis 2002; Xue and

Harker 2002) and retailers who move in this direction may actually hurt brand image and equity as well as employee and customer retention numbers. Therefore, retailers would benefit from knowing more about customers' perceptions of TBSS options within retail settings (Brady 2000). In particular, questions to be addressed might include where customers' perceptions of TBSS options fit into an overall perception of value, if customers value their own productivity, and how TBSS options (e.g., self-checkout systems in retail stores) supported by self-service technologies (SSTs) and contact employees impact the concept of customer productivity (Holbrook 1999; Anitsal and Fairhurst 2002; Anitsal and Flint 2003a). This research contributes to the existing body of knowledge by addressing an increasing number of calls for research on customer productivity (Gummesson 1998; Martin, Horne, and Schultz 1999; Parasuraman 2002).

Customers increasingly play an active role in service delivery and production, particularly in TBSS settings, and thus have an important impact on service productivity (Lovelock and Young 1979; Langeard, Bateson, Lovelock, and Eigler 1981; Xue and Harker 2002). Moreover, previous research has supported the notion that customers themselves

want to be productive (Holbrook 1999; Martin, Horne, and Chan 2001; Xue and Harker 2002; Anitsal and Flint 2003a; Sheth and Mittal 2004). This research investigates customer productivity in terms of customers' own perceptions of their inputs and outputs in service production and delivery. Major customer inputs include quality of customer participation as well as time and effort (besides money) spent by the customer. The major outputs include both service performance quantity and quality as perceived by customers. In assessing each one of these constructs, perceptions of customers will be the guiding measurement.

Retailers need to know how different customers react to TBSS options as well as how those service options impact customers' productivity. In general, if we can help retailers understand customers' perceptions of TBSS options and the effects of the perceptions on customer behavior, we can advise retailers on ways to not only help customers adopt TBSS options more willingly and quickly, but to enjoy doing so as well. Naturally, the success will be dependent upon how well the distinction between adopter and nonadopter customer categories of TBSS options is differentiated and addressed (Schumann 2003). As Walker et al (2002, p.92) state that,

> To determine the most efficient, effective and mutually acceptable use of technology in service delivery, the customer's perspective [of the service] needs to be known and understood.

Therefore, contrary to many existing studies either investigating customer productivity from a retailer's perspective or totally ignoring this important concept, this dissertation looks at customer productivity from a customer's perspective. We investigate the concept of customer productivity and its relation to customer value by developing and empirically testing a conceptual framework. Two identified segments ('enthusiastic adopters' and 'reluctant adopters') are considered (Schumann 2003).

Chapter 1 introduces technology-based self-service options, discusses customer productivity within a broader concept of productivity, and differentiates customer value from a customer productivity concept. It briefly introduces adoption of technology, reveals the gaps in the existing literature, and outlines the research objectives. Finally, contributions of the study and organization of the dissertation conclude the chapter.

Technology-Based Self-Service

Toward Technology-Based Self-Service

Historically, service providers have been oriented towards providing full-service. As the service sector evolved over time, self-service (e.g., stores with open displays) became the norm in many service industries. Today, technology-based self-service (TBSS) (e.g., automatic teller machines and self-checkout systems) is rapidly growing and eventually robots (technology-based full-service, TBFS) may be serving customers in the not too distant future (Pederson and Nysveen 2001; Anitsal, Moon, and Anitsal 2002b; Kephart and Greenwald 2002).

In the heyday of general stores, from 1865 to 1930, the storekeeper typically provided full-service to all customers (Harrison 2000). Indeed, those tasks included getting, "cutting, weighing, wrapping and tying" numerous food supplies, which were delivered to stores in "boxes, crates, kegs, buckets," "hogsheads," "cloth sacks," "containers, barrels" and "bins" (Harrison 2000, p.41 and 42).

The self-service concept was the cornerstone to the emergence of discount stores that eventually transformed the entire U.S. retail industry (Kotler 2000). In 1917, the founder of the Piggly Wiggly grocery store chain, Clarence Saunders, patented his notion of the 'self-service supermarket.' His goal was to eliminate the wasted manpower and space in traditional stores, where "customers had to ask staff behind a counter to hand over whatever was required from shelves behind them" (Dulken 2000, p.50). Consequently, by the 1930s, self-service in supermarkets had become widespread providing open displays for an easier shopping experience, one result being lower prices. Eventually, other store formats such as drug stores, variety stores and discount stores applied the self-service concept (McNair and May 1978).

Recently, there has been a clear movement from self-service to technology-based self-service (TBSS) (Business Week 1993; Dabholkar 1994; Meuter and Bitner 1998; Anitsal, Moon, and Anitsal 2002b). In this rapidly emerging, technologically oriented service concept, customers provide the service for themselves by utilizing technology with or without help from an employee of the service provider (Meuter, Ostrom, Roundtree, and Bitner 2000; Reda 2000;

Henderson 2001). Examples of TBSS options across different service industries include vending machines, automated teller machines (ATMs), electronic kiosks for baggage check in or a boarding pass at airports as well as for room check out at hotels, electronic blood pressure checking devices, automated car rental machines, touch free electronic car washers, automated telephone services, self-checkout systems at retail stores, electronic self-ordering systems at fast-food restaurants and service computers with internet connection at airports (Dabholkar 1994, 1996; Kotler 2000; Meuter, Ostrom, Roundtree, and Bitner 2000; Carlin 2002; Harler 2002; Wright 2002).

The transformation of service options from full-service toward technology-based service can be viewed in terms of the relationships between employee, customer and technology components (Figure 1). All interactions between these components are laid out from a customer's perspective, showing what a customer sees as s/he approaches to the service setting. The full-service option (A) includes customer-to-employee interaction, where a service employee waits on the customer. The joint production option (B) includes both the service employee

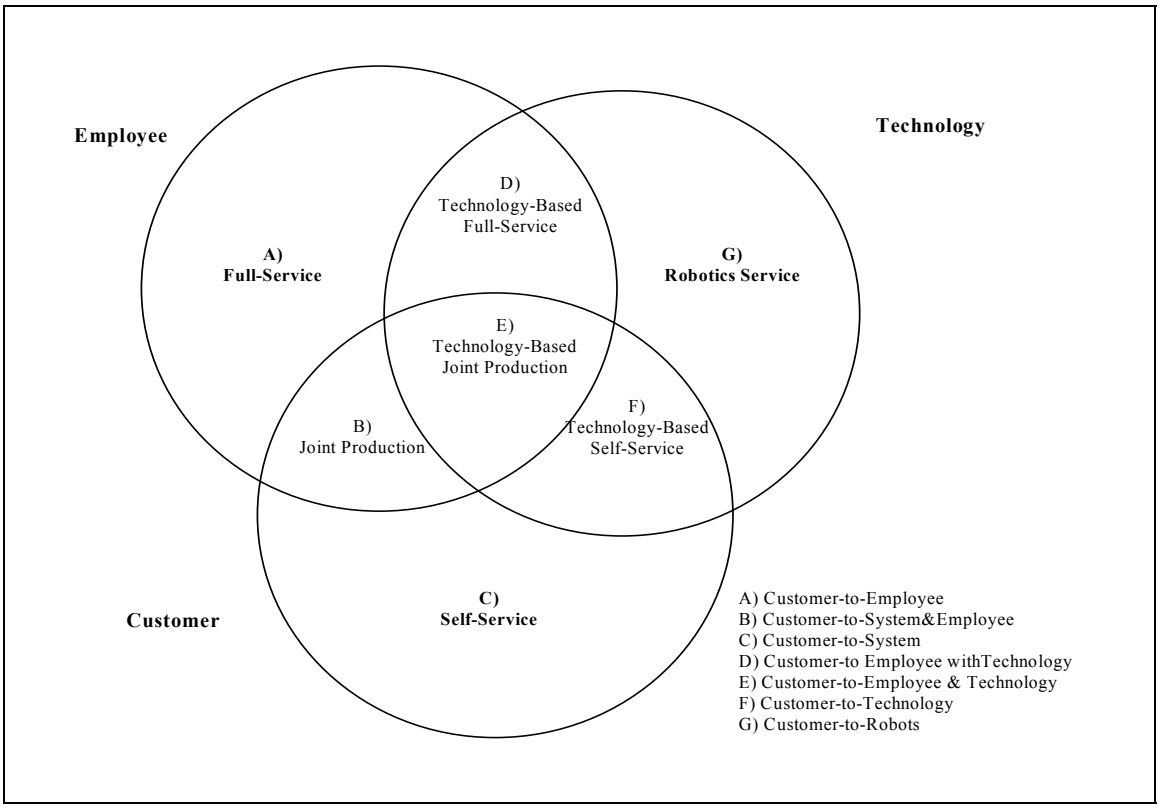

Figure 1: Service Options Transformation

(Anitsal, Moon, and Anitsal 2002b)

and the customer working together to produce and deliver the service within the service system, as defined by the service provider (i.e., customer serves herself in an open-buffet restaurant, while a waitress provides all requested drinks). The self-service option (C) reflects a customer responding to a service system in the absence of a service employee (i.e., customer shops at a self-service supermarket before checking out). The technology-based full-service option (D) includes a service employee fully serving a customer by utilizing full-service technologies (i.e., cashier uses scanning technology to scan all the items picked by customer at a traditional checkout lane). The technology-based joint production option (E) includes the customer interacting with a service employee and technology (i.e., checking out, the customer scans all the items herself in the presence of a contact employee). The technology-based self-service option (F) includes customer-to-technology interaction without any contact employee (i.e., customer scans all the items herself in the presence of a security camera only, or customer uses internet by herself) (Dabholkar 1994; Meuter and Bitner 1998; Anitsal, Moon, and Anitsal 2002a, 2002b). Finally, in the near future, the robotics service option (G) will likely include

human-like robots, humanoid robots, fully serving customers (Elkmann, Felsch, Sack, Bohme, Hortig, and Saenz 1999; Anitsal, Moon, and Anitsal 2002b; Kusuda 2002). In this sense, robotics service is similar to traditional technology-based full service, but without a human employee[1]. At this time, "no real business has yet materialized" by humanoid robots in regular consumer services (Kusuda 2002) with some exceptions. One exception may be Shopbots (e.g., mySimon.com and DealTime.com), software agent-based Internet services that provide easy information search with reduced search costs, and used presently to locate, elaborate on, and compare certain attributes across products and vendors (Pederson and Nysveen 2001; Kephart and Greenwald 2002). Another early-stage exception may be the trial of the world's first fully automated car refueling system, which is maneuvered by a robot, at 350 sites in Sweden (1997). Another important exception is Tokyo's Robo Shop Super 24, perhaps the first store in the world, which is staffed by robots in selling

[1] "Service robots are following the lead taken by industry robots. Wherever monotonous, dirty, or dangerous work must be done, service robots are being used more and more" (Elkmann, Felsch, Sack, Bohme, Hortig and Saenz 1999, p.460).

groceries and other consumer goods (Seiders, Berry, and Gresham 2000).

Importance of Technology in the Service Sector

The triangle model of services marketing highlights the three important dimensions of service as company, employees, and customer (Kotler 1994). The pyramid model of services marketing extends the triangle model by adding technology as the fourth critical dimension to reflect today's service environments (Parasuraman 1996, 2000; Colby and Parasuraman 2003).

Retailers, as an example within the service sector, employ either full-service technology (FST) to provide technology-based full-service (TBFS) options, or self-service technology (SST) to provide technology-based self-service (TBSS) options. This interaction between service and technology has been illustrated in Figure 2 (Anitsal, Moon, and Anitsal 2002a). Many retail companies initially used various technologies in their backstage activities (Walley and Amin 1994), which were invisible to customers, as a means to increase the efficiency of their internal

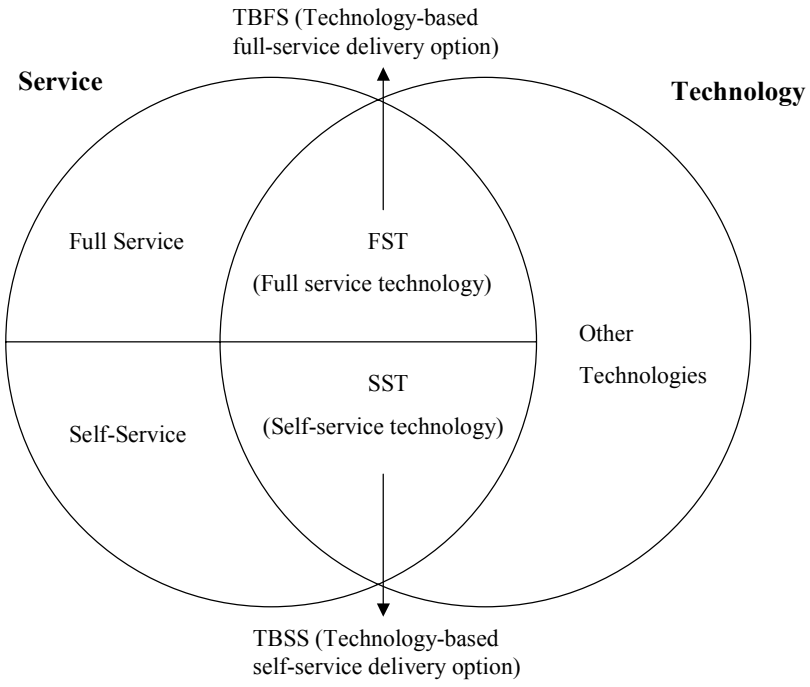

Figure 2: Service and Technology Interaction:
Technology-Based Services

(Anitsal, Moon, and Anitsal 2002a)

operations and relationships with their major suppliers. Some examples of those full-service technologies include computer-assisted call centers, data warehouses and CPFR (collaborative, planning, forecasting, and replenishment) systems as well as simple tools and equipment to move inventory. Later, retailers started frequently using FSTs in their front stage activities, visible to the customer, to increase their efficiency in serving customers. Some examples of frontstage (e.g., sales floor) FSTs, used by the retail employees to better help customers, include handheld inventory scanners, customer databases in pharmacy departments, cooking equipment in cafeterias, simple engraving or ear piercing tools, and telephones or pagers for the use of customer representatives at the customer service desk. Finally, as self-service technologies (SSTs) appeared, they were widely used in facilitating audience activities, which involved customers playing the role of actors rather than merely being a passive audience, at the frontstage of the service encounter (Grove and Fisk 1983; Johnson 2001; Anitsal, Moon, and Anitsal 2002a). Some examples of other technologies such as iris identification, speech recognition and speech synthesis (Johnson and

Coventry 2001), are now being tested and used as advanced SSTs.

Ultimately, customers will likely retain their increased expectations for self-service technologies as well as for traditional self-service and interpersonal full-service options.

> "The customer is changing faster than retail can keep up and retail is changing faster than its infrastructure can keep up. … As technology gets more sophisticated, the consumer's expectations go up exponentially" (Hopping 2000, p.63).

Indeed, "they still want service" (Bitner 2001), "it's service, service, service" (Sellers 1990). The question now is not whether to use technology, but how to use it appropriately. The issue is to determine relevant technologies that help enhance the customer's service experience (Cartin 2002), and the delivery of customer value (Gardial and Woodruff 2003), and in turn increase customer loyalty, retention, and profitability (Reda 2002). Despite the fact that self-serve gas stations are still banned in Oregon and New Jersey, self-serve gas sales, mostly from pay-at-the-pump gasoline stations, now hold an approximately ninety percent share of the market, up from

only one percent in the late 1960s and virtual zero percent in 1950s (Vandergrift and Bisti 2001; Witzel 2002). Indeed, it is expected that 15 percent of all traditional retail checkouts could become self-checkout lanes in the near future (Reda 2002), while it is predicted that 90 percent of grocery stores will have them in 2005 (Schatz 2003).

Despite the potential benefits provided to customers in terms of improved convenience, choice, and costs in the retail industry, many companies that did not adopt information technology, have disappeared from the marketplace, primarily because of the diminishing margins (Quinn and Baily 1994) and intensifying competitive pressures from the use of technology (Dubelaar, Bhargava, and Ferrarin 2002). Retail leaders in the use of information technology such as Wal-Mart, are among the most successful survivors, contributing approximately one-fourth of the economic productivity growth in the period from 1995 to 1999 (Quinn and Baily 1994; Johnson 2001).

Technology-Based Self-Service in Retailing

Technology-based self-service is a rapidly emerging service option in retailing. Self-service retailers are

growing two to three times faster than traditionally labor intensive department stores (Barlow 1997). Approximately half of 47 national retail companies currently use TBSS options to integrate their on-line and in-store activities (Reda 2000). What follows is a brief presentation of three examples of TBSS that are prevalent in today's retail services (banks are included as distributors of financial products).

Multimedia Kiosks

Retailers such as Wal-Mart, Target, K-Mart, Kroger and Bi-Lo among the big retailers have already adopted electronic kiosks. Both the number of consumers using these kiosks and their per capita purchases are continuously increasing. Indeed, the number is projected to increase from 3 million to 23 million over a five-year period from 2001 to 2006. During the same period of time, the per capita purchase is also projected to increase, from $57 to $289 (Henderson 2001).

The multimedia kiosk exemplifies a TBSS option from "which it is possible to inform, educate, train, persuade or perform information-based transactions" (Rowley 1995).

Consumers use this multimedia catalog (with touch screen using color graphics and sound) to view products with detailed product information, to see whether the product is in stock, to locate substitute products especially if the main product is out of stock, and even to order a product. Potential locations for kiosks include retail stores, shopping malls, coffee shops and non-store environments such as libraries, banks, airports and hotels. Woolworth's is using kiosks to offer thousands of CDs, videos and audiotapes to its customers, while Marks & Spencer is testing kiosks to offer dinner-party menus with suggestions for recipes, complementary wines, and in-store guides to locate relevant ingredients (Rowley 1995).

Vending Machines

Traditional vending machines as pioneer TBSS options have also been transformed into advanced interactive internet-equipped machines with swipe-card connections, providing a broadened range of products available through the convenience of simply using a credit card (McConnaughey 2000). Annual consumer spending has already reached $39 billion for the items bought from vending machines. The

number two soft drink maker, Pepsi, is planning to roll out credit card acceptance at its 1.2 million vending machines in U.S. and Canada (Howard 2001). Dial-A-Coke technology, where the charge for soft drink is reflected on the customer's cellular telephone bill, is being tested in Hong Kong with a 6.9 million-population, where shopping is a leisure pursuit for its residents of whom 75 percent own cellular phone (Kurtenbach 2001). Wireless, cashless vending convenience providing credit card, cell phone or debit card purchases, is projected to have increased sales by as much as 20 percent per machine (McConnaughey 2000; Howard 2001).

Vending machines were initially used to provide non-alcoholic beverages and basic food items such as chocolate bars and candies. But now, they provide a wide variety of items, including pre-paid telephone cards, tags, stickers, postage stamps, batteries, over-the-counter medicine, condoms, novelty items, strollers, films, one-time use cameras, CDs and video-cassettes, magazines, t-shirts, cigarettes, alcoholic drinks, a cup of hot coffee, fresh vegetables, pizza's as specified by the customer, and ready-to-eat pasta with a warm sauce (Walley and Amin 1994; McConnaughey 2000; Howard 2001).

There are 55 million vending machines in Japan (Emling 2001), which is home for one-fifth of the vending machines scattered all over the world (Kurtenbach 2001). Based on the love of vending machines in Japan, Sanyo has recently developed Auto Shop Vendor, a fully automated mini-convenience store with about 200 different products in its inventory (Emling 2001).

Automated Teller Machines

Banks introduced automated teller machines (ATMs) as cash dispensing machines in 1967 and 1969 in Britain and the United States, respectively. Soon after, ATMs with the capability of performing the same range of transactions as a human teller were developed. Later versions of ATMs were equipped with a telephone and staffed 24 hours a day (Lovelock and Young 1979; Wright 2002). ATMs generated $2.3 billion in user fees in 2001, but the number of transactions per machine dropped by half for the last five years. This intensified competition led to the latest generation of ATMs, which are wired to the Internet, offering a variety of services. Now, consumers can use ATMs to buy shares of stocks and DVDs, to purchase tickets for

concerts or a soccer match, to pay for insurance premiums and utility bills, to print cashier's checks and road maps, to give orders for flowers, to get discount coupons, to watch movie trailers, and to download games and MP3 tunes (Rawe 2002). Indeed, future ATMs based on new technologies for self-serve user interfaces such as iris identification, speech recognition and speech synthesis (Johnson and Coventry 2001) are expected to

> "recognize [the customer] by sight and voice, greet [the customer], know [the customer's] preferences from past interactions, and efficiently handle all of [the customer's] transactions" (Wright 2002, p.26).

Retailers, with long traditions of putting ATMs and mini bank branches into their stores, have now begun installing paycheck-cashing machines and coin machines. Kroger, for example, has installed RPM paycheck-cashing machines throughout its 84 stores in eastern Tennessee, southern Kentucky and northern Alabama. Consumers can use these machines to cash their payroll checks as well as government checks such as tax refunds, Social Security and federal assistance, but not personal checks (Brewer 2001). Coin machines (e.g., Coinstar machine), aiming an estimated $ 10.5 billion in consumers' loose change "hanging around

the house" or "lying in milk jugs," have also been installed in thousands of grocery stores since early 1990s (Slater 2002). After sorting and counting the coins, these machines issue receipts redeemable at the retailer's cash register for dollar bills in return of a service fee from the customer (Slater 2002).

TBSS Options Across In-Store Shopping Stages

Another way of categorizing TBSS options is through consideration of in-store shopping stages in brick-and-mortar stores, leaving out a number of off-store TBSS options such as telephone and Internet shopping. Retailers use different TBSS options at the four major stages of service activities at their stores: (1) store entry, (2) in-store shopping, (3) store exit, (4) pre-entry and post-exit (Anitsal, Moon, and Anitsal 2002b). First, store entry service activities are crucial to accommodate consumers with appropriate means of financing as they enter the store, before starting their shopping. Relevant TBSS options include the above-mentioned ATMs, paycheck-cashing machines, change machines, and coin machines.

Second, in-store shopping service activities include routine shopping activities and need to be supported by TBSS options for an efficient and effective shopping experience. VideOCart was a wireless system of LCD screens attached to the handlebars of the shopping carts to allow shoppers to locate the items they are looking for through the aisles and to see the much needed information for the currently promoted items. It was introduced in late 1980s, but failed in mid-1990s. Other relevant TBSS options of this stage of shopping include coin-operated self-serve photocopy machines; scales for fresh produce; in-store telephones to call a sales associate for customer assistance; self-scanning price look up points (price checkers); over-the-shelf automatic recipe and discount coupon dispensers; self-service candy and chocolate stations; coffee grinding machines; touch down electronic kiosks for tires, batteries or gift registry; photograph enlargement and production machines (stand-alone print kiosks); interactive electronic game demonstrations; music CD and movie VHS tape/DVD sampling machines; and electronic blood pressure checking devices. In Europe, self-scanning includes hand-held self-scanners used by pre-registered customers to scan items as they go through the aisles in

the store, and therefore is also a part of the in-store experience (Hennessy 1998; Kolonia 2003).

Third, store exit stage service activities are initiated when the customer is ready to check out. Relevant TBSS options in North America include self-scanning payment devices at the traditional check out registers operated by cashiers and the self-checkout systems.

Finally, pre-entry and post-exit stage service activities are important for warmly welcoming customers as they approach the store and providing a comfortable exit as they walk toward their cars in the designated parking lot. Relevant examples of this stage include postage stamp dispensers, coin-automated game machines for a kiddie-ride or a toy-catch up, mini-studio for self-photographing, and vending machines dispensing candies, soft drinks, personalized tags or stickers, and pay-at-the pump gasoline terminals operated by the retail store under its own name.

Retail Store Self-Checkout Systems

This dissertation will specifically focus on the self-checkout systems as an example of technology-based joint production options and technology-based self-service

options in the brick-and-mortar retail store environment. Certain earlier in-store inventions, provided for the benefit of consumers, eventually led to today's technology driven self-checkout systems. Indeed, it would have been quite difficult, if not impossible, to utilize self-checkout systems to the fullest extent without these former inventions that include the mechanical cash register in 1884, discount couponing in 1895, shopping carts in 1936, bar codes in 1952, automatic sliding entrance/exit doors in 1960 (investors.about.com 2002) as well as computers and other self-service technologies.

In today's typical self-checkout system, a customer

1) unloads the items from the shopping cart,
2) uses a color touch screen LCD panel to communicate with self-service technology,
3) scans a store card such as Kroger Plus shoppers card or Bi-Lo preferred customer bonus card,
4) scans each item's universal product code (UPC) with regular time intervals,
5) calls contact employee for help, if not - scans regularly or has an item scanned with an incorrect price,
6) enters price look up (PLU) numbers for all produce items,
7) calls contact employee for help, if not - figures out all correct PLU numbers by herself/himself,

8) bags the scanned items one by one as s/he goes through the process,

9) makes sure that every item on the shopping cart scanned,

10) scans all unexpired discount coupons and immediately puts them in the coupon collection bin with document sensor,

11) checks the total bill on screen,

12) earns redeemable points on the store card or an instant discount due to the store card,

13) selects a single payment type, or a combination of payment types, one at a time,

14) feeds coins and notes to coin-and-note acceptors,

15) gets the change from coin-and-note dispenser,

16) select the right option for debit, credit or gift card payments and immediately scans the card,

17) signs the credit card payment slip, or signs on the signature capture device, or completely skips this step if the purchase total is under a certain limit such as $50 dollars,

18) and gets self-service receipt and customized in-store discount coupons from the thermal printer (NCR 2000; NCR 2001; Anitsal, Moon, and Anitsal 2002a; Leigh 2002).

Self-checkout systems integrate numerous standalone SSTs provided for customers throughout the store. The self-checkout system is arguably the most comprehensive TBSS option currently used across the various shopping stages in

the store. This technology will be considered in light of the productivity associated with it as perceived by the customer.

Self-checkout systems, increasingly provided by large retail stores, including Wal-Mart Stores Inc., Kmart Corporation, The Home Depot Inc., The Kroger Co., The Great Atlantic & Pacific Tea Company (A&P), Food Lion LLC, Giant Eagle, Inc., Lowe's Food Stores, Inc., Pathmark Stores, Inc., Stop & Shop (Ahold USA, Inc.), Weis Markets, Inc. and Winn Dixie Stores, Inc. (Discount Store News 1998; Hennessy 1998; Hunt 1998; Grant 2001; Hannah 2001; Paul 2001; Rohland 2001; Chain Store Age 2002a; Bowden 2002; Chandler 2003; Dabholkar, Bobbitt, and Lee 2003; Schatz 2003), present a unique situation with regard to what was previously explained by Figure 1 in illustrating the transformation of service options. Indeed, self-checkout systems can be treated as either a technology-based joint production option or a technology-based self-service option, depending on the extent of required activity on the part of a contact employee.

When the customer does not need help from a contact employee, the service would be considered a technology-based self-service. In this case, the role of the contact

employee in monitoring the activities of a participating customer would be equivalent to the role of a security camera making that observation. When the contact employee pursues an active role to co-produce the service (e.g., with a novice participating customer), the service would be considered a technology-based joint production. In this case, the contact employee might help the novice customer in terms of providing initial training in the use of the SST, assisting with PLU (price look up) numbers for produce items, or demonstrating how to choose a specific payment alternative on the touch screen. Both the technology-based joint production options and the technology-based self-service options in brick-and-mortar retail stores will be examined within the domain of this dissertation.

Customer Productivity

Customer productivity can simply be defined in the following way:

> The ratio of the service output experienced by a customer to the inputs provided by that customer as a participant in service production (Parasuraman 2002, p.7).

Although the logic for this definition will be further elaborated in Chapter 2, within the scope of this study, we intend to establish and test the relationships between the components of customer productivity toward perceived customer productivity, rather than calculating a mere absolute number in a given situation.

Importance of Customer Productivity

Consider the following passage from Wrennal (2000, p.18 and 19):

> We are not able to answer your call at the moment, but your call is very important to us … Our agents are busy attending to other customers … Your call will be answered in the order in which it was received … You are now so important that your supplier has limited service to maximize their productivity or reduce their costs, but waste your time, and you have difficulty even talking to a real person.

Specifically, consider the following passage from Brady (2000, p.253):

> We're Sorry, All of Our Agents Are Busy with More Valuable Customers!
>
> Companies have become sophisticated about figuring out if you're worth pampering--or whether to just let the phone keep ringing. Here are some of their techniques:

CODING
Some companies grade customers based on how profitable their business is. They give each account a code with instructions to service staff on how to handle each category.

ROUTING
Based on the customer's code, call centers route customers to different queues. Big spenders are whisked to high-level problem solvers. Others may never speak to a live person at all.

TARGETING
Choice customers have fees waived and get other hidden discounts based on the value of their business. Less valuable customers may never even know the promotions exist.

SHARING
Companies sell data about your transaction history to outsiders. You can be slotted before you even walk in the door, since your buying potential has already been measured."

Companies differentiate between their customers based on the value of each customer to the business. They cut labor and tightly control other expenses in providing service to those less valuable and less fortunate customers, thus maximizing their profits at the expense of declining service quality (Xue and Harker 2002). According to Avila, "stupid companies use technology as a wall instead of as a bridge to their customers" (Horovitz 2003). Indeed, when Clarence Saunders patented his concept of 'self-service supermarket' in 1917, rather than to help

customers by letting them browse or save their own time, his goal was to create a more economical store for the owners by eliminating waste of manpower and space, (Dulken 2000).

In 2001, the number of cashiers in the U.S. totaled approximately 2.97 million people (Brunner 2002). It has been estimated that 2.23 million cashiers could potentially be eliminated if only one cashier was allocated as a contact employee monitoring four self-checkout lanes utilizing customers as implicit employees. However, such business practices may draw criticism in the media and public. Brady (2000) suggests that the result may be more efficiencies for the company, yet more frustration for certain customers. "Time saved for them is not time saved for [customers]" (Brady 2000).

> There are likely to be fundamental tradeoffs between "quantity" and "quality," especially when service by personnel plays a central role in customizing a firm's market offering to better meet customer needs (Anderson, Fornell, and Rust 1997, p.130).

However, in TBSS contexts, where standardization is relatively more important than customization compared to full-service options, productivity cannot be understood

without continuously considering its relation with quality as perceived by customers. Although service organizations, in a traditional manufacturing sense, can calculate and monitor their own productivity at different levels such as specific organizational units and profit centers, customers emerge as a crucial dimension of productivity in TBSS encounters. Customers can act, not only as consumers consuming the service, but also as active participants taking care of service production and delivery. They can influence the service organization's productivity at different levels through perceived service quality and their personal productivity, beyond their own customer productivity. Indeed, service productivity is ultimately evaluated externally by the customers, not internally by managers (Ojasalo 1999; Gronroos 2000). However, it is apparent that companies still have not found a way to reduce their costs without sacrificing service quality as perceived by customers. The answer may come from the idea of increasing customer efficiency (Xue and Harker 2002) and effectiveness in TBSS encounters. The customer can become an important contributor to better business productivity and enhanced perceived service quality in technology-based self-service environments, through active participation in

service production and delivery (Dabholkar 1990, 1991a; Gronroos and Ojasalo 2002).

Toward Customer Productivity

The customer's own productivity can be investigated from two different viewpoints: (1) the retailer's perspective and (2) the consumer's perspective.

First, many retailers historically like to treat their customers in traditional self-service and TBSS environments as a valuable resource (Walley and Amin 1994), co-producers (Wikstrom 1996), temporary participants (Kelley, Donnelly, and Skinner 1990), human resources (Bettencourt 1997), or partial employees (Dellande and Gilly 1998). Indeed, in an era of rising labor costs (Brady 2000), expanding number of part-time service employees and increasing employee turnovers (Bailey and Bernhardt 1997), retailers have had a tendency to put customers in the role of their quasi employees (Ford and Heaton 2001), when there is a potential to do so. In this way, productively participating customers can contribute to retailers' productivity by decreasing the labor costs, while potentially having an enhanced satisfaction and improved service quality (Dabholkar 1990;

Meuter and Bitner 1998; Rodie and Kleine 2000; Dabholkar, Bobbitt, and Lee 2003). Customer productivity from the retailer's perspective is relatively straightforward, since, to a certain extent, customers replace service employees.

Second, customers, as being involved in the productivity equation, can provide valuable insights to the retailers in creating and delivering superior customer value, and in turn increasing business performance. This comes in the form of different assumptions regarding the customer participation in service production and delivery, other than merely providing free labor to the retailer, or a simple convenience for the customer.

Overall American core values, demographic trends and technological trends as a consequence of changing demographics might help us better understand this second perspective, the consumer's perspective to customer productivity. These core values, among others, include individualism (e.g., self-reliance), efficiency (e.g., saving time and effort) and practicality (Schiffman and Kanuk 2000, 2004).

> When it comes to efficiency, [Americans] admire anything that saves time and effort. In terms of practicality, they generally are receptive to any new product that makes tasks easier and can help solve problems (Schiffman and Kanuk 2000, p.336).

There is an "extreme importance attached to *time*" (Schiffman and Kanuk 2000). "Americans place a great deal of importance … on the notion that time is money, on the importance of not wasting time, and on identifying 'more' time" (Schiffman and Kanuk 2000, p.336), despite the differences in various cultural environments (Levine 1997).

Recent demographic trends appear to strengthen American core values, especially values such as efficiency in shopping. Sheth and Mittal (2004) summarize changing demographics in terms of, rise in number of working women, increase in single-person households, and the decline of the middle class. The increase in the number of workingwomen has negatively affected the available time resource. As a result, there is a *time shortage* for shopping activities in general and a *time shift* for actual shopping time in particular. The increase in the number of single-person households has made people demand more *autonomy* in controlling their own lives, and *cocooning* by staying more at home rather than going out for shopping.

The decline of the middle class gave a rise in *customer militancy* - "vocal and physical protest if expectations are not met," given limited temporal and financial resources (Sheth and Mittal 2004, p.101).

Technological trends also shape customer values and are consistent with emerging demographic trends. New technologies enable customers to have more control over information, while automation of processes liberates customers to "buy anytime and anywhere" (Sheth and Mittal 2004). Technological advances enable customers to act as a service co-producer by engaging in "self-service, self-design, and self-ordering" as well as "self-ship, self-track and self-invoice shipping of time-sensitive documents" (Sheth and Mittal 2004, p.107). Technology further enables customers to cope with increasing time pressures by outsourcing their cooking, which was previously handled in the home, and merely defrosting, reheating, or microwaving precooked food.

> In sum, future customers, emboldened by what technology will make feasible, will demand hassle-free product information (e.g., advertising on demand), hassle-free product acquisition (e.g., home delivery), hassle-free consumption (e.g., self correcting smart products), and also hassle-free disposal. They will seek greater value in terms of … greater savings in

> time, effort, and money (Sheth and Mittal 2004, p.108).

The last part of the quotation from Sheth and Mittal (2004) underlines the importance of savings in the form of time, effort, and money. Berry, Seiders, and Grewal (2002) view saving time and/or effort as the benefits of convenience. Holbrook (1999), in his typology of consumer value, treats efficiency as one of the eight major types of consumer value. Anitsal and Flint (2003b) qualitatively explore the customer labor concept in consumer's retail shopping experiences, particularly in TBSS settings of brick-and-mortar retail stores. They also investigated the concept of customer productivity with multiple qualitative methods and indicate that shoppers "do think about their individual productivity in shopping environments" (2003a). The different, but interrelated concepts such as time, effort, money, convenience, efficiency, and customer labor can be combined under one umbrella concept - customer productivity, potentially leading customer value.

Based on the following quotation from Sheth and Mittal (2004), service organizations and retailers will likely understand that customer productivity is important not only from a retailer's perspective in general, but also from a

consumer's perspective, especially since the latter will likely affect the customer value creation and delivery efforts of the firm.

> Technological revolution in all spheres of life will undoubtedly unleash customer behavior that is more liberated as well as more demanding. As people start to change the way they work, communicate, and spend their leisure time, they will demand a change in the way companies do business with them. They will resent the high costs (both in time and effort) of acquiring the goods and services they seek and will shun marketers who can not meet their preference (Sheth and Mittal 2004, p.108).

Martin, Horne, and Schultz (1999) highlight the importance of customer productivity as a construct, and refer to the lack of research dealing with customer and client productivity. An exception to this would be hedonic service, where more effort and longer time can increase the value perception for the service (Berry, Seiders, and Grewal 2002). Anitsal and Flint (2003a) supported this exception by differentiating two intents of the shopping experience as window shopping and routine shopping.

The second perspective, the consumer's perspective of customer productivity, may actually provide a much better long-term positive impact on the firm's creation and

delivery of customer value, rather than narrowly focusing on the customer as a simple, physical replacement of existing service employees in retail stores. If that is the case, service organizations will likely manage their productivity by managing their customers' productivity, similar to how they manage their employees so as to increase employee productivity. Consequently, the issue becomes understanding customer productivity and its possible impact on customer value.

Customer Value

Importance of Customer Value

As business evolves, competition is getting more intense, especially in the over saturated U.S. retail industry. To date, retailers have mostly looked at their internal operations in terms of quality management, reengineering, downsizing, and restructuring for further improvements (Woodruff 1997). However, the competitive advantage in the future

> … will likely come from more outward orientation toward customers, as indicated by the many calls for

> organizations to compete on superior customer value delivery (Woodruff 1997, p.139).

Increased use of TBSS options such as self-checkout scanners in many retail stores is an indicator of an organizational desire for improved efficiency to achieve a competitive advantage. However, retailers may not be able to retain that advantage, unless they create value for the customer, for example, by increasing customer productivity. If enhanced customer productivity provides value for the customer, then a customer might start, and perhaps continue, using such TBSS options, more productively and at increasing usage rates. In return, retailers would likely have improved business performance (McNaughton, Osborne, and Imrie 2002).

The Relationship of Customer Productivity to Customer Value

The concept of perceived value has been explained in terms of a trade-off as "what I get for what I give up," as one of several meanings (Zeithaml 1988a). In this sense, customer value can be evaluated in terms of the benefits received and the costs sacrificed by the customer (Zeithaml 1988b; Monroe 1990, respectively):

Customer Value = Benefits - Sacrifices

Customer Value = Benefits / Sacrifices

Indeed, for an illustrative purpose in this introductory chapter, this trade-off can be stated as either "a ratio between what the customer gets and he gives," or "a difference between customer benefits and costs" (Kotler 2003, p.11 and p.253; Best 2004):

Customer Value = Customer Benefits / Customer Costs

Customer Value = Customer Benefits - Customer Costs

The productivity concept, in general, shows the relationship between the input resources and the outputs generated from those inputs utilized in a given system, and can be defined in the following manner (Sink 1985; Gronroos and Ojasalo 2002):

Productivity = Outputs / Inputs

When customer value and productivity are defined in a manner presented above, and those two equations are

directly compared, it initially seems that those two concepts are similar, or even identical. However, as it will be discussed in Chapter 2, customer value is related more to customer goals and purposes, not at the cultural level, but at an individual level. Customer productivity is measured specifically at the consequence level of a means-end hierarchy (Mentzer, Rutner, and Matsuno 1997; Woodruff 1997; Woodruff and Gardial 2001). Therefore, customer productivity can be viewed as a subset of the broader concept of the customer value, which is measured as overall value (Holbrook 1999). Customer productivity reflects efficiency and effectiveness (excellence) of a customer, and can be investigated as a potential antecedent to customer value, which is consistent with the following quotation.

> Often in building a research stream, constructs are first defined in terms of components. Later, as the literature develops, some of these components are viewed as antecedents to offer greater understanding of the phenomenon under study (Dabholkar, Shepherd, and Thorpe 2000, p. 139).

Adoption of Technology

Over the course of retailing history, there have been numerous successful innovations such as cash registers, shopping carts, automatic sliding doors, UPC (universal product code) scanners and electronic shelf labels (Burke 1999; investors.about.com 2002). Based on advances in technology such as computers, Internet, artificial intelligence, voice recognition and virtual reality, many different TBSS options have been introduced to the retail industry (Dabholkar 1994; Griffith and Krampf 1998; Burke 1999; Dabholkar, Bobbitt, and Lee 2003). All these specific innovations have potential effects, to varying degrees, both on retailers in their store formats and operations, and customers in their consumer behavior.

Innovations can be revolutionary (disruptive, pioneering, or breakthrough) or just evolutionary (sustaining, incremental, or spin-off) (Bates 1989; Christensen and Overdorf 2000; Christensen and Tedlow 2000). Revolutionary innovations are discontinuous and make consumers 'adopt new behavior patterns' (Schiffman and Kanuk 2000). The self-checkout system in retail grocery stores, for example, is one important innovation that

appears to be accelerating in its rate of adoption over the last two decades (McDonald 2002; Dabholkar, Bobbitt, and Lee 2003). However, *Viewtron* (jointly developed by Knight Ridder and AT&T as a videotext), *Checkout Channel* (developed by Time Warner as an interactive television with a network of five-inch monitors attached to checkout counters in grocery stores to broadcast CNN and its advertisements), and *VideOCart* (developed by Information Resources as computers with wireless system of LCD screens attached to the handlebars of shopping carts to show information for store aisles and promotion specials) were promising innovations in the beginning, but all failed after a maximum of four years from their introduction to market (Maruca 1999). Therefore, diffusion of innovations and particularly the adoption process within retailing have become important concerns.

A number of product characteristics seem to influence the consumer rate of adoption of new products, including relative advantage, perceived risk, compatibility, complexity, trialability and observability (Rogers 1995b; Sheth and Mittal 2004). Specifically, in our context of self-checkout systems, relative advantage shows the degree to which customers perceive self-checkout as superior to

traditional checkout in terms of convenience, control, and speed (Rogers 1995b; Dabholkar, Bobbitt, and Lee 2003). Perceived risk refers to the uncertainty attached to potential relative advantage; depending whether the advantage will build up and/or an unanticipated unfavorable outcome will occur (e.g., embarrassment of a failure to use self-checkout, or entering a PLU number that incorrectly matches an expensive produce item) (Sheth and Mittal 2004). Compatibility is the degree to which customers perceive that the self-checkout is consistent with their existing values in their consumption experiences (e.g., efficiency and excellence, or fun and enjoyment) and past experiences (e.g., use of personal computers and/or Internet) (Rogers 1995b; Dabholkar 1996; Holbrook 1999; Bobbitt and Dabholkar 2001). Complexity refers to the degree to which the self-checkout is difficult to understand and use (e.g., complexity of process or ease of use) (Rogers 1995b; Dabholkar, Bobbitt, and Lee 2003). Trialability is the degree to which a self-checkout can be tried on a limited basis (e.g., even just for purchasing one single, simple and cheap product such as a chewing gum) (Rogers 1995b). Observability refers to the degree to which a self-checkout has visible results, benefits and attributes. When positive

results can be described to potential customers (users), or customers can observe by themselves, they are likely to adopt self-checkouts and start using them on a regular basis in their shopping (Rogers 1995b).

The existing body of knowledge on consumers' response to innovations has generally followed two different research avenues (Barczak, Ellen, and Pilling 1997). The first path explored the factors causing consumers to adopt or reject innovations (e.g., Marr and Prendergast 1993). The second path employed a market segmentation approach, dividing customers based on demographics or usage (e.g., Woiceshyn 2000). The former is helpful in explaining usage reasons and the impact of these motivations on usage rates, while the latter, which is consistent with the scope of the current study, is useful in describing consumers as adopters and nonadopters (Barczak, Ellen, and Pilling 1997).

Once they recognize a particular need such as convenience, consumers are assumed to move through certain stages before making a decision for adoption or rejection. Stages in the adoption process include awareness, interest, evaluation, trial and adoption (or rejection) (Schiffman and Kanuk 2000). For the purpose of this research, an

enthusiastic adopter is a customer, who had been aware of self-checkout, tried it, used it, liked it, planned to use it again, started using it regularly for sometime, and eventually accepted self-checkouts for continued use. Reluctant adopter is a customer, who had been aware of self-checkouts, had used them up to three times, but did not like it or had mixed feelings, do plan to try it again or may try it again depending on situation and potentially may adopt it. Those two adopter categories (enthusiastic adopters and reluctant adopters) appear to be natural subcategories of adopters (Schumann 2003; Schumann and Fairhurst 2003).

A nonadopter is a customer, (1) who had not been aware of self-checkout, did not try it, and does not plan to try it, (2) who had been aware of self-checkout, did not try it, and does not plan to try it, (3) who had been aware of self-checkout, used at least once or two-three times, did not like it, and does not plan to try it again. Among the three major adoption categories, this study addresses customer productivity and its relation to customer value as it pertains to TBSS options in retail settings from enthusiastic adopters' and reluctant adopters' perspectives comparatively.

Gaps in the Existing Literature

The traditional productivity concept has been developed for manufacturers of physical goods. Measurement instruments are based on assumptions that consumption and production are separate processes and that customers do not participate in the production process. However, consumers do participate in the production and delivery of services, particularly in technology-based self-service environments.

The conceptual domain of productivity in services is not well developed, and naturally there is limited empirical research on service productivity (Filiatrault, Harvey, and Chebat 1996; Gronroos and Ojasalo 2002). Specifically, theoretical studies are needed to understand the antecedents and consequences of consumer performance. The real challenge here is on the operationalization of the conceptual frameworks (Bateson 2002). Although Singh (1999) has developed and empirically tested a model of performance productivity and quality of frontline employees and Gronroos and Ojasalo (2002) have recently proposed a service productivity model in an attempt to overcome this

deficiency, most of the service productivity literature is still normative (Filiatrault, Harvey, and Chebat 1996).

There are significant attempts to establish the content and measurement of the service-oriented productivity concept, apart from the manufacturing-oriented productivity concept (Vuorinen, Jarvinen, and Lehtinen 1998; Ojasalo 1999; Gronroos 2000; Gronroos and Ojasalo 2002). However, many existing conceptual and empirical studies claim to assess service productivity from the retailer's (service provider) viewpoint, and also base it on the manufacturing-oriented productivity concept (Brown and Dev 2000; Keh 2000; Dubelaar, Bhargava, and Ferrarin 2002). Further conceptual and empirical studies are needed to establish the role of perceived quality as an important element of service productivity (McLaughlin and Coffey 1990; Gummesson 1994, 1998; Gronroos and Ojasalo 2002), by paying attention to customer's perception of the service process and outcome.

There are an increasing number of calls for research to understand service productivity from the consumer's viewpoint (Martin, Horne, and Schultz 1999; Martin, Horne, and Chan 2001), and to better reflect the dual productivity perspective, which includes both the company's and

customer's perspectives (Parasuraman 2002). This new direction setting underlines one important potential shift in the literature by stimulating more exploratory research focusing on the customer's own productivity in a service setting. With a few exceptions such as client productivity in business-to-business consulting services, (Martin, Horne, and Chan 2001) and customer efficiency in e-services (Xue and Harker 2002), there is little research on customer productivity in services. To the best knowledge of the author, neither the effect of customer participation on TBSS productivity, nor the relationship between service employee participation and customer participation on labor productivity and customer productivity has been investigated and empirically tested. The relationship between 'core and facilitating supplementary' TBSS options and traditional 'enhancing supplementary' full-service options in brick-and-mortar retail stores has not been researched in this context either.

Finally, there are numerous studies on predictors of adoption of technology and descriptors of consumer groups in adopting a given technology within different contexts such as hospitals (e.g., bedside terminals) (Hebert and Benbasat 1994), retail banking (e.g., ATMs (Marr and

Prendergast 1993) or ATM cards and debit cards (Barczak, Ellen, and Pilling 1997)) and Internet (e.g., web retailing (Fenech and O'Cass 2001) or Internet as TBSS (Bobbitt and Dabholkar 2001)). However, existing studies do not address the nature of customers' perceptions of their productivity and its relation to customer value in TBSS settings in such a way to differentiate the adopters from those who are reluctant to adopt, for example, the use of retail self-checkout.

Research Objectives

The overall objective of this study is to investigate the concept of customer productivity in a TBSS context to understand how customer productivity and customer value are related to each other in a TBSS environment (e.g., self-checkout in brick-and-mortar retail stores). In order to realize this overriding objective, a conceptual framework is developed to identify the relationships between customer inputs (e.g., time and effort) into, and outputs (e.g., service performance and satisfaction) from (Parasuraman 2002), a TBSS option (e.g., self-checkout system), influenced by customer perceptions of self-service

technology (SST) and contact employee performances. Differences between enthusiastic adopters and reluctant adopters, regarding their perceptions of self-productivity and customer value, will also be investigated based on the research model. The model will be described in detail in Chapter 2.

Contributions of Study

This research regarding the customer productivity and its relationship to customer value, particularly in technology-based self-service environments, can make a significant contribution to managers and researchers.

Implications for Managers

Retail trade is the single largest service industry in the U.S. (Bailey and Bernhardt 1997) and employs more than 20 million people (National Retail Federation 2003). Indeed, nearly 3 million people work as cashiers in this industry (Brunner 2002) and it should be risky for retail managers to gain and sustain a competitive advantage in the long run by putting their customers in the shoes of those

cashiers as well as the roles of other retail employees as much as possible, without sufficiently motivating and especially compensating customers for their active participation in service production and delivery. Workers believe that productivity enhancement should cause aproximately an equal split of rewards between stakeholders; namely managers/shareholders, workers and customers. However, in reality, they perceive that managers/shareholders mostly have the rewards based on productivity savings (Savery 1996), not to mention the customers working as partial employees. It is apparent that there have been huge investments in information technology in the service sector (Stephen and Roach 1991) and the self-service technologies (e.g., self-checkout) in retail sector (Hennessy 1998; Heun 2001; Dabholkar, Bobbitt, and Lee 2003; Schatz 2003). Despite huge investments in the processes, systems and technology; when retailers choose not to compensate customers, acting as partial employees in service settings, who actually "demand and use this level of [TBSS] service" and "are proving themselves more honest and accurate than cashiers" (Hennessy 1998, p.86), TBSS options utilized as a core service or even a supplementary service may not help increase organizational productivity

and may also turn out to be perceived as a basic commodity. Then, competition is likely to focus on just one single factor: price.

Retailers can potentially combine TBSS options toward a new standalone retail format, leading a new form of retail institution (Anitsal, Moon, and Anitsal 2002b). Retailers can save costs, add value, and control quality in their service environments if they have transaction-efficient, value-efficient, and quality efficient customer bases, respectively (Xue and Harker 2002). But unless they understand the concept of customer productivity, it is going to be much more difficult, if not quite impossible in the long run, to survive by simply taking advantage of free labor of their customers. On the contrary, when retailers focus on mutual benefits of dual productivity, they will potentially be able to create and deliver superior customer value based on customer productivity. Understanding how customers perceive their own productivity in a TBSS setting will also help design better SST interfaces. Understanding the concept of customer productivity in one setting (e.g., TBSS environment of brick-and-mortar retail stores) will also help form an infrastructure for understanding customer productivity in other service industries, including

business-to-business services. Moreover, understanding differences between enthusiastic adopters and reluctant adopters with regard to customer productivity and customer value can help retailers to better interpret the impact of those differences on the adoption of TBSS options. Once they learn more about those potential differences, they can develop new TBSS options or redesign existing TBSS options, and in turn, reluctant adopters can be gained as regular adopters.

Implications for Researchers

This study regarding the customer productivity and its relationship with customer value can also make an important contribution to the existing body of knowledge in services marketing and retailing. It updates, synthesizes and integrates the existing literature on services marketing, retailing, service productivity, service quality, customer participation, and customer value to better understand customer productivity in TBSS encounters of brick-and-mortar retail stores and its relation to customer value. Therefore, it responds to the existing calls for research on service productivity. Specifically, this study assesses

service productivity from a customer's point of view by focusing on customer's own productivity. Indeed, it reflects the dual productivity perspective by attempting to establish the relationship between customer productivity and customer value. Based on preliminary exploratory qualitative research, this research develops a conceptual framework for customer productivity with appropriate scale items. It fills a gap in the literature by empirically testing a model on customer productivity and provides a tool for managers to understand customer productivity of their customers and potential differences between those customers who permanently adopt and reluctantly adopt TBSS options. This study also makes an important contribution by comparing productive and unproductive customers, who use TBSS options, in terms of their perception of customer productivity and its relation to customer value. When people value productivity and have a control over their productivity, there is a potential for them to become productive individuals in life, at home or work, and particularly in shopping. Indeed, to improve their business performance, retailers can potentially create customer value by increasing productivity of productive customers and making unproductive customers productive, if those

customers value their productivity. To make things easier, retailers can better design TBSS options and develop new service environments in their stores, so that customers can have higher levels of control over their productivity.

Organization of Dissertation

This dissertation consists of five chapters. Chapter 1 introduces the customer productivity concept within technology-based self-service context. The gaps in the existing body of knowledge are also posited. Chapter 2 provides a review of the literature and discusses the suggested model with all its constructs. Chapter 3 highlights the research methodology and the scientific view behind the study. It summarizes the specifics of the qualitative and quantitative tools utilized. Chapter 4 includes data analysis and results. Chapter 5 presents the conclusions and the directions for future research.

CHAPTER 2

MODEL DEVELOPMENT AND REVIEW OF LITERATURE

The research model posited to guide this dissertation is grounded in the existing body of knowledge in productivity, service quality, customer value and technology-based self-service (TBSS). In the first part of this chapter, a progressive understanding and conceptualization of customer productivity are based on the review of this extant literature. The proposed model contributes to the knowledge regarding customer productivity in TBSS environment by revising, integrating, adapting and extending components of the existing conceptual frameworks.

The proposed Model on Customer Productivity in TBSS Environment serves as a framework to review the extant literature. In the second part of this chapter, the theoretical basis for this dissertation research is provided. More specifically, the existing theoretical and empirical literature is discussed in developing precise construct definitions and their proposed relationships, as well as justifying logically precipitated hypotheses.

Technology-Based Self-Service

First, the type of the technology-based self-service (TBSS) options, employed in investigating customer productivity and customer value within the scope of this dissertation, requires clarification. A classification schema for services has been provided in Table 1 (Anitsal, Moon, and Anitsal 2002a). The schema combines the three dimensions of who ("delivers the service?"), where ("is the service delivered?") and how ("is the service delivered?") (Dabholkar 1994) as well as the service continuum of firm/ customer joint production (Meuter and Bitner 1998).

Among the twenty-four alternative service options given in total, example 13 in the second part of Table 1, represents 'customer-to-employee and technology' technology-based joint production option at a retailer's site with a direct contact, and has previously been elaborated by the step-by-step explanations under the section titled "Technology-Based Self-Service in Retailing" in chapter 1. Example 21 represents "customer-to-technology" technology-based self-service option at a retailer's site with a direct contact. Example13 is similar

Table 1: A Classification Schema for Services

(Anitsal, Moon, and Anitsal 2002a), which is adapted from Dabholkar (1994), and Meuter and Bitner (1998).

Service Question	**Service Delivery Options**																							
	Full-Service (Firm Production)								**Joint Production Continuum**								**Self-Service (Customer Production)**							
Who?	Customer-to-Employee (Interpersonal)				Customer-to-Employee with Technology (Technology-Based)				Customer-to-Employee (Interpersonal)				Customer-to-Employee and Technology (Technology-Based)				Customer-to-System (Personal)				Customer-to-Technology (Technology-Based)			
Where at?	Retailer's Site		Customer's Site		Retailer's Site		Customer's Site		Retailer's Site		Customer's Site		Retailer's Site		Customer's Site		Retailer's Site		Customer's Site		Retailer's Site		Customer's Site	
How?	D	ID	D	ID	D	ID	D	ID	D	ID	D	ID	D	ID	D	ID	D	ID	D	ID	D	ID	D	ID
Example #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

D: Direct contact or physical proximity between customer and employee (or technology / system).
Employee / system / technology is visible to customer. Hence, customer experiences greater sense of control.
Employee response is based on body language, words, and tone of voice of a customer.

ID: Indirect contact or physical distance between customer and employee (or technology / system).
Employee response is based on only words and tone of voice of a customer.

Table 1: (Cont'd)

Examples in Store and Non-store Retailing	
1. Salesman at the counter in a small delicatessen shop waits on a customer. 2. Customer calls meat department from an in-store telephone to give a special order, shops in store, and pick her order up later from the meat department. 3. Door-to-door salesman sells vacuum cleaner or pots and pans at customer's home. 4. Technician representing a computer store upgrades hardware and installs standard software into a PC at customer's home. 5. Cashier uses scanner technology at traditional store check out system to scan customer purchases. 6. Customer calls catalog operator from an in-store telephone to have her order punched in a computerized system. 7. Salesman with a laptop computer sells books and encyclopedias at customer's work place. 8. Customer calls to complain and operator records complaint on a computerized system. 9. Customer provides information for a store card with an extended line of credit, while retailer's representative interviews with customer for details. 10. Customer serves herself at an open-buffet restaurant, while employee serves drinks to customer. 11. Door-to-door salesman helps customer perform a live service demonstration (e.g., cleaning) at customer's home.	12. A fast-food restaurant organizes a kid's birthday party at customer's home in cooperation with the parents. 13. Customer scans her own purchases at a store self-check out system in the presence of a contact employee. 14. Customer uses an in-store automated system to punch in her order. 15. Customer uses a TV to shop at her home. 16. Customer calls an automated telephone system to learn store locations and hours, and asks a specific question to a live representative. 17. Customer visits traditional corporate library, finds item numbers for a catalog, reads annual reports of major retailers. 18. Customer serves herself at a salad bar, or shops at a self-service supermarket. 19. Customer does repairs based on what she learns from a do-it-yourself book or self-study course at home. 20. An experienced customer assembles newly bought furniture at home without using an instructions manual. 21. Customer scans her own purchases at a store self-check out system in the presence of a security camera. 22. Customer checks price of an item at price look up point (price checkers) in store. 23. Customer uses internet to track, purchase and listen to custom made music. 24. Customer calls an automated system from home to add credit to her store card.

to the example 21, except the latter does not require a contact employee, but a computer monitor for remote random security controls of customer activities. As previously discussed in detail in chapter 1, most of the current self-checkout systems at retail stores cover both of these technology-based service options and will be considered within the scope of this dissertation. From this point forward, those two service options will be referred as "technology-based self-service" since the contact employee has either no contribution at all or some contribution limited to only the supplementary service including exceptions, but not the core service.

Productivity

To better understand the impact of TBSS on the customer's own productivity, the dimension of interest in this dissertation, the systematic historical consideration of the productivity concept is an essential starting point. "Productivity is the true source of competitive advantage" (Drucker 1991), and has important consequences at every level of analysis. At the national level, productivity is crucial to stay competitive; to maintain a standard of

living; to shrink the trade deficit (Koretz 1989), to reduce inflation rate of outputs by offsetting increases in input prices; and to provide greater leisure time, consumption and conservation through decreased labor, increased capital and decreased natural resource inputs, respectively (Ojasalo 1999). At the industry level, productivity is vital for a progressive industry, while at the company level it is fundamental to stay profitable and even to survive in a competitive marketplace. Within the company level, productivity can further be analyzed for organizational units, profit centers, departments, processes, functions, teams and individual employees (Ojasalo 1999).

Defining Productivity

"No single meaning can be attached to the term 'productivity.' Definitions must vary according to the purposes to be served" (Cox 1948, p.433). Productivity is traditionally illustrated and defined in the following way:

> Productivity is simply the relationship between the outputs generated from a system and the inputs provided to create those outputs. Inputs in the general form of labor (human resources), capital

> (physical and financial assets), energy, materials, and data are brought into a system. These resources are transformed into outputs (good and services).
>
> Productivity is the relationship of the amount produced by a given system during a given period of time, and the quantity of resources consumed to create or produce those outputs over the same period of time (Sink 1985, p.3) (Figure 3).

Sink's (1985) productivity definition considers quantity, but not quality. Quality of the output is important and typically assumed to be at an acceptable level (Ojasalo 1999). Indeed, this definition of productivity can be simplified, with quality taken into consideration.

> Productivity is "the effective transformation of input resources into outputs, the quality of which is unchanged" (Gronroos and Ojasalo 2002, p.2).

The last definition of productivity is manufacturing-oriented, rather than being service-oriented. It has an assumption for constant quality, or identical quality that is impractical for services due to "the inherent variation in the quality of intangible output" (McLaughlin and Coffey 1990; Coates 1991; Nachum 1999a; Gronroos and Ojasalo 2002).

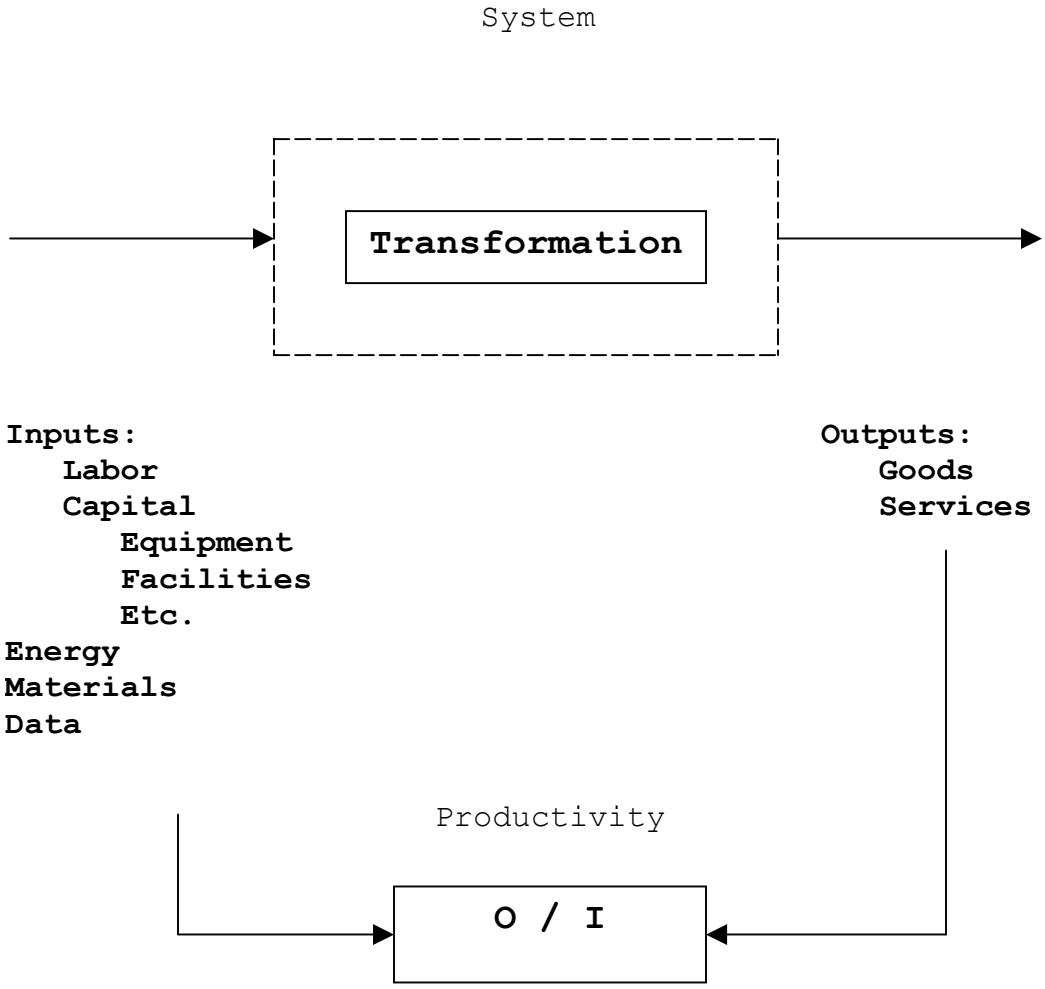

Figure 3: General Productivity Concept

(Sink 1985, p.3)

The manufacturing-oriented productivity concept is related to production efficiency (Gronroos and Ojasalo 2002), "doing things right" (Chase and Aquilano 1992; Sheth and Sisodia 2002), which focuses on 'the input side of the system' (Sink 1985).

> Efficiency is "the degree to which an activity generates a given quantity of outputs with a minimum consumption of inputs, or generates the largest possible outputs from a given quantity of inputs" (Vuorinen, Jarvinen, and Lehtinen 1998, p.379).

> Efficiency is "the degree to which the system utilizes the 'right' resources" (Ojasalo 1999, p.9),

Specifically for technolology-based self-service, in their discussion of service quality delivery through web sites, Zeithaml, Parasuraman and Malhothra (2002, p.366) define efficiency as follows:

> Efficiency refers to to the ability of the customers to get to the Web site, find their desired product and information assoiated with it, and check out with minimal effort.

Efficiency can be presented in the following formula (Sink 1985):

$$\text{Efficiency} = \frac{\text{Expected resource consumption}}{\text{Actual resource consumption}}$$

The service-oriented productivity concept is also related to effectiveness (Gronroos and Ojasalo 2002), "doing the right things" (Chase and Aquilano 1992; Sheth and Sisodia 2002), which focuses on 'the output side of the system' (Sink 1985). Indeed, perceived service quality is an inseparable part of the service-oriented productivity concept, and is not constant as it is in manufacturing (Lovelock and Wright 1999; Gronroos and Ojasalo 2002; Parasuraman 2002).

> Effectiveness indicates the ability to attain a goal . . . [by relating] the output to the goal(s) set for the operation (Vuorinen, Jarvinen, and Lehtinen 1998, p.379).

> Effectiveness is "the degree to which the 'right' outputs are accomplished" (Sink 1985),

which can be presented in the following formula (Ojasalo 1999):

$$\text{Effectiveness} = \frac{\text{Actual quality of outputs as perceived internally by management and externally by customers}}{\text{Expected quality of outputs, internally and externally}}$$

Both efficiency and effectiveness are important in service-oriented productivity, especially in order to have 'productive marketing' based on 'effective efficiency'. Sheth and Sisodia (2002) explained this relationship in the following manner:

> A firm should first strive to effectiveness, then seek efficiency in the achievement of that effectiveness. The effectiveness and efficiency dimensions of productivity are multiplicative; neither is enough by itself, and one cannot compensate for shortcomings in the other (Sheth and Sisodia 2002, p.351).

> Too often, however, companies either create satisfied customers at unacceptly high cost, or alienate customers . . . in their search for marketing efficiencies (Sheth and Sisodia 2002, p.352). (Table 2)

These components will be included in the dissertation and be dicussed in later sections.

Table 2: Marketing Efficiency and Effectiveness from Marketer's (or Retailer's) Viewpoint

(Sheth and Sisodia 2002)

Effectiveness	Efficiency: High	Efficiency: Low
High	Effective and Efficient "Effective Efficiency" "Productive Marketing" Satisfied customers Low marketing costs	Effective, but inefficient "Premium Marketing" Satisfied customers High marketing costs
Low	Efficient, but ineffective "Hit and Run Marketing" Alienated customers Low marketing costs	Inefficient and ineffective "Death-Wish Marketing" Alienated customers High marketing costs

Productivity Levels

It is important to understand and differentiate the productivity levels within the TBSS context, from a macro (general) to micro (specific) point of view, as it will help establish the scope of this dissertation. Productivity can be considered at different levels (Figure 4). At macro level, it can be viewed either at the national level or at the industry level (Ojasalo 1999). At the industry level, retailing is differentiated from manufacturing. Within retail industry, merchandising and service operations are two major branches. As suggested earlier, service options basically cover a continuum from pure full-service to joint production, and to pure self-service options. Joint production service options, having different points of emphasis on the levels on technology, employee and the customer, would be classified as services either with technology (technology-based) or without technology (interpersonal).

Technology-based services include both technology-based full-service (TBFS) options and technology-based self-service (TBSS) options. The applications of TBSS include virtual storefronts as well as physical (brick-and-

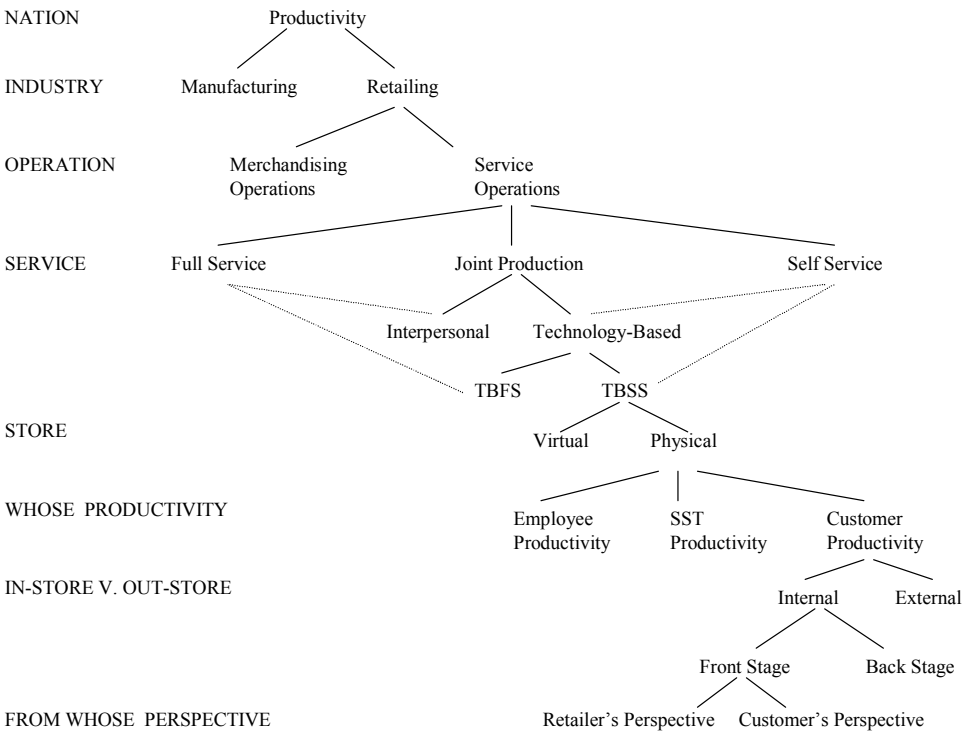

Figure 4: Funneling Down Process for Productivity

mortar) stores. Productivity at the physical store level can be investigated from different perspectives as well, including employee, customer and even self-service technology's (SST) viewpoints, besides an overall productivity measure for a specific TBSS option, a group of TBSS options, or all TBSS options existing in a given store(s) or retailer.

Customer's productivity can be treated as either internal or external (Martin, Horne, and Chan 2001). Internal customer productivity focuses on, for example, productivity while the customer is at the self-checkout system as a co-producer of the service. External customer productivity would be word-of-mouth communication in "the participation in the selling of the service to others" (Martin, Horne, and Chan 2001), when the customer is no longer at the self-checkout system of the store.

Internal treatment of customer productivity can be viewed either at the frontstage or backstage, which are the two important elements of the services theater framework besides actors (service workers as well as participating customers), an audience (customers) and a setting (service environments). Service actors perform (provide service) for the customers at the frontstage, heavily supported by the

backstage activities which are invisible to the audience (Grove and Fisk 1983; Grove, Fisk, and John 2000; Fisk, Grove, and John 2004). Similarly, customers have their own backstage (Martin, Horne, and Chan 2001), which is analogous to the service provider's backstage (Grove and Fisk 1983). Indeed, customers can have backstage players, for example, a determined spouse, hi-tech kids, trusted close friends, or other helping customers. Those people "implicitly or explicitly modify [customer's] service encounter behavior, their on-stage performance and productivity" (Martin, Horne, and Chan 2001). Backstage situations are beyond the scope of this study, since this dissertation only concentrates on the front stage of the customer to interpret the customer productivity. Finally, customer productivity can be analyzed from two perspectives: the retailer's perspective and customer's perspective. This dissertation investigates internal customer productivity at the frontstage from customer's perspective.

Service Productivity

Importance of Service Productivity

Services hold an approximate annual share of 60 percent in personal consumption expenditures (McGeveran 2002) and the service industry currently employs 82 percent of the overall workforce in the United States (Hilsenrath 2002), up from 70 percent in the 1980s (Quinn and Gagnon 1986) and 55 percent in the 1970s (Stephen and Roach 1991). The service sector owns more than 85 percent of the information technology installed in the US (Stephen and Roach 1991), and a $3 trillion investment in information technology was made in the service industry between 1984 and 1994 (Biema 1994). But still, lagging productivity gains for the service industry compared to manufacturing industry continued to be a major problem (i.e., diminishing profits, rising deficits, service cutbacks and quality of life in general) afflicting for-profit, public and non-profit service providers (Lovelock and Young 1979; 1994; Biema and Greenwald 1997). Indeed, Information Week (Heun 2001) reports that only 9 percent of the customer-services

departments, for example, make the largest productivity gains within the company.

Productivity is particularly important in the service and retailing sectors, which are more labor intensive than the other sectors of the economy. Indeed, improved overall labor productivity is very influential on pricing strategy, cost structure, and profitability in the service industry (Brown and Dev 2000), especially in developing countries (Saulan 2002). Drucker (1991) suggested that in developed countries, "the single greatest challenge facing managers ... is to raise the productivity of knowledge and service workers." Increased use of technology in consolidating the retail industry is an additional mandate on increased retail productivity (Reardon, Hasty, and Coe 1996; Dubelaar, Bhargava, and Ferrarin 2002).

Toward Service Productivity

Services require a broader interpretation of the productivity concept than manufacturing (Vuorinen, Jarvinen, and Lehtinen 1998). The manufacturing viewpoint treats productivity in terms of production efficiency (Gronroos and Ojasalo 2002) which was originally developed

for physical goods (Gronroos 2000), and separately considers quality as an internal measure under the term of effectiveness (Ojasalo 1999). The manufacturing-oriented productivity concept assumes that the production and consumption processes are separate processes; customers do not participate in the production process; inputs and outputs of the production system are homogeneous and easy to relate to one another; and perceived quality is an easy-to-measure constant and depends on the output only (Nachum 1999a; Gronroos 2000).

Services have some differentiating characteristics, when compared to physical products. Major service characteristics include: (1) intangibility, (2) perishability, (3) inseparability, and (4) variability (Zeithaml, Parasuraman, and Berry 1985; Lovelock and Wright 1999; Armstrong and Kotler 2000). Services are mostly intangible and generally cannot be counted, measured, tested, seen, felt, heard, smelled or tasted, before they are sold (obvious exceptions would include certain personal care services). Services are perishable and cannot be inventoried for a later use. Many services are also inseparable in terms of their production and consumption. "Quality in services is not engineered at the manufacturing

plant, then delivered intact to the consumer" (Zeithaml, Parasuraman, and Berry 1985), and therefore varies, unlike the manufacturing quality. Service quality depends on when, where, and how it is provided, as well as who provides the service (Armstrong and Kotler 2000).

The service-oriented productivity concept assumes that the service production system is an open system; where customers simultaneously participate to a certain extent in the system (Gronroos 2000; Parasuraman 2002). This concept further assumes that it is difficult to relate input and output amounts, since the heterogeneous and relatively intangible outputs do vary, depending on demand (Gronroos 2000).

Service organizations have often viewed productivity from an internal perspective, ignoring the external perspective based on the perceptions of customers on service quality as it relates to service productivity (Ojasalo 1999). Before discussing why quality should be treated as a part of service productivity concept, it is going to be useful to compare service-oriented and manufacturing-oriented productivity concepts.

As summarized in Table 3 (Gronroos 2000), there are major assumptions that differentiate service-oriented

Table 3: Service Productivity Dilemma

Adapted from (Gronroos 2000, p.208)

Assumptions	**Manufacturing-Oriented Productivity Concept**	**Service-Oriented Productivity Concept**
Production and consumption	Separate processes	Simultaneous process
Type of system	Closed system	Open system
Perceived quality	Dependent on outcome only	Dependent on both outcome and process
Customer participation	Customers do not participate in the production process.	Customers participate in the service production process.
Inputs and Outputs of the production system	Homogenous	Heterogeneous
	Easy to relate input and output amounts	Difficult to relate input and output amounts
Output	Mostly tangible	Relatively intangible
	Constant, separate from sales volume	Variable, dependent on demand
	Can be inventoried	Can not be inventoried
Quality	Easy to measure	Difficult to measure
	Constant	Relatively fluctuating

productivity concept from manufacturing-oriented productivity concept. In terms of production and consumption, there are separate processes in the closed system of manufacturing compared to simultaneous process in the open system of services. Indeed, in services, perceived quality is dependent not only on outcome, but also on process. While customers do not have a particular role in the manufacturing production process, they do actively participate in the service production system, particularly in TBSS environments. Heterogeneous inputs and outputs of the service production system are much more difficult to relate, compared to constant, mostly tangible outputs and easy to measure quality of homogenous manufacturing production system.

Defining Service Productivity

The interrelationship between quantity and quality dimensions of the service offering is inseparable (Gronroos 2000). These dimensions cannot be treated in isolation (Vuorinen, Jarvinen, and Lehtinen 1998) since they are just as the “two sides of the same coin” (Lovelock and Wright 1999). A broad interpretation of productivity is needed in

service operations to provide a joint impact of quantity and quality on the total productivity of service. On the contrary of Sink's (1985) definition of general productivity, the content of service productivity should also include quality inputs (such as tangible and intangible elements) and quality output (such as customer perceived quality) (Figure 5). Then, service productivity can be stated in the following ratio (Vuorinen, Jarvinen, and Lehtinen 1998):

$$\text{Service Productivity} = \frac{\text{Quantity of output and Quality of output}}{\text{Quantity of input and Quality of input}}$$

Efficiency and effectiveness should be thought of together in assessing productivity. Their optimum interrelationship at the high end of the spectrum, leads to 'effective efficiency' to satisfy customers at low marketing costs (Figure 5) (Sheth and Sisodia 2002). Gronroos and his colleague (Gronroos 2000; Gronroos and Ojasalo 2002) depict this interrelationship in terms of levels of efficiency. These two interrelated concepts can further be elaborated

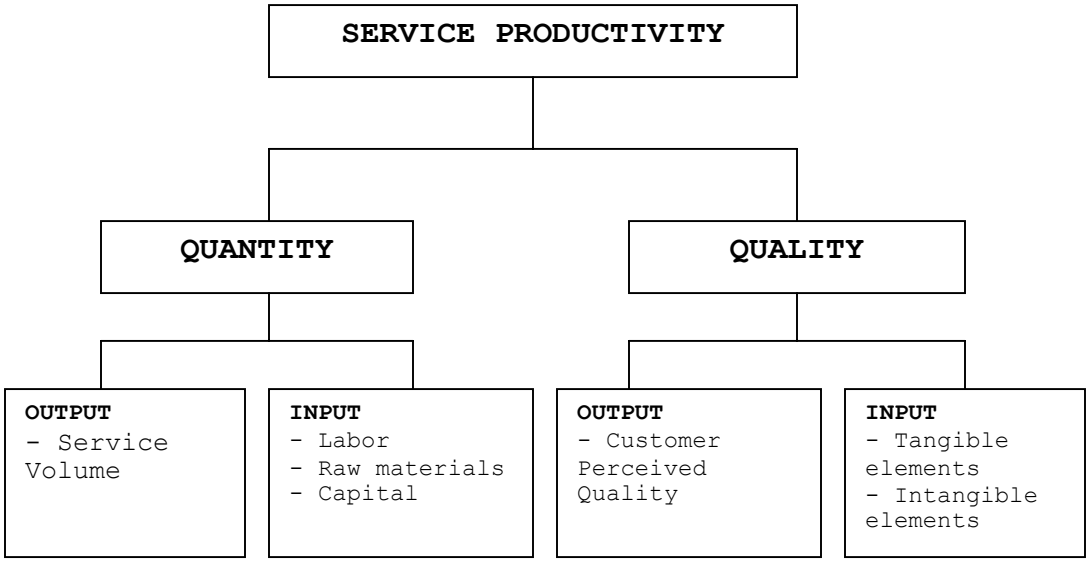

Figure 5: The Content of Service Productivity

(Vuorinen, Jarvinen, and Lehtinen 1998, p.383)

as follow. They take 'efficiency' as "internal efficiency", 'effectiveness' as "external efficiency", and add a new element, demand, and label it as "capacity efficiency." Internal efficiency is the traditional 'cost efficiency.' External efficiency is 'revenue efficiency' based on perceived service quality, having a potential for increased unit sales and revenues. Capacity efficiency is based on demand management, which is more important in services than physical products, since service providers cannot use inventory as a buffer between the excess amounts of supply and demand. Consequently, service productivity can be defined as a function of internal efficiency, external efficiency and capacity efficiency (Gronroos 2000; Gronroos and Ojasalo 2002):

Service productivity = f (internal efficiency, external efficiency, capacity efficiency)

Components of Service Productivity

Service productivity is dependent on both the service provider's and the customer's contributions (Gummesson 1998; Gronroos and Ojasalo 2002; Parasuraman 2002). In

'provider-induced productivity,' the service provider can provide part of the service work independent of the customer. Similarly, in 'customer-induced productivity,' the customer can participate in part of the service production and delivery independent of the service provider. An additional source for the emerging service productivity is 'interactive productivity,' where the service work is done by the interaction of the two parties (Figure 6) (Gummesson 1998).

Traditional measures of productivity only refer to provider-induced productivity. This internally oriented perspective does not consider the customer as a production factor, but treats them as a free utility (Gummesson 1998). However, the customer is becoming an important source in the production and delivery of services, especially in TBSS environments. Indeed, the customer's perspective along with the service providing company's perspective should be incorporated into service productivity models. Parasuraman (2002) suggests a conceptual framework for understanding the interplay between service quality and productivity (Figure 7). Although this model considers service quality as a separate construct rather than incorporating it into service productivity as one of its dimensions, it provides

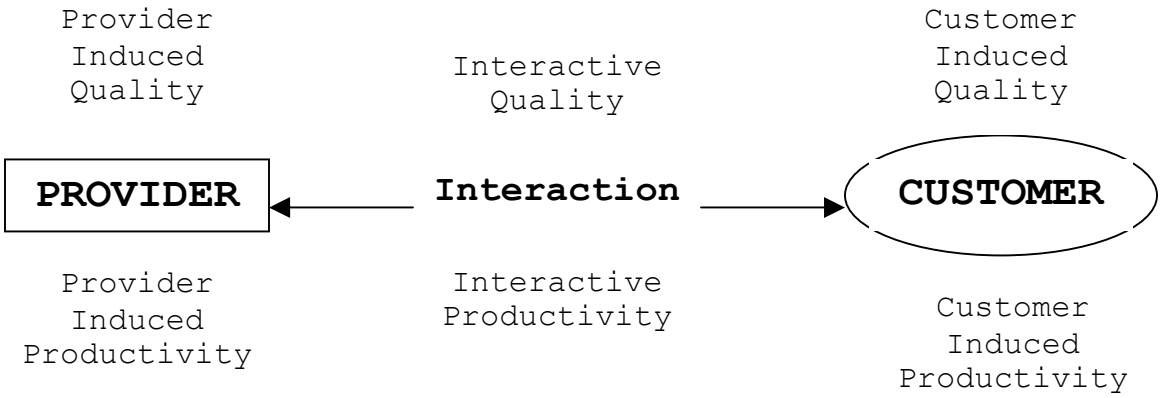

Figure 6: Service Productivity and Service Quality Induced by the Provider and the Customer as well as by the Interaction Between the Two

(Gummesson 1998, p.9)

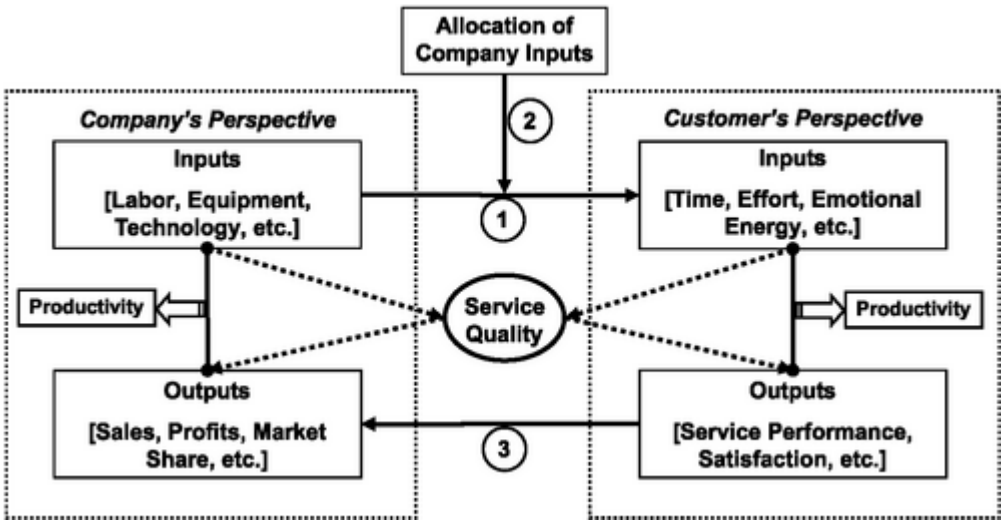

Figure 7: A Conceptual Framework for Understanding the Interplay Between Service Quality and Productivity

(Parasuraman 2002, p.8)

an essential infrastructure in differentiating, but also relating, company's and customer's perspectives for productivity based on completely separate but interrelated inputs and outputs (Parasuraman 2002). The dual company-customer perspective is important, particularly in a retailer-dominant world, because

> "The company and customer perspectives on productivity, when considered separately, are at odds with each other; improvement in one type of productivity is invariably accompanied by deterioration in the other" (Parasuraman 2002, p.7).

But still, before completely focusing on the dual productivity perspective, the concept of customer productivity has to be clearly investigated beyond the mere impact of the customer on service productivity from a retailer's perspective.

Parasuraman's (2002) model presents three basic relationships between the company and the customer. The relationship labeled "1" in Figure 7 depicts that the more inputs (e.g., labor, equipment, and technology) the company puts into service provision, the less inputs (e.g., time, effort and emotional energy) the customer will provide. Relationship "2" suggests that changes in allocation of

company inputs, besides the level of those inputs, influence changes in customer inputs. Specifically, unless the company appropriately allocates its increased inputs, the customer will not decrease her/his inputs proportionately. Relationship "3" highlights that outputs from a customer's perspective has a positive impact on the outputs from a company's perspective.

Dimensions of Service Productivity

Gronroos and Ojasalo (2002), supported by Ojasalo (1999) and Gronroos (2000), suggest a service productivity model integrating the dimensions of service productivity under internal, external and capacity efficiencies (Figure 8). The service process (the shaded box in the middle of the figure), from a productivity perspective, is consisted of three components: (1) service provider producing the service in isolation from customer, (2) service provider and customer producing the service in interaction, and (3) customer producing the service in isolation from the service provider, as all previously suggested by Gummesson (1998). Gronroos and Ojasalo's (2002) model also takes into consideration of what is suggested by Vuorinen, Jarvinen,

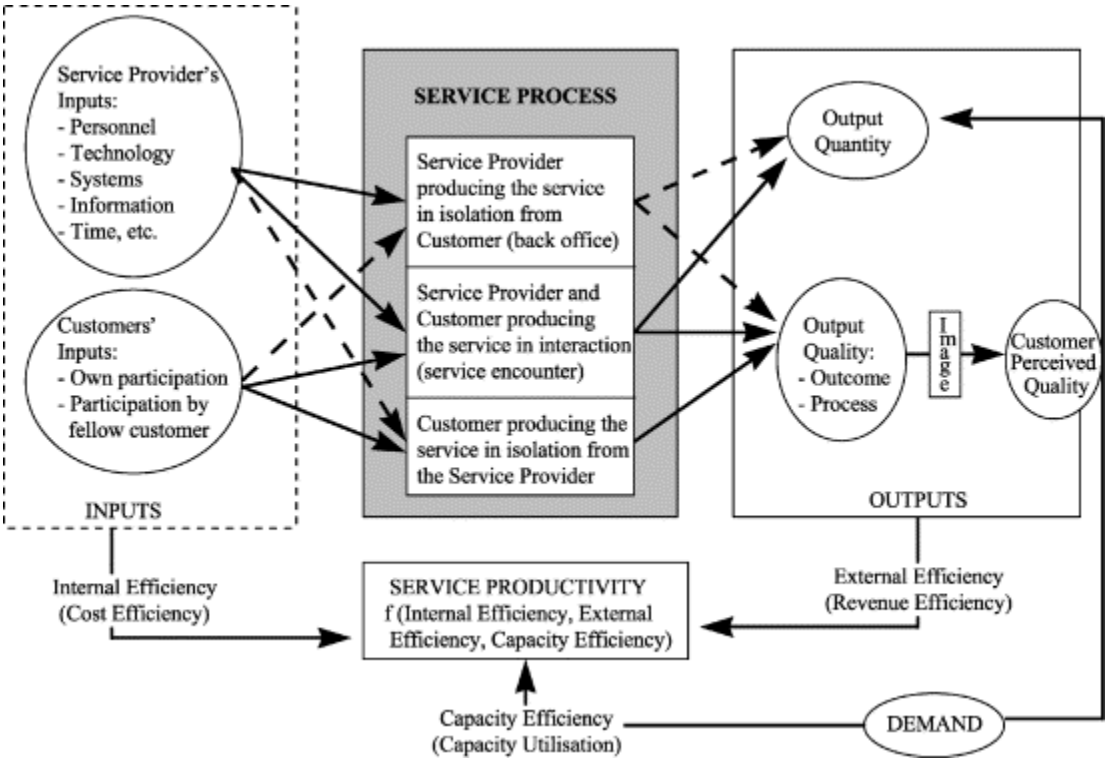

Figure 8: A Service Productivity Model

(Gronroos 2000, p.214; Gronroos and Ojasalo 2002, p.5), based on Ojasalo (1999, p.71 and 201)

and Lehtinen (1998) in terms of output quantity and output quality, but does not differentiate between input quantity and input quality. Still this service productivity model is a comprehensive conceptual framework outlining the three productivity dimensions in services: internal efficiency (cost efficiency), external efficiency (revenue efficiency) and capacity efficiency (capacity utilization). It treats productivity and quality not as separate concepts, on the contrary to Gummesson (1998), and further adds demand as capacity utilization for capacity efficiency. Demand is highly influential on productivity. Scheduled production in manufacturing plays an important role in productivity of the firm in contrast to consumer orders in services (McLaughlin and Coffey 1990). Low demand levels lead to underutilized resources of the service providing company, causing a reduced internal efficiency. When demand exceeds manageable levels with existing company resources, it will a have negative effect on service quality as perceived by the customer (Gronroos 2000).

Measurement of Service Productivity

The measures of productivity can generally be classified into two major categories: (1) parametric measures and (2) non-parametric measures (Keh 2000). Parametric estimation is needed when a production or cost function, the two sides of the same coin, is constructed and estimated statistically. Two estimates are used for this purpose; total factor productivity (TFP) and partial factor productivity (PFP). TFP and PFP can be defined as "the ratio of all outputs to all inputs" and "the ratio of all outputs to a single input," respectively (Reardon, Hasty, and Coe 1996). It assumes that "a production function accurately describes the maximum output attainable from a set of factor inputs" (Keh 2000). Cobb-Douglas production function is a common representation of TFP and measures the maximum attainable output from a given amount of all inputs such as labor, capital and managerial inputs (Brown and Dev 2000; Keh 2000). There are both advocates and critics of using TFP and PFP over one another (Keh 2000). Lusch and Moon (1984), for example, advocates the use of PFP. They note that labor is more flexible and

controllable than the other production inputs, and therefore should be managed better.

Non-parametric measures of productivity are based on index numbers, and can be constructed directly from data without estimating production or cost function. Data Envelopment Analysis (DEA), a non-parametric technique, has recently found greater applications in marketing (Keh 2000) and is helpful in benchmarking the most efficient organizations, or decision-making units (e.g., retail stores and bank branches) as a unit of analysis (McLaughlin and Coffey 1990; Winston and Albright 2001). This mathematical model measures "the relative efficiency, ['ratio of total weighted output to total weighted input'], of decision-making units with multiple inputs and outputs" (Adler, Friedman, and Sinuany-Stern 2002), without requiring a functional form between inputs and outputs (Nachum 1999a). Keh (2000, p.166) compares DEA with statistical regression:

> Instead of following the approach in statistical regressions, which use a single optimization to come as close as possible to all points, DEA makes *n* optimizations, and comes as close as possible to each of *n* observations.

The productivity concept simply is defined as "the ratio of a specific measure of output[s] to a specific measure of input[s]" (McEachern 2000). The important point at this stage is the selection of relevant inputs and outputs of productivity in specific contexts. The inputs that were used in the retailing literature, for example, include: (1) environmental conditions (such as industry technology level and per capita income), (2) customer factors (such as socioeconomic and demographic wants and needs), (3) retail firm's managerial efforts (such as total floor space, inventory investment, breadth of assortment, particular services offered, number of employees, overall wage rate, salaries and labor intensity), and (4) employee's personal factors (such as hours worked, education, training and motivation). Research has also investigated various productivity outputs, that can be categorized as (1) financial or economic outcomes (such as number of transactions, sales volume, profits, market share and gross margin) and (2) behavioral outcomes (such as service quality and customer store loyalty) (Donthu and Yoo 1998; Brown and Dev 2000; Keh 2000; Dubelaar, Bhargava, and Ferrarin 2002; Ratchford 2003).

The content of service productivity includes both the quantity and the quality of relevant outputs and inputs. The quantity and quality dimensions of the service productivity are interrelated and should be differentiated from each other for better understanding of the whole. The quantity dimension, for example, includes 'inputs' such as labor (e.g., amount of labor and overtime, and the service availability to customers in number of hours) and capital (e.g., information technology, telework facilities, self-checkout systems) as well as 'outputs' such as the number of customers, the number of transactions, service volume, assortment and market share. Similarly, the quality dimension of the service productivity, for example, includes 'inputs' such as tangibles (e.g., branch office locations and interiors) and intangibles (e.g., expertise and skills, teamwork, and corporate culture) as well as 'outputs' such as service quality (e.g., customer satisfaction, corporate image and access time) (Vuorinen, Jarvinen, and Lehtinen 1998).

A comprehensive measure of service productivity requires the following three conditions (Vuorinen, Jarvinen, and Lehtinen 1998, p.386):

(1) Both the quantity and quality aspects of service productivity must be operationalized;

(2) The operationalization must be implemented through a commensurable unit of measurement; and

(3) The possibility of cumulative effects has to be accounted for in the measurement effort.

Alternatives for productivity measurements can be classified into three major groups: physical measures, financial measures, and combined measures (Gronroos 2000; Gronroos and Ojasalo 2002). Physical measures (e.g., customers served/employee hours) could be misleading when they are used alone, since they do not include cost and revenue effects, and do ignore the variations in service quality and the influence of customer participation. Financial measures (e.g., revenues/labor costs) are hard to use due to the calculation difficulties of the service output, coming from the heterogeneity of production inputs, the customer participation, and price fluctuations. Potential problems with financial measures include possible misconceptions of price-quality relationships in government-subsidized businesses, monopolistic markets, and competitive situations pressuring price levels. Combination measures (e.g., revenues/number of employees) could also be

misleading by omitting either costs or revenues out of the equation. Gronroos and Ojasalo (2002, p.636) suggest that

> "Regardless of the problems involved, the only theoretically correct and practically relevant approach to measuring service productivity seems to be base productivity calculations on financial measures."

Therefore, the following way of measuring service productivity takes into account internal efficiency, external efficiency and capacity efficiency in terms of cost effects, revenue effects and cost-and-revenue effects, respectively (Gronroos and Ojasalo 2002).

$$\text{Service Productivity} = \frac{\text{Revenues from a given service}}{\text{Costs of producing this service}}$$

Customer Productivity

"Productive marketing" requires simultaneously being effective and efficient (Figure 4) (Sheth and Sisodia 2002). But a marketer's, or specifically a retailer's, perspective would be different from that of a customer's in

deploying existing resources as addressed in the following section. Indeed, retailer efficiencies can easily translate into customer inefficiencies (Seiders, Berry, and Gresham 2000). This difference is reflected in the following two quotes:

> Supermarkets commonly locate frequently purchased products . . . near the back of the store to encourage impulse buying . . . To save on labor costs, some retailers maintain minimal staffing levels, leaving customers to search or wait for store associates . . . Closed checkout lanes forcing customers to queue up in open lanes . . . (Seiders, Berry, and Gresham 2000).

> In recent years, [Food Lion / NCR] have introduced new technology to speed up the checkout and improve productivity without making the cashier work harder [just because the participating customer works much harder] (Amato-McCoy 2003).

Resource Deployment

Retailer and consumer perspectives on customer productivity can be reflected in the Friedman matrix (Friedman and Friedman 1990), mentioned in (Sheth and Sisodia 2002), evaluating resource deployment in terms of the spending options in different circumstances (Table 4). This two dimensional matrice basically shows the relative productivity of spending, based on whose money, or time, is

Table 4: The Friedman Matrix

Adapted from (Friedman and Friedman 1990), mentioned in (Sheth and Sisodia 2002)

(*Time has also been treated as money.)

		Whose money* is spent	
		Retailer's Money	Customer's Money
For whose benefit money is spent	Retailer	Effective and Efficient **1**	Effective, but inefficient **2**
	Customer	Efficient, but ineffective **3**	Inefficient and ineffective **4**

being spent for whose benefit (Friedman and Friedman 1990; Sheth and Sisodia 2002). In exemplifying the two perspectives, money has interchangeably been treated as time. It seems that relative productivity assessments for retailer and consumer are different, but should eventually be complementary.

The framework presented Table 4 suggests that the outcome becomes the most optimal when the party who owns resources spends them for her or his own purposes. This has been reflected in cell 1. Further elaboration of resource deployment from the two perspectives, retailer's and customer's, across four different cells are illustrated in Table 5 and Table 6.

Relative productivity from the retailer's (service providing company) viewpoint is illustrated in Table 5. For the most optimal results, in cell 1, retailer may decide to buy a budget affordable and corporate goal satisfying self-service technology (SST) for the self-checkouts in its stores. Relative productivity from customer's (customer is participating in the production and delivery of service) viewpoint is illustrated in Table 6. For the most optimal results, in cell 4, customer may decide to use self-checkout with SST in a retail store to have a control over

Table 5: Relative Productivity from Retailer's Viewpoint

Adapted from (Friedman and Friedman 1990)

(*Time has also been treated as money.)

		Whose money* is spent	
		Retailer's Money	Customer's Money
For whose benefit money is spent	Retailer	Retailer buys budget affordable and corporate goal satisfying ***self-service technology*** for its stores. **1**	Retailer installs an effective and completely ***automated call center with 1-800 number*** regardless how long customer waits in line. **2**
	Customer	Retailer provides ***store coupons*** at self-checkout to customers to get rid of its slow moving merchandise. **3**	Retailer continuously spends all the profits from its current customer base to diversify into a ***nonstore business***. **4**

Table 6: Relative Productivity from Customer's Viewpoint

Adapted from (Friedman and Friedman 1990)

(*Time has also been treated as money.)

		Whose money* is spent	
		Retailer's Money	Customer's Money
For whose benefit money is spent	Retailer	Customer helps ***fellow customers*** in the use of ***self-checkout*** with her criticism and negative word-of-mouth comparing competing stores. **1**	***Customer participates*** in self-service encounter without playing her role based on the service script. **2**
	Customer	Customer prefers using ***traditional checkout*** in order not to unload, scan and bag items by herself. **3**	Customer buys higher quality ***products*** always with lower sale prices, ***or*** uses ***self-checkout*** to have a control over the service process in a faster way. **4**

the service process in a faster way. However, although it ideally should do, the existing self-checkout system in a given store may not necessarily maximize the relative productivities of both the retailer and the customer.

To Be or Not To Be Productive

It is normally assumed in the modern world that people value their productivity in many situations (Holbrook 1999). However, in some small and remote villages, or towns, in a given underdeveloped country, this may not be true (Figure 9). This is also true for different use situations within similar contexts. Teenagers may go to a shopping mall just to hang around, kill sometime and socialize with their peer groups and friends in a relaxed, laid back environment. However, an elderly may go shopping malls for the sake of doing some physical exercise in an easy-going setting, while a businessperson may only aim to purchase some brand name products from conveniently located stores as soon as possible. Routine shopping and leisure shopping apparently make a big difference with regard to productivity preferences of the very same customer. Moreover, people, who value their own productivity, may not

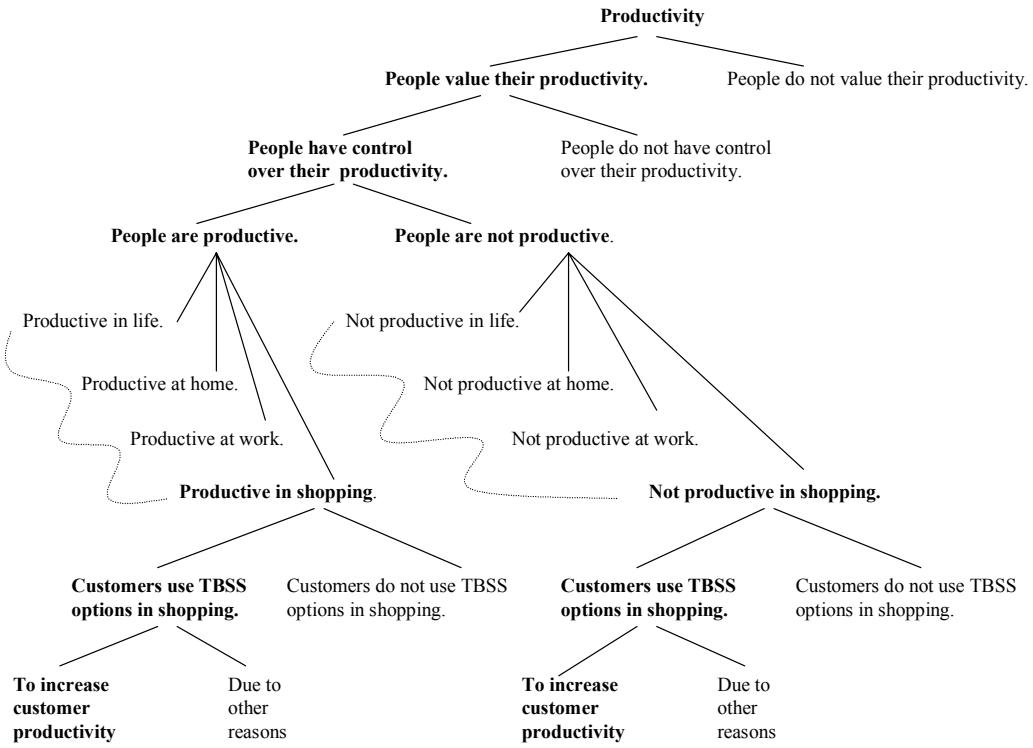

Figure 9: To Be or Not To Be Productive

have complete control over it in certain places in the world geography. This was especially true for shopping in centrally planned economies of former communist block countries, as clearly seen in different scenes of the movie called "Moscow on the Hudson," performed by Robin Willams. Consumers were not free to choose even the right size for a pair of shoes in some instances (Mazursky and Capetanos 1984). According to Gwertzman (1969), still consumers in Moscow used to spend 20 million hours in queues annually just to pay for their rents and utilities (Levine 1997). Although it may be wise to assume that the majority of the society in the United States value individual efficiency (Schiffman and Kanuk 2000), still we can not assume all people are productive. Specifically, housewives at home, working people at work, customers in shopping and eventually people in life may become productive, or some may not. Some of those productive and not so productive people, customers, may use TBSS options (e.g. self-checkout) regularly or occasionally in shopping, or some may not. Further, they may be using TBSS options just to increase their individualistic productivity as a customer in shopping, along with some other reasons. The goal of this research is to investigate customer productivity and

its relation to customer value based on the perceptions of productive and not so productive customers, who use TBSS options in brick-and-mortar retail stores.

Customer Productivity Essentials

Measures of productivity traditionally do not consider the customer as a production factor (Gummesson 1994). "Services have been named residuals, invisibles, and intangibles in statistics," and similarly, these internally oriented measures now treat customers as residuals and ignore them (Gummesson 1998, p.7). Therefore, 'cost obsessed' productivity measures traditionally only refer to 'provider productivity'(Gummesson 1994). "We must, however, also focus on 'customer productivity', i.e., the customers' contribution to productivity" (Gummesson 1994, p.88).

"In service production, the provider's input and output are measured as monetarized, the customer's are not" (Gummesson 1998, p.8). As discussed earlier, 'customer induced productivity' is important in investigating service productivity (Gummesson 1998), and customer's perspective has to be incorporated into service productivity models (Lovelock and Young 1979; Gummesson 1994, 1998; Ojasalo

1999; Gronroos 2000; Gronroos and Ojasalo 2002; Parasuraman 2002). Recent conceptual models of service productivity suggest a dual productivity perspective, combining company's and customer's perspectives (Gummesson 1998; Parasuraman 2002), but they deal with service quality as a separate construct. As highlighted in the following quote, this narrowly focused productivity concept considers the importance of quality in service productivity investigations, but still it does ignore quality as a part of service productivity.

> Service providers can't afford to separate productivity improvement from quality improvement. If the two issues are totally divorced, operations managers may launch productivity efforts that will degrade the service received by customers, and marketing managers may introduce service quality programs that complicate operations, raise costs, and hurt profits (Lovelock and Wright 1999, p.106).

Customers, as active participants in service production and delivery, play an important role in the emergence of service productivity (Gummesson 1998; Nachum 1999a; Xue and Harker 2002), particularly in TBSS environments, and service quality as perceived by customers should not be separated from productivity (Vuorinen, Jarvinen, and Lehtinen 1998; Ojasalo 1999; Gronroos 2000;

Gronroos and Ojasalo 2002). Vuorinen, Jarvinen, and Lehtinen (1998) incorporate customer perceived quality in their explanation of the content of service productivity for 'output quality,' but do not specifically highlight the impact of participating customers in realizing 'input quality.' Gronroos and his colleague Ojasalo (Ojasalo 1999; Gronroos 2000; Gronroos and Ojasalo 2002) suggest a service productivity model to fill this gap by including "customers' inputs" in the inputs side for internal efficiency (cost efficiency), beyond service quality in the outputs side for external efficiency (revenue efficiency) within the concept of service productivity. But still, all these models put customer into the model to better assess service productivity from a retailer's point of view, and do not pay attention to customer productivity from a customer's perspective, evaluated within customer's unique set of conditions. This research puts a magnifier on the customer productivity from a customer's perspective. Ultimately, future research studies can focus on service productivity from a customer's viewpoint, and compare it service productivity from a retailer's viewpoint.

Martin, Horne, and Chan (2001) illustrate client productivity by discussing its complexities within the

servuction systems model of the service experience (Eiglier and Langeard 1977; Langeard, Bateson, Lovelock, and Eigler 1981, p.15), exploring the multiple facets of the service encounter. As discussed earlier in the section titled 'Productivity Levels,' they suggest that customers participating in service production and delivery have their own backstage, and so do their fellow customers around them, for example, using a nearby self-checkout station (Figure 10). This is an extension similar to an organization's backstage, which is invisible to customers. All backstages are beyond the scope of this research, and assumed to be constant at a certain level. It is also assumed that the participating customer does not interact with other nearby fellow customers during service production and delivery. However, the customer within the scope of this research interacts with self-service technology (SST) regularly and a contact employee on a need basis, all forming an organization's on-stage performance vehicles. But these vehicles will be evaluated from customer's viewpoint of the customer's own productivity.

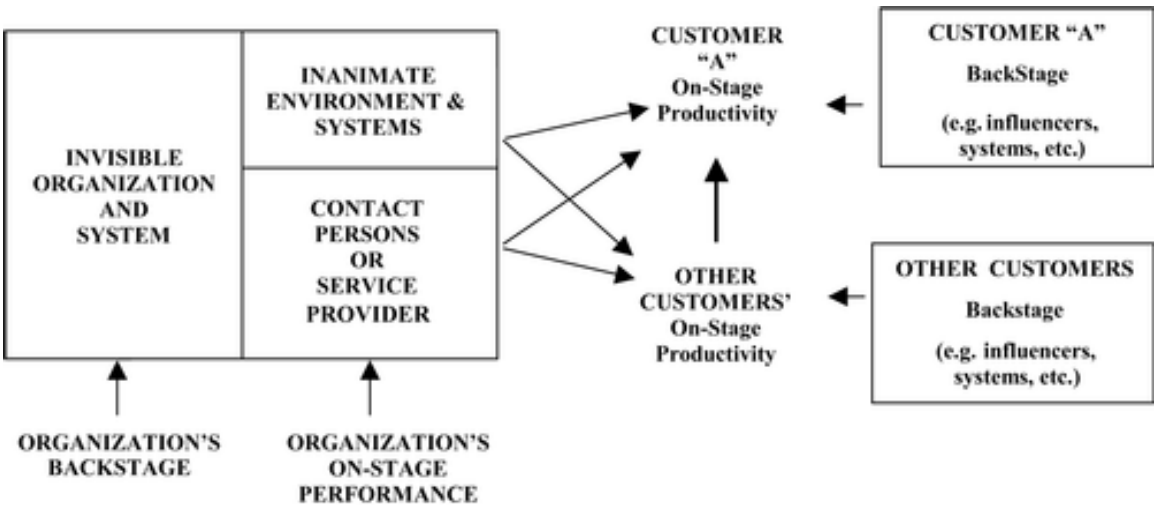

Figure 10: A Conceptual Framework for Understanding the Complexity of Client Productivity Based on the Servuction Concept

(Martin, Horne, and Chan 2001, p.141)

Understanding Customer Productivity

Organizations rely on customers more than ever to increase their organizational service productivity, especially through TBSS options provided. However, Martin, Horne, Chan (2001, p.140) suggest that co-productivity of clients are often not considered by service organizations, and "can cause a backstage productivity gain to actually result in a loss of client productivity." Indeed, we do not know if TBSS serves to help consumers be more productive themselves, or even if productivity is important in their shopping experiences at all. Retailers ideally like to improve their service productivity through the means that are valued by their customers as well. But before we can link organizational productivity to customer productivity in service environments, we need to know more about customer productivity from a customer's perspective in relation to TBSS options. What is customer productivity? Do customers care about their own productivity? If they care, do they think that their productivity is important in their shopping activities? How do customers treat their own productivity in TBSS environments? Will customer perceptions of their own productivity influence their

adoption of TBSS options? For this purpose, the next section considers definitions of customer productivity while the subsequent section summarizes the methodology and findings of an exploratory qualitative study investigating the phenomenon.

Defining Customer Productivity

Xue and Harker (2002) interchangeably use customer efficiency and productivity concepts, and define customer efficiency in the following way:

> Customer A is evaluated as more efficient than Customer B if Customer A consumes fewer inputs to produce at least the same amount of certain outputs as Customer B, or if Customer A produces more outputs using at most the same amount of certain inputs as Customer B (Xue and Harker 2002, p.256).

This general definition of customer efficiency can be further elaborated by three types of customer efficiency: transaction efficiency, value efficiency, and quality efficiency (Xue and Harker 2002). Transaction efficiency

refers to the number of transactions[2] accomplished as service outputs compared to mainly time as the service input. Value efficiency refers to "the value[3] per unit of cost that the customer creates through coproduction with the firm" (Xue and Harker 2002, p.256). Quality efficiency refers to "the quality of service associated with a firm's brand name that is actually in the control of its customers to a large extent" when customer plays a major role in the coproduction process (Xue and Harker 2002, p.256).

Based on their focus in a business-to-business service environment, Martin, Horne, and Chan (2001, p.142) define client productivity in a management consulting relationship in the following way:

> High "client productivity" can be regarded as timely, quality and value-added inputs (e.g., data diagnosis or critical decisions) made to consulting projects for transformation of such into achievement of preset common objectives.

[2] Such as informational transactions, customer service transactions, and purchase transactions (Xue and Harker 2002).

[3] Tangible value includes financial value that comes with the purchase. Intangible value includes intellectual assets created by customers, but owned by the service organization (Xue and Harker 2002).

This definition of customer productivity is more comprehensive than Ingene's (1982) definition (customer productivity is value-added by the customer in the co-producer role), and also explicitly cover the quality aspect when compared to Xue and Harker's (2002) definition.

Parasuraman (2002) defines customer productivity from a customer's perspective as,

> The ratio of the service output experienced by a customer to the inputs provided by that customer as a participant in service production (Parasuraman 2002, p.7).

This last definition[4] can best serve our purposes in the current research in highlighting the general boundary of the customer productivity concept in a simple way, although our intent is not to quantitatively calculate customer productivity, but based on its parts (dimensions) as antecedent constructs, to investigate its possible relationship to customer value concept.

Customers perform as they are expected, when they understand their roles in the service delivery. Their motivation and ability to perform will complement their

[4] Parasuraman (2002) suggests that this definition suffers in the context of service productivity when service organizations focus only on customer's perspective ignoring dual productivity perspective, which is irrelevant here.

understanding (Bowen 1986). Service providers can orient customers into their new roles as partial employees; motivate them by using employee motivation models; and train them by utilizing formal socialization programs, providing organizational literature, environmental clues and reinforcement, and letting them observe other customers (Bowen 1986). Both service providers and customers expect to have value out of increased customer participation in service production and delivery.

To increase customer productivity, service organizations can use a number of productivity improvement techniques, which are applied to customers rather than their employees, such as "behavior modification, understanding and accepting change, fitting the service to client values, and client training" (Martin and Horne 1992; Martin, Horne, and Schultz 1999, p.58; Martin, Horne, and Chan 2001, p.138). Like Bowen (1986), Lovelock and Wright (1999) stress the importance of motivating customers in managing them as human resources or partial employees. Specifically, they suggest customers be rewarded for their good performance, as explained in the following quote:

> Motivate customers by ensuring that they will be rewarded for performing well (for instance, satisfaction from better quality and more customized output, enjoyment of participating in the actual process, or a belief that their own productivity speeds the process and keeps costs down) (Lovelock and Wright 1999, p.61).

The client productivity definition as well as the comments on how to raise customer productivity provides us with a good infrastructure in understanding customer productivity from a service organization's perspective. However, we still need to make sure what organizations see match what customers actually perceive in terms of customer productivity in creating customer value.

Exploratory Study on Customer Productivity

Findings of the exploratory study (Anitsal and Flint 2003a) indicate that the participants do think about their individual productivity in shopping environments. While every participant per se did not mention productivity, meaning the word productivity was not in every participant's daily vocabulary, our analyses clearly point out components of customer productivity. The following

quotes suggest that participants did think in terms of productivity:

> Mark: I work eight hours and I produce something at the end of the eight hours. At the end of the eight hours, I come up with a lot of meaningful results. If he produced more than I did [it means that] I was somewhat less productive.
>
> Oliver: I'm really good, fast shopper, so it is not gonna take too much time today because of my productivity.

When the participants spoke of their shopping activities, it became clear that money and time were crucial dimensions of their individual productivity. In order to save, but not to waste their money and time, they developed certain beliefs and habits in their shopping activities. They were concerned with the use of their money, and therefore they mentioned that they paid attention to items on sale, prepared shopping lists and used store loyalty cards as explained in the following quotes:

> Lillian: If it's a sale, then you can't pass it up.
>
> Alice: Anything you can save is better. I just got tired of spending money and throwing stuff away.
>
> Taylor: Sometimes she [my wife] makes out a list of things she wants, when it comes to shaving stuff. You

> gotta [go] where the sales [are] at every now and then. If you don't, you just add the cashiers and the price so we try to save a little money here and there.
>
> Alice: Every time you go to a store, Food City's got a card, Kroger's got a card, Bi-Lo's got a card so you've got to keep up with all these cards. Well you wouldn't have to fool with all these cards. It [store card] gives me the price that it should have been to begin with. Why can't they just mark stuff down to the price without the card and let it go with that? I think they mark it up so they can mark it down.

Study participants were also concerned with the use of their time spent shopping. Unless they were doing leisure shopping as "an excuse to do something constructive," "to get away from kids," (Lillian) or "just to goof around and see what is there in a store" (Alice), they were very conscious and sensitive to how they could efficiently and effectively spend their time in shopping. Therefore, they tried to finish their shopping in the shortest possible time by increasing their familiarity with the store layout and preparing a shopping list by the store layout. Several passages support this theme:

> Oliver: In my life maybe the most important [thing] is my time. If I find something very quick, I will do that. If I go to shopping with my wife, I spend more than one hour. … That's why always I prefer to go there [stores] by myself. … For me, spending less time is more important than spending less money.

Hector: Whenever you've had a chance, you could just run by, grab whatever, and it would just be a few items. It it's not like my mom and my grandma [who] went [for shopping] once a week or twice a week and loaded that cart down. It's just unreal pushing that buggy down through there. It's just the necessities to get you through to the next few days.

Mark: I like driving, but you know, it's just [a] waste your time [to drive distant stores].

Hector: Usually I just know what I'm going to get and run in for it.

Alice: There's no point in lingering around. I want to go get what I need and leave. [Because] I can just waste my time doing something else.

Hector: I usually don't take this much time, I mean I just run over and snatch and go. I think it's just how I'm geared just go to do what I need to do and be done with what I have to do, and go on to something else. Usually hurried. In and out, as quickly as possible. I stay on the go.

Alice: It [shopping list] saves you trips [inside the store], instead of going back and forth all the time.

Lillian: If there's no time constraint, it's easy to get lost in the store and just buy things because you see it. I make my grocery list usually by the layout of Kroger and I go down the aisle.

Oliver: I look at the [shopping] list, make a map and memorize everything in that list. First of all, I look at which one [item] is the closest. I can go there, then the other one, then the other one. I will be very quick.

Alice: I don't want to go up and down every aisle and look at everything. I know where everything is, I know what I want when I go in and I go to that aisle and I get it, and I leave. … I go through the store a certain way and usually when I make my list out I'll make it by aisles.

The intent of the shopping experience (use situation) (e.g., goofing around versus routine grocery shopping) may be a condition that affects whether or not productivity is important to shoppers. In routine grocery shopping, participants preferred to use self-checkout systems as one of the TBSS options in retail stores because they were "pretty quick" (Oliver), "a lot faster," and usually without lines (Lillian). Participants also mentioned "it's getting the way that's just about the only way to do things" (Lillian). Participants thought that this was a good thing, "making your life easy," since "you're doing your job yourself" (Mark). Perceived control appeared to be important to study participants as reflected in the following quotes:

> Hector: You don't have to deal with anybody and you just do it. You just go and do what you gotta do.
>
> Mark: I am more satisfied with things doing myself, … and everything in order I like. They [cashiers] don't bag them [the items purchased] right, then you say, … you do it yourself and feel comfortable, you know, put your items as you like, then leave.
>
> Oliver: If I just do something by myself, I'm pretty quick [since] I don't need anybody.

Many participants enjoyed using TBSS options and were happy with limited waiting or no waiting for and perceived control over the self-checkout. However, they were still concerned with the level of effort they were required to spend when they chose the TBSS option over the traditional checkout with regular cashier. Indeed, they preferred going through the self-checkout when they had "a handful necessities" (Lillian), produce items with PLU (price look up) numbers attached but without bar codes, and sufficient space in the bagging tray for their items as supported by the following quotes:

> Alice: It's really convenient if you're just picking up a few items. If I have a buggy full of stuff I go through the other [traditional] lane.
>
> Lillian: It's hard for me to look up all of the produce and stuff and when you have a lot of bags.
>
> Oliver: I have an item [produce] without a product [PLU] number. … so you are dependent on other people in the store.
>
> Lillian: I got potatoes and I didn't want to have to do the number [PLU number] look up above to key in the number [on the self-checkout screen] and wait on potatoes and all of that stuff.
>
> Alice: [I didn't use self-checkout today,] because I wanted to write a check and I had produce.
>
> Lillian: If you get produce and stuff then you've got to look up the code and the things got to weigh it, and part of the time it does it well and part of the

> time it doesn't or if you put the wrong code in then you've got the wrong thing.

TBSS options may increase customer productivity under the conditions of few items, easily accessible price code data, and sufficient space on the self-checkout equipment to accommodate the items held. Based on the participant comments, it was also clear that efficient use of money, time and effort was related to the quality of the service. Participants indicated that how they received the service (functional quality) was sometimes relatively more important than what they received eventually (technical quality) (Gronroos 2000). The issues they saw as important included privacy, quality human interaction when needed, tolerance for a lack of familiarity with the TBSS option, and responsiveness to SST requests under specific situations. These concepts were supported by the following quotes:

> Lillian: No one is watching you. No one notices your items and what are you buying.
>
> Beth: People want to find the product [in the store] and then see a smiling face in front them [at the checkout].

> Lillian: Since I have a whole buggy full, I'm not going through the self-check[out] because they can do it faster with fewer mistakes.
>
> Beth: They [cashiers] think you should know it but I don't know. They don't give me a second or a third chance to learn it [self-scanning device for payment]. I didn't feel comfortable, because I don't have so much experience in that and in front of a cashier, I do not want to be seen stupid.
>
> Lillian: When you go through the check out there at Bi-Lo and you use your food stamp card, the woman's voice on the technology thing says, 'Please press the food stamp button' or 'Please scan your food stamp card now.' It's kind of a humiliating experience.
>
> Lillian: You can't question a computer outside of what it knows, you know. You have to wait through the menu [when you call a 1-800 number]. You have to … figure out which department you want to talk to. It kind of becomes a headache, especially for my health insurance. There is no other way to do it. I guess they're hoping you'd just hang up. You don't get to know the people anymore. I'm kind of afraid that, that efficiency and cutting back, you know, on payrolls and stuff like that, … in the near future I don't see that it's going to get better.

Based on the overall study interpretations, Anitsal and Flint (2003a) developed an initial general model of customer productivity (Figure 11), including the components of money, time, effort and quality. Indeed, this model shows that customers' money, time and effort are interrelated and interlinked. Each service option, based on the level of customer participation in the service production and delivery, can uniquely influence any and all

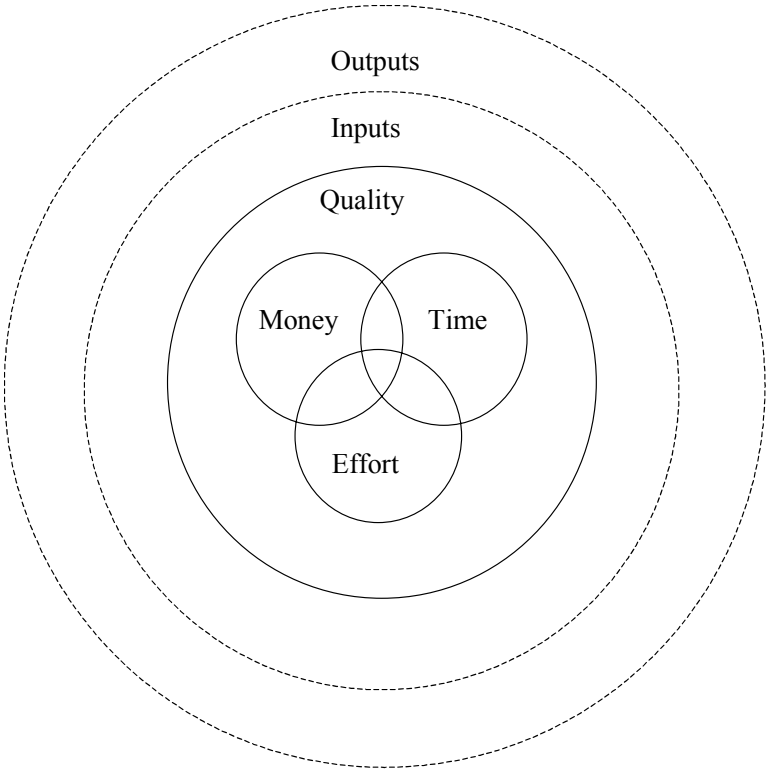

Figure 11: Customer Productivity

(Anitsal and Flint 2003a)

of these components. Customers may be mostly concerned with the right utilization of their money, time and effort when they are concerned with their productivity. But the degree to which they successfully meet their monetary, temporal, and effort goals depends to a large extent on the quality of the self-service technology, including machinery and associated customer service personnel. In terms of service quality perceptions, functional quality appears to be more important for self-checkout adoption. All these components form customer inputs and outputs, and customer outputs are ideally expected to be larger than customer inputs for desired customer productivity (Table 7). Customers in various customer segments may prefer different relationships in numerous situations. Opportunistic customers, for example, may try to maximize their savings while minimizing their spending in all interrelated components simultaneously.

Table 7: Interrelations Among the Components of Customer Productivity

Customer productivity is enhanced	
When the following relationship holds	based on the assumption that
-m<+M, -e<+E, -t<+T, -q<+Q	none
-m<+M	-t=+T, -e=+E, -q=+Q
-t<+T	-m=+M, -e=+E, -q=+Q
-e<+E	-t=+T, -m=+M, -q=+Q
-q<+Q	-t=+T, -e=+E, -m=+M
-m<<+M	Σ{+T+E+Q}<Σ{-t-e-q}<+M
-t<<+T	Σ{+M+E+Q}<Σ{-m-e-q}<+T
-e<<+E	Σ{+T+M+Q}<Σ{-t-m-q}<+E
-q<<+Q	Σ{+T+E+M}<Σ{-t-e-m}<+Q
-m<<+M and -t<<+T	Σ{+E+Q}<Σ{-e-q}<Σ{+M+T}
-m<<+M and -e<<+E	Σ{+T+Q}<Σ{-t-q}<Σ{+M+E}
-m<<+M and -q<<+Q	Σ{+T+E}<Σ{-t-e}<Σ{+M+Q}
-t<<+T and -e<<+E	Σ{+M+Q}<Σ{-m-q}<Σ{+T+E}
-t<<+T and -q<<+Q	Σ{+M+E}<Σ{-m-e}<Σ{+T+Q}
-e<<+E and -q<<+Q	Σ{+M+T}<Σ{-m-t}<Σ{+E+Q}

Notes:

-m: money spent, +M: money saved
-t: time spent, +T: time saved
-e: effort spent, +E: saved
-q: quality spent (in customer participation),
+Q: quality received (in service)

Summation of a combined set of these three variables is not intended to be a mathematical equation.

Customer Value

Defining Customer Value

Customer value has been used in different contexts in the literature (Zeithaml 1988b; Monroe 1990; Woodruff 1997; Ulaga and Chacour 2001). Despite the interrelations between those varying terms for the value such as 'customer values,' 'customer value,' and 'customer's value,' the distinctions between these terms should be highlighted (Payne and Holt 2001; Anitsal and Fairhurst 2003; Anitsal, Anitsal, and Bolat 2003).

"Customer values" are not attached to specific objects or situations. These enduring values guide culturally proper behaviors of consumers (Schiffman and Kanuk 2000). Two of the widely known instruments to measure customer values are VALS (values and lifestyles) (Mitchell 1983) and LOV (list of values) (Kahle 1983). These value inventories are useful in investigating the consumer's behavior in detail, but they ignore the notions of consumer preferences and trade-off in interpreting what customers value (Payne and Holt 2001).

"Customer's value" is the value of the customer to the retailer. Retailers can link this value with the customer lifetime value (CLV) concept (Payne and Holt 2001), which can be quantified by the net present value of the customer (NPVC). NPVC is based on the net present value (NPV) that discounts total profits associated with a customer. The focus of NPV calculation here is on an individual customer or a specific segment of customers, but not on the product or service (Stahl, Barnes, Gardial, Parr, and Woodruff 1999).

"Customer value" is a concept guided by customer values, and in turn is highly influential on the customer's value (Anitsal and Fairhurst 2003). What customers value has been defined in terms of price, quality, and other attributes of a product or service as well as a trade-off based on what is given and what is received (Zeithaml 1988a).

> Customer value is the difference between all the benefits derived from a total product and all the costs of acquiring those benefits. (Hawkins, Best, and Coney 2004, p.11)

Holbrook (1999, p.5) defines consumer (customer) value as "an interactive relativistic preference experience."

This definition holds four major characteristics in customer value. First, customer value is interactive, because it requires an interaction between a subject (e.g., participating customer) and an object (e.g., checkout system). Second, customer value is relativistic, because it is comparative, personal and situational. It is comparative, because customers may value a given service encounter (e.g., self-checkout) compared to another service encounter (e.g., traditional checkout). It is personal, because different customers (e.g., enthusiastic adopters as opposed to reluctant adopters) can perceive value from different perspectives. It is situational, because customers' evaluative judgments depend on the context (e.g., regular shopping versus leisure shopping). Third, customer value is preferential, because it involves a preference judgment. The concept of preference includes a variety of value-related terms such as

> "affect (pleasing vs. displeasing), attitude (like vs. dislike), evaluation (good vs. bad), predisposition (favorable vs. unfavorable), opinion (pro vs. con), response tendency (approach vs. avoid), or valence (positive vs. negative)" (Holbrook 1999, p.8).

Fourth, customer value is an experience, because customer value

> ". . . resides not in the product purchased, not in the brand chosen, not in the object possessed, but rather in the consumption experience(s) derived there from . . ." (Holbrook 1999, p.8).

One of the most comprehensive descriptions of customer value is given by Woodruff (1997) and , this statement will provide an infrastructure, where the discussions are based on in Chapter 2.

> "Customer value is a customer's perceived preference for and evaluation of those product attributes, attribute performance, and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations" (Woodruff 1997, p.142).

Customer Value Hierarchy

A means-end type model can capture the essence of desired customer value (Woodruff 1997; Woodruff and Gardial 2001). According to customer value hierarchy as a means-end model, customer perceptions and evaluations of product and service use experiences are based on product and service attributes leading product or service consequences toward

customer goals and purposes (Gutman 1982; Mentzer, Rutner, and Matsuno 1997; Woodruff and Gardial 2001).

In customer value hierarchy, "…'lower levels' are the means by which 'higher level' ends are achieved" (Gardial and Woodruff 2003, p.137). At the bottom of the customer value hierarchy, customers consider products as bundles of attributes and attribute performances. More specifically, product and service features, component parts, service atmospherics, service employee traits, options and activities are the attributes that describe the product, or service. At the next stage, customers try to achieve particular desired consequences based on salient product and service attributes. Consequences can be positive experiences such as benefits or desired outcomes and realizations, and negative experiences such as sacrifices and costs or undesirable outcomes. Consequences are relatively more abstract and subjectively defined than attributes and show what the product does for the consumer. At the top of the customer value hierarchy, desired end-states describe the person in terms of the most fundamental and overriding motivations, goals and purposes (Gardial and Woodruff 2003).

When it is incorporated into a hierarchy model, customer value provides a much richer picture of how customers think about the value of products and services in different use situations (Woodruff 1997). Both the level of abstraction and the stability of the hierarchy tend to increase at higher levels of customer value hierarchy. Since the value dimensions of a value hierarchy in a given use situation is highly dependent upon that specific use situation or for the person, "… there is no such thing as 'the' value hierarchy for a product or service" or for the person. Once the use situation changes, the components of the value hierarchy also significantly change (Gardial and Woodruff 2003, p.137).

Dimensions of Customer Value

Consumption experiences can be categorized into six different types of value, reflecting three major dimensions of customer value: (1) extrinsic versus intrinsic value, (2) self-oriented versus other-oriented value, and (3) active versus reactive value (Holbrook 1999). Value is extrinsic when a consumption experience is prized for its functionality or utility "in serving as a means to

accomplishing some further purpose, aim, goal, or objective" (e.g., a store loyalty card is valued to get an instant cash discount or a store coupon at self-checkout) (Holbrook 1999, p.10). Value is intrinsic when a consumption experience is prized "as an end in itself - for its own sake -" (e.g., pure enjoyment of using a retail TBSS option regardless a variety of benefits of using it) (Holbrook 1999, p.10). Value is self-oriented when a consumption experience is prized "for a [consumer's] own sake, for how [s/he] react[s] to it, for the effect it has on [consumer]" (e.g., a collection of store loyalty cards from all over the world) (Holbrook 1999, p.10). Value is other-oriented when a consumption experience is prized for its impact on other(s) such as family, friends, other fellow customers, and service employees as well as "some inaccessible 'inner [self]' or … some 'unconscious' part of the mind with which one seeks to 'get in touch'" (e.g., status of an elderly person in the eyes of youngsters, when s/he competently uses self-checkout or another state-of-the-art technology option) (Holbrook 1999, p.11). Value is active when a consumption experience involves "things *done by* a consumer *to* or *with* a product" (e.g., actively participating customer using self-checkout) (Holbrook 1999,

p.11). Value is reactive when a consumption experience involves "things *done by* a product *to* or *with* a consumer" (e.g., a customer who is admiring enhanced service quality based on technological advancements in self-checkout compared to traditional checkout) (Holbrook 1999, p.11).

Distinction From Customer Productivity

From the three key dimensions of customer value, Holbrook (1999) proposes a typology, (Table 8). Among the eight value cells based on three value dimensions, first two, namely 'efficiency' and 'excellence,' should be our concern in this study with regard to customer productivity. In his typology, Holbrook (1999) differentiates between efficiency and excellence in terms only one value dimension, reactive value. However, in TBSS settings, we know that customers are active participants in service production and delivery, not mere reactive service recipients. Therefore, in retail self-checkout as an example of TBSS options, both efficiency and effectiveness (excellence) should be thought of within one single cell, which is an intersection of self-oriented, extrinsic and active value dimensions. This cell simply includes both efficiency and effectiveness in

Table 8: A Typology of Consumer Value

(Holbrook 1999, p.12)

		Extrinsic	*Intrinsic*
Self-oriented	Active	**Efficiency** (Output/Input, Convenience)	**Play** (Fun)
	Reactive	**Excellence** (Quality)	**Aesthetics** (Beauty)
Other-oriented	Active	**Status** (Success, Impression management)	**Ethics** (Virtue, Justice, Morality)
	Reactive	**Esteem** (Reputation, Materialism, Possessions)	**Spirituality** (Faith, Ecstasy, Sacredness, Magic)

TBSS (Anitsal 2003), and can be illustrated with an example (Table 9). Specifically, a self-checkout system may provide a fast checkout based on functional modern equipment supported by shorter waiting lines (extrinsic value) when a customer actively participates in service production and delivery (active value) to reflect her/his lifestyle based on speed (self-oriented value). The same TBSS option can help customers not only for efficiency, but also for effectiveness. Indeed, a self-checkout system may provide a higher perceived service quality based on easy-to-use, useful equipment (extrinsic value) for the customer who actively participates in service production and delivery (active value) to reflect her/his ability to understand and contribute to quality.

Drawing from earlier discussions made in this chapter on efficiency and effectiveness (Sink 1985; Vuorinen, Jarvinen, and Lehtinen 1998; Ojasalo 1999; Sheth and Sisodia 2002); service productivity in relation to quantity and quality of outputs in comparison to inputs (Vuorinen, Jarvinen, and Lehtinen 1998; Gronroos 2000; Gronroos and Ojasalo 2002); and customer productivity (Martin, Horne, and Chan 2001; Parasuraman 2002; Xue and Harker 2002), customer productivity can potentially be calculated

Table 9: Customer Productivity Based on Efficiency and Effectiveness

Adapted from Holbrook (1999) and Richins (1999).

		Efficiency
	Example >	Speed
Value Dimensions	Extrinsic	Self-checkout as a TBSS option provides shorter waiting lines, and modern (faster) software and hardware.
	Active	Customer actively participates in service production and delivery.
	Self-oriented	Ego is important since it reflects 'speed' as customer's lifestyle.
		Effectiveness
	Example >	Service Quality
Value Dimensions	Extrinsic	Self-checkout as a TBSS option provides ease of use for better quality.
	Active	Customer actively participates in service production and delivery.
	Self-oriented	Ego is important since it reflects the ability of customer to understand and contribute to quality.

as a ratio of customer outputs (O) to inputs by customers (I) or a ratio of I/O with respective qualities attached (efficiency and effectiveness). This study measures how customers perceive their self-productivity within a structural equation model rather than calculating a specific productivity figure for a given occasion or a period of time. It is expected that each customer will take into consideration relevant efficiency and effectiveness dimensions to combine them into an overall construct measuring customer productivity.

Holbrook's (1994; 1999) consumer value typology contains eight value types. A particular case can demonstrate that customers from different consumer segments may be willing to use the same TBSS option (e.g., self-checkout) for different consequences. This study combines efficiency and excellence (effectiveness) based on three value dimensions (self-oriented, active, and extrinsic value) into customer productivity as an independent consequence. Thus, customer productivity can be taken as a subset of a broader concept, namely customer value, which is measured as overall value perceived by customers within the scope of this study. Customer productivity is one

important consequence for many consumers doing their regular shopping (Anitsal and Flint 2003a).

Convenience is one of the key examples of efficiency for consumers. "The relevant O/I ratio has *time* as a denominator representing the key input of concern" (Holbrook 1999, p.13). "Convenience stores," for example, operate during off-hours to accommodate people's hectic time schedules, while shoppers can buy "convenience foods" to fix quickly (Holbrook 1999).

> Many other examples of consumer value should be interpreted as cases of efficiency in general and convenience in particular by virtue of their relevance to time as the key resource input of interest (Holbrook 1999, p.13).

However, once again, this study focuses on customer value as a composite score as perceived by customers, combining efficiency and effectiveness, at the consequence level of the customer value hierarchy. Morevover, this study only concentrates on convenience as it relates to customer productivity. Specifically, perceived customer productivity while using a TBSS option (e.g., self-checkout) will focus on transaction convenience followed by benefit convenience (Berry, Seiders, and Grewal 2002), or execution dimension

of convenience (Brown 1990), leaving out all other types of service convenience such as decision convenience (deciding how to obtain a particular service similiarly to 'make-or-buy' decision in products), access convenience (gaining access to the service), and postbenefit convenience (contacting with a service provider, for example, for a service failure not resolved while at the service encounter) (Berry, Seiders, and Grewal 2002). Once a customer decides to use self-checkout rather than regular checkout and locates an open self-checkout lane, s/he starts using it. Transaction convenience is directly related to the actions of consumers co-producing a TBSS. While in the beginning of the co-production, transaction convenience becomes more important based on perceived expenditures of time and effort to initiate the specific tasks during the transaction, toward the end of service realization, benefit convenience gains momentum based on perceived expenditures of time and effort "to experience the service's core benefits" (Berry, Seiders, and Grewal 2002). During this execution dimension of the concept of convenience, consumers can choose "how much [emotional,] mental or physical effort he or she wishes to expend in obtaining a product or service" (Brown 1990).

Customer Participation

Based on machines and standardized procedures, mechanization, or "industrialization," of the service can enhance service productivity (Levitt 1972, 1976). However, services are basically consumer intensive, besides probably being capital and labor intensive in many instances (Rosen 1973), mentioned in (Gartner and Riessman 1974). Therefore, customer participation also plays an important role in improving service productivity, for example, in TBSS options (Lovelock and Young 1979; Langeard, Bateson, Lovelock, and Eigler 1981; Bendapudi and Leone 2003).

Defining Customer Participation

Customer participation is defined as "a *behavioral* concept that refers to the actions and resources supplied by customers for service production and/or delivery, including customers' physical, mental and emotional inputs (Rodie and Kleine 2000, p.111). Physical inputs consist of tangibles and physical labor provided by customer, and mental inputs include information and cognitive labor. For

example, customers (patients) may cognitively work in preparing the information (symptoms) to be submitted to service (health care) provider, or physically work (unload shopping cart or scan items to be purchased) in a service encounter (self-checkout system at grocery stores) to facilitate direct transactions. Emotional inputs contain emotional labor provided by customer in terms of patient and pleasant behavior in interacting with a less-than-competent service (contact or support) employee (Rodie and Kleine 2000).

The concept of customer participation is distinct from the concept of customer contact. Customer contact is a situational concept (Silpakit and Fisk 1985), and is described as the "physical presence of the customer in the system" (Chase 1978, p.138). Specifically, it can be stated as "the percentage of time the customer must be in the system relative to the total time it takes to serve him" (Chase 1978, p.138). This definition focuses on 'system contact' rather than 'human contact,' but human contact does not necessarily occur with customer participation at the same intensity level (Faranda 1994). "Customer participation, in contrast, is a behavioral concept

emphasizing the active role the customer plays in the service encounter" (Silpakit and Fisk 1985, p.117).

The concept of customer participation can also be contrasted to the concept of customer involvement. Involvement as a dispositional characteristic of a customer refers to "a customer's personal interest in a particular service" (Rodie and Kleine 2000). A customer, for example, doing her routine daily grocery shopping can extensively participate in self-service delivery without being highly involved. During checkout, the same customer may realize her emerging interest in technology and may become highly involved in a TBSS option (e.g., entire self-checkout system or one of its major parts) when a contact employee explains and provides service completely or partially to this first time user of TBSS option.

Customer participation may vary between 'very heavy (intense)' or full and 'very light (causal)' or low participation (Bateson 1983; Lehtinen and Lehtinen 1991). Levels of participation may include three unique levels; namely attendance (low level), information provision (moderate level), and co-production (high level) (Zeithaml and Bitner 1996). At a low level participation, customer merely shows up in the service setting and service provider

does all the work (Bitner, Faranda, Hubbert, and Zeithaml 1997) At a moderate level participation, customer acts as a consultant, inspector or reporter, and presents information before the service provider provides the service (Bettencourt 1997; Bitner, Faranda, Hubbert, and Zeithaml 1997; Claycomb, Lengnick-Hall, and Inks 2001). Customers at this level may also participate by communicating with other fellow customers at the service encounter and provide advice, evaluative comments and expertise (McGrath and Otnes 1995; Claycomb, Lengnick-Hall, and Inks 2001). At a high level of participation, the customer acts as a human resource (Bettencourt 1997), specifically 'unpaid' human resource (Harris, Baron, and Tacliffe 1995), a partial employee (Kelley, Donnelly, and Skinner 1990; Bateson 2002), a quasi-employee (Ford and Heaton 2001), and a co-producer (Bowen 1986; Wikstrom 1996) either to design or to produce the service partially, or completely (Claycomb, Lengnick-Hall, and Inks 2001).

Understanding Customer Labor

Productivity can be increased in four different ways: (1) improving quality of labor, (2) investing on technology

and other capital equipment, (3) automating labor tasks, (4) changing customer interaction with the service system (Lovelock and Young 1979). Each one of these paths shows the importance of the productivity of participating customer in a technology-based self-service environment (e.g., retail self-checkout systems). It also points out the positive potential impact of the customer as a source of productive capacity on retailer's productivity and overall business performance, in turn, on retail industry's performance as a whole (Lovelock and Young 1979; Bateson 2002; Xue and Harker 2002).

Labor is one of the most common measures of productivity. Labor productivity is defined as "the total output divided by the number of units of labor employed to produce that output" (McEachern 2000). Labor holds about 70 percent share of the cost of production. In traditional manufacturing sense, it is also relatively easier to measure (e.g., hours per week) and has readily more available statistical data than other inputs (McEachern 2000).

Capital is the most important element in increasing labor productivity. Capital can be investigated under two broad categories: physical capital and human capital

(McEachern 2000). Physical capital includes, for example, buildings (e.g., retail stores), roads (e.g., in-store aisles and layout), tools (e.g., shopping carts), and machines (e.g., self-service technologies). Human capital reflects the quality of labor, and is "the accumulated knowledge, skill, and experience of the labor force" that helps enhancing labor productivity (McEachern 2000). This type of human capital can be named as intellectual capital. When supported by emotional capital based on self-esteem, courage and resilience, people will be able to convert their intellectual capital into an effective action (Gratton and Ghoshal 2003).

"Resource owners are paid *wages* for their labor, *interest* for the use of their capital, and *rent* for the use of their land" (McEachern 2000). In TBSS environments, customers participate in the production and delivery of service, and nowadays they are getting treated more as labor. Indeed, customers are now a valuable resource (Walley and Amin 1994), treated as a partial employee (Bowen 1986; Kelley, Donnelly, and Skinner 1990; Dellande and Gilly 1998; Keh and Teo 2001) or quasi-employee (Ford and Heaton 2001). Retailers normally have labor savings of 20 to 40 hours a week per self-checkout station they

installed (Hennessy 1998). Even some stores report increased sales volume of between 10-12 percent coming from the customers prefer using self-checkouts. However, those participating customers may not get paid for their labor due to the overemphasis on firm benefits (Meuter and Bitner 1998). Companies (e.g., Dell) use the term "direct ownership" rather than "self-service" for not to create a perception of "pushing work from Human Resources to employees" (2002b). This way they hope to increase customer participation without generating negative feelings about the "unpaid labor" being provided by employees as customers (Walley and Amin 1994). Keane and Fountas (2002), for example, found that technology gains in banking services (e.g., increased use of ATMs) have not been translated into lower spreads for customers over more than ten years in Ireland. "Can consumers put up with only having convenience benefits of new TBSS options … without getting any economic benefits?" (Anitsal and Fairhurst 2002)

Before we can link customer participation to a variety of performance outcomes for retailers as well as customers themselves, we need to know what customer labor means. What is customer labor? Do customers think they provide labor to retailers? If they do, what kind of labor do customers

provide to retailers? How do customers treat their own labor in TBSS environments? The exploratory qualitative study conducted by Anitsal and Flint (2003b) suggests some answers to these questions.

Exploratory Study on Customer Labor

Anitsal and Flint (2003b) utilized the grounded theory orientation (Strauss and Corbin 1998) to discover the meanings related to customer labor in self-service shopping and TBSS environments. Their findings indicate that study participants perceive themselves as customers providing labor in retail shopping environments. Although they did not use the term of labor explicitly, their self-service and TBSS shopping experiences apparently pointed out that certain activities they perform can be implicitly connected with the concept of customer labor. Indeed, it was concluded from data that study participants provide customer labor under three major categories: (1) physical labor (PL), (2) cognitive labor (CL), and (3) emotional labor (EL), which were all consistent with the customer inputs suggested by the literature (Langeard and Eiglier 1983; Claude R. Martin and Horne 1992; Ashforth and

Humphrey 1993; Mann 1997; Lengnick-Hall, Claycomb, and Inks 2000; Rodie and Kleine 2000; Parasuraman 2002).

Physical inputs provided by customers include "customers' own tangibles [e.g., customer's own body, or customer-owned tangibles] and physical efforts [e.g., labor utilized at a salad bar]" (Rodie and Kleine 2000). In self-service environments, Anitsal and Flint (2003b) define physical labor as the following:

> Pyhsical labor is the degree to which a participating customer works physically to produce and deliver service.

The following quotes suggest that participants provide physical labor to retailers.

> Alice: You've got to … scan it, take it off the scanner and put it in the bag, and do all that yourself.
>
> Hector: I just had a lot of items and I had to bag them and all that stuff.

Mental inputs provided by customers include "information [e.g., providing information to a service organization] and mental effort [e.g., cognitive labor]" (Rodie and Kleine 2000). In self-service environments,

Anitsal and Flint (2003b) define cognitive labor as the following:

> The degree to which a participating customer provides/ processes information and communicates/ mentally helps other customers to produce, deliver and improve service.

The following quotes suggest that participants provide cognitive labor to retailers.

> Lillian: You have to wait through the menu [when you call a 1-800 number]. You have to figure out which department you want to talk to.
>
> Lillian: I make my grocery list usually by the layout of Kroger and I go down the aisle.
>
> Oliver: I look at the shopping list, I make a map and I memorize everything in that list. I look at which one [item] is the closest. I can go there, then the other one, then the other one.
>
> Alice: If I get produce and stuff, then I've got to look up the code [PLU-price look up number]. Part of the time it does it well and part of the time it doesn't or if you put the wrong code in then you've got the wrong thing.

Emotional inputs provided by customers include "emotional labor [e.g., patient behavior despite an unpleasant service employee]" (Rodie and Kleine 2000). Based on the discussions of emotional labor in Ashforth and

Humphrey (1993), Mann (1997), and Rodie and Kleine (2000), "emotional labor, in self-service environments, can be defined as the following:

> The degree to which a participating customer displays expected appropriate emotions such as patience, pleasance and tolerance during service production and delivery (Anitsal and Flint 2003b).

The following quotes suggest that participants provide emotional labor to retailers.

> Lillian: When you put your items in the bags, sometimes it [self-checkout system] doesn't catch the weight of it and it'll start telling you, 'please place the item in the bag, please place the item in the bag, please place the item in the bag.' Like multiple times until you have to wait on someone from the other register or somewhere to come and help you and they push a button on their register.
>
> Hector: The second time I went [to self-checkout], it kept making me wait for a cashier for some reason and I didn't know why. Then she said it's okay and it cleared itself and it went on. It wasn't bad.
>
> Lillian: When you go through the self-checkout at Bi-Lo and you use your food stamp card, the woman's voice on the technology thing says, 'Please press the food stamp button' or 'Please scan your food stamp card now.' It's kind of a humiliating experience.

Multiple-forms of inputs provided by participating customers include different combinations of the previously

stated customer inputs (Rodie and Kleine 2000). Specifically, for example, PL may have to be based on CL; or prior CL may be a condition for the level of current PL. The following quotes suggest that participants provide a combination of PL, CL and EL.

> Mark: Cashiers don't bag [the items purchased] right, then you say, you do it yourself and feel comfortable, you know, put your items as you like. You just go there [self-checkout]. You scan your items, you put them into the bag and you put everything [by] yourself. You scan your credit card and you pay yourself.
>
> Lillian: I am picking out some potatoes that aren't bruised, decent size, so I can bake them if I want to. Costs more to get them this way, but I'd rather pick them out than buy a bag when they're all bruised and I get mad. I also have to make sure the eggs aren't broken, you know.
>
> Alice: You've got to write a check and take it up to the little cashier [contact employee] and all of that, instead of just writing it right there at the line while the other person is putting it through.
>
> Alice: Shopping list saves you trips [inside the store], instead of going back and forth all the time.

Study participants clearly highlighted that they would not provide their labor (e.g., PL, CL and EL) free to retailers; unless they expect to spend less time and effort for the activities they need to participate or perform to produce the service. Specifically, they want to be fast,

have a control over their shopping activities and budgets, and have convenience, which are all consistent with the existing literature (Dabholkar 1996; Berry, Seiders, and Grewal 2002; Dabholkar, Bobbitt, and Lee 2003). Still, it seemed too early that, in general, at this stage of an overall customer life cycle, majority of customers have an expectation for monetary rewards for their labor in service production and delivery in service settings, besides the nonfinancial convenience benefits such as ease of use, control, enjoyment, and speed. The following quotes support these thoughts.

> Oliver: If I just do something by myself, I'm pretty quick.
>
> Taylor: You can get yourself run [in the store]. Then you head towards that checkout and scan. You don't have to worry about somebody else making a mistake or waiting in line for somebody that has a problem. You just go and do what you gotta do.
>
> Lillian: I have to weigh them, so l know how much money I'm spending.
>
> Lillian: I always take my little calculator [while I'm shopping]. I always write down the price, that way in future I can compare the regular price.
>
> The people who check you out are so familiar with it, they remember those things and it's easier for them. It's just it takes me longer to go through [all PLU numbers].

> Lillian: [In future] you'd be typing the first three letters of whatever this fruit or vegetable is.

When customer labor is categorized as physical labor, cognitive labor, and emotional labor; it eventually becomes apparent that customer labor can be further classified into three subcategories within each major category: internally-focused customer labor, externally-focused customer labor, and indirectly-focused customer labor. Because in service production and consumption, clients have dual roles of *customer* and *co-producer* (Claude R. Martin and Horne 1992). Anitsal and Flint (2003b) explain these subcategories for customer labor in the following way:

> Internally-focused customer labor includes all the labor activities performed by customers for their own direct benefit.
>
> Externally-focused customer labor includes all the labor activities performed by customers for the benefit of the service organization.
>
> Indirectly-focused customer labor includes all the labor activities performed by customers for the benefit of someone else (e.g., another customer) that might *eventually* benefit either the customer, the service organization, or both.

Externally-focused customer labor has to be compensated by the service organization in terms of more

convenience, recognition and praise, less customer effort and time requirement as well as somehow financially; either through apparently lower prices or special TBSS use discounts.

The following quotes from participants support these thoughts with regard to internally-focused customer labor, which does not need to be compensated by the service organization at all.

> Lillian: I don't get the Sunday paper; therefore I'm going to grab a Bi-Lo sale circular.
>
> Lillian: With some things I have to read the ingredients because of food allergies.
>
> Mark: You need to sit, search for, and cut the coupons. You need to spend some time to organize them.

How consumers perceive the distinction between externally- and internally-oriented customer labor they provide in self-service environments should have important implications for both retailers and researchers. If consumers perceive the customer labor as internally-focused labor, then they probably expect no compensation, which is good for retailers in getting all the benefits out of TBSS options in their stores without sharing the savings with their customers, even not to a certain extent. It appears

that the current usage of TBSS options (e.g., self-checkout in retail stores) coincides with what has been explained above. However, when service providers start exaggerating their benefits from TBSS options, for example, by forcing customers to use those options (e.g., economy class passangers increasingly using the self-checkin sytems as the only option in major U.S. airports), or charging customers (e.g., $25 addition per ticket) for their electronic airline tickets purchased over the Internet. When those similar applications become widespread, customers may start thinking of themselves quite differently possibly from traditional full-time hosewifes working at home without demanding any financial monthly direct return for their labor. Since self-checkout system, for example, is not currently the only option to utilize in stores or hotels, some consumers may already feel what they provide is indeed an externally-focused customer labor that needs to be directly compensated when they choose to use the TBSS option.

When customers do not demand anything for their labor, specifically their externally-focused customer labor, service organizations, in our case retailers, naturally become happy. However, customers may also be providing

undesired labor to the retailer, which is unsought by retailers. In such a case, retailers may not have enough degree of freedom to 'fire a customer worker' Lengnick-Hall (1996) or nicely 'terminate' these customers (Lovelock and Wright 1999) not to alter demand for that service unfavorably. The following quote supports this thought.

> Alice: You know I've let people use my [store] card so they could get a percentage off because they forgot their card and left it at home. So here scan mine that way you can get a discount. It makes me feel pretty good. They got it cheaper.

Based on the previous discussions and interpretations, Anitsal and Flint (2003b) developed a preliminary model of customer labor (Figure 12). This model shows that there are three major categories of customer labor; namely physical labor, cognitive labor, and emotional labor. The model further suggests that these three pure types of customer labor are interrelated and interlinked. Indeed, customer labor combinations co-exist with pure customer labor varieties in service settings. One type of customer labor may be a condition for one another, and can also be a controlling factor for the intensity level of another type of customer labor.

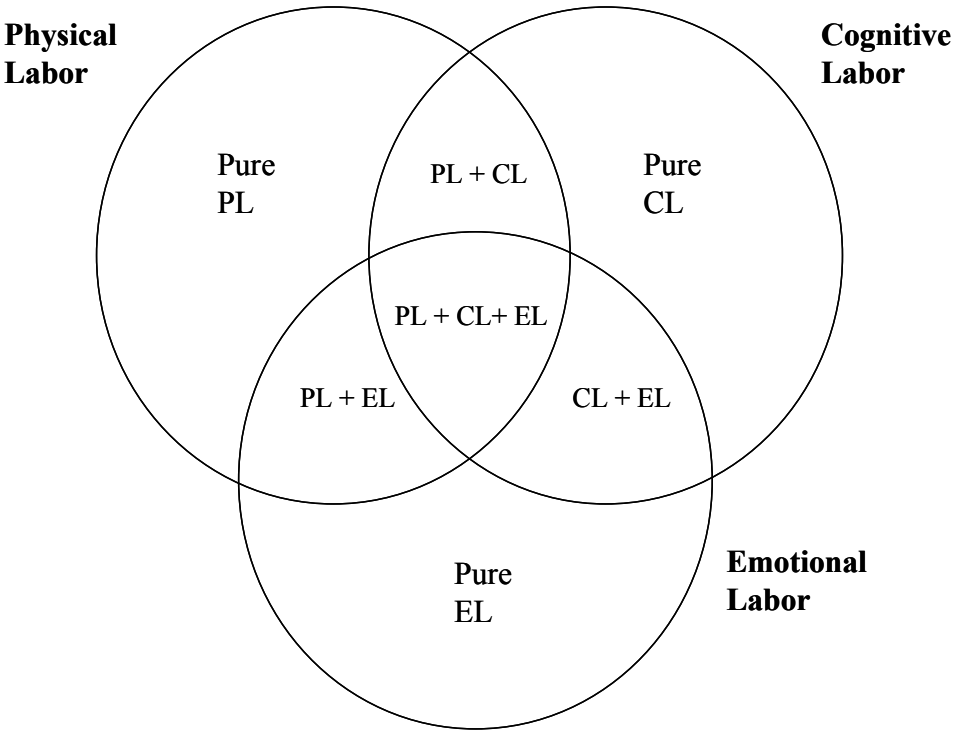

Figure 12: Customer Labor

(Anitsal and Flint 2003b)

Service Quality

In contrast to early manufacturing quality concepts based on conformance to technical standards (Crosby 1979), more recent models of service quality paid closer attention to the strong link between quality and the customer. A stream of research investigating the concept of customer perceived quality underlined the notion that the customer is the focal point of service quality and what customers perceive as quality is critical (Gronroos 1993).

Gronroos (1983) suggested that service quality as perceived by customers can be analyzed under two differentiating types of quality: technical quality and functional quality. Technical quality is what (outcome of the service) is delivered to the customer, while functional quality is how (process of service delivery) it is delivered. Lehtinen and Lehtinen's (1982) physical quality and interactive quality are closely related to the technical and functional qualities (Parasuraman, Zeithaml, and Berry 1985). Lehtinen and Lehtinen (1991), based on their two empirical studies of restaurant services, suggested two approaches to service quality components. In the first approach, they used three quality dimensions:

physical quality (quality that is based on service materials and facilities), interactive quality (quality that is based on the interaction between the customer and the interactive elements of the service), and corporate quality (quality that is based on how the corporate entity is seen by customers over time). The interactive elements in a service encounter include the customer, physical equipment (e.g., a self-checkout), contact employees, and other fellow customers. In the second approach, they utilized two quality dimensions: process quality; "customer's qualitative evaluation of his participation in the service production process," and output quality; "customer's evaluation concerning the result of a service production process" (Lehtinen and Lehtinen 1991). Quality of customer labor initially seems to be similar to process quality, but it is based on customer's quality perception of her/his own efforts provided during service production and delivery, not customer's quality perception of the service production and delivery process, where the customer is only one of the important components.

Berry, Zeithaml and Parasuraman (1985) concluded that customers compare their "expectations prior to receiving service" and "actual experiences with the service."

Therefore, they presented their conceptualization of service quality in terms of a gap model (Parasuraman, Zeithaml, and Berry 1985). Their findings initially yielded ten dimensions of service quality: reliability, responsiveness, competence, access, courtesy, communication, credibility, security, understanding/knowing the customer and tangibles. Later, Parasuraman, Zeithaml and Berry (1988) developed a 22-item scale, SERVQUAL scale (Figure 13), to measure service quality in terms of the gap between customers' expectations of the service to be received and their perceptions of the service actually delivered. These perceptions were based on five major dimensions: tangibles, reliability, responsiveness, assurance and empathy. These dimensions focused primarily on the human interaction in the service delivery in addition to the tangibles of service such as atmospherics, employee dress and appearance of equipment (Sureschandar, Rajendran, and Kamalanabhan 2001). Several studies have recently aimed at highlighting those dimensions in different settings such as sporting events (Kelley and Turley 2001), campus career services centers(Engelland, Workman, and Singh 2000), churches (Dabholkar, Shepherd, and Thorpe 2000), rural tourism sites in Israel

Tangibles:

1. Excellent …… companies will have modern-looking equipment.
2. The physical facilities at excellent …… companies will be visually appealing.
3. Employees at excellent …… companies will be neat-appearing.
4. Materials associated with the service (such as pamphlets or statements) will be visually appealing.

Reliability:

5. When excellent …… companies promise to do something, and they will do so.
6. When a customer has a problem, excellent …… companies will show a sincere interest in solving it.
7. Excellent …… companies will perform the service right the first time.
8. Excellent …… companies will provide their services at the time they promise to do so.
9. Excellent …… companies will insist on error-free records.

Responsiveness:

10. Employees in excellent …… companies will tell customers exactly when services will be performed.
11. Employees in excellent …… companies will prompt service to customers.
12. Employees in excellent …… companies will always be willing to help customers.
13. Employees in excellent …… companies will never be too busy to respond to customers' requests.

Assurance:

14. The behavior of employees in excellent …… companies will instill confidence in customers.
15. Customers of excellent …… companies will feel safe in their transactions.
16. Employees in excellent …… companies will be consistently courteous with customers.
17. Employees in excellent …… companies will have the knowledge to answer customers' questions.

Empathy:

18. Excellent …… companies will give customers individual attention.
19. Excellent …… companies will have operating hours convenient to all their customers.
20. Excellent …… companies will have employees who give customers personal attention.
21. Excellent …… companies will have the customer's best interests at heart.
22. The employees of excellent …… will understand the specific needs of their customers.

Figure 13: SERVQUAL Items

(Zeithaml, Parasuraman, and Berry 1990)

(Reichel, Lowengart, and Milman 2000), health care and car repair service (Mittal and Lassar 1996), fast-food restaurants (Dabholkar 1996), and supermarkets in Spain (Vazquez, Bosque, Diaz, and Ruiz 2001). It became apparent that service quality dimensions can vary across different kinds of services (Kelley and Turley 2001).

SERVQUAL scale has been criticized in certain aspects. Buttle (1996, p.10-11) summarizes theoretical and operational criticisms on SERVQUAL (Figure 14). Specifically, some researchers criticized conceptualizing service quality as a difference score and pointed out that several problems may come out in terms of reliability, discriminant validity, spurious correlation and variance restriction, when the perceived service quality is calculated as a "difference score" (Peter, Churchill, and Brown 1993). Cronin and Taylor (1994) suggested performance-only SERVPERF scale for measuring service quality using customer attitudes. The perception approach completely ignored customer expectations, and suggested that customer evaluations form the basis to directly measure perceived quality (Cronin and Taylor 1994; Teas 1993). Dabholkar, Shephard and Thorpe (2000) empirically supported that the measured disconfirmation, "direct mental

Theoretical Criticisms:

- Paradigmatic objections: SERVQUAL is based on a disconfirmation paradigm rather than an attitudinal paradigm; and SERVQUAL fails to draw on established economic, statistical and psychological theory.
- Gaps model: there is little evidence that customers assess service quality in terms of P - E gaps.
- Process orientation: SERVQUAL focuses on the process of service delivery, not the outcomes of the service encounter.
- Dimensionality: SERVQUAL's five dimensions are not universals; the number of dimensions comprising SQ is contextualized; items do not always load on the factors, which one would a priori expect; and there is a high degree of intercorrelation between the five RATER dimensions.

Operational Criticisms:

- Expectations: the term expectation is polysemic; consumers use standards other than expectations to evaluate SQ, and SERVQUAL fails to measure absolute SQ expectations.
- Item composition: four or five items can not capture the variability within each SQ dimension.
- Moments of truth (MOT): customers' assessments of SQ may vary from MOT to MOT.
- Polarity: the reversed polarity of items in the scale causes respondent error.
- Scale points: the seven-point Likert scale is flawed.
- Two administrations: two administrations of the instrument cause boredom and confusion.
- Variance extracted: the over SERVQUAL score accounts for a disappointing proportion of item variances.

Figure 14: Criticisms of SERVQUAL (Buttle 1996)

estimation of perceptions compared to expectations", is better than the computed disconfirmation (difference score). Their findings also pointed out the superiority of perception measures over the computed disconfirmation.

Both measurement types have their unique advantages over one another. (Parasuraman, Zeithaml, and Berry 1985) contend that traditional disconfirmation models are useful to explore gaps such as customer expected service-customer perceived service gap and customer expectation-management perception gap. Practitioners in the retail industry need insight for continuously improving their service processes, but perception measures do not identify gaps. When the objective is gap analysis to diagnose the shortfalls in service quality, measured disconfirmation should preferably be used due to its superiority over computed disconfirmation. On the other hand, direct measurement of the perceived service quality would increase the prediction and/or explanation power for the quality as well as its determinants (Kasper, Helsdingen, and Vries 1999; Dabholkar, Shepherd, and Thorpe 2000). In spite of the existing debates on whether service quality should be measured as a perception or disconfirmation as well as theoretical and operational criticisms of SERVQUAL

measurement scale, SERVQUAL has gained popularity and been widely applied in different service settings as an infrastructure for service quality (Buttle 1996; Lam and Woo 1997).

Adoption of Self-Service Technology

Adoption of self-checkout systems across retail sectors is still in its infancy. However, it has been well established among large grocery retailers. Currently, 23 percent of grocery stores have already adopted self-checkout systems, while an additional 14 percent will likely to adopt within two years (RIS/Gartner 2003). According to another optimistic prediction, almost 90 percent of grocers will have self-checkout lines by 2005 (Schatz 2003). In consumers' part of adoption, nearly 20 percent of the customers at UK Safeway and 46 percent in one store located in Scotland are using self-checkout systems (Hennessy 1998). A recent study based on an online survey completed by 2,120 consumers also showed that the majority of respondents (59.7 percent) prefer to have (including 'must have,' should have,' and 'nice to have' choices) "self-scan and bag products at checkout," while

only 22 percent prefer not to have this shopping feature (Burke 2002, p.425).

Rapid adoption process of SSTs is important for retailers for not to pay all the fixed costs of the technology without getting rid of the existing labor force at an accelerating rate (Lee and Allaway 2002). What are those factors influencing the consumer adoption of SSTs? Customers may be reluctant to adopt SSTs involving greater risks for uncertain benefits without much personal control over the service process. Based on the results of an experiment with a 2x2x2 factorial design using a scenario method, Lee and Allaway (2002, p.557 and 564) argue that

> The greater the controllability [as well as outcome desirability] individuals perceive they have in dealing with a technology-based service innovation, the more positively they will evaluate the innovation in terms of higher adoption intention.

Based on their results of a Delphi technique using five different panels to understand the adoption of SSTs at retail banking in New Zealand, Marr and Prendergast (1993, p.10) had three emerging variables encouraging the adoption:

Time convenience (the ability to perform banking transactions at a time which suits the customer)

Place convenience (the ability to perform banking transactions in a location which suits the customer)

Simplicity of use

The variables discouraging consumer acceptance of technologies were preference of dealing with humans, 'habit' of using human tellers, and privacy (Marr and Prendergast 1993).

Hebert and Benbasat (1994) investigated the factors on the adoption of technology in a health care setting (e.g., a nurse adopting bedside terminals). Based on the results of a forward stepwise regression analysis, the variables in predicting the intent to use point-of-care technology, from the most to the least important, were compatibility, relative advantage, result demonstrability as attitude factors, and nursing director as a subjective norm.

Fenech and O'Cass (2001) and O'Cass and Fenech (2003) examined the predictors of adoption of Web retailing by Internet users. Using a self-administered Web based survey; Fenech and O'Cass (2001) had the results indicating attitude towards Web retailing and perceived usefulness affect the adoption, where the former was a much stronger

predictor than the latter. Davis (1989) hypothesized that perceived usefulness and perceived ease of use were both fundamental determinants of user acceptance of information technology, which were tested on four application programs in computers with two different study samples. His results indicated that the link between usefulness and usage was stronger than the link between ease of use and usage.

Dabholkar, Bobbitt and Lee (2003) compared consumers who plan to use self-scanning regularly to those who do not plan. Compared to nonadopters, findings indicated that adopters perceived self-scanning more reliable, easier to use, more enjoyable and offers a greater control. Speed was very important to both categories, but not a discriminating factor.

Physical effort required for electronic shopping as a TBSS option is much less than the effort spent while visiting a brick-and-mortar store (Darian 1987; Verhoef and Langerak 2001). Therefore, larger physical effort as perceived by customer in a brick-and-mortar store shopping creates larger preceived relative advantage of electronic grocery shopping. Thus, the level of physical effort is a significant determinant of intention to adopt electronic grocery shopping (Verhoef and Langerak 2001).

When Rogers (1995a) published the fourth edition of his well-known book on the diffusion of innovations, there were approximately 3,900 diffusion publications available with three-fourth of which were empirical, and the number is currently growing higher. Rather than listing and discussing many relevant empirical research studies on adoption of technology, at this stage, it will be natural to move into the theoretical foundations of the topic.

Expected service quality of a TBSS option can be an important factor determining the intention to use that TBSS option. Dabholkar (1996) proposed and tested two alternative models of service quality: attribute-based model and overall affect model. In attribute-based model, the relevant factors to customers in using TBSS options, supported by data, were ease of use, enjoyment and control, all leading to expected service quality. In overall affect model, the attitude toward using technological products and the need for interaction with service employee had both a positive effect on expected service quality. Eventually in both models service quality positively influenced the intention to use TBSS option.

Later, Bobbitt and Dabholkar (2001) developed a unifying theoretical framework integrating attitudinal theories to

understand and predict the use of TBSS options, and applied the framework into the Internet (Figure 15). Theory of reasoned action (Ajzen and Fishbein 1980) provided an infrastructure for this integration by simply suggesting that 'attitude toward using TBSS' will have a direct positive effect on 'intention to use TBSS,' and in turn, the latter will have a direct positive effect on 'TBSS behavior,' ignoring subjective norms due to its weak effect on intention (Dabholkar 1991b; Bobbitt and Dabholkar 2001). Adoption of technology will likely to happen, if consumers previously have used similar technologies and formed positive attitudes toward using them (Dabholkar 1996; Bobbitt and Dabholkar 2001). Therefore, in the first place, 'attitude toward using technology' and 'attitude toward using self-service options will have direct, positive effects on 'attitude toward using TBSS.' In the last part of the theory of reasoned action, theory of planned behavior highlights the importance of 'perceived behavioral control' on 'TBSS behavior' (Ajzen 1991; Bobbitt and Dabholkar 2001; Lee and Allaway 2002). Theory of trying (Bagozzi and Warshaw 1990) brings experiences into the picture, tying the consequence of 'TBSS behavior' to 'attitude toward using TBSS' as a feedback. 'Perceived

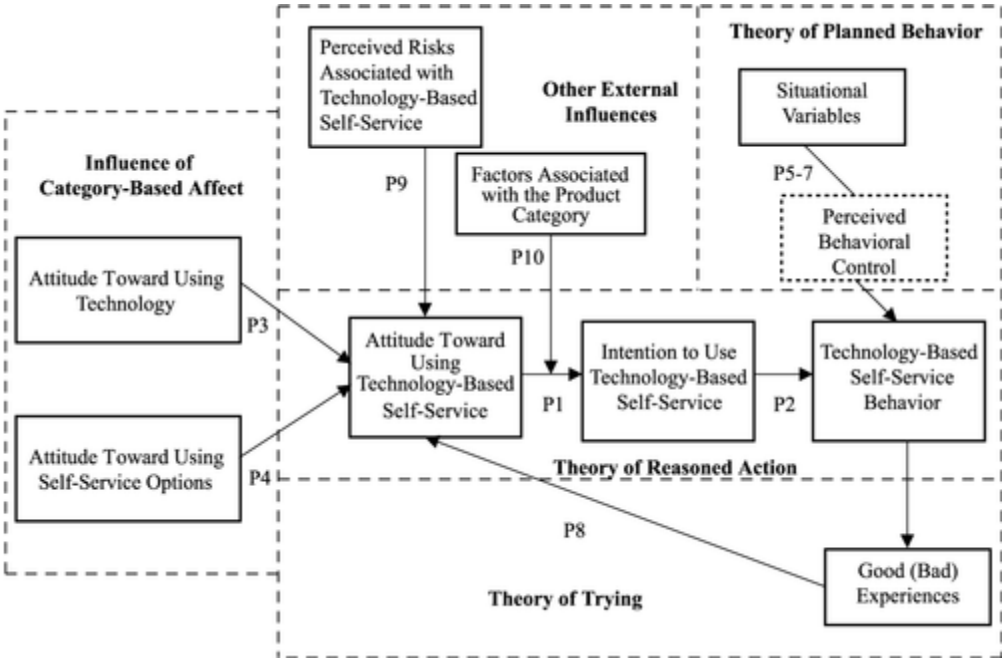

Figure 15: An Integration of Attitudinal Theories to Understand and Predict Use of Tehcnology-Based Self-Service (Bobbitt and Dabholkar 2001)

(financial, psychological, performance and temporal) risks associated with TBSS' will also influence 'attitude toward using TBSS,' while product category related risks can moderate the relationship between 'attitude toward using TBSS' and intention to use TBSS' (Dabholkar 2000; Bobbitt and Dabholkar 2001). Indeed, Dabholkar and Bagozzi (2002) tested the moderating effects of consumer traits (e.g., self-efficacy and need for interaction) and situational factors (e.g., perceived waiting time and social anxiety) on the relationships in an attidudinal model based on the theory of reasoned action (Bobbitt and Dabholkar 2001) and relevant factors (e.g., ease of use and fun) to customers in using TBSS (Dabholkar 1996).

This literature review on the adoption of technology reveals that consumers can change their habits and preferences when they perceive a simple-to-use, at the same time useful innovation has a relative advantage while maintaining its compatibility with the existing alternatives without bringing substantial risk and uncertainty (Davis 1989; Marr and Prendergast 1993; Hebert and Benbasat 1994; Rogers 1995a; Fenech and O'Cass 2001; Lee and Allaway 2002; Dabholkar, Bobbitt, and Lee 2003; Sheth and Mittal 2004). In spite of all the other favorable

characteristics given in a particular technology or system, easy-to-use system providing a greater control to its users may not become more enjoyable when it requires too much effort on the part of the user (customer). Customers do not like spending too much effort in their regular shopping, regardless of the stage in shopping (e.g., walking through the aisles or checkout) (Anitsal and Flint 2003a, 2003b). For time constrained customers, speed is also very important, although it did come through as a discriminating factor between adopters and nonadopters (Dabholkar, Bobbitt, and Lee 2003). However, in our qualitative study, it became apparent that speed is not only important, but also may become a differentiating factor (Anitsal and Flint 2003a). Therefore, the relationships between perceived effort and perceived time related constructs (e.g., physical labor, quality of customer labor, or time savings) are worth to investigate.

Model Proposed to Guide Dissertation

The review of the literature and the existing models of productivity provide a base for the model that has been developed to guide this dissertation. The dissertation

model, A Model of the Customer Productivity, is presented in Figure 16 in summary and Figure 17 in detail. It integrates existing concepts from the literature and also adds modified concepts beyond what is given in current models. The model incorporates four specific stages of using a TBSS option (e.g., self-checkout), all as perceived by customer who participates in service production and delivery: (1) retailer support, (2) inputs by customer, (3) outputs for customer, and (4) overall outcome.

Under the first stage illustrating retailer support, the proposed model incorporates SST performance and contact employee performance as the two major antecedents for the second stage constructs.

Under the second stage demonstrating inputs by customer, there are three constructs each representing different types of customer labor; namely physical labor, cognitive labor, and emotional labor. However, it seems that it will take sometime for retailers to have a control over the emotional labor provided by their participating customers as they already manage, at least to certain extent, the emotional labor provided by their service employees. Once most consumers clearly begin to see the role of their physical and cognitive labor in the service

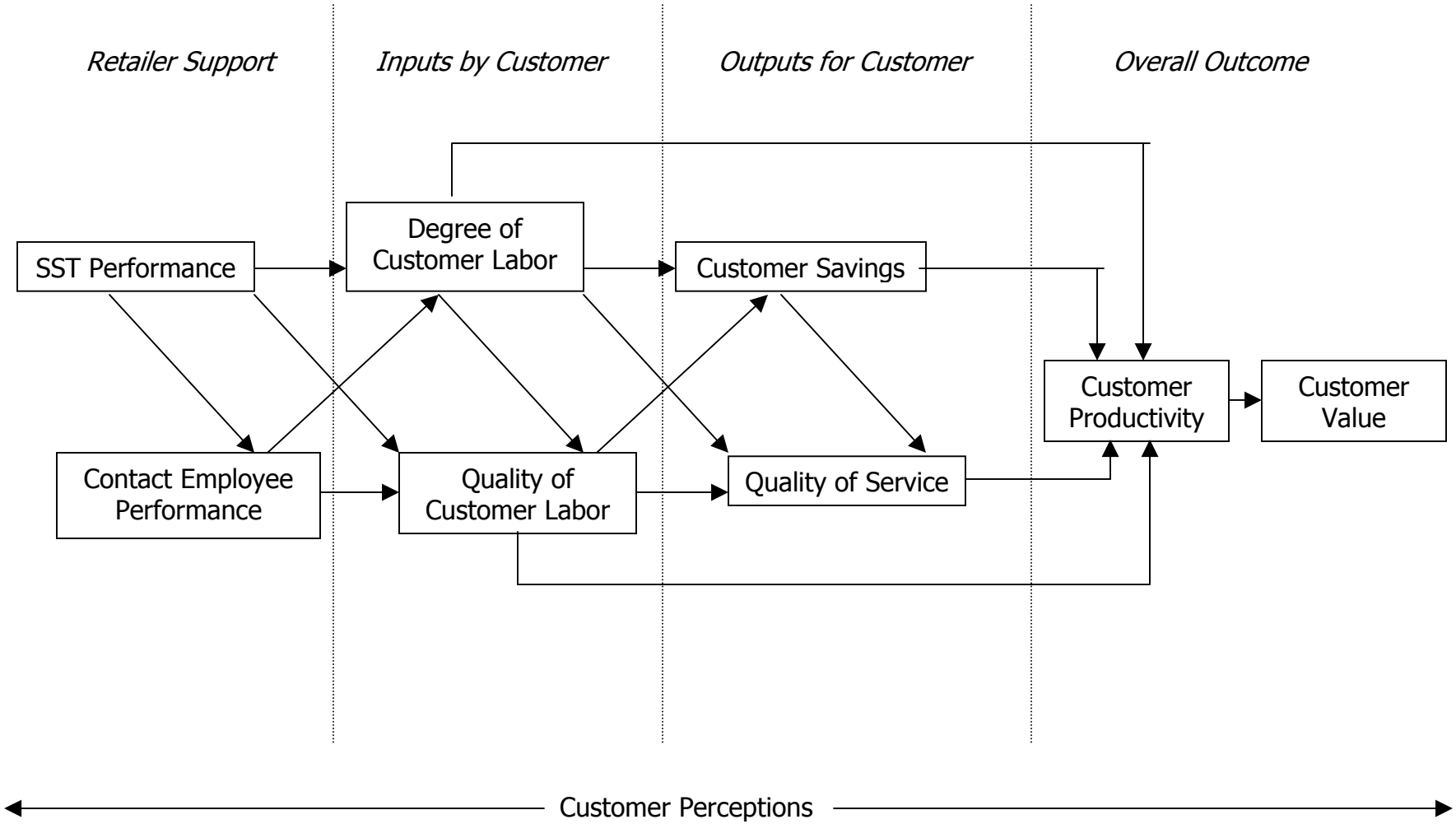

Figure 16: A General Model of the Customer Productivity

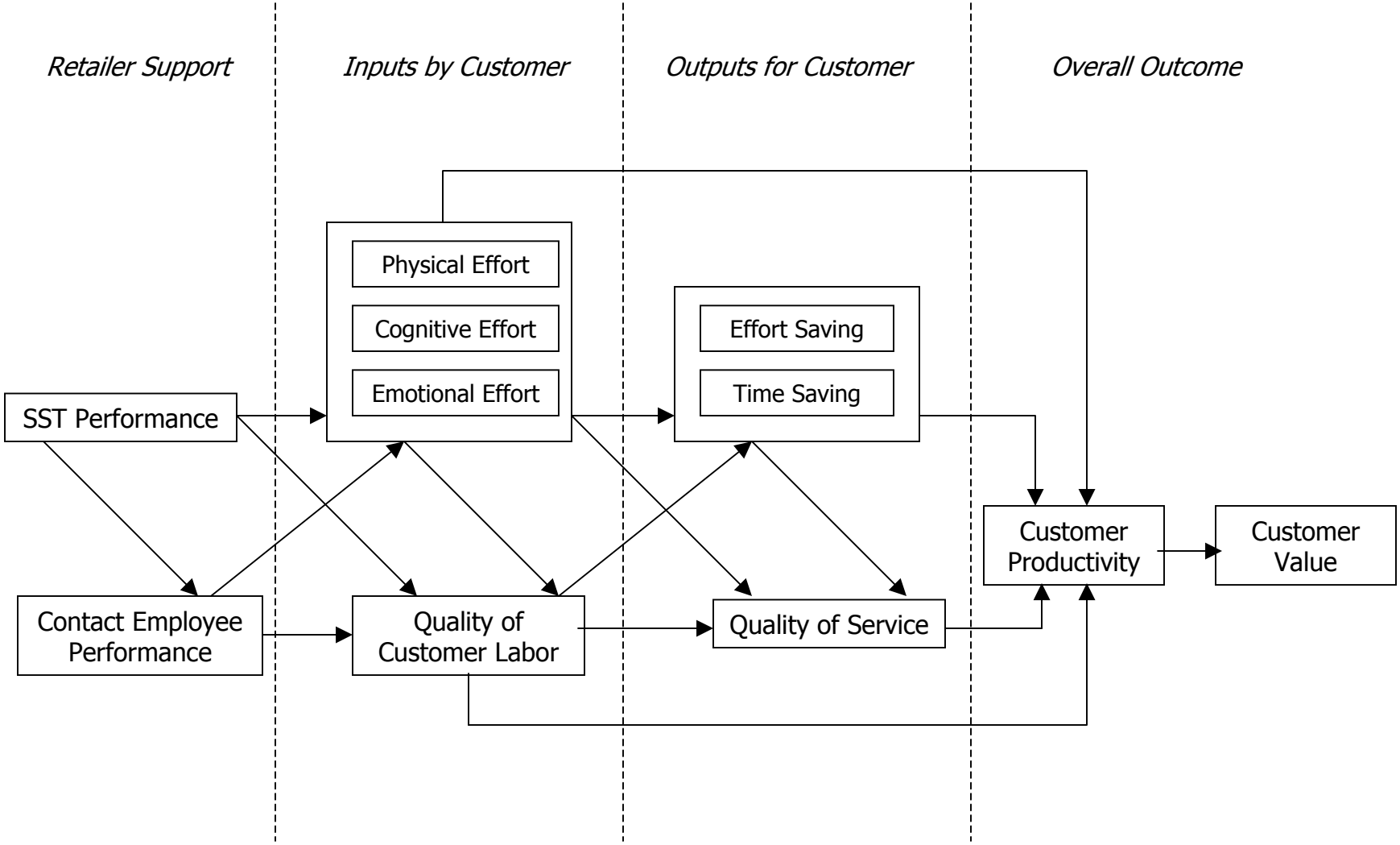

Figure 17: A Detailed Model of the Customer Productivity

environments, they may come to a point to consciously colloborate with service providers on this aspect of emotional labor. Therefore, based on the literature and qualitative findings, the emotional labor is clearly out there in the model, but at this time, it will only be tested in an exploratory manner rather than a full-blown hypothesis testing. Quality of customer labor is also included to represent the overall quality of customer efforts, but it was not differentiated among the qualities of three different customer labor constructs (e.g., quality of physical labor, quality of cognitive labor, and quality of emotional labor), which can be a point of interest in a future study. Under the third stage showing outputs for customer; namely effort saving, time saving and quality of service are included as consequence constructs based on the antecedents given in the second stage. At this stage of the adoption of self-checkout as a TBSS option, money savings are not explicitly demonstrated by retailers, and also not clearly perceived by customers. Therefore, perceived money savings construct may be a research interest of a study at a later time.

The third stage showing outputs for customer is a consequence stage based on the previous stage demonstrating

inputs for customer led by the retailer support in the form of potentially good performing SST and a contact employee.

The last stage illustrating the overall outcome based on the second and third stages, namely customer inputs and outputs, incorporates customer productivity and its potential impact on customer value.

The following sections fully reviews the literature related to each construct in the model. They also discuss the relationships specified in the proposed model, A Model of the Customer Productivity.

Retailer Support

Self-Service Technology Performance

Self-service technology (SST) is essential to the sound operations of technology-based self-service (TBSS) options, and its performance, therefore, should be important. Self-checkout lane as a TBSS option and SST supporting that option are usually taken as one single entity by customers using them, and will also be considered similarly from now on in this study for data gathering and testing purposes. These self-checkouts (or scan-it-yourself

checkout lines, or do-it-yourself lanes) are usually faster than traditional (staffed) checkouts, "partly because many stores limit [customers] to 10 or 15 items, making them de facto express lanes" (Schatz 2003).

SSTs sometimes may not work as they are designed to perform. In the case of self-checkouts (Schatz 2003), a magnetic pad next to the scanner may not neutralize the security sensor; causing security alarms to set off at the store exit. In buying produce, SST may not differentiate clearly enough among different types of similar looking tomatoes despite the existing 'pick-a-veggie picture screens;' leading to incorrect price charges. In scanning a barcode, the movement of an item in the wrong direction across a scanner may cause problems; requiring a system to reset. In slow, but careful scanning while watching out the price details as they appear on the screen, the SST (the self-checkout machine, here) may shut itself down due extended inactivity period based on its internal standards and need to be restarted by an available contact employee with a special code.

In the favorable side (Schatz 2003), SSTs may work as they are designed to perform, and exceed the expectations of reluctant adopters, if not enthusiastic adopters. In its

screen, SST may offer simple, but helpful advice for certain items such as a 22-pound bag of dog food by a handy "Leave large items in your cart" to be scanned by a cashier button. When a customer tries to purchase only one piece out of a three-piece product bundle, which is barcoded differently, SST may quickly flash an "overhead distress light" for human help. "Roomy bagging area" is much better than "cramped counters," but still may not be enough for certain items such as a 5-foot broom. Then, SST may let the customer carry the product to the end of the lane.

Based on both favorable and unfavorable examples given, SST performance can be evaluated objectively with regard to certain criteria. However, what is important in this evaluation should be customer's own perception rather than a set of objective criteria. Schifmann and Kanuk (2000, p.122) define perception as follows:

> Perception is defined as the process by which an individual selects, organizes, and interprets stimuli into a meaningful and coherent picture of the world.

Schifmann and Kanuk (2000) also underline that perceptions are shaped by a highly individual process, where individual's own needs, values, and expectations play an

important role. One single end result, or a number of end results, based on personal observations for the actual or supposed experiences in the use of self-checkouts will form the perceptions (Kasper, Helsdingen, and Vries 1999). Indeed, customer perceptions could be potentially different, depending on their level of SST technology adoption. Enthusiastic adopters and reluctant adopters, for example, may have different 'absolute' and 'differential' thresholds at and in between the regular and self-checkouts as well as within different versions of the self-checkouts. Absolute threshold is "the lowest level at which an individual can experience a sensation" by detecting "a difference between 'something' and 'nothing,'" while differential threshold (or just noticeable difference) is "the minimal difference that can be detected between two similar stimuli" (Schiffman and Kanuk 2000, p.123 and 124). As a result, all constructs presented in the dissertation model, posited in Figure 17, are based on customer perceptions.

SST is the starting point in providing TBSS. Its performance should have an impact on the performance of contact employee helping customers especially for exceptions during the service production and delivery, and

the labor provided by customer. Customer is dependent on SST to initiate and produce the service, and SST will potentially influence all other customer activities at the service encounter. Specifically, both customer efforts in a variety of service tasks and the quality of those efforts should be related to how SST is performing. When SST performs well, a customer will not probably spend too much effort, which will be operational in defining customer labor in this study (Chapter 3), to accomplish regular tasks at self-checkout. This also became apparent in an empirical study (Anitsal and Paige 2004, 2005), which supported that the perceived quality of TBSS environment is essential to increase both the perceived level of support offered by contact employee and the perceived extent of customer participation. Once the quality environment there to attract certain degree of participation from employee and customer, the performance may become the determining factor of the effort to be spent by the customer. Based on the review of the literature, the following hypotheses are developed and tested:

> H_1: SST performance (SSTP) positively influences contact employee performance (CEP).

H2a: SST performance (SSTP) negatively influences physical effort (PE).

H2b: SST performance (SSTP) negatively influences cognitive effort (CE).

H3: SST performance (SSTP) positively influences quality of customer labor (QCUL).

Contact Employee Performance

"To the consumer, [contact employees] *are* the company," acting as a link between company and customer. "When something goes wrong, …… it is the contact person …… to whom the customer will likely turn" (Berry, Zeithaml, and Parasuraman 1985, p.48). Contact employees are also essential to the sound operations of technology-based self-service (TBSS) options, and her/his performance, therefore, should be important. Indeed, at this current stage advancement of existing self-checkouts, contact (support) employees are crucial human elements to customers using those SSTs and become apparent in the following quotes (Anitsal and Flint 2004):

Lillian: You can't question a computer outside of what it knows, you know.

Hector: Sometimes, if you run an item through and you have put it in the bag, it'll [SST] say please bag

> your item and you're like well, I did and you can't say well, . . . you can't converse with it.

Contact employee can act as a "traffic cop to keep people moving" and direct customers to open registers, making self-checkout a fast service (Schatz 2003). Moreover, a knowledgeable, skillful and willing contact employee, who is better equipped with FST option in enabling customers use their SSTs, can perform favorably in helping customers. They can help customers solve the problem, when the menu on SST screen does not show a particular product. They can reset the system, when an error or call for help messages appear on screen due to an item scanned in the wrong direction or too long idle time elapses between the purchases of two items, respectively. They can override the price or use their initiatives in giving an item free of charge, when a particular item is scanned at a price more than the sale price. Customers can consistently deliver good service when the retailer has a sound and performing infrastructure in terms of SST and the contact employee (Xue and Harker 2002).

Contact employee performance is important in delivering good service quality (Berry, Zeithaml, and Parasuraman 1985; Bitner, Booms, and Mohr 1994) and

ultimately in creating satisfied customers (Keaveney 1987). These support employees can directly influence the quality of service interactions through their attitudes, behaviors, and expertise (Brady and Cronin 2001). Indeed, contact employees may impact customer labor and its quality during service delivery and production, particularly when there is a reluctant adopter, who is novel in the use of a TBSS option. In the case of the enthusiastic adopter, who is quite an expert in the use of self-checkout, contact employee should be more helpful in handling 'exceptions' or 'problems'. Still in both cases, higher contact employee performance will likely help customers reduce their physical and cognitive efforts in co-producing the service. A contact employee can assist customers with their service tasks, and may save customers time by reducing their efforts (Beatty, Mayer, Coleman, Reynolds, and Lee 1996). Based on the qualitative findings (Anitsal and Flint 2003a, 2003b) and the review of the literature, the following hypotheses are developed and tested:

> $H4_a$: contact employee performance (CEP) negatively influences physical effort (PE).
>
> $H4_b$: contact employee performance (CEP) negatively influences cognitive effort (CE).

H5: contact employee performance (CEP) positively influences quality of customer labor (QCUL).

Inputs by Customer and Outputs for Customers

A service is "a deed, a performance, or an effort" (Rathmell 1966, p.33). In services marketing in general and in TBSS environments in particular, "consumer performance should be a key construct" (Bateson 2002). A customer, who chooses to participate in service production and delivery, incurs an expense, rather than s/he acquires an asset (Rathmell 1966). "A service is an act," (Rathmell 1966, p.33) that requires an effort and other crucial customer inputs (Xue and Harker 2002), in turn customer desires to experience an acceptable level of service performance (Parasuraman 2002).

Customers increasingly play an active role in service production and delivery (Nachum 1999a; Xue and Harker 2002) in TBSS environments, and naturally induce a certain degree of input uncertainty for service organizations (Larsson and Bowen 1989; Bateson 2002) as defined as follows:

> Customer-induced input uncertainty is the organization's incomplete information about what, where, when and how customer input is going to be

> processed to produce desired outcomes (Larsson and Bowen 1989, p.217).

Specially, Larsson and Bowen (1989) suggested the following service concepts in resolving these uncertainties: customer's supplies of object, place, time and labor as well as customer's desired object, place and time outcomes. These service concepts shed a light into discussions of customer inputs (sacrifices) and outputs (benefits).

The typology of service interdependence patterns matching input uncertainty (Larsson and Bowen 1989, p.221) puts TBSS options into a sequential standardized service design cell, in a 2x2 matrice, with high customer disposition to participate and low diversity of demand. As long as customers have an adequate level of ability to perform their service tasks and role clarity on what to perform based on tightly specified scripts[5], they can serve themselves after the retailer have provided appropriate SST in a TBSS encounter and a contact employee has given necessary ad hoc service support (Larsson and Bowen 1989; Bateson 2002). This way, customers potentially become "a

[5] "A script is a representation in memory of a series of actions to be performed in a particular event" (Bateson 2002, p.207).

useful source of productive capacity" (Bateson 2002, p.206) for retailers, and for themselves, too.

In measuring service productivity, there should be a balanced focus on the quantity and quality of inputs as well as the outputs they produce (Coates 1991). From a retailer's perspective, for example, sufficient amount of quantity and level of quality of customer contacts without "rushing customers, transferring calls improperly just to get rid of them, and providing any answer rather than taking the time to research the correct answer" (Coates 1991, p.23) should produce a good number of satisfied customers as desired a outcome at the end. Similarly, in measuring customer productivity, a balanced focus on customer labor and its quality can be expected to produce at least a sufficient level of customer savings and service quality. Specifically, customers as co-producers, for example, are expected to maximize the number of items scanned without entering incorrect PLU numbers, scanning unexpired coupons, or bagging only scanned items and still to save time and effort and receive good quality of service as perceived by them (as consumers, not as co-producers this time).

Inputs by Customers

Inputs provided by customers during service production and delivery can be defined as (Keh and Teo 2001, p.371),

> The amount of "work" performed by the customer while patronizing a retail establishment.

A customer spends less effort in a departmental store than in a discount store while shopping due to the former has higher availability of store employees and better store layout than the latter (Keh and Teo 2001). Indeed, it becomes apparent that labor provided by customers can be defined in different ways. 'Action' showing whether a specific service task is accomplished or not would provide one base to define labor provided by customers. Another base to further elaborate the definition of customer labor would come from the'amount of work' done in rendering technology-based self-service. The exploratory qualitative works (Anitsal and Flint 2003a, 2003b, 2004) support that 'effort' spent in co-producing the service becomes a key issue for many participating customers. It seems that the customer effort is more important than the amount of the work or the work itself; therefore, customer inputs

definition should incorporate 'effort' required rather than a mere 'amount' of the work done (Figure 17).

Degree of Customer Labor

The input aspect of productivity includes capital (e.g., money spent by customer) and labor (customer labor) (Vuorinen, Jarvinen, and Lehtinen 1998). As an important nonmonetary cost, customer labor requires participating customers' effort, or energy expenditures (Berry, Seiders, and Grewal 2002). Labor provided by customers as co-producers or partial employees include three different types of customer inputs; physical inputs, mental inputs, and emotional inputs (Rodie and Kleine 2000). Among those customer inputs in each category, only relevant types of efforts, namely physical effort, cognitive (mental) effort and emotional effort will be taken into account within this study (Mohr and Bitner 1995; Rodie and Kleine 2000; Berry, Seiders, and Grewal 2002; Parasuraman 2002). Moreover, customers also spend their time, while waiting in line, as inputs into the service process (Parasuraman 2002), although they may not be able to provide their active labor

as a customer during this waiting period. Thus, time is left out.

Drawing from quantity of inputs discussion from a retailer's viewpoint (Vuorinen, Jarvinen, and Lehtinen 1998), customer labor from a customer's perspective can traditionally be operationalized as number of items searched in store and picked from shelf as well as unloaded from a shopping cart, scanned at a self-checkout, waited on for contact employee help, bagged after payment, customer overtime (helping other fellow customers) among other things, or simply customer labor hours spent, beyond the money provided. However, in this study, customer labor will be taken in terms of perceived effort spent by customer as a co-producer, rather than the mere amount of all these activities based on a composite and an objective quantity measured by retailer or calculated by customer.

Effort is a relevant input to an exchange (Berry, Seiders, and Grewal 2002) and the "attempt to maintain equality" is obviously important in restricted marketing exchanges (e.g., retailer versus consumer) (Bagozzi 1975, p.33). In evaluating the "service investment" from a customer's perspective, asking the following question is vital (Lengnick-Hall, Claycomb, and Inks 2000, p.360):

> How much effort must I put forth to realize any benefits from my association with the organization?

Effort is a well-known construct in motivation theories, and can be defined in the following way (Mohr and Bitner 1995, p.240).

> Effort is defined as the amount of energy put into behavior or series of behaviors.
>
> Perceived effort is defined as the amount of energy an observer believes an actor has invested in a behavior.

If equity is an important component of satisfactory exchange (Oliver and Swan 1989), then the more effort one party exerts, the more outcome s/he expects in return (Mohr and Bitner 1995; Berry, Seiders, and Grewal 2002). According to equity theory, developed by J. Stacy Adams, "a state of equity exists whenever the ratio of one person's outcomes to inputs equals the ratio of another's outcomes to inputs" (Daft 2000, p.543). When there is a perceived inequity, a customer, for example, can change inputs (changing the levels of physical, cognitive and emotional labor as well as the quality of customer labor), change outcomes (asking retailers for higher effort saving and

time saving), distort perceptions (distorting the level of others' rewards to reach a balanced equity), or leave (choosing not to participate in the service co-production) (Daft 2000).

According to expectancy theory, associated with the work of Victor Vroom, there is a relationship between effort, performance and the desirability of outcomes. Specifically, this can be explained in the following way (Daft 2000).

> E [Effort] → P [Performance] involves whether putting effort into a task will lead to high performance (p.544).
>
> P [Performance] → O [Outcomes] involves whether successful performance will lead to the desired outcome (p.545).

Specifically, E → P holds if a customer, for example, truly believes that with sufficiently hard work in the use of self-checkout, s/he can get effort saving, time saving or quality of service as an indicator of the performance accomplished. Similarly, P → O holds if effort saving, time saving or quality of service is sufficient to generate higher customer productivity as an overall outcome.

Effort is also an important construct for attribution theory (Mohr and Bitner 1995) in explaining the self-serving attribution bias (Bitner, Booms, and Mohr 1994). According to the theory, customers as co-producers are likely to take credit for success (internal attribution, or self-enhancing bias) and deny responsibility by crediting failure to others or outside events (external attribution, or self-protecting bias) (Bitner, Booms, and Mohr 1994; Schiffman and Kanuk 2000).

Mohr and Bitner (1995) conclude that "customers frequently do notice and think about the service employer's effort level." When customers put themselves in the shoes of contact employees to a certain extent as partial-employees co-producing the service, a similar perception may occur.

Xue and Harker (2002) underline that the role of customers as partial employees co-producing the service is important, and therefore their efficiency should influence the quality of service. At ebay.com, for example, customers serve other fellow customers directly by performing a number of activities. They post product information before the auction, bid, and contact each other after the auction. They further pack, ship, charge, and write reviews.

For particular services that customers are familiar with and can use without much expertise, higher levels of customer participation will generally lead to higher levels of service quality as perceived by customers (Dabholkar 1990; Claycomb, Lengnick-Hall, and Inks 2001). Results of the empirical tests indicated that customer participation is important in directly increasing perceived service quality (Dabholkar 1991a; Claycomb, Lengnick-Hall, and Inks 2001).

Thoughts on Emotional Labor

Emotion in the workplace is crucial, and especially "the manner in which one displays feelings has a strong impact on the quality of service transactions" (Ashforth and Humphrey 1993, p.88). Certain emotional reactions are expected from service employees in terms of range, intensity, duration and object of emotions (Hochschild 1979). Indeed, consumers may expect to have cheerful and friendly flight attendants, somber and reserved funeral directors, empathetic and supportive nurses, and cold and hostile bill collectors (Ashforth and Humphrey 1993).

A service employee has to publicly display the appropriate emotions in service production and delivery regardless of "what emotions are actually felt." This emotional labor can be defined in the following way (Ashforth and Humphrey 1993, p.80):

> Emotional labor is the display of expected emotions by service agents during service encounters.

Another definition for emotional labor is more descriptive (Mann 1997, p.4):

> Employees are expected to conform to [certain] expectations about emotional display even when they conflict with inner feeling. When this conflict results in individuals suppressing genuine emotion or expressing fake emotion, the work or effort involved doing so is termed "emotional labor."

The focal point here is the "behavior" rather than the "emotions underlying the behavior" (Ashforth and Humphrey 1993, p.90).

A service employee may genuinely feel the expected emotion. Otherwise, emotional labor can be performed by one of two unique ways: surface acting and deep acting, focusing on outward behavior and inner feelings,

respectively. Surface acting creates "emotive dissonance" (Hochschild 1983), "the sense of strain caused by portraying feelings that are not felt" (Ashforth and Humphrey 1993, p.107), while deep acting requires a greater psychic effort (Hochschild 1979, 1983; Ashforth and Humphrey 1993). Ashforth and Humphrey (1993, p.92 and 93) state the two forms of acting in the following way:

> Surface acting involves simulating emotions that are not actually felt, which is accomplished by careful presentation of verbal and nonverbal cues, such as facial expression, gestures, and voice tone.
>
> Deep acting [involves] attemp[ing] to actually experience or feel the emotions that one wishes to display.

Service providers can help service employees learn emotional labor directly through training, feedback and rituals, or indirectly through stories and observation. Variety and intensity of emotions are likely to come from experience in service performance. Rewards and reprimands will help internalization of and compliance with display rules (Ashforth and Humphrey 1993).

Customers as partial employees closely interact with contact employees as well as other fellow customers in TBSS environments. Since customers increasingly actively

participate in service production and delivery, their emotional labor should be important in services as well. Indeed, it is apparent that customers do provide all three types of customer labor (physical, cognitive and emotional) when they use self-checkouts (Anitsal and Flint 2003b). Drawing Kelman (1958) and Mann (1997), a service investment requires physical labor at the lowest level, cognitive labor at a higher level, and emotional labor at the highest level. Currently, it seems that retailers do not intend to control the emotional labor provided by customers, and customers as partial employees do not care much about their emotional labor in the same manner they care about their physical and cognitive labor. Although one can eventually propose three hypotheses similar to hypothesis 6, 7, and 8 for emotional labor, those potential relationships will only be investigated in an exploratory sense within the scope of this study.

Based on this review of the literature, the following hypotheses are developed and tested:

H_{6a}: Physical effort (PE) positively influences quality of customer labor (QCUL).

H_{6b}: Cognitive effort (CE) positively influences quality of customer labor (QCUL).

H_{7aa}: Physical effort (PE) positively influences effort saving (ES).

H_{7ab}: Physical effort (PE) positively influences time saving (TS).

H_{7ba}: Cognitive effort (CE) positively influences effort savings (ES).

H_{7bb}: Cognitive effort (CE) positively influences time saving (TS).

H_{8a}: Physical effort (PE) positively influences quality of service (QS).

H_{8b}: Cognitive effort (CE) positively influences quality of service (QS).

Quality of Customer Labor

Based on the discussion with regard to the quality of service inputs from a retailer's viewpoint (Vuorinen, Jarvinen, and Lehtinen 1998), quality of customer inputs from a customer's perspective can be simply defined as a customer's perception of her/his own performance quality as a co-producer. This performance will be dependent on a number of criteria such as clear understanding of their roles, current level of expertise and skills, completed training activities and teamwork with a contact employee in a given corporate culture of retailer (Kelley, Skinner, and Donnelly 1992; Vuorinen, Jarvinen, and Lehtinen 1998).

Customers can contribute to quality of service through "customer technical quality" (what they do) and "customer functional quality" (how they do it) (Kelley, Donnelly, and Skinner 1990; Kelley, Skinner, and Donnelly 1992). Kelley and his colleagues coined the terms for two different customer quality components based on Gronroos's (1983) earlier conceptualization of service quality, since the service is now actively being produced by a "service customer," not a service employee. Specifically, customer technical quality involves what a participating customer provides to the service encounter in terms of physical inputs, labor performance (e.g., completing a loan application at a bank), and mental inputs, information (e.g., providing tax documents to an accountant). Customer functional quality involves how a participating customer behaves at the service encounter during service production and delivery in terms of emotional inputs (e.g., interpersonal aspects such as courtesy, friendliness, and respect) (Kelley, Skinner, and Donnelly 1992; Rodie and Kleine 2000). Based on this review of literature, it becomes noticeable that either two types of the quality of customer labor (technical quality and functional quality of customer labor), or three types of the quality of customer

labor (quality of physical labor, cognitive labor and emotional labor) can be further investigated. Within the scope of this study, one overall quality of customer labor will be examined and differentiations among quality types will be left to another study within a program of research till after three customer-labor types are established as separate constructs in a TBSS environment.

Within a broader concept of customer participation, increased customer labor and its quality are expected to create outcomes leading better quality of service. However, there may be one exception with regard to the impact of customer labor on service quality. When a customer has to "re-initiate the service" or "intervene in the service process" just because of a service failure or inconsistency forcing customer to spend more effort to perform normally an ordinary service task, increased labor is likely to cause poor service quality perceptions (Broderick and Vachirapornpuk 2002). This will also prevent the customer reaching higher levels of satisfaction just because s/he "must put forth extra or unexpected effort to prevent or overcome service failure" (Rodie and Kleine 2000, p.114). As a result, quality of labor provided by a customer can enable her/him to save effort by doing the right thing the

first time and to gain time by being able to better control different service tasks, while enhancing perception of service quality.

Based on this review of the literature, the following hypotheses are developed and tested:

$H9_a$: Quality of customer labor (QCUL) positively influences effort saving (ES).

$H9_b$: Quality of customer labor (QCUL) positively influences time saving (TS).

$H10$: Quality of customer labor (QCUL) positively influences quality of service (QS).

Outputs for Customers

Customer Savings

Vuorinen, Jarvinen, and Lehtinen (1998) assume customers generally buy one unit of service output (e.g., a haircut or a holiday tour), and therefore ignore service output in terms of quantity as a significant issue. Further, they assume that customers basically give priority to quality of service rather than its quantity. However, services cannot be treated as discrete products that can be instantly purchased once customer pays for it. Regardless

of the length of process, services are continuous processes and customers should pay attention to what they get in quantity representing money, time and effort gains from a particular service.

Based on quantity of outputs discussion from a retailer's viewpoint (Vuorinen, Jarvinen, and Lehtinen 1998), customer savings from a customer's perspective can be defined as number of items bought, number of employee contacts[6] made by customer, time and money saved among other things. However, in this study, effort savings as well as time saving will be taken in terms of a composite quantity of all these activities as perceived by customer.

Money Saving

Consumers often seek to optimize their shopping outcomes. Expectation of money savings is a common motivation in searching for information and incentives (Putrevu and Lord 2001). Within the context of TBSS options (e.g., self-checkouts), customers can save money by obtaining an additional product (a complimentary balloon

[6] Some customers using self-checkouts may unfavorably treat these contacts with service employee, especially in traditional checkouts.

for the kid) or service (getting rid of accumulated loose coins) for free and getting a special price break (store discount coupons printed by SST based on purchasing history). Customers will also have a chance to better control prices of scanned items at their own pace, preventing potential losses from incorrect prices. All those examples are indicators of indirect money savings.

Rodie and Kleine (2000, p.119) highlight the importance of time and effort savings in relation to the monetary aspect.

> Most consumers find operating an ATM less costly in time and effort than interacting with a teller; indeed, many are willing to pay a service fee for the privilege of ATM usage.

Many service providers still think in a similiar manner by charging customers for using TBSS options, or at least by not sharing their TBSS related savings with customers. Money savings, in general, are very important for the majority of consumers in regular shopping (Anitsal and Flint 2003a). However, as encouraged by retailers, there is ignorance by consumers, on TBSS related money savings. Due to this reflection on the money savings, the study will

also ignore 'money savings' as a construct in the dissertation model for the time being.

Effort Saving

The following quotes from our qualitative study support the preliminary findings that customers, doing their regular shopping, try to save their effort rather than exerting a lot of energy into the service process when it is possible, and in turn, this may also help them save time.

> Julius: If the lines [for regular and self-checkout] were equal I would prefer whichever one I'm closest.
>
> Joy: If it's under $10, I'll use *cash* usually [at self-checkout]. But when I use cash, I have to slide it in like you do on a vending machine or a Coke machine, and it never goes in. It's always spitting it back out at you and you have to straighten your dollars.
>
> If I only got one or two items, I don't want to use the *check*. It's one less thing that I have to write down in my checkbook for balancing and stuff.
>
> [Over $10], I use *debit card* mostly. I like debits, because I don't have to sign. I just type in my number.
>
> I sometimes use *credit card*. If I use credit, I always have to sign. But if I use debit, then I just type in my PIN number that goes with my card.

On the basis of our qualitative study, it is reasonable to expect effort saving to affect quality of service.

> H_{11a}: Effort saving (ES) positively influences quality of service (QS).

Time Saving

Consider the following two passages from Levine (1997, p.102 and 106, respectively):

> Time is money. ... Workers are paid by the hour, lawyers charge by the minute, and advertising is sold by the second.

> In Communist Poland, for example, I once watched people wait more than two hours for the privilege of buying a pair of shoes (and "no time for trying on, please"). As soon as they left the store, many lucky customers turned around and offered their purchases at black-market prices. The resale price, I learned, was simply calculated by how long the original buyer had to wait in line.

Nowadays, many consumers are more task-oriented in their shopping, doing less recreational shopping. As also supported by our qualitative findings (Anitsal and Flint 2003a), "for precision shoppers, shopping has become a strike mission: get in, find what you want, buy it, get

out" (Seiders, Berry, and Gresham 2000, p.82). Thus, time saving is increasingly becoming more important for time-scarce consumers (Reynolds and Beatty 1999), and 52 percent of consumers are likely to spend less time in shopping just to be able to allocate more time for other uses (Seiders, Berry, and Gresham 2000).

In a recent study using critical incident technique to understand satisfaction on consumer interactions with TBSS options, "saved time" became a major category having the largest percentage share in total satisfying incidents, which was a way above those of other groups with multiple categories (Meuter, Ostrom, Roundtree, and Bitner 2000). Brady and Cronin (2001) also found that perceived waiting time (wasting time in one sense) had a direct influence on service outcome quality, and service outcome had a direct contribution on perceived service quality. Thus, time saving is expected to have a positive impact on quality of service as perceived by customers.

H11b: Time saving (TS) positively influences quality of service (QS).

Overall Outcome

Customer Productivity

Fair treatment of customers in the same customer segment is important for customer satisfaction and long-term loyalty. Customer reactions to unfair treatments will likely to be immediate, emotional and enduring (Seiders and Berry 1998). Therefore, outcome of service allocations should be distributed in justice between retailer and customer. Moreover, participating customers should be treated by principles of equality (being entitled to the same outcome) and equity (equal rewards based on labor contributions in the exchange) based on customer needs (proportional rewards to needs) (Seiders and Berry 1998). Service fairness, "customer's perception of the degree of justice in a service firm's behavior" (Seiders and Berry 1998, p.9), becomes an issue for customer productivity.

Nachum (1999a; 1999b) highlights the importance of client (customer) inputs and outputs in a measure of productivity. Organizations may prefer to focus on the number of activities performed in general, or the number of calls answered, the quantity of service calls made and the

average time of a customer interaction in particular (Coates 1991). Similarly, a customer at the self-checkout may take into consideration the number of items scanned, the number of fellow customers helped and the average time spent with SST. Those outputs can be compared to the inputs provided into the system. In the case of customer participation in a TBSS environment, potential inputs may include capital (money, or even time), customer labor, and quality of labor (Vuorinen, Jarvinen, and Lehtinen 1998). All these represent important service related activities, but alone should not be sufficient for productivity measurement, unless the effectiveness of the service is measured (Coates 1991). How effectively the desired outcomes are achieved can be assessed by a single construct, the customer productivity. Customer productivity is an outcome, ideally representing the overall perceived consequence of a number of customer inputs of and outputs from service production and delivery. Customer perception of her/his self-productivity can overcome the difficulties of measuring inputs and outputs existing within the service-oriented productivity concept, mentioned in Figure 6. Indeed, overall perception of self-productivity as the "final product" can remove the difficulty to relate input

and output amounts as the "process or activities," but still give a reflection of the big picture on productivity (Coates 1991). In the dissertation model, selected dimensions in the form of independent constructs of customer inputs and outputs (e.g., customer labor and customer savings) can tighten the potential relationship between the overall measure of customer productivity and its traditional components.

Customers make an investment when they choose to participate in service production and delivery. This 'service investment' (e.g., hours spent and number of activities) is based on both time and breadth of customer participation (Lengnick-Hall, Claycomb, and Inks 2000). Lengnick-Hall and her friends empirically tested the relationship between service investment and perceived personal beneficial outcomes, and predicted a significant positive relationship between those. Specifically, service investment was significantly related to personal development, social development, and development of new skills/ abilities. Keh and Teo (2001) also posited that customers who spend greater effort during service production and selivery attribute greater value to it. However, there was no significant relationship between

service investment and the outcome of value development (Lengnick-Hall, Claycomb, and Inks 2000). Customers as partial employees effectively performing their roles increase productivity (Manolis, Winsor, and Kelley 1996). Customer productivity measured as an immediate outcome consequence to customer inputs and outputs may potentially explain this result by eventually leading to customer value measured as an overriding overall goal for a customer.

Drawing from the conceptualizations on service productivity (Vuorinen, Jarvinen, and Lehtinen 1998; Gronroos 2000; Gronroos and Ojasalo 2002) and customer productivity (Martin, Horne, and Chan 2001; Parasuraman 2002; Xue and Harker 2002), customers doing their regular shopping (not shopping for hedonic purposes) are expected to limit their labor and probably its quality, while increasing their savings in the form of time and effort as well as the quality of service.

Based on this review of the literature, the following hypotheses are developed and tested:

H_{12}: Quality of service (QS) positively influences customer productivity (CP).

H_{13}: Quality of customer labor (QCUL) positively influences customer productivity (CP).

H_{14a}: Effort savings (ES) positively influences customer productivity (CP).

H_{14b}: Time saving (TS) positively influences customer productivity (CP).

H_{15a}: Physical effort (PE) negatively influences customer productivity (CP).

H_{15b}: Cognitive effort (CE) negatively influences customer productivity (CP).

Customer Value

The customer value hierarchy captures the key aspect of customer value (Woodruff 1997). In this hierarchy, customers' goals and purposes are based on desired end states (Woodruff 1997; Gardial and Woodruff 2003) (Woodruff 1997; Gardial and Woodruff 2003), which will be instrumental in measuring desired customer value as perceived by customers in this study. Desired end states may be peace of mind, feeling good or enhanced self-esteem for consumers, and continuous improvement, profitability, longevity/success, customer responsiveness or responsibility to stakeholders for busineses (Woodruff and Gardial 1996; Mentzer, Rutner, and Matsuno 1997; Botschen, Thelen, and Piters 1999; Stahl, Barnes, Gardial, Parr, and Woodruff 1999; Gardial and Woodruff 2003). Desired end-

states are important for customers and also appeared in our qualitative study:

> Hector: You can't really back those things [trailers] out easily. If I'm on the road, I'm always looking for somewhere that has enough space I can get in and out. The trailer's like thirty-four foot and that it's a big trailer, so it is one of my biggest things is conveniently getting in and out as far as space wise with the trailer is concerned.
>
> If your gas is cheaper and you can turn your rig around, [that's better for me, because] it's just *peace of mind*.

Desired product/ service attributes and attribute performances at the lowest level, desired consequences in use situations at the middle level, and customers' goals and purposes at the highest level can provide customer satisfaction based on received value at individual levels of value hierarchy (Woodruff 1997). One of the major concerns in this dissertation is to test the potential link between customer productivity (as a consequence) and perceptions of received customer value (as an end-state). Indeed, Holbrook (1994; 1999) considers efficiency and excellence as two out of eight value types in consumption experience. Those two types of value can be further combined under the concept of customer productivity, which

can provide received value to particular consumers at the consequence level, and potentially received value at the end-state level.

Based on this review of the literature, the following hypothesis is developed and tested:

> H_{16}: Customer productivity (CP) positively influences customer value (CV).

CHAPTER 3

RESEARCH METHODOLOGY

The purpose of this dissertation research is to test the hypotheses developed in the previous chapter. Those hypotheses predict the relationships between the variable of interest with regard to customer perceptions of self-productivity as reflected in the conceptual framework. Specifically, the purpose of this chapter is to clarify the research methodology in terms of the procedures used to refine measurement, and gather and analyze data.

This dissertation draws upon some previous interlinked studies (Anitsal and Flint 2003a, 2003b, 2004) which utilized a grounded theory orientation (qualitative study that heavily borrowed upon techniques used in grounded theory methodology) to examine the customer productivity phenomenon with regard to the emerging service of TBSS options in grocery stores. Based on these qualitative insights and the extant literature on productivity, service productivity, customer participation in services, service quality, customer value, TBSS options and adoption of technology, this dissertation employed survey research

design to quantitatively assess the relationships among the variables outlined and hypothesized in the model.

Exploratory Qualitative Study Design

The grounded theory orientation (Strauss and Corbin 1998) toward discovery (Anitsal and Flint 2003a) was utilized to understand customer productivity, and the labor provided by customers as a new and complex phenomenon. The purpose was to discover meanings related to self-productivity and customer labor in self-service shopping and TBSS environments. Rather than beginning the research project with a preconceived theory in mind, or allowing the theory to emerge completely from data, representing the two research design boundaries in two extremes, a middle ground approach has been employed in this study. Specifically, some qualitative research was necessary to ensure the researcher has primary exposure to the phenomenon before borrowing from the literature (e.g., on productivity conceptualization in manufacturing and service industries) to develop a theory applied to customer productivity. Therefore, this qualitative research did not involve a complete theory development effort, but still provided

insights that enhanced understanding the phenomenon and faciliated the identification of key constructs based on not only personal experience and secondary data, but also qualitative understanding of the customer productivity phenemenon.

Research Questions

The purpose of the qualitative study was to answer the question, "What is the meaning of customer productivity?" Based on this general umbrella question, a number of surrounding questions were asked to informants for a better understanding of the phenemenon. Do customers care about their own productivity? If they care, do they think that their productivity is important in their shopping activities? How do customers treat their own productivity in TBSS environments? What is the meaning of customer labor? How do customers provide their labor when they choose to participate in service production and delivery? Why do customers provide labor? What do customers expect when they provide their labor in service settings?

Sample

Our purposive sample included nine informants, who were aware of TBSS options (e.g., self-checkout) and used them, and were also willing to share their actual shopping experiences with us. The overall goal was to look for variance of ideas (incidents, events, or happenings) rather than variance of people (e.g., gender differences) (Strauss and Corbin 1998). But still, the sample of the study included informants from diverse backgrounds in terms of age, gender, education, occupation, and marital status as well as their proficiency in the use of TBSS options (Appendix A). Unlike statistical sampling, sample size that allows reaching theoretical saturation was evolved as the research progressed.

Data Collection

The qualitative study included three-stage data collection episodes for each informant: (1) an initial depth interview, (2) an observation of an in-store shopping experience, and (3) a post-shopping depth interview (Appendix A).

Twenty-three interviews were conducted in all, lacking four interviews for the two defecting informants after the

first stage of data collection. Colleagues reviewed each interview guide before it was utilized. Each interview also became more focused as we went through the three-stage research process, which lasted approximately two hours for each participant. In-store observations followed one week after the initial interviews, and the post-shopping interview was held immediately after the in-store observation. Observations were done in the most preferred store for each informant. All interviews were audio-recorded. Then, interviews and observation notes were transcribed verbatim.

Data Analysis

In grounded theory methodology, data coding is the starting point in providing an infrastructure for systematic comparisons. The coding process involves three consecutive types of coding activity: (1) open coding, (2) axial coding, and (3) selective coding (Strauss and Corbin 1998).

Open coding began as soon as each verbatim transcript became ready. Over 300 total pages of interview transcripts were saved as a text file into the computer. Data analyses

were initially facilitated by utilizing ATLAS.ti (visual qualitative data analysis, management and theory building) software (Muhr 2003). In the first wave of data collection from seven informants based on 19 interviews, 170 categories of meaning with 523 occurrences were coded in the open coding phase. Later, the categories of meaning were linked into 35 themes in total within 8 major categories abstracted.

In axial coding, the ultimate goal was to relate categories to subcategories as well as major categories to each other. At this stage, some additional data were collected by going back to the field. In the second wave of data collection, four more transcripts from two additional informants were added into analyses.

In selective coding, the selected categories were integrated into a theoretical framework, also drawing from the extant literature. This level of coding also helped crystallizing the second wave of data collection and further axial coding.

Assessing the Rigor of Qualitative Study

The trustworthiness of the study and findings can be assessed by certain criteria such as credibility, transferability, dependability and confirmability (Hirschman 1986; Flint, Woodruff, and Gardial 2002). We addressed the trustworthiness issue by becoming immersed in the field collecting data for six months, using purposive sampling approach driven by emergent theoretical concepts, having several researchers for interview interpretations, asking participants to reflect on a variety of their actual experiences beyond the one we observed in a real shopping environment, professionally conducting non-threatening and confidential interviews, and assessing the fit of our emergent model with some participants.

The exploratory qualitative study helped prepare the infrastructure needed for the primary quantitative study for this dissertation research. Specifically, it provided guidance along with the extant literature for better theoretical and operational understanding the phenomenon.

Quantitative Research Design

A survey research design is considered appropriate for this dissertation research for the following reasons (Kerlinger and Lee 2000): (1) the wide scope of survey research has an advantage of providing great deal of information from a large population; (2) the information gathered from a survey through a properly drawn sample can be suprisingly accurate within a sampling error; (3) the nonexperiemental survey data can be analyzed by a method called covariance structure analysis or structural equation modelling (SEM) (4) the existing measures from prior research studies in the literature can be incorporated into newly designed survey research studies.

Survey research has also an important disadvantage of not being able to "ordinarily penetrate very deeply below the surface," even when the researcher has time, energy, money, and good deal of research knowledge of methodology and data analysis (Kerlinger and Lee 2000, p.613). However, in this particular research study, former use of qualitative study with a grounded theory orientation removes this disadvantage to a certain extent.

Research Questions and Hypotheses

As stated earlier in Chapter 1, the purpose of this study is twofold: (1) to investigate the customer productivity concept and (2) to examine the relationship between customer productivity and customer value, all in a technology-based self-service retail environment (e.g., self-checkout systems at retail stores). Two adopter categories are employed for comparison purposes: enthusiastic adopters and reluctant adopters. The following questions are posed: What is the nature of customers' perceptions of their productivity (inputs and outputs) for those who choose to participate in TBSS options (e.g., self-checkout) in retail settings? How does it relate to the value they seek? Considering enthusiastic adopters and reluctant adopters, what are the differences between these two groups regarding perceptions of self-productivity and customer value? The overall objective of this study is to investigate the concept of customer productivity in a TBSS context to understand how customer productivity and customer value are related to each other in a TBSS environment (e.g., self-checkout in brick-and-mortar retail stores).

Figure 18 illustrates the theoretical model and depicts the relationships among the study variables by locating the hypotheses to be tested. As described in Chaper 2, these hypothses are summarized below in Table 10.

Sample

The population of interest for this study includes individual consumers, who are older than 21; aware of TBSS options; have used a self-checkout system at least once in their regular shopping at retail stores (e.g., Kroger) within the last one year; also plan to use/ try self-checkouts in future; and have an access to Internet through a Windows-based PC. Specifically, this study compares enthusiastic and reluctant adopters (Figure 19), who have different levels of accumulated use of self- checkouts, attitudes and intentions toward the experience with this TBSS option; based on their particular responses on the phenomenon.

The sample population in a given store was divided into two mutually exclusive and exhaustive subsets to reflect equal sizes of customers coming from each of the

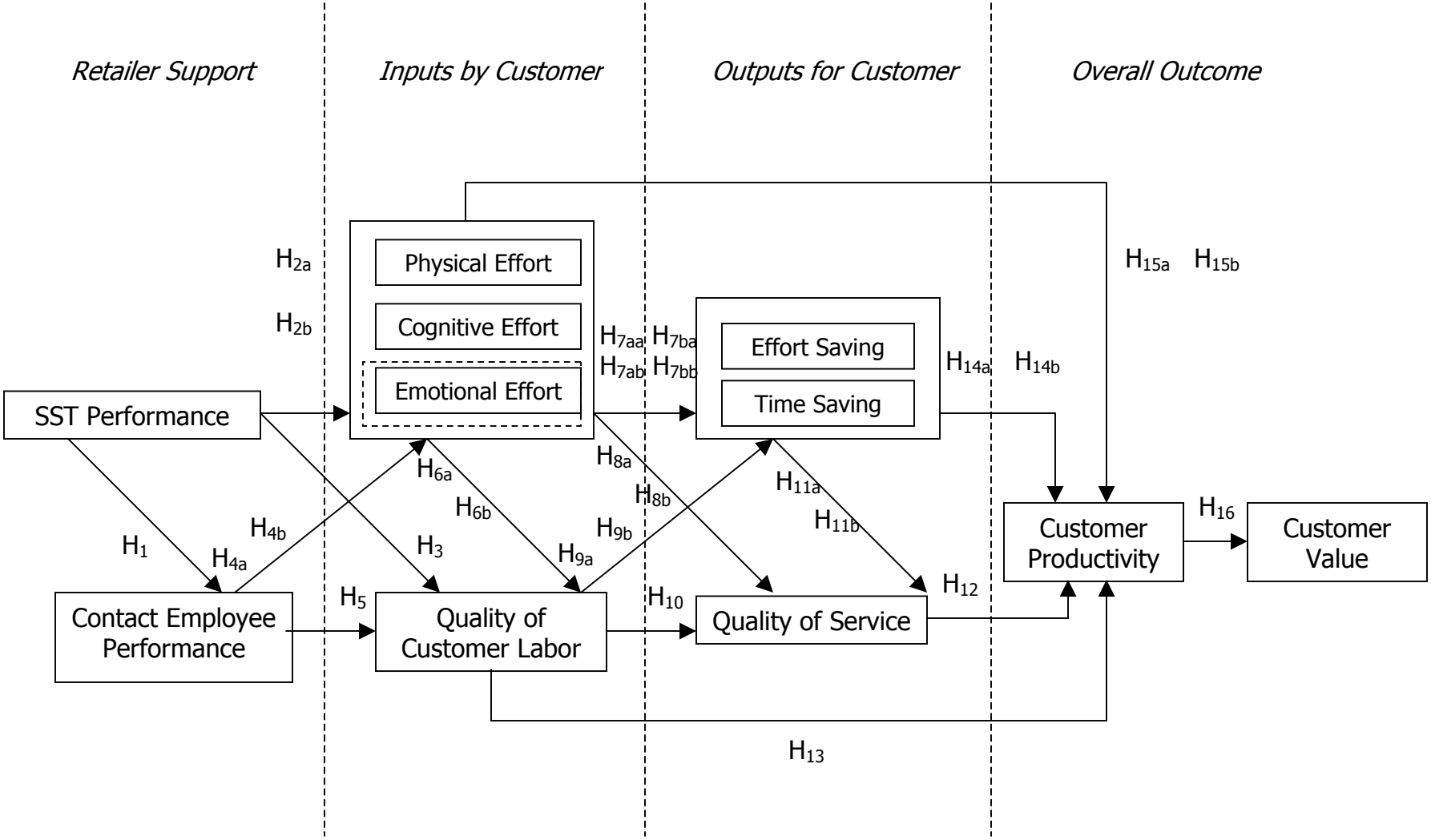

Figure 18: Hypotheses To Be Tested

Table 10: Hypotheses

H1: SST performance (SSTP) positively influences contact employee performance (CEP).
H2a: SST performance (SSTP) negatively influences physical effort (PE). **H2b:** SST performance (SSTP) negatively influences cognitive effort (CE).
H3: SST performance (SSTP) positively influences quality of customer labor (QCUL).
H4a: contact employee performance (CEP) negatively influences physical effort (PE). **H4b:** contact employee performance (CEP) negatively influences cognitive effort (CE).
H5: contact employee performance (CEP) positively influences quality of customer labor (QCUL).
H6a: Physical effort (PE) positively influences quality of customer labor (QCUL). **H6b:** Cognitive effort (CE) positively influences quality of customer labor (QCUL).
H7aa: Physical effort (PE) positively influences effort saving (ES). **H7ab:** Physical effort (PE) positively influences time saving (TS). **H7ba:** Cognitive effort (CE) positively influences effort savings (ES). **H7bb:** Cognitive effort (CE) positively influences time saving (TS).
H8a: Physical effort (PE) positively influences quality of service (QS). **H8b:** Cognitive effort (CE) positively influences quality of service (QS).

Table 10: (Cont'd)

H9a: Quality of customer labor (QCUL) positively influences effort saving (ES). **H9b:** Quality of customer labor (QCUL) positively influences time saving (TS).
H10: Quality of customer labor (QCUL) positively influences quality of service (QS).
H11a: Effort saving (ES) positively influences quality of service (QS). **H11b:** Time saving (TS) positively influences quality of service (QS).
H12: Quality of service (QS) positively influences customer productivity (CP).
H13: Quality of customer labor (QCUL) positively influences customer productivity (CP).
H14a: Effort savings (ES) positively influences customer productivity (CP). **H14b:** Time saving (TS) positively influences customer productivity (CP).
H15a: Physical effort (PE) negatively influences customer productivity (CP). **H15b:** Cognitive effort (CE) negatively influences customer productivity (CP).
H16: Customer productivity (CP) positively influences customer value (CV).

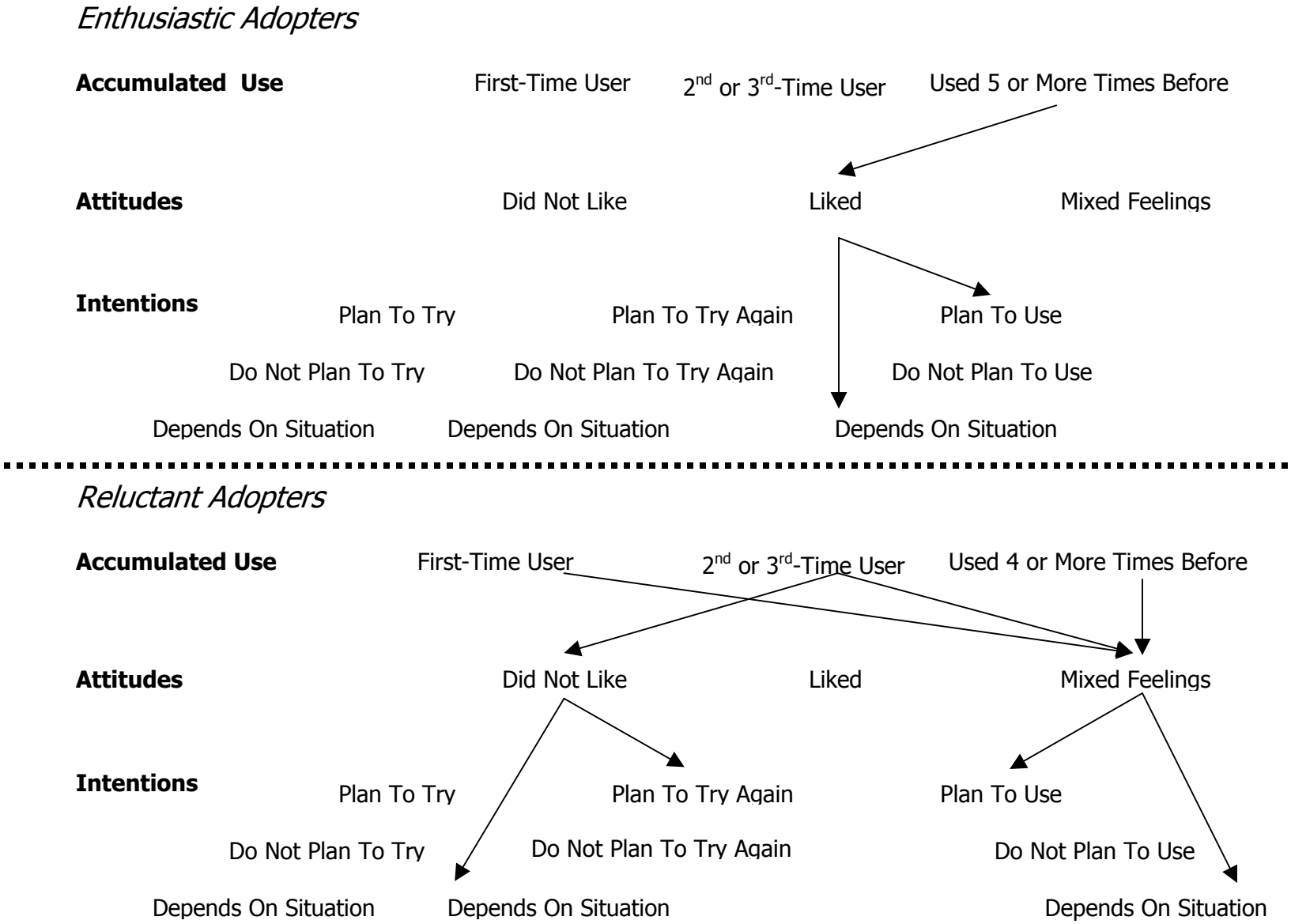

Figure 19: Enthusiastic versus Reluctant Adopters Adapted from Dabholkar, Bobbitt and Lee (2003).

checkout options (self-checkout and regular checkout). A systematic sampling was employed within a stratified sampling with a disproportionate allocation (McDaniel and Gates 2001).

Procedure

Individual consumers as target respondents were randomly contacted in selected grocery stores of a national grocery chain in the Southeast region when they have completed their checkout activities at either self-checkout or regular (traditional) checkout. During this initial, pre-qualifying face-to-face contact in a given grocery store, potential respondents were briefly asked a number of questions to make sure they meet all the age, awareness and past use criteria. For this purpose, a panel of seven student researchers was recruited, properly trained, regularly corresponded and randomly checked to make sure they were consistently in the right track. Each of the randomly selected qualified respondents who agreed to complete the self-administered survey at their homes in their convenience was given an invitation card with a ebsite link address and a respondent ID number necessary to

complete the survey online. The contact information of the researcher was also provided to respondents for their possible future questions in the process of completing the surveys.

Initial Customer Contact

A team of paid students were trained to approach customers after they have finished their shopping. These students approached potential respondents, identified themselves, and then described the study and the incentive offered for completion of the survey as provided in the interviewer script (Appendix C). If potential respondents agree to participate in the study, the student interviewer then asked a brief series of questions to ascertain the participants' level of self-checkout use experience. A written invitation card was provided to each respondent agreeing to participate. The card provided explicit instructions on how to complete the survey online later at the respondent's place (e.g., home, work, public library) and submit it (Appendix C).

Incentives to Respondents

The survey usually takes approximately 15-20 minutes to complete. Upon completion of the survey and the respondent's name-and-address information in two separate files for anonymity, the respondents were mailed a $10 incentive in the form of free merchandise coupons and cash.

The merchandise coupons were for specific Kroger brand name merchandise such as 24-pack Kroger brand purified drinking water, Big K 12-pack any, 8 oz. bar of Kroger cream cheese, and 8 oz. bar Kroger natural cheese any variety. The coupon covered the full cost of the merchandise, but was subject to state and local taxes. Specifically, to be used in this research, Kroger provided 492 coupons for free Kroger products (e.g., 436 coupons for one free 24-pack Kroger brand purified drinking water [valued at $4.99 each]; 3 coupons for one free Big K 12-pack any variety [valued at $2.39 each]; 3 coupons for one free 8 oz. bar of Kroger cream cheese [valued at $1.39 each]; 4 coupons for one free 8 oz. bar Kroger natural cheese any variety [valued at $2.19 each]; and other Kroger coupons like the previous ones in total in which the total worth is $2,293.75.

Some respondents had, for example, one free 24-pack Kroger brand purified drinking water coupon [valued at $4.99 currently] and $5.01 cash. When 436 coupons were completely used for one free 24-pack Kroger brand purified drinking water [valued at $4.99 each], the remaining coupons were continued to use, and complemented by cash of which the total value will be at $10. The most typical incentive was in the form of 50 percent coupon for free merchandise and 50 percent cash.

Survey Design

The survey design, for the main study, adapted Dillman's (2000) tailored design method, which is an updated version of Dillman's (1978) total design method. The following steps were followed to achieve a high reponse rate (Dillman 2000):

1. Respondent-friendly questionnaire,
2. Pre-qualifying face-to-face contact,
3. An invitation card with the web site link address, a respondent ID number and the researcher's correspondence information,

4. A detailed cover letter in the opening page of the survey,
5. Replacement paper-and-pencil version of the questionnaire option with a return envelope with real first-class samples to respondents with Mac computers instead of a Windows-based PC,
6. Final e-mail contact a week after the invitation card delivery to selected nonrespondents, and
7. Personalization of correspondence through e-mail when a respondent had a problem with the survey.

The incentives for enhanced participation in the research study included a direct payment to each respondent in the form of cash and free merchandise coupons valued at $10. Information pertaining to rewards was noted in the beginning part of the survey site. Random manual checks were also performed on the coded data into an excel database to ensure data integrity.

Measure Development

Measure development for the constructs laid out in the study model include both existing measures adapted for the

prevailing context of the study and new measures developed when there were no appropriate existing measures.

The new scale development process adhere to the following procedures (Churchill 1979; Bearden, Netemeyer, and Mobley 1993; Mentzer and Flint 1997).

1. Specify the domain of each construct based on the extant literature and the qualitative study.
2. Generate a pool of items for each construct, and review them with colleagues as expert judges familiar with the phenemenon to tap the construct's domain in terms of item specificity (correspondence), readability (language), face validity[7] and content validity[8].
3. Collect data to pretest the scale.
4. Purify each measure (reliability and validity). Conduct a confirmatory factor analysis to check the unidimensionality of each scale and examine normality, skewness, kurtosis, means and standard deviations as well as cronbach's coefficient alpha for reliability. Modification indices greater than

[7] McDaniel and Gates (2001) define face validity as "the degree to which a measurement that seems to measure what it is supposed to measure" (p.260).
[8] McDaniel and Gates (2001) define content validity as "the representativeness or sampling adequacy of the content of the measurement instrument" (p.260).

10, standardized residuals greater than 4, fit statistics such as comparative fit index (CFI) and chi-square (χ^2) with corresponding degrees of freedom were employed to flag potentially problematic items (Anderson and Gerbing 1988; Mentzer, Flint, and Hult 2001). Variance extracted by the constructs measure was calculated for internal consistency (Bearden, Netemeyer, and Mobley 1993).

5. Collect data.
6. Assess reliability[9].
7. Assess validity[10]. Chi-square maximum likelihood test and fit statistics were utilized to test convergent and discriminant validities (Bearden, Netemeyer, and Mobley 1993). These figures for each scale were assessed by the utilization of a structural equation modelling (SEM[11]) package,

[9] According to Cook and Campbell (1979) reliability is the degree to which meaures are free from random error, therefore, provide consistent data over multiple applications.

[10] According to Cook and Campbell (1979) trait validity checks whether measures of a specific construct load on a common factor (convergent validity) and measures of different constructs load on different factors (discriminant validity).

[11] LVSEM [Latent Variable Structural Equation Model] is a generalization of both regression and factor analysis, it

namely Analysis of Moment Structures (AMOS 4.01) published by SmallWaters Corporation (Arbuckle 1999).

8. Develop norm.

Construct Definitions and Item Generation

Based on the review of literature and the findings of exploratory qualitative study, an initial pool of items consistent with the following conceptual definitions has been developed. All items were also reviewed, at least three iterations, with six colleagues as expert judges who are familiar with the phenemenon. The following revised set of items was further refined by pre-testing within the dissertation using a pilot study. (The items in the final survey were separately provided in Appendix C).

Self-Service Technology Performance

Self-service technology performance (SSTP) is the degree to which self-service technology is perceived as

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incorporates most linear modeling methods (including ANOVA and ANCOVA) as special cases Mackenzie (2001).

helping, guiding and supporting the customer to produce and deliver service. The following statements represent survey items for this construct. Items 2,4 and 5 were adapted from SERVQUAL developed by Zeithaml, Parasuraman, and Berry (1990). Item 3 was taken from Anitsal and Paige (2004), which was adapted from Dabholkar, Bobbitt, and Lee (2003). Item 9 was adapted from Davis (1989). The rest of the items came from either qualitative study or SST performance observations. The self-checkout:

1. Performs accurately.
2. Provides error-free records (barcode prices, etc.)
3. Is a more enjoyable experience than traditional checkouts.
4. Tells me exactly what to do next.
5. Assures me that a given problem will be resolved.
6. Provides privacy throughout the self-checkout process.
7. Provides reasonable completion time.
8. Provides helpful guidance in performing tasks.
9. Provides information on how much each item scanned will cost.
10. Avoids technical jargon in communication.

Contact Employee Performance

Contact employee performance (CEP) is the degree to which the contact employee is perceived as helping, guiding and supporting the customer to produce and deliver service. The following statements represent survey items for this construct. Items 1, 2, 4, 5, 8, 9 and 14 were adapted from SERVQUAL developed by Zeithaml, Parasuraman, and Berry (1990). Item 15 was taken from the exploratory study done by the same three authors. Item 12 was adapted from Cronin, Brady, and Hult (2000). The rest of the items came from either qualitative study or observations on contact employee performance at self-checkout environments. A service employee at the self-checkout:

1. Presents a clean and neat appearance.
2. Shows sincere interest in solving my problems.
3. Quickly responds to my request for help.
4. Is willing to answer my questions.
5. Has the knowledge to answer my questions.
6. Instructs me as how to perform certain service tasks.

7. Is very willing to explain store policies regarding the self-checkout process.
8. Is consistently corteous with me.
9. Has my best interest at heart.
10. Instills confidence in me.
11. Is willing to listen to me.
12. Makes the effort to understand my needs.
13. Is consistently friendly to me.
14. Explains complicated service matters clearly.
15. Quickly responds to my specific needs.
16. Provides individualized attention when needed.
17. Recognizes me as a regular customer.

Degree of Customer Labor

The perceived degree of physical effort spent should be more important than the mere amount of work accomplished by the customer. Therefore, the customer labor (CUSL), in general, can be defined as the perceived degree of physical, cognitive and emotional effort required for producing and delivering service, on the part of the participating customer. The findings of exploratory

qualitative study were used to determine items for each customer labor type in terms of the perceived effort spent by customer.

Physical Effort

Physical Effort (PE) is the perceived degree of physical strength and activity on the part of the participating customer required for completing the self-checkout process. The following statements represent survey items for this construct. Based on each of the following statements given below, I feel that I spend minimum (or maximum) effort:

1. Even if it involves physical tasks, I usually prefer using the self-checkout rather than the traditional checkout.
2. I do not need to exert a lot of physical energy when I unload my items at the self-checkout.
3. I do not need to exert a lot of physical energy when I bag my items at the self-checkout.

4. It is usually more work for me to scan my produce items than regularly packaged food items at the self-checkout.
5. When I use coins and paper money to pay for my items, I can usually put them into the right slots without any physical difficulty.
6. It is easier for me to get help in scanning produce than to do it by myself.
7. Instead of scanning by myself, I prefer getting help from a service employee.

Cognitive Effort

Cognitive Effort (CE) is the perceived degree of cognition (e.g., effort for the mental attention provided) on the part of the participating customer required for completing the self-checkout process. The following statements represent survey items for this construct. Based on each of the following statements given below, I feel that I spend minimum (or maximum) effort:

1. Even if it involves a lot of thought, I usually prefer using the self-checkout rather than the traditional checkout.
2. I try to think very carefully about how to accomplish all requirements for a faster checkout when I am at the self-checkout.
3. I carefully check to make sure that I scanned every item in my shopping cart when the computer asks.
4. I usually answer the questions asked by the computer on the touch screen without putting a lot of thought into it.
5. I usually read or listen to the instructions provided by the computer without any struggle.
6. I am very exact in following the instructions given by the computer.
7. I usually do not have to make much of an effort to find the code numbers for produce items.
8. At the self-checkout, I usually need to get help in finding the code numbers for my produce items.
9. I generally check the item prices one-by-one on the touch screen of the self-checkout.
10. If an item is scanned with an incorrect price, I usually call somebody for a correction.

11. I prefer to press the help button to call a service employee, rather than attempting to look for a nearby employee.
12. I often ask other customers for help in using the self-checkout.
13. When I use coins and paper money to pay for my items, I usually put them into the right slots without much thought.
14. I typically find it hard to use my credit or debit card with the card scanner.

Emotional Effort

Emotional Effort (EE) is the perceived degree of emotional constraint (e.g., effort for the emotional control provided) on the part of the participating customer such that a customer's emotions do not detract from completing the self-checkout process. The following statements represent survey items for this construct. Based on each of the following statements given below, I feel that I spend minimum (or maximum) effort:

1. I usually feel like an unpaid cashier providing labor at the checkout register when I am using the self-checkout.
2. I resent having to do the work that a paid employee should do.
3. I generally attempt to stay patient while waiting in line for the self-checkout.
4. It is usually easy for me to be patient while waiting for help from a service employee.
5. When something goes wrong and I have to wait, I generally do not have difficulty in trying to remain calm.
6. I try to be pleasant even when I must work with an employee who is not proficient in knowing how to use the self-checkout proficiently.
7. When I get upset in using the self-checkout, I am able to keep from showing my frustration.
8. I personally bag the items I purchased without any complaining for my work.

Quality of Customer Labor

Quality of customer labor (QCL) is the overall perceived quality of effort provided by the customer for completing the self-checkout process. The following bipolar dimensions represent survey items for this construct. Item 3 and 5 were adapted from Cronin, Brady, and Hult (2000). Rest of the items came from multiple discussions with colleagues.

1. Bad - Good
2. Weak - Strong
3. Inadequate - Superior
4. Ordinary - Impressive
5. Below my standards - Above my standards
6. Careless - Careful
7. Uncommitted - Dedicated
8. Amateur - Expert
9. Unfocused - Focused
10. Passive - Active

Customer Savings

Customer savings (CUSS), in general, can be defined as the perceived degree of savings when a customer uses a TBSS option. Customer savings occur in terms of effort and timesavings.

Effort Saving

Effort saving (ES) is the perceived degree of savings in the form of effort when a customer uses a TBSS option. The following statements represent survey items for this construct. Item 1 and 6 were adapted from Berry, Seiders, and Grewal (2002) and Davis (1989), respectively. Rest of the items were drawn the findings of exploratory study.

1. Compared to the traditional checkout, paying for the items at the self-checkout requires less effort.
2. I am able to just do the checkout by myself rather than struggling with a cashier.
3. The self-checkout saves me work.

4. I spend less effort at the self-checkout than the regular checkout.
5. My shopping would be more of a struggle if I would not use the self-checkout.
6. The self-checkout produces coupons for me without making me continuously search, clip or organize coupons.

Time Saving

Time saving (TS) is the perceived degree of savings in the form of time when a customer uses a TBSS option. The following statements represent survey items for this construct. Item 1 and 6 were adapted from Berry, Seiders, and Grewal (2002) and Davis (1989), respectively. Item 4 and 5 were adapted from Dabholkar, Bobbitt, and Lee (2003). Rest of the items was drawn from the findings of exploratory study.

1. I am able to complete my purchase more quickly at the self-checkout.
2. I am able to complete all service tasks myself immediately rather than depending on a cashier.

3. The time required to get through the self-checkout is less than what I usually spend at a regular checkout.
4. The self-checkout saves me time.
5. The self-checkout lets me check out quickly.
6. By using the self-checkout, I can reduce the time I spend on unproductive activities such as waiting for cashier to perform during regular checkout.
7. When I have a limited number of items, I think self-scanning at a self-checkout is much faster than a cashier scanning the purchases at the tradiditional checkout.

Quality of Service

Quality of service (QS) is the overall perceived quality of the TBSS option (e.g., self-checkout) as evaluated and perceived by the participating customer to produce and deliver service. The following statements represent survey items for this construct. Item 1 and 2 were adapted from Butcher, Sparks, and O'Callaghan (2003). Item 3 was adapted from Cronin, Brady, and Hult (2000).

1. I think the overall service I usually receive at the self-checkout is of high quality.
2. I often rate the overall quality of the service at the self-checkout as excellent.
3. Most of the time, I perceive the overall quality of the service at the self-checkout as superior.

Customer Productivity

Customer productivity is an overall evaluation by the customer, rather than a mere mathematical number representing a ratio, as in manufacturing. More specifically, customer Productivity (CP) is the overall perceived self-productivity of the participating customer for the degree to which s/he is experiencing the service outputs (e.g., customer savings in the form of effort and time) related to service inputs (e.g., her/his level and quality of efforts at the service encounter). The following statements represent survey items for this construct. Item 1, 2, 3 and 5 were adapted from Davis (1989). Item 4 was based on the exploratory qualitative study.

1. I usually try to be very productive when I shop.
2. I care about my productivity.
3. I accomplish more by using the self-checkout than would otherwise be possible.
4. I improve my checkout performance by using self-checkout.
5. I am more effective in shopping when I use the self-checkout.
6. I increase my productivity by using self-checkout.
7. I am more efficient in shopping when I use the self-checkout.
8. I feel more productive when I use the self-checkout.
9. Using the self-checkout contributes to my overall productivity.

Customer Value

Customer Value (CV) is the overall value as perceived by the participating customer for the degree to which the self-checkout helps her/him to accomplish what s/he wants to have happen about a desired purpose or goal in a specific use situation. The following statements represent survey items for this construct. Item 5 and 6 were adapted

from Botschen, Thelen, and Piters (1999) and Woodruff and Gardial (1996), respectively. The remainder of the items was drawn from the findings of exploratory study.

1. The self-checkout service option is valuable to me.
2. Overall, I think the self-checkout service is worth the time and effort it requires.
3. When I use the self-checkout, I feel good about my ability to use technology.
4. When I use the self-checkout, I feel that I accomplish a great deal.
5. I feel good about myself when I use the self-checkout.
6. I have peace of mind when I use the self-checkout.
7. I feel more relaxed when I use the self-checkout.
8. The self-checkout service is valuable.
9. I feel more competant in finishing my shopping when I use the self-checkout.
10. I receive better overall value when I use the self-checkout service.

Pre-Test Data Analyses

Initial pool of construct items based on literature review and exploratory qualitative study findings were provided in the previous section. This section provides the results of the pre-test data analyses used to purify the scales.

Pre-Test Sample

The data for the pre-test analyses were collected from a student sample in a large public university in the South. Students present an easily accesible homogenenous group of respondents. They were thought to be appropriate respondents for the pre-test study since they frequently use the self-checkout systems in a variety of retail stores.

Students were initially accessed through multiple oral and written announcements in junior- and senior-level marketing and business classes. Participation in the pre-test survey was voluntary and those who chose to participate were typically offered an extra credit in the course. The pre-test inital total sample size was 335. Some

surveys were removed from the sample due to missing responses, geometric patterns in responses, nonadopters, and those can not be categorized into one of the two adopter categories under consideration as enthusiastic and reluctant adopters. Then, the usable total pre-test sample size became 264. Those steps were necessary for the response accuracy.

Pre-Test Survey

The pre-test survey was used to validate the measures introduced earlier in this chapter. After securing the face validity based on expert reviews for readability and item clarity, a total of 153 items was used in the pre-test survey, including demographics and general classification questions. There were a total of 101 items for 11 constructs presented in the conceptual framework. The complete pre-test survey with all variables used in the statistical analysis tables is provided in Appendix B.

Scale Purification

Scale purification process included multiple steps. First, a series of principal components analysis were conducted to see how many components needed to explain each set of items under consideration. It turned out to be that each set of the items had only one eigen value which is greater than 1.0000 with a cumulative percentage range between 66.50 and 93.52 (Appendix B). Scree plots also visually supported this finding. Specifically, contact employee performance, self-service technology performance, emotional effort, effort saving, time saving, quality of customer labor quality of service, customer productivity and customer value constructs had acceptable eigen values (12.5227, 6.7549, 5.3199, 4.0482, 6.0164, 7.3514, 2.7553, 6.5464, and 8.6818, respectively) and cumulative percentages (73.66, 67.55, 66.50, 67.47, 85.95, 73.51, 91.84, 93.52, and 86.82, respectively). Only two sets of items (for physical effort and cognitive effort) had two eigen values greater than 1.0000, initially creating precaution for using one factor. In these two cases, use of one component was found to have a cumulative percentage of slightly higher than 51, requiring further analyses.

Second, detailed item analyses were conducted to better understand discriminant and convergent validities. Item analysis report (Appendix B) included two sections for each proposed construct: reliability section and correlation section. Inter-item correlations were checked to make sure those were sufficiently low, preferably less than 0.50, and ideally at 0.30 or 0.40s. At the same time, when they come together, those items were expected to generate a Chronbachs alpha value of at least 0.70, or even at 0.80s, but preferably not higher than 0.90s. In general, after removing some selected items on the basis of individual coefficient alpha, high correlations, and theoretical considerations in each construct, all constructs with an exception of the three satisfied the overall combination of those criteria to a certain extent. In the case of quality of service, customer productivity and customer value constructs, they were thought to be acceptable based on the theoretical foundations in spite of their high Cronbachs alpha values of low to mid 0.90s due to existing high inter-item correlations.

Third, confirmatory factor analysis was conducted. Factor loadings after varimax rotation for each item for all constructs were provided in Appendix B. Relevant items

for each construct successfully loaded on one factor without any hesitation.

Summary

Chapter 3 has presented the methodology used in the dissertation research to test the hypotheses developed and the overall conceptual model proposed. In order to accomplish its goal, this chapter initially provided methodological details of the qualitative research design used in the exploratory phase of a related research. Later, the chapter outlined the quantitative research design to be utilized in this dissertation. Specifically, it presented research questions and hypotheses. It also described sample, data collection procedure, survey design and measure development. Construct definitions and item creation concluded this chapter.

CHAPTER 4

DATA ANALYSES AND RESULTS

The purpose of this chapter is to present the research findings from the survey. Specifically, this chapter describes the statistical analyses conducted to test the hypotheses proposed in the previous chapter and discusses their results. NCSS (Number Cruncher Statistical Systems - Release 2004) of Jerry Hintzewas used to calculate descriptive statistics, while AMOS 5 (Build 5138 - Release 2003) of James L. Arbuckle was employed to conduct structural eqution modeling analyses. The final survey items and the detailed results of statistical analyses are provided in the appendices section.

Sample Data

The number of qualified potential respondents contacted in selected stores of a major national grocery store chain in the Southeast, based on their responses to the screening questions, was 3,338. Of this total, 529 respondents completed the final survey and the initial reponse rate was 15.8 percent.

The collected data were screened to clean the raw responses for usable responses. There were 14 partially completed surveys. Moreover, one respondent completed the survey twice in two diffent dates, and seven respondents answered all the questions asked in the survey although they never used the self-checkouts. Remaining responses were interpreted to allocate the total sample between enthusiastic and reluctant adopters based on Figure 19 as earlier discussed in Chapter 3. The respondents who used the self-checkouts at least once, but still categorized as non-adopters in Figure 19, were also dropped out from the sample. Possible outliers in each data set were also checked. Data set for reluctant adopters had no outliers ~~at all~~. The data set for ethusiastic adopters had only five outliers, however they did not have a significant effect on the models, therefore were retained in the data set. After all deductions were made based on each of the five reasons discussed, there were 475 total remaining surveys. Initially, it was targeted to have 200 responses in each of the two adopter categories: enthusiastic adopters and reluctant adopters. After refining the data, 271 enthusiastic adopters and 204 reluctant adopters who fully completed the survey remained. The current data include 35

percent more enthusiastic adopters and 2 percent more reluctant adopters than initially targeted, although the overall usable response rate of 15.2 percent was relatively lower than the targeted response rate of 20 percent.

Each of three waves of data collected over three 4-week periods within a twelve-week data collection period were compared against each other in the total sample on randomly selected items for each construct. These comparisons showed no difference between waves, therefore nonresponse bias was thought not to be of concern. Additionally, based on the screening data, respondents and nonrespondents were categorized and compared (The complete set of screening questions are provided in Appendix C). First, 199 enthusiastic adopter respondents were compared to 260 enthusiastic adopter nonrespondents. Second, 130 reluctant adopter respondents were compared to 130 reluctant adopter nonrespondents. Each comparison was made based on the responses given for X25 (How many times had you used the self-checkout systems in a grocery store within the last year?), X26 (How frequently do you use the self-checkout?), X27 (How well do you work with the self-checkout system?), X28 (How much did you like the self-checkout system?), X29 (How do you plan to try/ use the

self-checkout system?) and X39 (What is your age?). T-test results supported that there were no significant differences between respondents and nonrespondents in enthusiastic and reluctant adopter categories, respectively, in terms of the means of their responses to the questions asked. The only exception in each category was X29 (Do you plan to try/use the self-checkout system?). It became apparent that 'depends on situation' choice was distinct when the responses were cross-tabulated. Both reluctant and enthusiastic adopter respondents, compared to nonrespondents, dominantly preferred this choice. Moreover, about 10 percent of both reluctant and enthusiastic adopter nonrespondents did not respond to this question. Overall, the potential impact of a nonresponse bias was adequately handled and it was thought not to be of concern.

Sample Characteristics

The total sample for the final survey consisted of 475 respondents. Out of this, 271 were enthusiastic adopters and 204 were reluctant adopters. This section summarizes the characteristics of the total sample and the two subsets of this sample (please refer to Appendix D).

In general, approximately one out of every three respondents said they often use the self-checkout systems more than once a week, while one out of every five used them once week. Specifically, 45.02 percent of enthusiastic adopters said they used self-checkouts more than once a week. This figure was much higher than the 18.63 percent for reluctant adopters. The frequency for grocery shopping was slightly higher for enthusiastic adopters (53.14 percent) than for reluctant adopters (41.18 percent). When respondents were asked how well they work with self-checkouts, 61.25 percent of enthusiastic adopters perceived themselves as excellent users. This number for reluctant adopters was only 14.22 percent. The use of self-checkout frequency and grocery shopping frequency were also individually cross-tabulated across the two adopter categories (Appendix D). Both chi-square values were significant, pointing to differences between the two adopter categories. Two-sample t-test statistical results also confirmed that the means of enthusiastic and reluctant adopters regarding to X26 - the use of self-checkout frequency (mean for enthusiastic adopters = 1.900 and mean for reluctant adopters = 3.044) and X30 – the grocery shopping frequency (mean for enthusiastic adopters = 1.594

and mean for reluctant adopters = 1.814) were significantly different at p=-0.050 and p=0.002, respectively. Specifically, enthusiastic adopters use self-checkouts once a week, while reluctant adopters use this particular TBSS option biweekly. Enthusiastic adopters also report shopping slightly more often for their groceries than reluctant adopters do. The difference between the means of the use of self-checkout frequency for enthusiastic and reluctant adopters was greater than the means of the grocery shopping frequency for those two adopter categories.

Both enthusiastic and reluctant adopters had relatively equal frequency distributions in the number of adults and the number of children in their houselholds. The average number of adults in the household dominantly was two with a percentage of 65.26 in the total sample, while 67.79 percent of all respondents did not have a child living in the household. The number of respondents in the total sample with one child and two children in the household were 14.53 and 11.79 percent, respectively. Both adopter categories, on the average, mostly shopped for one person (19.37 percent) or two people (45.05 percent). The respondents (37.47 percent) mostly spent between $151 and $300 for their grocery spending. The spending categories

were comparable between two adopter categories, with a greater percentage of enthusiastic adopters (41.70 percent) occupying the range compared to reluctant adopters (31.86 percent).

Female respondents were somewhat higher in number than the male respondents. The total sample included 56.84 percent females and 43.16 percent males. The number of male enthusiastic adopters (45.39 percent) was higher than male reluctant adopters (40.20 percent). However, the number of female enthusiastic adopters (54.61 percent) was lower than female reluctant adopters (59.80 percent). Both adopter categories had the same distribution in marital status, in which almost 60 percent were married. In terms of the latest school graduated from, college with a Bachelor's degree formed the most dominant category with 36.63 percent in the total sample. Remaining education categories were equally distributed between the two adopter categories. Categorical distribution for age was also generally similar between the two subsets of the sample. The only exception was among people who were older than 70. In this age category, there were more people as reluctant adopters (6.86 percent) than as enthusiastic adopters (1.85 percent).

Descriptive Statistics

Descriptive statistics for all measurement items are provided in Appendix E. Specifically, descriptive statistics presented here include means, standard deviations, tests for skewness and kurtosis with z and probability values. Means for construct items 57 through 112 in the total sample ranged from 3.027 to 6.055. Standard deviations for the same items ranged from 1.102 to 1.885. Only six out of 55 items had a kurtosis value that was higher than 2. The highest kurtosis value was 3.589. All the remaining 49 items had a kurtosis value that was lower than 2. Therefore, all kurtosis values were within accepted limits.

Scale Confirmation

A set of statistical analyses were performed for scale confirmation and those basically included confirmatory factor analysis, and item analysis with reliability and correlation sections (please refer to Appendix E). First, observed indicators were assigned to latent variables in

the conceptual framework. The measurement model (please refer to Appendix F) allowed all latent variables to correlate freely. This was the measurement model without any modifications based on relevant factors such as modification indices. The overall goodness of fit of the measurement model was initially quite satisfactory. The p ('p value' associated with discrepancy function: test of perfect fit) was 0.000; the rootmean square error of approximation (RMSEA) was 0.065; comparative fit index (CFI) was 0.872; and Chi-square ratio (CMIN) was 3.016. Hoelter's (.05) and Hoelter's (.01) indexes were 168 and 172, respectively. Hoelter index "directly focuses on the adequacy of the sample size, rather than model fit" (Byrne 2001). The benchmark for Hoelter's index is 200. The sample size is accepted satisfactory when Hoelter's index is higher than 200. The measurement model's relatively low Hoelter's index was expected to be one of the factors unfavorably affecting other model fit statistics.

Second, individual factor unidimensionality tests were also calculated. Factor loadings after varimax rotation were provided for each construct in the model in Appendix E. All but 5 items out of 55 items loaded significantly into 11 constructs with a factor loading of greater than or

equal to 0.50. Those five items (manifest variables) included two items of physical effort construct (X57 and X61), two items of cognitive effort construct (X62 and X68) and one item of emotional effort construct (X72) with factor loadings of 0.45, 0.45, 0.47, 0.37 and 0.43, respectively. Besides having relatively low factor loadings, additional statistical tests (e.g., review of modification indices for the regression weights in the following section for model modification) combined with theoretical reasoning led to removing those items from further consideration in the alternative model.

Item analyses including reliability and correlation sections are provided in Appendix E. Inter-item correlations, coefficient alpha for each item and Cronbach's alpha for each construct are presented. All coefficent alpha values for all items except for the items of the cognitive effort construct were sufficiently higher than 0.70, while many were higher than 0.80. Similarly, all Cronbach's alpha values for each construct with an exception of emotional effort construct were also sufficiently higher than 0.70, while many were higher than 0.80. The emotional effort construct is an important exploratory construct in the conceptual framework and was

kept for further investigation in the model modification section, especially based on modification indices.

Measurement Model Modification

The measurement model (please refer to Appendix F) provides an opportunity for improvement regarding some measurement items and constructs in terms of factor loadings, inter-item correlations, construct correlations, Cronbach's alpha and the variance extracted; model fit, and overall sample sufficiency as discussed in the previous section. This section will investigate those issues in further detail based on statistical reasoning (e.g., kurtosis, modification indices, critical ratios, and standardized regression weights) and theoretical reasoning as a part of the modification to the a priori model.

There were not any kurtosis issues in the total sample. However, in the subset of the sample for enthusiastic adopters, but not for reluctant adopters, the following items had kurtosis values that were higher than 4: X65, X75, X82, X83, X85, X86, X87, X92, X93, X101, X102 and X109.

A review of the modification indices for the regression weights revealed several items indicative of cross-loadings. The following items had the high modification indices that required additional thoughts based on theoretical foundations of the conceptual framework (Table 11).

Physical Effort

X57 (Even if it involves physical tasks, I usually prefer using the self-checkout rather than the traditional checkout) had high modification indices greater than 10 with 49 items. Modification indices with 13 of these items were even higher than 100. X57 of physical effort also cross-loaded into customer productivity, customer value, cognitive effort, emotional effort, effort saving, time saving, SST performance, contact employee performance, quality of service and quality of customer labor, and X57 was removed.

Table 11: A Summary of Items Dropped and Remained

Items	Dropped or Remained
Physical Effort	
Even if it involves physical tasks, I usually prefer using the self-checkout rather than the traditional checkout. (X57)	Dropped
I do not need to exert a lot of physical energy when I unload my items at the self-checkout. (X58)	Remained
I do not need to exert a lot of physical energy when I bag my items at the self-checkout. (X59)	Remained
I do not need to exert a lot of physical energy when I scan my items at the self-checkout. (X60)	Remained
When I use the coins and paper money to pay for my items, I can usually put them into the right slots without any physical difficulty. (X61)	Dropped
Cognitive Effort	
I try to think very carefully about how to accomplish all requirements for a faster checkout when I am at the self-checkout. (X62)	Dropped
I carefully check to make sure that I scanned every item in my shopping cart when the computer asks. (X63)	Remained
I usually answer the questions asked by the computer on the touch screen without putting a lot of thought into it. (X64)	Dropped
I usually read or listen to the instructions provided by the computer without any struggle. (X65)	Dropped
I am very exact in following the instructions given by the computer. (X66)	Remained
I usually do not have to make much of an effort to find the code numbers for produce items. (X67)	Dropped
I generally check the item prices one-by-one on the touch screen of the self-checkout. (X68)	Dropped
When I use coins and paper money to pay for my items, I usually put them into the right slots without much thought. (X69)	Remained
Emotional Effort	
I generally attempt to stay patient while waiting in line for the self-checkout. (X70)	Dropped
It is usually easy for me to be patient while waiting for help from a service employee. (X71)	Remained
When something goes wrong and I have to wait, I generally have difficulty in trying to remain calm. (X72)	Dropped
I try to be pleasant even when I must work with an employee who is not proficient in knowing how to use the self-checkout. (X73)	Remained
When I get upset in using the self-checkout, I am able to keep from showing my frustration. (X74)	Remained
I personally bag the items I purchased without any complaining for my work. (X75)	Dropped

Table 11: (Cont'd)

Items	Dropped or Remained
Quality of Customer Labor	
Inadequate v. Superior (X76)	Remained
Ordinary v. Impressive (X77)	Dropped
Below my standards Above my standards v. (X78)	Remained
Uncommitted v. Dedicated (X79)	Remained
Amateur v. Expert (X80)	Remained
Unfocused v. Focused (X81)	Dropped
Self-Service Technology Performance	
Performs accurately. (X82)	Remained
Tells me exactly what to do next. (X83)	Remained
Assures me that a given problem will be resolved. (X84)	Dropped
Provides reasonable completion time. (X85)	Remained
Provides information on how much each item scanned will cost. (X86)	Dropped
Avoids technical jargon in communication. (X87)	Dropped
Contact Employee Performance	
Quickly responds to my request for help. (X89)	Remained
Instructs me as how to perform certain service tasks. (X90)	Remained
Is very willing to explain store policies regarding the self-checkout process. (X91)	Dropped
Is consistently courteous with me. (X92)	Remained
Provides individualized attention when needed. (X93)	Dropped
Effort Saving	
Compared to the traditional checkout, paying for the items at the self-checkout requires less effort. (X94)	Remained
The self-checkout saves me work. (X95)	Remained
My shopping would be more of a struggle if I would not use the self-checkout. (X96)	Remained
The self-checkout produces coupons for me without making me continuously search, clip or organize coupons. (X97)	Dropped
Time Saving	
I am able to complete all service tasks myself immediately rather than depending on a cashier. (X98)	Remained
The time required to get through the self-checkout is less than what I usually spend at a regular checkout. (X99)	Remained
By using the self-checkout, I can reduce the time I spend on unproductive activities such as waiting for a cashier to perform during regular checkout. (X100)	Remained
When I have a limited number of items, I think self-scanning at a self-checkout is much faster than a cashier scanning the purchases at the tradiditional checkout. (X101)	Dropped

Table 11: (Cont'd)

Items	Dropped or Remained
Quality of Service	
I think the overall service I usually receive at the self-checkout is of high quality. (X102)	Remained
I often rate the overall quality of the service at the self-checkout as excellent. (X103)	Remained
Most of the time, I perceive the overall quality of the service at the self-checkout as superior. (X104)	Remained
Customer Productivity	
I accomplish more by using the self-checkout than would otherwise be possible. (X105)	Remained
I am more efficient in shopping when I use the self-checkout. (X106)	Remained
I feel more productive when I use the self-checkout. (X107)	Dropped
Using the self-checkout contributes to my overall productivity. (X108)	Remained
Customer Value	
Overall, I think the self-checkout service is worth the time and effort it requires. (X109)	Dropped
When I use the self-checkout, I feel good about my ability to use technology. (X110)	Remained
I have peace of mind when I use the self-checkout. (X111)	Remained
I receive better overall value when I use the self-checkout service. (X112)	Remained

X61 (When I use the coins and paper money to pay for my items, I can usually put them into the right slots without any physical difficulty) had high modification indices greater than 10 with 43 items. The modification index between X61 and X69 was the highest at 191.513. X61 of physical effort also cross-loaded into cognitive effort, emotional effort, SST performance, quality of customer labor, quality of service, customer productivity, time saving, and customer value, as a result X61 was eliminated.

Cognitive Effort

The modification index between X62 (I try to think very carefully about how to accomplish all requirements for a faster checkout when I am at the self-checkout) and X63 (I carefully check to make sure that I scanned every item in my shopping cart when the computer asks) was very high at 27.919. The other high modification indices were with X60, X59 and X58. X62 of cognitive effort also cross-loaded into physical effort. X62 was discarded, while X63 was kept as a better worded alternative for physical effort.

The modification indices between X68 (I generally check the item prices one-by-one on the touch screen of the

self-checkout) and X93 (A service employee at the self-checkout provides individualized attention when needed) were high at 22.777. The other high modification indices were with X90, X91 and X92. X68 of cognitive effort also cross-loaded into contact employee performance. X68 was removed.

X64 (I usually answer the questions asked by the computer on the touch screen without putting a lot of thought into it), X65 (I usually read or listen to the instructions provided by the computer without any struggle) and X67 (I usually do not have to make much of an effort to find the code numbers for produce items) of cognitive effort had high modification indices with X59, X63, X66 and X68; X62, X92 and X97; and X95, X94, X97, X77, X112, X111, X98, X106 and X84, respectively. X67 cross-loaded into effort saving, quality of customer labor, customer value and customer productivity. X64, X65 and X67 were removed.

Emotional Effort

X70 (I generally attempt to stay patient while waiting in line for the self-checkout), X72 (When something goes wrong and I have to wait, I generally have difficulty in

trying to remain calm) and X75 (I personally bag the items I purchased without any complaining for my work) of emotional effort had high modification indices with X71, X105, X106, X107 and X108; X71; and X64, X71, X90, X101 and X109, respectively. X70 also cross-loaded into customer productivity. X70, X72 and X75 were removed.

SST Performance

X84 (The self-checkout assures me that a given problem will be resolved), X86 (The self-checkout provides information on how much each item scanned will cost) and X87 (The self-checkout avoids technical jargon in communication) of SST performance had high modification indices with X71, X97, X85 and X95; X87; and X86. X84 also cross-loaded into effort saving. X84, X86 and X87 were removed.

Contact Employee Performance

X91 (A self-service employee at the self-checkout is willing to explain store policies regarding the self-checkout process) cross-loaded into effort saving. X93 (A

self-service employee at the self-checkout provides individualized attention when needed) of contact employee performance had high modification indices with X102, X109 and X68. X93 also had high kurtosis for enthusiastic adopters and had a high coefficient alpha at 0.9419. Contact employee performance construct also had a very high Cronbach alpha value of 0.9576. X91 and X93 were removed.

Effort Saving, Time Saving, and Quality of Customer Labor

X97 (The self-checkout produces coupons for me without making me continuously search, clip or organize coupons) of effort saving had high modification indices with X57, X65, X84, X104, X105 and X112. X101 (When I have a limited number of items, I think self-scanning at a self-checkout is much faster than a cashier scanning the purchase at the traditional checkout) of time saving high modification index with X75, X77 (ordinary versus impressive) and X81 (unfocused versus focused) of quality of customer labor had high modification indices with X101 and X102; and X87, X66, X63, X79 and X86. X97, X101, X77 and X81 were removed.

Customer Value and Customer Productivity

X109 (Overall, I think the self-checkout service is worth the time and effort it requires) of customer value had high modification indices with 27 items. X109 also cross-loaded into quality of service, quality of customer labor, SST performance, contact employee performance, physical effort, cognitive effort, emotional effort and time saving. X107 of customer productivity had high modification indices with X57, X83, X85 and X89. X109 and X107 were removed. After X109 and X107 were removed, a separate factor analysis was run among the items of these two constructs. The factor loadings confirmed that X105, X106 and X108 reasonably loaded into customer productivity construct. The factor loadings for X105, X106 and X108 were 0.81, 0.83 and 0.78, respectively. Similarly, The factor loadings confirmed that X110, X111 and X112 also reasonably loaded into customer value construct. The factor loadings for X110, X111 and X112 were 0.77, 0.85 and 0.55, respectively.

Variance Extracted

Based on the following two equations, the variance extracted for each construct was calculated and provided in Table 12.

$$\text{Construct Reliability} = \frac{(\sum \text{standardized loadings})^2}{[(\sum \text{standardized loadings})^2 + \sum \text{measurement error}]}$$

$$\text{Variance Extracted} = \frac{(\sum \text{squared standardized loadings})}{(\sum \text{squared standardized loadings} + \sum \text{measurement error})}$$

The variance extracted for each construct with the total sample was greater than the acceptable value of 0.50 with two exceptions of cognitive effort and emotional effort. Based on further investigation with enthusiastic adopters sample, it turned out that the variance extracted for cognitive effort construct was very close to 0.50 for enthusiastic adopters, while it was 0.38 for reluctant adopters. Conversely, the variance extracted for emotional effort construct was 0.38 for reluctant adopters, while it was 0.34 for enthusiastic adopters.

Table 12: Construct Reliability and Variance Extracted

		Construct Reliability			Variance Extracted		
Scale	N of Items	Enthusiastic Adopters	Reluctant Adopters	Both Adopters	Enthusiastic Adopters	Reluctant Adopters	Both Adopters
Contact Employee Performance	3	0.9211	0.8920	0.9121	0.7957	0.7355	0.7763
SST Performance	3	0.8383	0.8104	0.8559	0.6378	0.5882	0.6650
Physical Effort	3	0.9498	0.9558	0.9542	0.8638	0.8786	0.8745
Cognitive Effort	3	0.7342	0.6194	0.7043	0.4843	0.3767	0.4507
Emotional Effort	3	0.6032	0.6390	0.6288	0.3378	0.3763	0.3632
Effort Saving	3	0.8354	0.8620	0.8689	0.6347	0.6796	0.6936
Time Saving	3	0.8802	0.8181	0.8782	0.7159	0.6019	0.7097
Quality of Customer Labor	4	0.8406	0.8330	0.8736	0.5696	0.5588	0.6347
Quality of Service	3	0.9516	0.9360	0.9563	0.8676	0.8306	0.8796
Customer Productivity	3	0.8999	0.9261	0.9280	0.7507	0.8071	0.8114
Customer Value	3	0.8434	0.8655	0.8835	0.6437	0.6832	0.7177

Highest Shared Variances

Construct correlations and highest shared variances are provided in Table 13 and Table 14, respectively. All correlations were significant with six exceptions: CEP ↔ PE, CE, ES; ES ↔ EE, CE; CP ↔ EE. The correlation between CP and CV was relatively high (r=0.76). As Campbell and Fiske (1959) recommended, convergent and discriminant validities can be examined by using multitrait-multimethod correlation matrix. In this research, convergent and discriminant validities between customer productivity and customer value have been further checked using within-method cross-trait correlations and cross-method cross-trait correlations, respectively. Positive and high inter-item correlations within customer value items (0.81; 0.63, and 0.71) and within customer productivity items (0.81; 0.80; and 0.82) suggest the existence of good convergent validity. Inter-item correlations tend to be higher than cross-method cross-trait correlations (having a mean value of 0.65) indicating some degree of discriminant validity. However, cross-method cross-trait correlations are not negligible, suggesting some overlap among traits (Loshlin 1998). "All early measurement models focused on convergent

Table 13: Construct Correlations

			Correlation Estimate	p
Contact_Employee_Performance	<-->	Cognitive_Effort	0.096	0.078
Contact_Employee_Performance	<-->	Customer_Productivity	0.127	0.010
Contact_Employee_Performance	<-->	Customer_Value	0.150	0.003
Contact_Employee_Performance	<-->	Effort_Saving	0.082	0.105
Contact_Employee_Performance	<-->	Physical_Effort	0.058	0.236
Contact_Employee_Performance	<-->	Quality of_Customer Labor	0.184	0.000
Contact_Employee_Performance	<-->	Quality of_Service	0.327	0.000
Contact_Employee_Performance	<-->	SST_Performance	0.250	0.000
Contact_Employee_Performance	<-->	Time_Saving	0.151	0.002
Customer_Productivity	<-->	Cognitive_Effort	0.180	0.000
Customer_Productivity	<-->	Physical_Effort	0.178	0.000
Customer_Value	<-->	Cognitive_Effort	0.287	0.000
Customer_Value	<-->	Customer_Productivity	0.765	0.000
Customer_Value	<-->	Physical_Effort	0.154	0.002
Effort_Saving	<-->	Cognitive_Effort	0.048	0.399
Effort_Saving	<-->	Customer_Productivity	0.603	0.000
Effort_Saving	<-->	Customer_Value	0.500	0.000
Effort_Saving	<-->	Physical_Effort	0.101	0.045
Effort_Saving	<-->	Quality of_Service	0.349	0.000
Effort_Saving	<-->	Time_Saving	0.516	0.000
Emotional_Effort	<-->	Cognitive_Effort	0.592	0.000
Emotional_Effort	<-->	Contact_Employee_Performance	0.135	0.023
Emotional_Effort	<-->	Customer_Productivity	0.091	0.133
Emotional_Effort	<-->	Customer_Value	0.199	0.000
Emotional_Effort	<-->	Effort_Saving	0.034	0.582
Emotional_Effort	<-->	Physical_Effort	0.330	0.000
Emotional_Effort	<-->	Quality of_Customer Labor	0.238	0.000
Emotional_Effort	<-->	Quality of_Service	0.328	0.000
Emotional_Effort	<-->	SST_Performance	0.414	0.000

Table 13: (Cont'd.)

			Correlation Estimate	p
Emotional_Effort	<-->	Time_Saving	0.140	0.023
Physical_Effort	<-->	Cognitive_Effort	0.372	0.000
Quality of_Customer Labor	<-->	Cognitive_Effort	0.264	0.000
Quality of_Customer Labor	<-->	Customer_Productivity	0.409	0.000
Quality of_Customer Labor	<-->	Customer_Value	0.524	0.000
Quality of_Customer Labor	<-->	Effort_Saving	0.416	0.000
Quality of_Customer Labor	<-->	Physical_Effort	0.161	0.000
Quality of_Customer Labor	<-->	Quality of_Service	0.404	0.000
Quality of_Customer Labor	<-->	Time_Saving	0.395	0.000
Quality of_Service	<-->	Cognitive_Effort	0.376	0.000
Quality of_Service	<-->	Customer_Productivity	0.429	0.000
Quality of_Service	<-->	Customer_Value	0.504	0.000
Quality of_Service	<-->	Physical_Effort	0.228	0.000
SST_Performance	<-->	Cognitive_Effort	0.420	0.000
SST_Performance	<-->	Customer_Productivity	0.337	0.000
SST_Performance	<-->	Customer_Value	0.457	0.000
SST_Performance	<-->	Effort_Saving	0.302	0.000
SST_Performance	<-->	Physical_Effort	0.187	0.000
SST_Performance	<-->	Quality of_Customer Labor	0.526	0.000
SST_Performance	<-->	Quality of_Service	0.577	0.000
SST_Performance	<-->	Time_Saving	0.476	0.000
Time_Saving	<-->	Cognitive_Effort	0.232	0.000
Time_Saving	<-->	Customer_Productivity	0.621	0.000
Time_Saving	<-->	Customer_Value	0.557	0.000
Time_Saving	<-->	Physical_Effort	0.258	0.000
Time_Saving	<-->	Quality of_Service	0.465	0.000

Table 14: Variance Extracted and Highest Shared Variances

	Variance Extracted			Highest Shared Variances		
Scale	Enthusiastic Adopters	Reluctant Adopters	Both Adopters	Enthusiastic Adopters	Reluctant Adopters	Both Adopters
Contact Employee Performance	0.796	0.734	0.776	0.035	0.114	0.107
SST Performance	0.638	0.588	0.665	0.328	0.256	0.277
Physical Effort	0.863	0.878	0.874	0.185	0.070	0.138
Cognitive Effort	0.483	0.373	0.448	0.437	0.261	0.350
Emotional Effort	0.338	0.379	0.364	0.437	0.261	0.350
Effort Saving	0.630	0.679	0.690	0.317	0.342	0.364
Time Saving	0.713	0.603	0.708	0.292	0.408	0.386
Quality of Customer Labor	0.570	0.558	0.634	0.328	0.183	0.146
Quality of Service	0.868	0.830	0.880	0.321	0.506	0.333
Customer Productivity	0.750	0.807	0.811	0.508	0.610	0.386
Customer Value	0.644	0.683	0.717	0.508	0.610	0.585

validity only" (Ladd 2002). For discriminant validity, *simple structure* rotations (orthogonal simple structure or oblique simple structure) can be used (Ladd 2002). Besides those, further tests of discriminant validity could be conducted to consider and investigate the high level of covariance between customer productivity and customer value. Besides being significant, all other correlations between the latent constructs were generally very low, a good indicator for discriminant validity.

Highest shared variances were also calculated as the squared highest correlations for each construct for total sample, enthusiastic adopters and reluctant adopters. All highest shared variances were compared against the variances extracted. For the total sample, all highest shared variances were favorably lower than the variances extracted. Emotional effort as an exploratory construct had an acceptable highest shared variance value for the total sample and reluctant adopters. However, the highest shared variance for this construct using enthusiastic adopters sample was relatively higher than the variance extracted. This comparison was also made with the two adopter categories. The only exception was emotional effort in

enthusiastic adopters sample, having a highest shared variance of 0.437 with a variance extracted of 0.338. After the measurement model modification, the final factor loadings for the total sample were displayed in Table 15. They were all satisfactory. As can be seen from a summary of the final factor loadings for enthusiastic adopters and reluctant adopters that were additionally provided in Appendix E, loadings were sufficiently high for enthusiastic adopters. X69 was the only exception having a factor loading less than 0.50 only for reluctant adopters.

Modified Structural Model

The modified structural model (please refer to Appendix F) for the total sample yielded a chi-square (CMIN) value of 1298.040 with 494 degrees of freedom and a probability (p) of 0.000, providing a fairly well fit of the data to the hypothesized model. The chi-square ratio was 2.628, providing an adequate overall fit. The model had a CFI of 0.938. When CFI is greater than 0.90, it is considered to be adequate for a well-fitting model. RMSEA was 0.059 and also indicates a good fit. GFI and AGFI for the model were 0.859 and 0.831, repectively. Both were satisfactory,

Table 15: Summary of Confirmatory Factor Loadings For The Total Sample

	PE	CE	EE	QCUL	SSTP	CEP	ES	TS	QS	CP	CV
X58	0.83										
X59	0.96										
X60	0.88										
X63		0.63									
X66		0.81									
X69		0.52									
X71			0.54								
X73			0.67								
X74			0.55								
X76				0.86							
X78				0.76							
X79				0.72							
X80				0.86							
X82					0.83						
X83					0.79						
X85					0.73						
X89						0.94					
X90						0.83					
X92						0.90					
X94							0.87				
X95							0.83				
X96							0.60				
X98								0.64			
X99								0.88			
X100								0.75			
X102									0.90		
X103									0.96		
X104									0.86		
X105										0.78	
X106										0.87	
X108										0.86	
X110											0.78
X111											0.87
X112											0.72

considering the following Hoelter figures were merely beyond the benchmark level and since those two former indices tend to grow by sample size. Hoelter's (.05) and Hoelter's (.01) indices were 200 and 209, respectively. This indicates the existence of an adequate sample size. Based on a number of statistics presented, the hypothesized a priori model fits the total sample data fairly well.

The same structural model was also tested with two adopter category sample data. For enthusiastic adopters, the model had a chi-square of 988.538; df of 494; p of 0.000, chi-square ratio of 2.001; CFI of 0.924; RMSEA of 0.061; GFI of 0.832 and AGFI of 0.798. The model for enthusiastic adopters was significant with a good overall fit. For reluctant adopters, the model had a chi-square of 898.794; df of 494; p of 0.000, chi-square ratio of 1.819; CFI of 0.919; RMSEA of 0.064; GFI of 0.96 and AGFI of 0.755. The model for reluctant adopters was significant with a fairly well fit.

All three models (N=475 total sample, N=271 enthusiastic adopters and N=204 reluctant adopters) were found to be significant with an adequate fit. However, each model had different regression weights for the theorized paths. Specifically, respondents in two adopter categories

seemed to be different in terms of how they think about the relationships between the concepts represented by the constructs. Actually some of the supported paths were different in the two adopter categories. Relationships well-explained for one adopter category were less apparent in the other. For example, the path from SST performance to contact employee performance was significant with a strong regression weight for reluctant adopters, while the path was not significant for enthusiastic adopters. The outputs for customer (effort saving and time saving) had a strong impact on customer productivity for both adopter categories, while the inputs by customer (physical effort, cognitive effort, emotional effort) had indirect impact on the same construct. Similarly, quality of customer labor (another input by customer) had indirect impact on customer productivity in both adopter categories through effort saving and time saving. Quality of service as another output for customer had a direct relationship with customer perceptions of productivity, but only for only enthusiastic adopters, not for reluctant adopters. Quality of customer labor had a direct significant relationship with quality of service in the total sample and reluctant adopters.

For enthusiastic adopters, physical effort had a signifiant relationship with effort saving; cognitive effort with time saving; and emotional effort with both effort saving and time saving. However, those direct relationships did not surface for reluctant adopters with the exception of the link from physical effort to time saving.

As it became clear from its title, this dissertation put an emphasis on the potential link between customer productivity and customer value. This path was found to be significant in the total sample as well as two adopter categories, and each sample category had very high positive regression weight for this path.

At this stage the question becomes whether it can statistically be concluded that those two groups share exactly the same path diagram. For this purpose, a multi-group analysis was performed with the two adopter categories in AMOS. In this simultaneous analysis of structural equation model for two groups, all structural weights were constrained. ΔCMIN (chi-square difference) of 56.521 with a degrees of freedom of 34 was found to be significant at a p (probability) of 0.009. The results are

presented in the following section reporting the hypotheses tests.

Hypothesis Testing

The results of the hypothesis testing for the total sample, the enthusiastic adopters and the reluctant adopters, were summarized below. There were 27 proposed relationships in the conceptual framework. For the total sample, 15 relationships were supported (shown in red), including two marginally supported relationships (shown in red underlined) (please refer to Table 16). For each of the enthusiastic adopter tests, 13 relationships were supported, including one marginally supported relationship (please refer to Table 17). For each of the reluctant adopter tests, 13 relationships were supported, including three marginally supported relationships (please refer to Table 18). Finally, there were seven relationships related to the exploratory contruct (emotional effort). Out of these seven exploratory relationships, three for the total

Table 16: Tests of Proposed Relationships For the Total Sample

Structural Relationship: Hypothesized Paths			Parameter Estimate	C.R.	P	H	-/+	Supported or Not Supported
Cognitive_Effort	→	Customer_Productivity	0.04	0.928	0.353	H15b	-	Not Supported
Cognitive_Effort	→	Effort_Saving	-0.06	-1.119	0.263	H7ba	+	Not Supported
Cognitive_Effort	→	Quality of_Customer Labor	0.00	-0.024	0.981	H6b	+	Not Supported
Cognitive_Effort	→	Quality of_Service	0.17	3.674	0.000	H8b	+	Supported
Cognitive_Effort	→	Time_Saving	0.07	1.450	0.147	H7bb	+	Not Supported
Contact_Employee_Performance	→	Cognitive_Effort	-0.02	-0.321	0.748	H4b	-	Not Supported
Contact_Employee_Performance	→	Physical_Effort	-0.02	-0.372	0.710	H4a	-	Not Supported
Contact_Employee_Performance	→	Quality of_Customer Labor	0.09	1.907	0.057	H5	+	M. Supported
Customer_Productivity	→	Customer_Value	0.84	18.953	0.000	H16	+	Supported
Effort_Saving	→	Customer_Productivity	0.37	7.713	0.000	H14a	+	Supported
Effort_Saving	→	Quality of_Service	0.13	2.672	0.008	H11a	+	Supported
Physical_Effort	→	Customer_Productivity	0.00	0.062	0.951	H15a	-	Not Supported
Physical_Effort	→	Effort_Saving	0.07	1.470	0.142	H7aa	+	Not Supported
Physical_Effort	→	Quality of_Customer Labor	0.07	1.605	0.109	H6a	+	Not Supported
Physical_Effort	→	Quality of_Service	0.01	0.231	0.818	H8a	+	Not Supported
Physical_Effort	→	Time_Saving	0.18	4.070	0.000	H7ab	+	Supported
Quality of_Customer Labor	→	Customer_Productivity	0.11	1.911	0.056	H13	+	M. Supported
Quality of_Customer Labor	→	Effort_Saving	0.58	9.692	0.000	H9a	+	Supported
Quality of_Customer Labor	→	Quality of_Service	0.23	3.645	0.000	H10	+	Supported
Quality of_Customer Labor	→	Time_Saving	0.51	9.780	0.000	H9b	+	Supported
Quality of_Service	→	Customer_Productivity	0.14	2.883	0.004	H12	+	Supported
SST_Performance	→	Cognitive_Effort	0.53	7.924	0.000	H2b	"-"	Not Supported
SST_Performance	→	Contact_Employee_Performance	0.34	6.831	0.000	H1	+	Supported
SST_Performance	→	Physical_Effort	0.32	5.980	0.000	H2a	"-"	Not Supported
SST_Performance	→	Quality of_Customer Labor	0.66	8.339	0.000	H3	+	Supported
Time_Saving	→	Customer_Productivity	0.40	8.347	0.000	H14b	+	Supported
Time_Saving	→	Quality of_Service	0.26	5.099	0.000	H11b	+	Supported

Table 17: Tests of Proposed Relationships For Enthusiastic Adopters

Structural Relationship: Hypothesized Paths			Parameter Estimate	C.R.	P	H	-/+	Supported or Not Supported
Cognitive_Effort	→	Customer_Productivity	0.05	0.831	0.406	H15b	-	Not Supported
Cognitive_Effort	→	Effort_Saving	-0.02	-0.207	0.836	H7ba	+	Not Supported
Cognitive_Effort	→	Quality of_Customer Labor	0.00	-0.007	0.995	H6b	+	Not Supported
Cognitive_Effort	→	Quality of_Service	0.25	3.731	0.000	H8b	+	Supported
Cognitive_Effort	→	Time_Saving	0.19	2.684	0.007	H7bb	+	Supported
Contact_Employee_Performance	→	Cognitive_Effort	0.03	0.514	0.608	H4b	-	Not Supported
Contact_Employee_Performance	→	Physical_Effort	0.05	0.842	0.400	H4a	-	Not Supported
Contact_Employee_Performance	→	Quality of_Customer Labor	0.01	0.104	0.917	H5	+	Not Supported
Customer_Productivity	→	Customer_Value	0.75	10.836	0.000	H16	+	Supported
Effort_Saving	→	Customer_Productivity	0.36	4.983	0.000	H14a	+	Supported
Effort_Saving	→	Quality of_Service	0.13	1.810	0.070	H11a	+	M. Supported
Physical_Effort	→	Customer_Productivity	0.04	0.741	0.459	H15a	-	Not Supported
Physical_Effort	→	Effort_Saving	0.15	2.308	0.021	H7aa	+	Supported
Physical_Effort	→	Quality of_Customer Labor	-0.02	-0.275	0.784	H6a	+	Not Supported
Physical_Effort	→	Quality of_Service	0.05	0.956	0.339	H8a	+	Not Supported
Physical_Effort	→	Time_Saving	0.21	3.400	0.000	H7ab	+	Supported
Quality of_Customer Labor	→	Customer_Productivity	0.08	1.004	0.316	H13	+	Not Supported
Quality of_Customer Labor	→	Effort_Saving	0.51	6.139	0.000	H9a	+	Supported
Quality of_Customer Labor	→	Quality of_Service	0.12	1.533	0.125	H10	+	Not Supported
Quality of_Customer Labor	→	Time_Saving	0.33	4.652	0.000	H9b	+	Supported
Quality of_Service	→	Customer_Productivity	0.13	1.962	0.050	H12	+	Supported
SST_Performance	→	Cognitive_Effort	0.48	6.281	0.000	H2b	"-"	Not Supported
SST_Performance	→	Contact_Employee_Performance	0.05	0.749	0.454	H1	+	Not Supported
SST_Performance	→	Physical_Effort	0.25	3.830	0.000	H2a	"-"	Not Supported
SST_Performance	→	Quality of_Customer Labor	0.51	5.789	0.000	H3	+	Supported
Time_Saving	→	Customer_Productivity	0.37	5.627	0.000	H14b	+	Supported
Time_Saving	→	Quality of_Service	0.28	4.433	0.000	H11b	+	Supported

Table 18: Tests of Proposed Relationships For Reluctant Adopters

Structural Relationship: Hypothesized Paths			Parameter Estimate	C.R.	P	H	-/+	Supported or Not Supported
Cognitive_Effort	→	Customer_Productivity	0.01	0.231	0.817	H15b	-	Not Supported
Cognitive_Effort	→	Effort_Saving	-0.13	-1.607	0.108	H7ba	+	Not Supported
Cognitive_Effort	→	Quality of_Customer Labor	0.02	0.257	0.797	H6b	+	Not Supported
Cognitive_Effort	→	Quality of_Service	0.11	1.505	0.132	H8b	+	Not Supported
Cognitive_Effort	→	Time_Saving	-0.04	-0.450	0.653	H7bb	+	Not Supported
Contact_Employee_Performance	→	Cognitive_Effort	-0.04	-0.485	0.627	H4b	-	Not Supported
Contact_Employee_Performance	→	Physical_Effort	-0.11	-1.289	0.197	H4a	-	Not Supported
Contact_Employee_Performance	→	Quality of_Customer Labor	0.10	1.274	0.203	H5	+	Not Supported
Customer_Productivity	→	Customer_Value	0.84	12.155	0.000	H16	+	Supported
Effort_Saving	→	Customer_Productivity	0.39	5.518	0.000	H14a	+	Supported
Effort_Saving	→	Quality of_Service	0.13	1.802	0.072	H11a	+	M. Supported
Physical_Effort	→	Customer_Productivity	-0.08	-1.432	0.152	H15a	-	Not Supported
Physical_Effort	→	Effort_Saving	-0.04	-0.536	0.592	H7aa	+	Not Supported
Physical_Effort	→	Quality of_Customer Labor	0.13	1.724	0.085	H6a	+	M. Supported
Physical_Effort	→	Quality of_Service	-0.04	-0.680	0.497	H8a	+	Not Supported
Physical_Effort	→	Time_Saving	0.14	2.019	0.043	H7ab	+	Supported
Quality of_Customer Labor	→	Customer_Productivity	0.10	1.221	0.222	H13	+	Not Supported
Quality of_Customer Labor	→	Effort_Saving	0.46	5.064	0.000	H9a	+	Supported
Quality of_Customer Labor	→	Quality of_Service	0.19	1.958	0.050	H10	+	Supported
Quality of_Customer Labor	→	Time_Saving	0.52	6.165	0.000	H9b	+	Supported
Quality of_Service	→	Customer_Productivity	0.12	1.751	0.080	H12	+	M. Supported
SST_Performance	→	Cognitive_Effort	0.47	4.140	0.000	H2b	"-"	Not Supported
SST_Performance	→	Contact_Employee_Performance	0.42	5.459	0.000	H1	+	Supported
SST_Performance	→	Physical_Effort	0.28	3.191	0.001	H2a	"-"	Not Supported
SST_Performance	→	Quality of_Customer Labor	0.62	4.092	0.000	H3	+	Supported
Time_Saving	→	Customer_Productivity	0.48	5.956	0.000	H14b	+	Supported
Time_Saving	→	Quality of_Service	0.21	2.320	0.020	H11b	+	Supported

sample (please refer to Table 19); four for the enthusiastic adopters (please refer to Table 20); and four for the reluctant adopters (please refer to Table 21) were statistically significant. Two of the four significant relationships for emotional effort were marginally significant. All significant paths (including marginally significant ones) are visually presented in red in the presented structural models for the total sample, enthusiastic adopters and reluctant adopters (please refer to Figures 20, 21 and 22). In each of the three sample categories, there were two hypotheses (H2a and H2b) found to be significant but not in the hypothesized direction. These two significant relationships are shown in blue in Figures 20, 21 and 22 and will be further discussed in Chapter 5.

Table 19: Tests for Exploratory Relationships For the Total Sample

Structural Relationship:			Parameter Estimate	C.R.	P	Significant or Not Significant
Contact_Employee_Performance	→	Emotional_Effort	0.09	1.452	0.147	Not Significant
Emotional_Effort	→	Customer_Productivity	-0.05	-0.977	0.329	Not Significant
Emotional_Effort	→	Effort_Saving	-0.03	-0.545	0.586	Not Significant
Emotional_Effort	→	Quality of_Customer Labor	-0.15	-2.033	0.042	Significant
Emotional_Effort	→	Quality of_Service	0.26	4.850	0.000	Significant
Emotional_Effort	→	Time_Saving	0.02	0.395	0.693	Not Significant
SST_Performance	→	Emotional_Effort	0.53	7.535	0.000	Significant

Table 20: Tests for Exploratory Relationships For Enthusiastic Adopters

Structural Relationship:			Parameter Estimate	C.R.	P	Significant or Not Significant
Contact_Employee_Performance	→	Emotional_Effort	0.05	0.674	0.501	Not Significant
Emotional_Effort	→	Customer_Productivity	0.00	0.003	0.998	Not Significant
Emotional_Effort	→	Effort_Saving	-0.19	-2.217	0.027	Significant
Emotional_Effort	→	Quality of_Customer Labor	0.07	0.872	0.383	Not Significant
Emotional_Effort	→	Quality of_Service	0.23	2.863	0.004	Significant
Emotional_Effort	→	Time_Saving	-0.17	-2.068	0.039	Significant
SST_Performance	→	Emotional_Effort	0.42	5.096	0.000	Significant

Table 21: Tests for Exploratory Relationships For Reluctant Adopters

Structural Relationship:			Parameter Estimate	C.R.	P	Significant or Not Significant
Contact_Employee_Performance	→	Emotional_Effort	0.08	0.895	0.371	Not Significant
Emotional_Effort	→	Customer_Productivity	-0.10	-1.319	0.187	Not Significant
Emotional_Effort	→	Effort_Saving	0.05	0.544	0.587	Not Significant
Emotional_Effort	→	Quality of_Customer Labor	-0.27	-1.860	0.063	Marginally Significant
Emotional_Effort	→	Quality of_Service	0.32	3.571	0.000	Significant
Emotional_Effort	→	Time_Saving	0.15	1.648	0.099	Marginally Significant
SST_Performance	→	Emotional_Effort	0.61	5.345	0.000	Significant

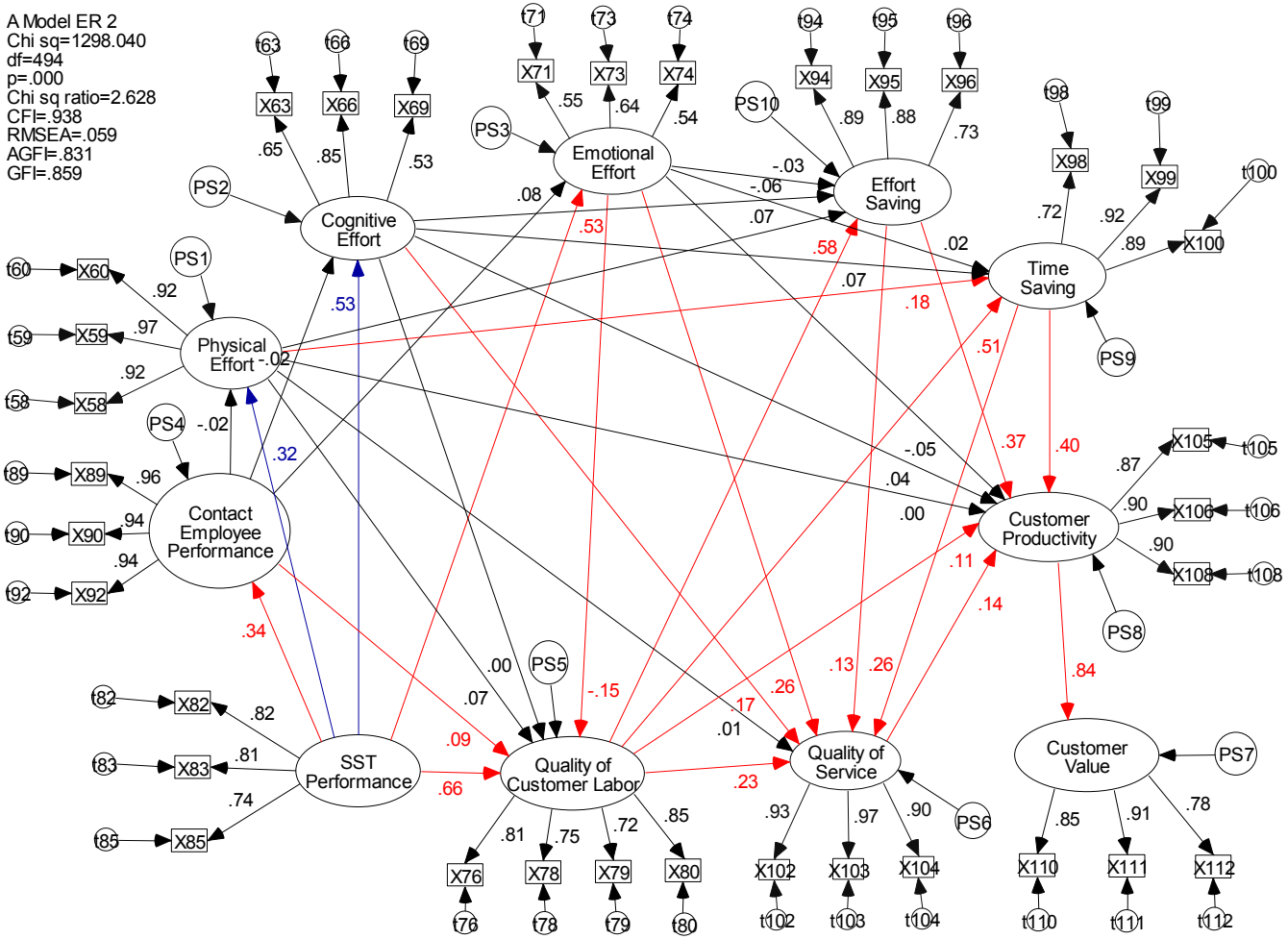

Figure 20: Structural Model For Total Sample

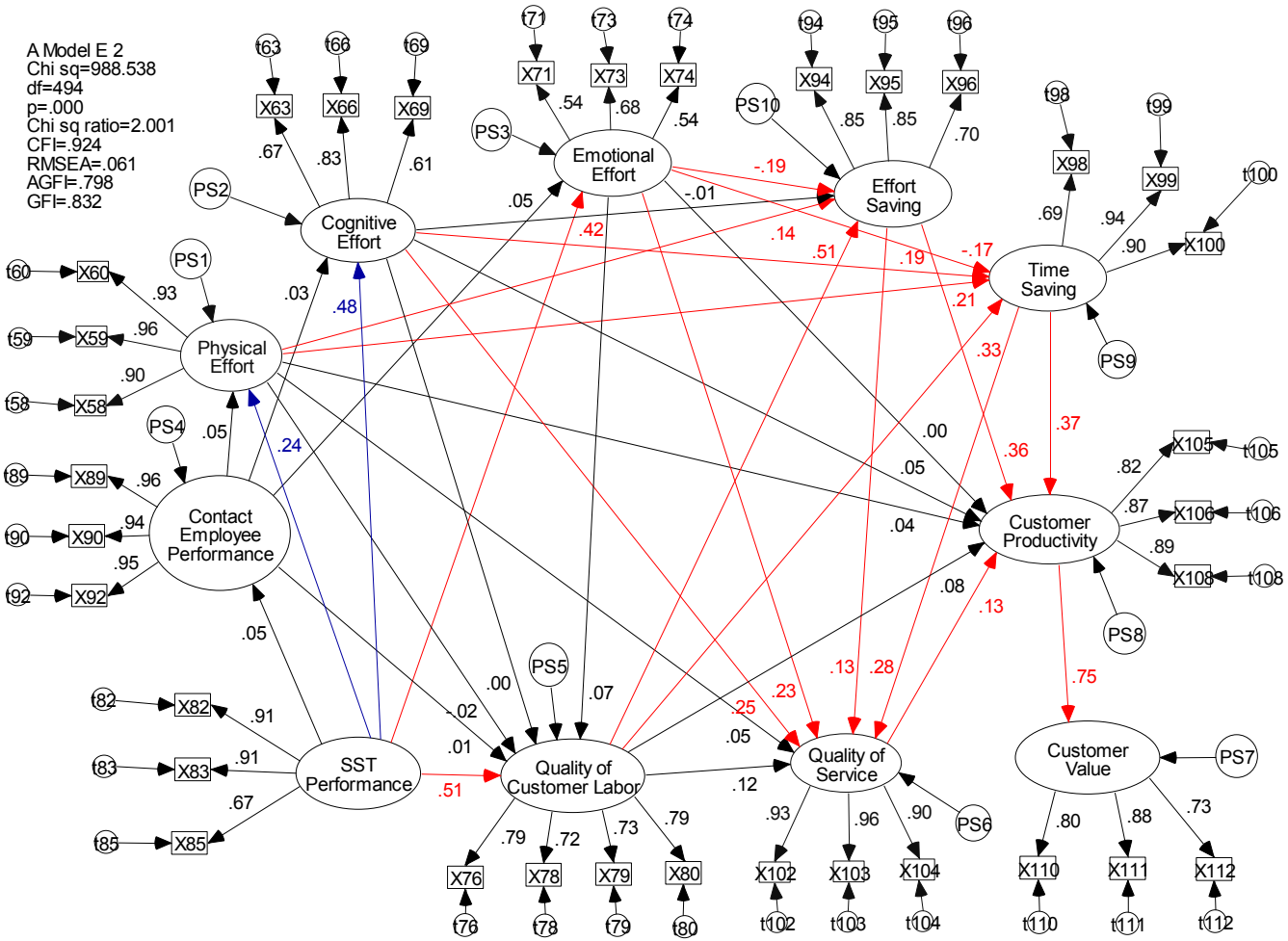

Figure 21: Structural Model For Enthusiastic Adopters

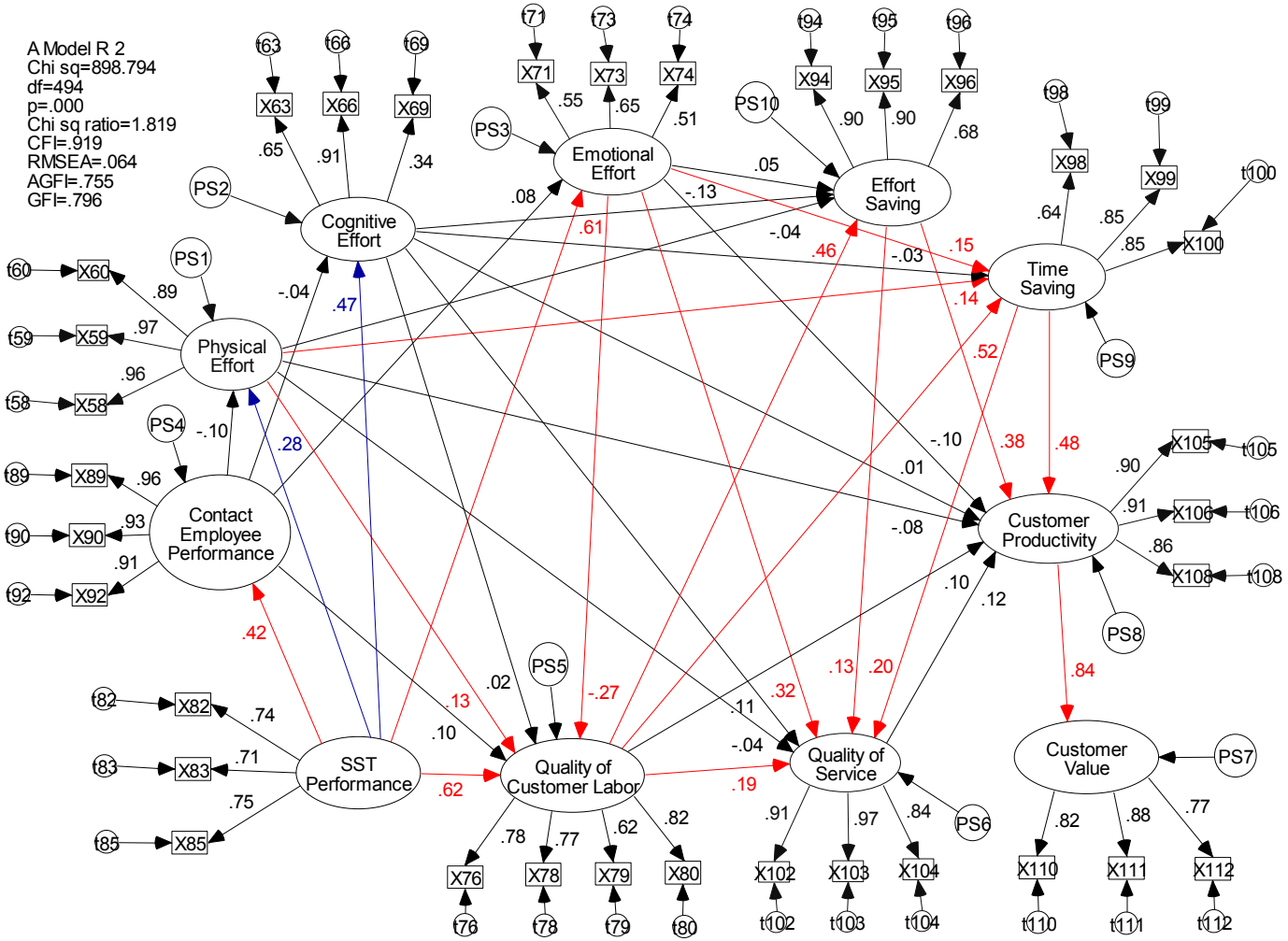

Figure 22: Structural Model For Reluctant Adopters

Hypothesis 1

H_1 stated posited that SST performance (SSTP) should positively influence contact employee performance (CEP). This hypothesis was supported for the overall sample(p=0.000, path parameter estimate of 0.34). When the adopter categories were examined, SSTP was found to influence CEP for the reluctant adopters (p=0.000, path parameter estimate of 0.42). However, the hypothesis was not supported for the enthusiastic adopters (p=0.454, path parameter estimate of 0.05).

Hypothesis 2

H_{2a} posited that SST performance (SSTP) is expected to negatively influence physical effort (PE). This hypothesis was not supported for the total sample(p=0.000, path parameter estimate of 0.32). Moreover, it is interesting to note the direction of the relationship was reverse from the hypothesized relationship. When the models were tested separately by adopter category, the same counter hypothesized results emerged. The hypothesized direction was not supported for either the enthusiastic adopters or

for the reluctant adopters (parameter estimates of 0.25 and 0.28, respectively).

H_{2b} stated that SST performance (SSTP) negatively influences cognitive effort (CE). This hypothesis was not supported for the total sample (p=0.000, path parameter estimate of 0.53). Consistent with the findings from H2a, the direction of the relationship was again reverse of the hypothesized relationship. Category based analysis revealed counter directional results for both the reluctant and enthusiastic adopter categories (path parameter estimates of 0.48 and 0.47, respectively).

Hypothesis 3

H_3 posited that SST performance (SSTP) should positively influence quality of customer labor (QCUL). This hypothesis was supported for the total sample(p=0.000, path parameter estimate of 0.66). Support for the hypothesis was also found for enthusiastic adopters (p=0.000, path parameter estimate of 0.51) and for reluctant adopters (p=0.000, path parameter estimate of 0.62).

Hypothesis 4

Contact employee performance (CEP) is expected to negatively influences both physical effort (PE)(H4a), and cognitive effort (CE) (H4b). Neither of these hypotheses was supported for the total sample (p=0.710), Likewise there was no support for the hypotheses in the findings for enthusiastic adopters (0.400) nor for reluctant adopters (p=0.197).

Hypothesis 5

H_5 stated that contact employee performance (CEP) positively influences quality of customer labor (QCUL). This hypothesis was marginally supported for the total sample (p=0.057, path parameter estimate of 0.09). However, the hypothesis was not supported for enthusiastic adopters nor for reluctant adopters.

Hypothesis 6

H_{6a} posited that physical effort (PE) should positively influence quality of customer labor (QCUL). This

hypothesis was not supported for the total sample nor for the enthusiastic adopters. However, support did emerge for the reluctant adopters (p=0.085, path parameter estimate of 0.13).

H_{6b} posited that cognitive effort (CE) is likely to positively influence quality of customer labor (QCUL). Similar to H6a, this hypothesis was not supported for the total sample (p=0.981), nor for enthusiastic adopters (p= 0.995), nor for reluctant adopters (p=0.797).

Hypothesis 7

H_{7aa} stated that physical effort (PE) positively influences effort saving (ES). This hypothesis was not supported for the total sample(p=0.142, path parameter estimate of 0.07). The hypothesis was also not supported for reluctant adopters (p=0.592, path parameter estimate of -0.04). However, findings for the enthusiastic adopters, revealed a significant path between physical effort and effort savings (p=0.021, path parameter estimate of 0.15).

H_{7ab} proposed that physical effort (PE) should positively influence time saving (TS). This hypothesis was supported for the total sample(p=0.000, path parameter

estimate of 0.18). The hypothesis was also supported for both enthusiastic adopters (p=0.000, path parameter estimate of 0.21) and reluctant adopters (p=0.043,path parameter estimate of 0.14).

$H7_{ba}$ stated that cognitive effort (CE) positively influences effort savings (ES). This hypothesis was not supported for the general model(p=0.263, path parameter estimate of -0.06), nor was there any directional support. Likewise, the hypothesis did not hold for enthusiastic adopters (p=0.836, path parameter estimate of -0.02), nor for reluctant adopters (p=0.108, path parameter estimate of -0.13). In both cases, no directional support was forthcoming.

$H7_{bb}$ posited that cognitive effort (CE) should positively influence time saving (TS). This hypothesis was not supported for the total sample p=0.147, path parameter estimate of 0.07). However, the cognitive effort did positively influence perceptions of time saved for enthusiastic adopters (p=0.007, path parameter estimate of 0.19), but not for reluctant adopters (p=0.653, path parameter estimate of -0.04).

Hypothesis 8

H_{8a} stated that physical effort (PE) positively influences quality of service (QS). This hypothesis was not supported for the total sample (p=0.818, path parameter estimate of 0.01). Similarly, physical effort was not linked to service qualite for enthusiastic adopters (p=0.339, path parameter estimate of 0.05), nor for reluctant adopters (p=0.497, path parameter estimate of -0.04).

H_{8b} stated that cognitive effort (CE) positively influences quality of service (QS). This hypothesis was supported for the total sample (p=0.000, path parameter estimate of 0.17). Category based findings revealed the hypothesis was also supported for enthusiastic adopters (p=0.000, path parameter estimate of 0.25), but not for reluctant adopters (p=0.132, path parameter estimate of 0.11).

Hypothesis 9

H_{9a} posited that quality of customer labor (QCUL) should positively influences effort saving (ES). This

hypothesis was supported for the total sample(p=0.000, path parameter estimate of 0.58). Category based findings revealed support for both enthusiastic adopters (p=0.000, path parameter estimate of 0.51) and reluctant adopters (p=0.000, path parameter estimate of 0.46).

$H9_b$ stated that quality of customer labor (QCUL) positively influences time saving (TS). This hypothesis was supported for the total sample(p=0.000, path parameter estimate of 0.51). Category based analysis also revealed support for both enthusiastic adopters (p=0.000, path parameter estimate of 0.33) and reluctant adopters (p=0.000, path parameter estimate of 0.52).

Hypothesis 10

$H10$ stated that quality of customer labor (QCUL) positively influences quality of service (QS). This hypothesis was supported for the total sample(p=0.000, path parameter estimate of 0.23). Likewise, the hypothesis was supported for reluctant adopters (p=0.050, path parameter estimate of 0.19). However, quality of customer labor was not found to be a cause of perceived quality of service for

enthusiastic adopters (p=0.125, path parameter estimate of 0.12)

Hypothesis 11

H_{11a} predicted that effort saving (ES) should positively influence quality of service (QS). This hypothesis was supported for the total sample(p=0.008, path parameter estimate of 0.13). Similar support was found for both enthusiastic adopters (p=0.070, path parameter estimate of 0.13) and reluctant adopters (p=0.072, path parameter estimate of 0.13).

H_{11b} anticipated that Time saving (TS) would positively influence quality of service (QS). This hypothesis was supported for the total sample(p=0.000, path parameter estimate of 0.26). Likewise, the hypothesis was also supported for both enthusiastic adopters (p=0.000, path parameter estimate of 0.28) and reluctant adopters (p=0.020, path parameter estimate of 0.21).

Hypothesis 12

H_{12} stated that quality of service (QS) positively influences customer productivity (CP). This hypothesis was supported for the total sample (p=0.004, path parameter estimate of 0.14). The hypothesis was also supported both for enthusiastic adopters (p=0.050, path parameter estimate of 0.13) and for reluctant adopters (p=0.080, path parameter estimate of 0.12).

Hypothesis 13

H_{13} posited that quality of customer labor (QCUL) should positively influence customer productivity (CP). This hypothesis was marginally supported for the total sample (p=0.056, path parameter estimate of 0.11). However, support was lacking for both enthusiastic adopters (p=0.316, path parameter estimate of 0.08) and reluctant adopters (p=0.222, path parameter estimate of 0.10).

Hypothesis 14

H_{14a} reflected that effort savings (ES) is expected to positively influence customer productivity (CP). This hypothesis was supported in the general model(p=0.000), based on the positive path parameter estimate of 0.37. Category based analysis also revealed support for both enthusiastic adopters (p=0.000, path parameter estimate of 0.36) and for reluctant adopters (p=0.000, path parameter estimate of 0.39).

H_{14b} stated that Time saving (TS) positively influences customer productivity (CP). This hypothesis was supported in the general model(p=0.000, path parameter estimate of 0.40). Support was also found for enthusiastic adopters (p=0.000, path parameter estimate of 0.37) as well as for reluctant adopters (p=0.000, path parameter estimate of 0.48).

Hypothesis 15

H_{15a} posited that physical effort (PE) should negatively influence customer productivity (CP). This hypothesis was not supported in the general model(p=0.951,

path parameter estimate of 0.00). Likewise, no support was found for either enthusiastic adopters (p=0.459, path parameter estimate of 0.04) nor for reluctant adopters (p=0.152, path parameter estimate of -0.08).

H_{15b} stated that cognitive effort (CE) negatively influences customer productivity (CP). Similar to H15a, this hypothesis was not supported in the general model(p=0.353, path parameter estimate of 0.04). The hypothesis was also not found for enthusiastic adopters (p=0.406, path parameter estimate of 0.05) nor for reluctant adopters (p=0.817, path parameter estimate of 0.01).

Hypothesis 16

H_{16} stated that Customer productivity (CP) positively influences customer value (CV). This hypothesis was supported in the general model(p=0.000, path parameter estimate of 0.84). The hypothesis was also supported for both enthusiastic adopters (p=0.000, path parameter estimate of 0.75) and for reluctant adopters (p=0.000, path parameter estimate of 0.84).

The results of the hypothesized relationships provided in this chapter will be discussed in detail in the next chapter. The exploratory construct (emotional effort) will also be interpreted in Chapter 5.

A Comparison of Ensthusiastic and Reluctant Adopters

A set of questions were asked to respondents to better understand potential differences between enthusiastic and reluctant adopters. They were asked 17 different questions (please refer to X40 thru X56 in Appendix C) on technology, automated systems and productivity in general, and their use of self-checkouts in particular. First, the section on psychographic differences initially provides the results of the two-sample t-test analyses conducted on each one of those 17 items, exploring the potential for statistically significant differences between the means of the two adopter categories. After the t-test results, findings based on the frequency distributions were also provided to verbally highlight the interesting differences between enthusiastic and reluctant adopters. Second, the section on the use of technology-based self-service (TBSS) options provides additional information highlighting the extent of

awareness and use of different TBSS options among enthusiastic and reluctant adopters.

Psychographic Differences

Two-sample t-test results comparing the means of enthusiastic and reluctant adopters are discussed in this section to see if there are statistically significant differences between the two groups. First, the tests of assumptions for normality and equal variances (Appendix D) were provided before conducting any two-sample t-test analyses. In a normality assumption check, kurtosis values were emphasized over the skewness and omnibus measures in the case of a possible conflict. Second, in equal variance assumption check, modified Levene statistic was emphasized over the variance ratio statistic in conflict cases between the two measures.

When both normality and equal variance assumptions were satisfied, an equal variance t-test method was used to see if the means of two adopter categories were different. When the normality assumption was satisfied, but variances were not equal, Aspin-Welch unequal-variance test was utilized. When the normality assumption did not worked out,

but variances were equal (or not), Mann-Whitney U and Wilcoxon rank-sum test for difference in medians were considered. The null hypothesis reflected that there was no difference between the means of two adopter categories.

In all cases of the 17 items (X40 thru 56), except one, the null hypothesis was rejected and the means of two adopter categories were found to be statistically different. Specifically, the only insignificant case was for X47 (I need to know someone is there, just in case, to listen to me if I have a question or problem).

The effect sizes for all 17 items were also checked (Table 22). The effect size is defined as (Hair et al. 1995, p.10):

> The probability of achieving statistical significance is based not only on statistical considerations but also on the actual magnitude of the effect of interest (e.g., a difference of means between two groups …) in the population, termed the **effect size** … An effect size of .5 indicates that the mean difference is one-half of a standard deviation.

Table 22: The Effect Sizes

		Effect Size		
		Total	Enthusiastic	Reluctant
Item	Chi-Sq	N=475	N=271	N=204
X40	67.513	0.3770	0.4991	0.5753
X41	89.171	0.4333	0.5736	0.6611
X42	80.175	0.4108	0.5439	0.6269
X43	211.276	0.6669	0.8830	1.0177
X44	118.653	0.4998	0.6617	0.7626
X45	157.328	0.5755	0.7619	0.8782
X46	81.737	0.4148	0.5492	0.6330
X47	16.982	0.1891	0.2503	0.2885
X48	24.469	0.2270	0.3005	0.3463
X49	160.832	0.5819	0.7704	0.8879
X50	113.096	0.4880	0.6460	0.7446
X51	57.969	0.3493	0.4625	0.5331
X52	114.705	0.4914	0.6506	0.7499
X53	92.812	0.4420	0.5852	0.6745
X54	66.683	0.3747	0.4960	0.5717
X55	40.361	0.2915	0.3859	0.4448
X56	24.745	0.2282	0.3022	0.3483

W (Effect Size) = SQRT (Chi-Sq / N)

Small value of w is 0.1,
a medium value is 0.3, and
a large value is 0.5.

As it could be expected, the adopter category based differences for X47 (I need to know someone is there, just in case, to listen to me if I have a question or problem) had the lowest effect size and was previously found insignificant based on the t-test result. In an order of increasing effect sizes, X48, X56 and X55 had a small effect size. X51, X54, X40, X42, X46, X41, X44, X50, X52 and X44 had a medium effect size. Finally, X45 (I feel completely at ease with the use of self-checkout), X49 (Interacting with self-checkout is often frustrating) and X43 (I love using the self-checkout) had a large effect size.

The scale employed was a seven-point Likert scale for X40 thru X56. Checking "1" meant that the respondent strongly disagreed with the statement and checking "7" meant that s/he strongly agreed. All the detailed results for each item, point by point are provided in Appendix D. For simplification purposes and especially for highligting the interesting differences in frequency distributions between the two adopter categories, the next section groups the two highest and two lowest Likert points together (e.g., 1 and 2; 6 and 7). These groupings well be described as "strongly agree" or "strongly disagree."

Enthusiastic adopters (37.64 percent) felt like they were more in control with automated systems, while only 10.78 percent of reluctant adopters said so. In the specific case of self-checkouts, the findings were similar. Enthusiastic adopters (47.87 percent) strongly agreed that the self-checkout gave them more control, while only 11.27 percent of reluctant adopters felt the same way. The majority of enthusiastic adopters (45.02 percent) strongly agreed that the self-checkout let the customer be in charge, while only 14.70 percent of reluctant adopters strongly agreed.

Almost three-fourths of enthusiastic adopters (73.80 percent) strongly agreed that they loved using the self-checkout. The percentage of reluctant adopters who strongly agreed with this statement was considerably lower (14.21 percent). Technology was viewed as saving time for 74.54 percent of enthusiastic adopters, while only for 32.35 percent of reluctant adopters strongly agreed. Virtually all enthusiastic adopeters (81.92 percent) strongly agreed that they felt completely at ease with the use of the self-checkout, while only 28.43 percent of reluctant adopters could make that claim. In terms of error recovery, 36.9 percent of enthusiastic adopters and 13.21 percent of

reluctant adopters strongly agreed they they found it easy to recover from errors encountered while using the self-checkout. This difference was statistically different.

Interestingly, face-to-face contact at the self-checkout seemed not to be that important for neither enthusiastic nor reluctant adopters. Only 7.75 percent of enthusiastic adopters and 14.21 percent of reluctant adopters strongly agreed that they usually needed face-to-face contact at the self-checkout to explain what they want and to have answers for their questions. Still, 54.24 percent of enthusiastic and 57.84 percent of reluctant adopters strongly agreed that they needed to know someone was available for questions or problems.

Frustration and confusion with the use of self-checkout seemed to be perceived very differently between the two adopter categories. When respondents were asked whether they agreed if interacting with the self-checkout was often frustrating, 74.90 percent of enthusiastic adopters strongly disagreed, while only 22.55 percent of reluctant adopers said likewise. Similarly, 87.46 percent of enthusiastic adopters strongly disagreed that they often became confused when they used the self-checkout, whereas

only 51.55 percent of the reluctant adopters made the same claim.

Scanning activity is one important task in the use of self-checkout systems. Most of the enthusiastic adopters (84.13 percent) strongly disagreed that they preferred getting help from a service employee, instead of scanning themselves, while only 42.65 percent of reluctant adopters said they did not prefer getting help. It was not easier for enthusiastic adopters (63.10 percent) to get help in scanning produce compared to doing it themselves, but it was easier for the reluctant adopters (only 30.40 percent disagreeing).

When respondents were asked if they usually felt like an unpaid cashier working at the self-checkout register when they were using the self-checkout, 84.50 percent of enthusiastic adopter strongly disagreed, while this number for reluctant adopters was significantly lower (47.06 percent). Similarly, 87.09 percent of enthusiastic and 60.78 percent of reluctant adopters strongly disagreed that they resented having to do the work that a paid employee should do. Only 3.70 percent of enthusiastic adopters agreed with the resentment statement, while slightly more, 12.25 percent of reluctant adopters agreed.

In terms productivity, when respondents were asked if they usually tried to be very productive when they shop, 75.28 percent of enthusiastic adopters strongly agreed, while 51.47 percent of reluctant adopers said likewise. In terms of personal productivity, 78.97 percent of enthusiastic adopters and 63.23 percent of reluctant adopters strongly agreed that they cared about their productivity.

Use of Technology-Based Self-Service Options

Respondents were also asked what other options of technology-based self-service (TBSS) they noticed and used in retail stores. Percentage frequency distributions for each adopter category and the total sample are provided in Appendix D. The top three TBSS options that most of the total sample was aware of included check-cashing machines, automatic recipe dispensers, and in-store service/ information telephones for customers with a percentage share of 50.32, 36.84 and 36.63, respectively. Conversely, the bottom three TBSS options that most of the total sample was unaware of included ATMs (automated teller machines), produce scales, and electronic blood pressure checking

devices with a percentage share of 1.68, 1.89 and 3.37, respectively.

The top three TBSS options that most of the total sample were aware of but had not used, included coin machines, coffee grinding machines and coin-operated photocopy machines with a percentage share of 57.68, 52.00 and 47.16, respectively. Conversely, bottom three TBSS options that most of the total sample was aware of but had not used, included self-scanning payment devices at traditional checkout lanes, produce scales and price checkers (price look up points) with a percentage share of 8.00, 13.68 and 14.53, respectively.

The top three TBSS options that most of the total sample was aware of and used included produce scales, self-scanning payment devices at traditional checkout lanes, and pay-at-the pump gasoline terminals in the store's parking lot with a percentage share of 84.42%, 76.84% and 76.21%, respectively. Conversely, the bottom three TBSS options that most of the total sample was aware of and used included check-cashing machines, interactive monitors for electronic game demonstrations, and vending machines for personalized tags or stickers with a percentage share of 10.11%, 24.21% and 24.42%, respectively.

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

The purpose of this dissertation was to investigate the concept of customer productivity in a technology-based self-service context (e.g., self-checkouts in grocery stores) to understand how customer productivity and customer value are related to each other. As described and discussed in Chapter 2 and Chapter 3, a preliminary qualitative study explored the meaning of customer productivity and the labor provided by customers in self-service shopping and TBSS environments. Based on these exploratory insights and the extant literature, a conceptual framework was developed to identify the relationships between customer inputs into a TBSS option and customer outputs from that option influenced by customer perceptions of self-service technology (SST) and contact employee performance. Two adopter categories were employed for comparison purposes: enthusiastic adopters and reluctant adopters.

The quantitative study utilized a survey research design. After pre-testing the scale items with a large student sample, the latent variable structural equation

model was tested by data collected from both enthusiastic and reluctant adopters who customers of a large national grocery chain. There were 27 hypotheses in total as summarized below:

H1: SST performance positively influences contact employee performance.

H2a: SST performance negatively influences physical effort.

H2b: SST performance negatively influences cognitive effort.

H3: SST performance positively influences quality of customer labor.

H4a: Contact employee performance negatively influences physical effort.

H4b: Contact employee performance negatively influences cognitive effort.

H5: Contact employee performance positively influences quality of customer labor.

H6a: Physical effort positively influences quality of customer labor.

H6b: Cognitive effort positively influences quality of customer labor.

H7aa: Physical effort positively influences effort saving.

H7ab: Physical effort positively influences time saving.

H7ba: Cognitive effort positively influences effort savings.

H7bb: Cognitive effort positively influences time saving.

H8a: Physical effort positively influences quality of service.

H8b: Cognitive effort positively influences quality of service.

H9a: Quality of customer labor positively influences effort saving.

H9b: Quality of customer labor positively influences time saving.

H10: Quality of customer labor positively influences quality of service.

H11a: Effort saving positively influences quality of service.

H11b: Time saving positively influences quality of service.

H12: Quality of service positively influences customer productivity.

H13: Quality of customer labor positively influences customer productivity.

H14a: Effort savings positively influences customer productivity.

H14b: Time saving positively influences customer productivity.

H15a: Physical effort negatively influences customer productivity.

H15b: Cognitive effort negatively influences customer productivity.

H16: Customer productivity positively influences customer value.

Besides testing the proposed hypotheses, the dissertation also investigated a total of seven potential relationships between the exploratory construct of emotional effort and the SST performance, contact employee performance, effort saving, time saving, quality of customer labor, quality of service and customer productivity.

This concluding chapter presents a discussion of the findings from testing the theoretical model. It also compares the findings from the two adopter categories. Contributions of the research in terms of implications for both managers and researchers are then presented. The chapter concludes with the limitations of this study and the future research avenues.

Discussion of Findings

Theoretical Model

The structural model of customer productivity after item modification for the total sample was significant (p=0.000) and a well-fitting model (Chi Sq Ratio= cmin/df

=2.628; CFI =0.938; and RMSEA =0.059). Once again, based on GFI and AGFI values of 0.859 and 0.831, respectively, it was concluded that the hypothesized model fits the total sample data sufficiently well.

The same structural model for each of the two adopter categories was also significant at p=0.000 and had sufficient fit values. For enthusiastic adopters sample, the structural model had a Chi-sq ratio of 2.001; CFI of 0.924; RMSEA of 0.061; GFI of 0.832 and AGFI of 0.798. For reluctant adopters sample, the structural model had a Chi-sq ratio of 1.819; CFI of 0.919; RMSEA of 0.064; GFI of 0.796 and AGFI of 0.755. As mentioned by Byrne (2001), "GFI and AGFI values can be overly influenced by sample size" and the structural model based on reluctant adopters sample data had low Hoelter's at p=0.05 and 0.01 indices of 124 and 129 (150 and 156 for the structural model based on enthusiastic adopters sample data), respectively. When the sample size becomes larger, providing a Hoelter's index much higher than a sufficient Hoelter index of 200 is achieved, GFI and AGFI values are will likely to become much higher, therefore more favorable.

In summary, the overall structural model after item modification held for the total sample, as did the

individual models for enthusiastic adopters and reluctant adopters. The model presented in this dissertation was one of the first models in the literature, tested empirically and found statistically significant. It addressed the nature of customers' perceptions of their productivity and the relation to customer value in a TBSS setting, as well as differentiating enthusiastic adopters from reluctant adopters. Thus an early model of perceived TBSS productivity has been tested and now paves the way for numerous avenues of future esearch.

Self-Service Technology Performance

Self-service technology (SST) is essential to the sound operations of technology-based self-service (TBSS) options. The customer is dependent on SST to initiate and produce the service, and SST will potentially influence all other customer activities at the service encounter.

H1 was supported for the total sample. Perceptions of SST performance positively influences perceptions of contact employee performance. While this was also the case for reluctant adopters, it did not hold up for enthusiastic adopters. One reason may be that enthusiastic adopters are

much less dependent on contact employee performance than SST performance itself. Enthusistic adopters more frequently use the self-checkout and they use it well. They feel like they are more in control with automated systems in general, and self-checkouts in particular, than reluctant adopters feel. Enthusiastic adopters voice they are more in charge of the use of the self-checkout when compared to reluctant adopters. Interacting with self-checkouts is more often frustrating for reluctant adopters compared to enthusiastic adopters. Thus, reluctant adopters need more face-to-face contact (e.g., a contact employee) at the self-checkout for explanations to their questions and ease for their frustrations in interacting with the self-checkout.

H2a and H2b were not supported for the total sample. Therefore, SST performance does not negatively influence either physical effort or cognitive effort. This was also true for both enthusiastic and reluctant adopters. Although each relationship was statistically significant, the sign of the relationship was reverse compared to what was hypothesized. One reason for the reverse sign may be both enthusiastic and reluctant adopters do not perceive how SST performance may decrease their efforts physically and

cognitively at the self-checkout. On the contrary, they seem to think that SST performance positively influences both physical and cognitive efforts. This may be a reflection of how SST is perceived to increase customer labor in TBSS environments compared to traditional self-service environments. As suggested by Dabholkar, Bobbitt and Lee (2003), "self-scanning checkouts were met with stubborn resistance" and this resistance may still have a considerable impact on customers using self-checkouts, preventing what can potentially be accomplished in terms of reduced effort and greater efficiencies gained from using modern SSTs.

H3 was supported for all sample categories. Perceptions of SST performance appears to positively influence the perceived quality of customer labor. The link was very strong statistically. It appears that one's evaluation of SST performance is an essential factor in judgments of quality of customer labor, even if it increases the level of the effort required.

A service employee has to publicly display the appropriate emotions in service production and delivery regardless of "what emotions are actually felt" (Ashforth and Humphrey 1993). Customers as partial employees closely

interact with contact employees as well as other fellow customers in TBSS environments. Since customers increasingly actively participate in service production and delivery, their emotional labor should be important in services as well. Aside from the theorized hypotheses, this dissertation also explored perceived emotional effort of customers participating in the production and delivery of of TBSS. Emotional effort appears to be similar to physical effort regarding the relationship with evaluation of SST performance. It is still expected, as customers become more accustomed to the use of self-checkouts in near future, they may try to get more benefits from less effort by heavily relying on better SST performance. This may change the sign of the relationship from positive to negative. Still under this scenario, there may be a threshold for a sign change in the explored relationship. Existence of such a threshold and its probable shape with inflection point(s) should be investigated not only for the self-checkouts but also for some other TBSS options.

Contact Employee Performance

A contact employee can assist customers with their service tasks, and may save customers time by reducing their efforts (Beatty, Mayer, Coleman, Reynolds, and Lee 1996). Higher contact employee performance was expected to help customers reduce their physical and cognitive efforts in co-producing the service. However, H4a and H4b were not supported for the total sample, nor for the enthusiastic and reluctant adopter categories.

One reason may be an emerging trend similar to the historical development in the use of ATMs. In the case of bank ATMs, initially bank personnel personally helped customers learn how to use ATMs. This was followed with ATM intercoms that provided direct access to support personnel to help customers with problems. Later, customers started using ATMs without immediate direct or indirect help. In the current stage of self-checkouts, contact employees are usually available to help customers. However, there are also some self-checkouts automatically monitored but not supported by a contact employee. Even when the contact employee is available, customers, especially enthusiastic adopters, do not always rely on them.

Another reason may be lack of management skills of customers in using contact employees with the expertise to enhance the service results. This may potentially reduce the effort spent by customers. When a customer has the skills and willingness to manage a contact employee, who normally is expected to better know and use the checkout system, the contact employee performance may be inadequate, not sufficient to reduce the effort on the customer side.

Contact employee performance is important in delivering good service quality (Berry, Zeithaml, and Parasuraman 1985; Bitner, Booms, and Mohr 1994). These support employees can directly influence the quality of service interactions through their attitudes, behaviors, and expertise (Brady and Cronin 2001). For the total sample, H5 was supported at $p=0.057$, although the relationship was not very strong. Contact employee performance was found to positively influence perceptions of the quality of the customer labor. However, this hypothesis was not supported for enthusiastic and reluctant adopters. However, it is still theoretically expected for especially reluctant adopters with a larger sample size to have a significant relationship between contact employee performance and quality of customer labor. As it had been

disccussed in Chapter 4 and will be mentioned in the limitations of the study section later in this chapter, the adequacy of sample size is important and Hoelter's index directly focuses on this adequacy issue. Hoelter indices of higher than 200 as a benchmark level would provide a more accurate picture to reflect the theorized paths, especially for enthusiastic and reluctant adopters.

Three Types of Effort

Effort is a relevant input to an exchange (Berry, Seiders, and Grewal 2002) and the "attempt to maintain equality" is obviously important in restricted marketing exchanges (e.g., retailer versus consumer) (Bagozzi 1975, p.33). In evaluating the "service investment" from a customer's perspective, asking "How much effort must I put forth to realize any benefits from my association with the organization?" is vital (Lengnick-Hall, Claycomb, and Inks 2000, p.360). If equity is an important component of satisfactory exchange (Oliver and Swan 1989), then the more effort one party exerts, the more outcome s/he expects in return (Mohr and Bitner 1995; Berry, Seiders, and Grewal 2002).

The conceptual framework included positive paths from each of the three types of customer effort (physical, cognitive and emotional) to the customer outputs in terms of the perceptions of the quality of service, effort saving and time saving constructs. It also included links from each of those three types of customer effort to another customer input measured by quality of customer labor construct. Results showed that there were more significant relationships from different kinds of customer effort to quality of service than to quality of customer labor. Similarly, there were more significant relationships from time saving than to effort saving (Table 23).

H6a and H6b were not supported for the total sample nor for the enthusiastic adopters. The only marginal support came from reluctant adopters for H6a, stating that physical effort positively influences quality of customer labor. It seems that reluctant adopters think positively about the quality of labor they provide when they work physically at the self-checkout. This may be a perceived indicator of the work done or a personal accomplishment. The link from emotional effort to quality of customer labor was also marginally significant at p=0.063, which may also be explained with the above argument. For enthusiastic

Table 23: Summary of Relationships By Type of Effort

		p- Values		
To	**Sample**	**Physical Effort**	**Cognitive Effort**	**Emotional Effort**
Quality of Customer Labor	Total	0.109	0.981	0.042
	Enthusiastic	0.784	0.995	0.383
	Reluctant	0.085	0.797	0.063
Effort Saving	Total	0.142	0.263	0.586
	Enthusiastic	0.021	0.836	0.027
	Reluctant	0.592	0.108	0.587
Time Saving	Total	0.000	0.147	0.693
	Enthusiastic	0.000	0.007	0.039
	Reluctant	0.043	0.653	0.099
Quality of Service	Total	0.231	0.000	0.000
	Enthusiastic	0.339	0.000	0.004
	Reluctant	0.497	0.132	0.000

adopters, none of the relationships from any type of customer effort to quality of customer labor was significant. One reason for that would be how personal accomplishment at self-checkout perceived by enthusiastic adopters compared to reluctant adopters may be different. Enthusiastic adopters may see all these tasks fulfilled and effort spent as a routine of their activities at self-checkout rather than an accomplishment as might be perceived by reluctant adopters.

H7aa and H7ba were not supported for the total sample, enthusiastic adopters and reluctant adopters with one exception for physical effort. For enthusiastic adopters, it was found that judgment of physical effort positively influences perceived effort saved. When one spends more effort for activities under one's control, one potentially saves effort from other activities that are not directly controllable. For example, a customer may try to scan and keep on scanning PLU (price look up) numbers for different produce items multiple times as if they were bar codes while using self-checkouts and waiting for help from a contact employee when their approach to scanning does not work as they initially expected. This reasoning seems to

work for the significant path from emotional effort to effort saving. Emotional effort spent initially at self-checkout might save additional effort that may be needed in a service recovery situation or while impatiently waiting for help from a contact employee. When their method of handling PLU numbers did not work, customers who do not become argumentative with contact employees, would be more likely to save their emotional effort. However, this assumption did not seem to work for cognitive effort. The reason may be that enthusiastic adopters perceive cognitive effort only as a way to save some time rather than saving effort.

H7ab was supported for all sample categories reflecting that perceived physical effort positively influences perceptions of time saved. When one works hard physically to unload, scan and bag the items at self-checkout, one might potentially view this as a savings of time. This relationship was also expected for cognitive effort as well. However, H7bb was not supported for the total sample nor for the reluctant adopters. Cognitive effort did not positively influence time saving. However, the relationship was significant for enthusiastic adopters. It may be easier and/or more natural for enthusiastic

adopters to spend effort cognitively without any hesitation or resistance. When one works hard cognitively to figure out what s/he is doing in a relatively routine task such as self-checkout, one potentially may perceive a savings of time. The path from emotional effort to time saving was significant for enthusiastic adopters and marginally significant for reluctant adopters. Probably the relationship was watered down by reluctant adopters for the total sample which turned out to be insignificant. Here, it appears that some form of cognitive dissonance might serve as an explanation. Reluctant adopters may hold more conflicting thoughts than enthusiastic adopters toward using self-checkouts, creating a discomfort or dissonance.

Drawing on Kelman (1958) and Mann (1997), a service investment requires physical labor at the lowest level, cognitive labor at a higher level, and emotional labor at the highest level. H8a was not supported for the total sample, nor for the two adopter categories. However, H8b was supported for both the total sample and enthusiastic adopters. This suggests that physical effort does not positively influence quality of service, yet cognitive effort does. Moreover, the path from emotional effort to quality of service was significant for all sample

categories. It seems that the relationships between the three types of effort and quality of service work better at higher levels of customer labor (effort in our case). Customers seem to provide their physical, cognitive and emotional efforts in a particular order. However, reluctant adopters might be different from enthusiastic adopters in following such an order. Compared to enthusiastic adopters, reluctant adopters do not find it easy to recover from errors encountered while using self-checkout. This may be related the intensity of cognitive effort provided and possibly emotional effort provided as well. Reluctant adopters might provide their cognitive efforts to learn the details of self-checkout, but after a probable threshold they might not be able to go any further to acquire expert skills in the use of self-checkout. Similarly, due to certain defficiencies in the use of self-checkout systems, reluctant adopters might not be able to reach an optimum level for their emotional effort provided. When reluctant adopters do not experience probable potential threshold levels for both cognitive and emotional efforts, the links from those two types of efforts to quality of service may not hold true, or even hold true, may not come out as positive or negative relationship around the threshold.

Quality of Customer Labor

Quality of labor provided by a customer can enable her/him to save effort by doing the right thing the first time and to gain time by being better able to control different service tasks, while enhancing perception of service quality. Both H9a and H9b were supported for the total sample, enthusiastic adopters and reluctant adopters. Quality of customer labor positively influences both effort saving and time saving all at p=0.000 level. H10 was supported for the total sample and reluctant adopters, but not for enthusiastic adopters. Quality of customer labor positively influences quality of service for the total sample and reluctant adopters, but not for enthusiastic adopters. Enthusiastic and reluctant adopters seem to have different perceptions on the link between quality of customer labor and quality of service. Reluctant adopters might perceive the existing link based on their accomplisments in the use of self-checkouts. However, enthusiastic adopters, based on their expert skills in the use of self-checkouts, might perceive the outcome merely as a good job done rather than their contribution to quality

of service through their active participation in the service system, or quality of service provided to them by the system. Still, this distinct difference between the two adopter categories found in the results of this research deserves further study based on the above discussion.

Customer Savings

It may be assumed that customers, in performing their normal shopping activities, try to save their effort rather than exerting a lot of energy, this in turn potentially helping them save time. Time saving is increasingly becoming more important for time-scarce consumers (Reynolds and Beatty 1999), with 52 percent of consumers voicing that they are less likely to spend time shopping as a means of allocating more time for other activities (Seiders, Berry, and Gresham 2000). Brady and Cronin (2001) also found that perceived waiting time (wasting time in one sense) had a direct influence on service outcome quality, and service outcome had a direct contribution on perceived service quality. Thus, both effort and time saving were expected to have a positive impact on perceived quality of service. Both H11a and H11b were supported. Findings supported the

literature, and both effort saving and time saving positively influence quality of service.

Customer Productivity

Manufacturing-oriented-productivity concept is traditionally defined in the following way:

> Productivity is the relationship of the amount produced by a given system during a given period of time, and the quantity of resources consumed to create or produce those outputs over the same period of time (Sink 1985, p.3)

Sink's (1985) productivity definition considers quantity, but not quality. Quality of the output is important and typically assumed to be at an acceptable level as perceived by customers (Ojasalo 1999).

The manufacturing-oriented productivity concept is related to production efficiency (Gronroos and Ojasalo 2002), "doing things right" (Chase and Aquilano 1992; Sheth and Sisodia 2002), which focuses on 'the input side of the system' (Sink 1985). The service-oriented productivity concept is also related to effectiveness (Gronroos and Ojasalo 2002), "doing the right things" (Chase and Aquilano 1992; Sheth and Sisodia 2002), which focuses on 'the output

side of the system' (Sink 1985). Indeed, perceived service quality is an inseparable part of the service-oriented productivity concept, and is not constant as it is in manufacturing (Lovelock and Wright 1999; Gronroos and Ojasalo 2002; Parasuraman 2002).

"In service production, the provider's input and output are measured as monetarized, the customer's are not" (Gummesson 1998, p.8). As discussed earlier, 'customer induced productivity' is important in investigating service productivity (Gummesson 1998), and customer's perspective has to be incorporated into service productivity models (Lovelock and Young 1979; Gummesson 1994, 1998; Ojasalo 1999; Gronroos 2000; Gronroos and Ojasalo 2002; Parasuraman 2002). Parasuraman (2002) defines customer productivity from a customer's perspective as,

> The ratio of the service output experienced by a customer to the inputs provided by that customer as a participant in service production (Parasuraman 2002, p.7).

This last definition can best serve our purposes in the current research in highlighting the general boundary of the customer productivity concept in a simple way, although our intent was not to quantitatively calculate customer

productivity, but based on its parts (dimensions) as antecedent constructs, to investigate its possible relationship to customer value concept.

Findings on hypothesized relationships and exploratory relationships showed that all links focusing on the 'output side of the system' in the conceptual framework were supported, while none of the links focusing on the 'input side of the system' were supported at all. Specifically, H12, H14a and H14b were strongly supported (mostly at p=0.000) for all sample categories including the total sample, enthuiastic adopters and reluctant adopters, including H12 which was marginally supported (p=0.080) for reluctant adopters. H13, H15a and H15b were not supported for any sample category with an exception of H13 which was marginally supported (p=0.056) only for the total sample. The exploratory path from emotional labor to customer productivity was also statistically insignificant.

The manufacturing-oriented productivity concept is focused on 'the input side of the system,' while the service-oriented productivity concept also focuses on 'the output side of the system' (Sink 1985). When the productivity concept was interpreted from a customer's view point, it became apparent that customers put more emphasis

on the output side of the system rather than the input side of the system (Table 24).

Perceived service quality is an inseparable part of the service-oriented productivity concept (Lovelock and Wright 1999; Gronroos and Ojasalo 2002; Parasuraman 2002). When the productivity concept was interpreted from a customer's view point, it also became apparent that customers gave much importance to quality. On the output side of the system, quality of service toward customer productivity was strongly supported for the total sample at p=0.004. Even when input side of system was not very important to them, quality of customer labor toward customer productivity turned out to be important at p=0.056.

Customer Value

The customer value hierarchy captures a key aspect of customer value (Woodruff 1997). In this hierarchy, customers' goals and purposes are based on desired end states (Woodruff 1997; Gardial and Woodruff 2003), which were instrumental

Table 24: A Summary of Relationships By Customer Productivity

		P-Value
From	**Sample**	**To Customer Productivity**
Physical Effort	Total	0.951
	Enthusiastic	0.459
	Reluctant	0.152
Cognitive Effort	Total	0.353
	Enthusiastic	0.406
	Reluctant	0.817
Emotional Effort	Total	0.329
	Enthusiastic	0.998
	Reluctant	0.187
Quality of Customer Labor	Total	0.056
	Enthusiastic	0.316
	Reluctant	0.222
Effort Saving	Total	0.000
	Enthusiastic	0.000
	Reluctant	0.000
Time Saving	Total	0.000
	Enthusiastic	0.000
	Reluctant	0.000
Quality of Service	Total	0.004
	Enthusiastic	0.050
	Reluctant	0.080

in measuring desired customer value as perceived by customers in this study.

Desired product/ service attributes and attribute performances at the lowest level, desired consequences in use situations at the middle level, and customers' goals and purposes at the highest level can provide customer satisfaction based on received value at individual levels of value hierarchy (Woodruff 1997). One of the major concerns in this dissertation was to test the potential link between customer productivity (as a consequence) and perceptions of received customer value (as an end-state). Indeed, Holbrook (1994; 1999) considered efficiency and excellence as two out of eight value types in consumption experience. Those two types of value can be further combined under the concept of customer productivity, which can provide received value to particular consumers at the consequence level, and potentially received value at the end-state level.

Based on this review of the literature, H16 was developed and tested. H16 was strongly supported at p=0.000 for all sample categories, including the total sample, enthusiastic adopters and reluctant adopters.

The results concerning enthusiastic and reluctant adopters supported the extant literature. Lee and Allaway (2002) mentioned that controllability is positively correlated with the evaluation of technology-based self-service options. This finding was confirmed by enthusiastic adopters feeling more in control with automated systems and reluctant adopters feeling more frustrated and often becoming confused when using self-checkouts. Marr and Prendergast (1993) found that time convenience was an important variable for ATM preference in banking industry. This finding was also supported by the results of this study in a grocery store setting as enthusiastic adopters also viewed technology as saving time.

Reluctant adopters preferred getting help from contact employees in scanning produce items and needed to know that someone was available for potential questions and problems. This result supports Marr and Prendergast's (1993) findings stating that customers who prefer to deal with humans tend to reduce their use of TBSS. Reluctant adopters also had relatively negative attitudes toward ease of use of self-checkouts while enthusiastic adopters felt completely at ease with the use of self-checkouts. These findings were in line with Fenech and O'Cass (2001) study stating positive

attitude toward TBSS in terms of perceived usefulness and perceived ease of use positively influence adoption decision.

Dabholkar (1996) and Dabholkar, Bobbitt and Lee (2003) found that TBSS was perceived by adopters as more reliable, easier to use and more enjoyable. It also offered a greater control to adopters. The findings on enthusiastic adopters indicated that they loved using self-checkouts and felt more in control. Moreover, enthusiastic adopters cared about their personal productivity and tried to be very productive when they shop. Dabholkar and Bagozzi (2002) identified self-efficacy, need for interaction and social anxiety as some important variables in the adoption of technology. Enthusiastic adopters in the current research found easy to recover from errors in use of self-checkouts, indicating that self-efficacy concept was relevant for them. Frustration and confusion of reluctant adopters when interacting with self-checkout systems are in line with social anxiety concept. Finally, their preference to have a contact employee for potential questions or problems, and their insistence to get help from a contact employee are in line with the concept of need for interaction (Dabholkar and Bagozzi 2002).

Research Contributions

This research regarding the customer productivity and its relationship to customer value has made important contributions to managers and researchers by filling gaps in the productivity, retailing and services marketing literatures. These research findings extend the extant literature in technology-based self-service environments and have the following theoretical and managerial implications.

Theoretical Implications

This dissertation research contributes to the body of knowledge on service productivity in several ways. It fills certain gaps in the literature by:

- introducing the new concept of customer productivity in services marketing area,
- providing an understanding of the concept of customer productivity in a technology-based self-service environment,

- incorporating both quantity and quality dimensions into inputs by customer and outputs for customer in testing multiple links toward customer productivity,
- empirically testing a conceptual framework on customer productivity,
- predicting links based on the antecedents of customer productivity, retailer support (SST and contact employee) and the overall outcome,
- establishing the link between customer productivity and customer value,
- exploring the concept of emotional effort and introducing it as a viable construct in customer productivity,
- differentiating between enthusiastic and reluctant adopters of TBSS options in general and self-checkouts in particular.

Following discussion provides the above mentioned research contributions in detail.

This study of customer productivity and its relationship with customer value, began by updating, synthesizing and integrating the existing literature on services marketing, retailing, service productivity, service quality, customer participation, and customer value

to better understand customer productivity in TBSS encounters within brick-and-mortar retail stores. The conceptual domain of customer productivity as it applies to services was not well developed, with limited empirical research on service productivity (Filiatrault, Harvey, and Chebat 1996; Gronroos and Ojasalo 2002). Specifically, theoretical studies were needed to understand the antecedents and consequences of consumer performance. This dissertation research responded to the existing calls for research on service productivity by introducing the new concept of customer productivity in services marketing area and providing an understanding the concept of customer productivity in a technology-based self-service environment. Based on the exploratory initial qualitative study, the resarch attempted to understand the meaning of customer productivity first by checking if customers care about their productivity, then by discussing customer labor within the emerging concept of customer productivity. Indeed, this research eventually introduced the "customer productivity" as a new viable concept. Previous theoretical studies in services did not directly address this point at all with two exceptions on client productivity in a business-to-business environment (Martin, Horna and Chan

2001) and customer efficiency in e-services (Xue and Harker 2002).

Many existing conceptual and empirical studies claimed to assess service productivity from the retailer's (service provider) viewpoint, basing it on the manufacturing-oriented productivity concept (Brown and Dev 2000; Keh 2000; Dubelaar, Bhargava, and Ferrarin 2002). Further conceptual and empirical studies were needed to establish the role of perceived quality as an important element of service productivity (McLaughlin and Coffey 1990; Gummesson 1994, 1998; Gronroos and Ojasalo 2002), paying attention to the customer's perception of the service process and outcome. Besides incorporating the role of quality into service productivity, there were increasing number of calls for research to understand service productivity from the consumer's viewpoint (Martin, Horne, and Schultz 1999; Martin, Horne, and Chan 2001), and to better reflect the dual productivity perspective, which includes both the company's and customer's perspectives (Parasuraman 2002). Based on preliminary exploratory qualitative research and the literature, this dissertation offered a conceptual framework for customer productivity and all components addressed relevant issues directly from a customer's view

point. Previous theoretical frameworks did not include the concept of customer productivity (Vuorinen, Jarvinen and Lehtinen 1998), or only covered customers' inputs and overall outputs as a part of service productivity framework from a service provider's view point (Gronroos 2000; Gronroos and Ojasalo 2002; and Ojasalo 1999). Still some others included customer's perspective only as a part of dual productivity (Parasuraman 2002) or interactive productivity (Gummesson 1998) in a service productivity context.

The conceptual framework in this dissertation included both customer inputs and outputs toward productivity. Each category itself included both quantity and quality dimensions to address a variety of research calls. Specifically, inputs by customer had two types of effort on the quantity side, physical effort and cognitive effort (besides the exploratory construct of emotional effort), and on the quality side, inputs included customer perceived quality of customer labor. Outputs for the customer included effort saving and time saving on the quantity side, and quality of service on the quality side. Research findings supported the entire model for both the total and the adopter category samples. However, certain links were

different for the enthusiastic versus the reluctant adopters, providing further managerial opportunities as discussed in the following section. Besides incorporating quantity and quality dimensions into inputs by customer and outputs for customer, this study empirically tested a conceptual framework on customer productivity. To the best knowledge of the author, virtually all limited number of previous studies were conceptual rather than being empirical.

This dissertation research assessed service productivity from a customer's point of view by focusing on customer's own productivity. Indeed, it reflected the dual productivity perspective by attempting to establish the relationship between customer productivity and customer value. Research findings showed that there was a strong link between customer productivity and customer value. This conclusion was true for all sample categories, including the total sample, enthusiastic adopters and reluctant adopters. As reflected in the most updated definition of marketing by AMA in August 2004, customer value is the backbone of marketing, and essential for competitive advantage. This research empirically supports that one way to create customer value is to work on customer

productivity and its antecedents. The strong link found between customer productivity and customer value is an invaluable result since it extends the customer value literature by providing a significant empirical result for a part of Holbrook's (1999) typology of consumer value, and at the same time presenting customer productivity as an important consequence toward an overriding goal of customers for an overall customer value presented by a customer value hierarchy (Woodruff 1997; Woodruff and Gardial 2001).

There were numerous studies on predictors of adoption of technology and descriptors of consumer groups in adopting a given technology within different contexts such as hospitals (Hebert and Benbasat 1994), retail banking (Marr and Prendergast 1993) or Internet as TBSS (Bobbitt and Dabholkar 2001). However, existing studies did not address the nature of customers' perceptions of their productivity and its relation to customer value in TBSS settings in such a way to differentiate enthusiastic adopters from those who are reluctant to adopt, for example, in the use of retail self-checkout. Therefore, the current structural model was run not only for the total sample, but also for enthusiastic- and reluctant-adopter

sub sample categories. This provided important results as reflected by certain differences in existing significant links for each of the adopter categories. Besides the conceptual framework tested for the two adopter categories, enthusiastic and reluctant adopters were also compared to one another in this technology-based self-service environment. Test results supported psychographic differences between the two adopter categories as discussed in the adoption literature (e.g., level of perceived control and ease of use). Further comparisons (unaware, aware but not used, aware and used) also aided in our better understanding of existing stages in the use of different technology-based self-service options (e.g., ATMs, check-cashing machines, coin machines, etc.) regarding to enthusiastic and reluctant adopters. Moreover, it provided a tool for managers to better understand their customers' perceptions of productivity and potential differences between customers who enthusiastically adopt, versus reluctantly adopt, TBSS options.

Managerial Implications

This dissertation research also provides important implications for managers. It contributes to the existing practical business applications in terms of retail strategies and tactics as concerns customers usage of technology-based self-service by:

- presenting the emerging concept of customer productivity as a new source of competitive advantage,
- providing a unique way to create and deliver customer value based on the concept of customer productivity – the self-productivity as perceived by customer,
- differentiating between the input and output sides of the system for customer productivity to provide further tactical details that can be used in implementation phase of the crafted strategy,
- differentiating between quality of customer labor and quality of service, and suggesting that the significant link between them can potentially be used to develop a customer training program to accelerate the adoption of self-checkouts by reluctant adopters,
- underlining the importance of emotional effort as a viable concept that can be used as a competitive tool

to increase perceived quality levels for both customer labor and service,

- providing ideas on how new generation SSTs can successfully be developed based on a number of consequences such as contact employee performance, quality of customer labor and emotional effort,
- differentiating between enthusiastic and reluctant adopters to understand what can potentially be done at strategic and tactical levels with regard to introducing, targeting and positioning self-checkout systems, other TBSS options and even technology-based business-to-business self-services.

Following discussion provides the above mentioned managerial implications in detail.

It should be risky for retail managers to gain and sustain a competitive advantage in the long run by putting their customers in the shoes of those cashiers as well as the roles of other retail employees. Without sufficiently motivating and especially compensating customers for their active participation in service production and delivery, such strategies and accompanying tactics may deteriorate the established relationships between a customer and the company. For example, workers believe that productivity

enhancement should cause approximately an equal split of rewards between stakeholders; namely managers/shareholders, workers, and customers. However, in reality, they perceive that managers/shareholders mostly have the rewards based on productivity savings (Savery 1996), not to mention the customers working as quasi employees. Therefore, retailers potentially need to counteract these unfovarable perceptions of both their employees by now and customers actively participating in numerous TBSS options as partila employees in near future. Indeed, retailers will gradually have to alter their reward systems such that, not only cashiers as regular employees participate, but also customers as quasi employees will receive, or at least increasingly feel, greater direct financial rewards besides the traditional convenience benefits that are perceived at the present time.

Test results of the conceptual model of this dissertation research provided strong support for the link from customer productivity toward customer value in technology-based self-service. Based on the results of this research, retailers need to see customer productivity as a subset of a broader concept of the customer value, which is measured as an overall value (Holbrook 1999). They need to

create customer value to gain competitive advantage, or at least stay competitive and survive in their respective markets. They need to do something more than just simply lowering their prices to provide value to their customers (Anitsal, Anitsal and Bolat 2003, 2004). Self-productivity is important for customers for their shopping in general and using TBSS options in particular (Anitsal and Flint 2003a, 2003b). Indeed, retailers can potentially create a self-service environment increasingly dependent upon TBSS options (Anitsal, Moon and Anitsal 2002) to enhance not only their own organizational productivity but also of their customers (Anitsal 2004). Therefore, when retailers start fulfilling the potential gaps in creating and delivering customer value in TBSS environments (Anitsal and Flint 2005), they need to consider how they would favorably influence the productivity of their customers as one essential way toward customer value.

A number of variables positively influenced customer productivity. The output side of the system based on effort saving, time saving and quality of service apparently became essential for customer productivity for all sample categories. The quality dimension was particularly important. Both input and output sides of the system

provided support for quality based on the total sample. Specifically, both perceptions of quality of customer labor and quality of service were key in explaining customer perceptions of their own productivity. Retailers can potentially take the advantage of these findings by simply increasing the savings for their customers and providing them better quality of service. They can rely on the quality of labor provided by their customers actively using TBSS options (e.g., self-checkouts) to create better quality of service without forgetting to provide both time and effort savings to their customers. Retailers can also potentially develop better programs for customer training information technology in the and socialization in TBSS environments to help their customers increase the quality of their labor as quasi employees, ultimately creating a favorable impact on the quality of service. When retailers start using these tactical details, they have a chance of increasing the productivity of their customers in the short run, thus reinforcing a higher level of customer value in the long run.

It is apparent that there have been, and continue to be, significantly large capital and human investments in service sector (Stephen and Roach 1991) and the self-

service technologies (e.g., self-checkout) in retail sector (Hennessy 1998; Heun 2001; Dabholkar, Bobbitt, and Lee 2003; Schatz 2003). However, when retailers choose not to compensate customers, acting as quasi employees in service settings, who actually "demand and use this level of [TBSS] service" and "are proving themselves more honest and accurate than cashiers" (Hennessy 1998, p.86), this choice will have its own consequences. TBSS options utilized as a core service or even a supplementary service may not help increase organizational productivity and may also turn out to be perceived as a basic commodity. Then, competition is likely to focus on just one single factor: price. In order to have alternate options, retailers may try to adapt the consequences of understanding customer productivity, in terms of not only the outputs for the customer, but also the inputs provided by the customer. At this point, emotional effort turns out to be a key concept. Emotional effort serves as an important direct link toward both quality of customer labor and quality of service, and in turn, another direct link emerges from each of those two service concepts toward customer productivity. Retailers seem to encourage their employees to provide emotional labor mostly in the form of 'surface acting' rather than

'deep acting' as discussed in Chapter 2 (Hochschild 1979, 1983; Ashforth and Humphrey 1993). However, retailers need to make their employees move from surface to deep acting in a typical day-to-day service provided on an on-going basis. Indeed, retailers may also try to go through a similar process with their customers acting as quasi employees in TBSS environments. When they find a way to implement such an emotional labor strategy, retailers may have a better control over their day-to-day tactics toward establishing a strong base for both quality of customer labor and quality of service, and in turn customer productivity toward customer value.

Emotional effort is especially vital for reluctant adopters toward quality of customer labor and quality of service, while for enthusiastic adopters only toward quality of service. Retailers may utilize state-of-the art SSTs (apparent differences can be seen over a number of generations of SSTs such as ATMs, self-checkouts and electronic kiosks) with better performances to establish a favorable link from SST performance to emotional effort. At this stage, contact employee performance is still important especially toward quality of customer labor, however, SST performance is directly related to emotional effort

Retailers can potentially combine TBSS options toward a new stand-alone retail format, leading a new form of retail institution (Anitsal, Moon, and Anitsal 2002b). Retailers can save costs, add value, and control quality in their service environments if they have transaction-efficient, value-efficient, and quality-efficient customer bases, respectively (Xue and Harker 2002). Understanding how customers perceive their own productivity in one TBSS setting will also likely provide clues on how to design better SST interfaces in some other TBSS settings, including technology-based business-to-business self-services as well. But unless they understand the concept of customer productivity as discussed in Chapter 2 from the customer's perspective, it is going to be much more difficult, if not quite impossible in the long run, to survive by simply taking advantage of free labor of their customers. On the contrary, when retailers focus on mutual benefits of dual productivity, they will be able to create and deliver superior customer value based on customer productivity. Once again, emotional effort provides one important link from SST performance toward quality of both customer labor and service as well as customer savings of effort and time. Retailers may also potentially develop

further tactics when they start using new SSTs utilizing combinations of different weights of physical, cognitive and emotional efforts. Specifically, retailers, for example, may start attaching barcodes not only to asparagus (e.g., JMB brand asparagus labeled with UPC code in front and nutrition facts in back) but also all produce items without any exception. However, they currently attach PLU numbers to all produce items (e.g., Tricar gold brand tomatoes on the vine with a PLU #4664) rather than UPC codes. Then, the same retailers provide a list of PLU numbers over the self-checkout or a series of pictures of produce items on the secreen of SST options just to make things easier for customers who may pick items with lost PLU numbers. Decreasing the burden on customers in terms of the three types of effort is important and retailers need to keep on searching better ways.

Understanding differences between enthusiastic adopters and reluctant adopters with regard to customer productivity and customer value can also help retailers to better interpret the impact of those differences on the adoption of TBSS options. Once they learn more about those potential differences, they can develop new TBSS options or redesign existing TBSS options, and in turn, reluctant

adopters can be gained as regular adopters. Specifically, retailers may encourage reluctant adopters to use self-checkouts more often by providing newer SST designs with better ease of use and less confusion. Retailers may also develop better mechanisms (e.g., a face-to-face contact, especially for exceptions such as scanning produce items) to help those reluctant adopters for service recovery in case of service failures. Retailers may want to provide more financial rewards to reluctant adopters than enthusiastic adopters since reluctant adopters usually feel more like an unpaid cashier working at the self-checkout register and resent having to do the work that a paid employee should do than enthusiastic adopters. Retailers may also find creative ways in their advertising campaigns to highlight how self-checkout users in general and enthusiastic adopters in particular boost their self-productivity by frequently using self-checkouts and some other TBSS options.

Limitations of the Study

This research has some limitations as summarized in this section. Those limitations also provide opportunities

for future studies. Further avenues for future research will be discussed in the following section.

The sample size was adequate for the total sample. However, Hoelter's index for both enthusiastic and reluctant adopter categories were less than the benchmark value of 200 for an adequate sample size. This may cause unfavorable model fit statistics. It is suggested that the structural model be re-tested with larger sub sample sizes for each adopter categories.

Multiple interviewers were utilized for conducting screening interviews to assess qualified potential respondents. They were all adequately trained for this data collection process and closely monitored by random checks while performing their tasks. However, a limited number of interviewers may provide a better opportunity for enhanced control.

Recruiting qualified potential respondents took longer than it was planned. Although initial plan was based on two-week screening interview task, the actual time spent in the field was almost twelve weeks. This raises the potential for a history effect although no critical socital events occurred during the data collection. It is possible that with the more significant data collection, that some

individuals were exposed to critical events that might have influenced their responses. Shorter data collection times would be better. To minimize a possible history effect over the data collection period, once the qualified potential respondents were determined, they were encouraged to complete the actual survey within three days after they were given the invitation cards to participate in the study, and were provided with all directions such as website link address and respondent ID number.

Screening interviews played an important role in determining qualified potential respondents. However, even answering a few questions was perceived as taking so long by many potential respondents. They were mostly in a hurry and had a tendency to leave the store as soon as they paid for the items they purchased. Initially, every response during the screening interviews was noted and coded. However, after contacting first 500 potential respondents, this method had to be modified for a better response rate. Later, interviewers asked similar questions and explained the nature of the study to randomly selected shoppers, but responses were not noted. As a precaution, a summary of respondent qualifications was also noted in the invitation cards.

There were 27 proposed hypotheses tested, besides seven exploratory path relationships investigated. In spite of large number of relationships tested, it was still impossible within the scope of a single study to investigate and test all potentially important links in a broader structural model. For example, mediating and moderating effects of the three types of efforts (physical, cognitive and emotional efforts) should be further researched. Antecedents of SST performance and contact employee performance are worth more future research attention and the implications of such further research would also be very important for managers. New product development managers may develop better SST interfaces, while retail managers may utilize their human resources (e.g., contact employees) more effectively in TBSS environments and motivate actively participating customers better by managing the potential interactions between three types of efforts. Similarly, understanding the antecedents of quality of customer labor and quality of service would provide opportunities to better understand the consequences of TBSS to include customer productivity and customer value.

Current research results can be generalized to population in the given area where the data were collected. It can also be generalized across subpopulations such as enthusiastic and reluctant adopters. However, still more studies are needed for a better coverage in the regional, national and international level. Cultural differences were not considered in this specific research endeavor. In both brick-and-mortar and virtual retail environments, further research is also needed to explore different TBSS options which may have consequences different from self-checkouts. Similarly, the self-checkouts themselves may have different consequences in different retail store formats, namely grocery stores, discount stores and department stores.

Future Research Avenues

Customer perceptions could potentially be different, depending on their level of SST technology adoption. Enthusiastic adopters and reluctant adopters, for example, may have different 'absolute' and 'differential' thresholds at and in between the regular and self-checkouts as well as within different versions of the self-checkouts. Absolute threshold is "the lowest level at which an individual can

experience a sensation" by detecting "a difference between 'something' and 'nothing,'" while differential threshold (or just noticeable difference) is "the minimal difference that can be detected between two similar stimuli" (Schiffman and Kanuk 2000, p.123 and 124). Then the question becomes if there is a threshold for a possible sign change for the relationship between SST performance and each of the three types of efforts: physical, cognitive and emotional.

Customers can contribute to quality of service through "customer technical quality" (what they do) and "customer functional quality" (how they do it) (Kelley, Donnelly, and Skinner 1990; Kelley, Skinner, and Donnelly 1992). Based on the review of literature, it becomes noticeable that either two types of the quality of customer labor (technical quality and functional quality of customer labor), or three types of the quality of customer labor (quality of physical labor, cognitive labor and emotional labor) can be further investigated in the context of TBSS.

Within a broader concept of customer participation, increased customer labor and its quality are expected to create outcomes leading to better quality of service. However, there may be one exception with regard to the

impact of customer labor on service quality. When a customer has to "re-initiate the service" or "intervene in the service process" due to a service failure or inconsistency forcing the customer to spend more effort to perform what is normally an ordinary service task, increased labor is likely to cause poor service quality perceptions (Broderick and Vachirapornpuk 2002). This will also prevent the customer from reaching higher levels of satisfaction because s/he "must put forth extra or unexpected effort to prevent or overcome service failure" (Rodie and Kleine 2000, p.114). However, different types of labor or effort may not create the same impact and potential differences are worth further investigation.

With a few exceptions such as client productivity in business-to-business consulting services, (Martin, Horne, and Chan 2001) and customer efficiency in e-services (Xue and Harker 2002), there has been little research on customer productivity in services. To the best knowledge of the author, neither the effect of customer participation on TBSS productivity, nor the relationship between service employee participation and customer participation on labor productivity and customer productivity has been investigated and empirically tested.

SSTs may not always work as they are designed to perform (Schatz 2003). Based on both favorable and unfavorable instances, SST performance can be evaluated based on a customer's own perceptions rather than a set of objective criteria. Contact employee performance is important in increasing the quality of customer labor and would likely favorably influence the quality of service. Those employees can potentially better help customers when they are adequately supported by well-performing SSTs. Further research in this area is needed to better establish the links between SST performance, contact employee performance and quality of customer labor. This also requires a larger sample in each of the two adopter categories.

A service is "a deed, a performance, or an effort" (Rathmell 1966, p.33). Labor provided by customers as co-producers or partial employees include three different types of customer inputs; physical inputs, mental inputs, and emotional inputs (Rodie and Kleine 2000). Among those customer inputs in each category, only relevant types of efforts, namely physical effort, cognitive (mental) effort and emotional effort were taken into account within this study (Mohr and Bitner 1995; Rodie and Kleine 2000; Berry,

Seiders, and Grewal 2002; Parasuraman 2002). However, it was beyond the scope of the curreny study to investigate the potential links between each type of customer effort. For example, emotional effort would be a gateway for physical and cognitive efforts toward some other variables such as quality of service, customer value, effort saving and time saving. Those potential connections require further research.

Concluding Remarks

This research regarding the customer productivity and its relationship to customer value has made important contributions to managers and researchers by filling gaps in the productivity, retailing and services marketing literatures and empirically testing theorectical foundation based on exploratory qualitative research and the extant literature. It specifically contributed to the existing practical business applications in terms of retail strategies and tactics as concerns customers usage of technology-based self-service.

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(Elkmann, Felsch, Sack, Bohme, Hortig, and Saenz 1999)

APPENDICES

APPENDIX A

EXPLORATORY QUALITATIVE STUDY

INFORMANT PROFILES (Anitsal and Flint 2003-2004)

	Name	Gender	Age	Education	Occupation	Married	Kids	Other Details
1	Beth	F	27	MS, Early Childhood Ed.	Teacher	No	None	Currently a doctoral student. Mom is an elementary school teacher. Dad is a retired professor of English.
2	Mark	M	35	PhD, Chemistry	Chemist	Yes	Three daughters	Researcher in a national research laboratory. His wife is an elementary school teacher.
3	Oliver	M	28	MS, Electrical Engineering	Engineer	Yes	One daughter	He is in between jobs. His wife is about to complete her Ph.D. dissertation.
4	Lillian	F	30	Some College, English7	Housewife / waitress	Yes	Two daughters and one son	Newly married. Was a single mother for six years. Home schooling her son. Owns two cats. Previously was a department manager of cosmetics at Parisian. Gets paid $2.13 an hour and everything else is based on tips.
5	Alice	F	69	High School	Housewife / PT worker	Yes	Three grown sons	Lives alone. Still works two to four days a week. Goes to church every Sunday. Owns a little dog and a nice yard.
6	Taylor	M	65	High School		Yes	Six grown kids.	Has worked as a clerk for Kroger up in Ohio in 1979. He is a sales enthusiast, but her wife hates shopping.
7	Hector	M	31	High School	Horse trainer and riding instructor	No	Has two brothers, one of which is twin.	Generally has a hectic schedule, especially during the horse show times. Used to live with his grandma and eat variety of homemade meals daily cooked. Has a special dog and bunch of horses.
8	Julius	M	20	Some College	Student	No	None	An African-American. College junior.
9	Joy	F	20	Some College	Student	No	None	A College junior.

Notes: Names are pseudonyms. Some ages are estimates. First three participants are non-Americans. All respondents are white, while Taylor is black. Only fifth respondent owns her home.

INITIAL INTERVIEW GUIDE

Initial interview takes about 45-60 minutes.

1. INTRODUCTION

Purpose of the interview: To explore customer perceptions of in-store technology options for self-service.

What they will get out of it: Self-understanding and a little fun.

Ensure confidentiality.

Get permission to observe respondent's in-store shopping activities (consent form).

Get permission to audiotape conversations between the respondent and interviewer (consent form).

Get Form A certification for exemption from IRB review for research involving human subjects.

2. INITIAL QUESTIONS (Before entering the store)

First of all, I thank you for your willingness to participate in this study. I have been exploring the customer perceptions of in-store self-service technology for some time, and now I am interested in the meaning of this self-service technology in helping, or hindering you accomplishing your desires in the modern world.

- Tell me about yourself.
- Tell me about your daily activities, for example, your routine shopping activities for food and other products.
- What kinds of in-store technology options have you noticed recently in the stores you shopped?
- Have you used some of these? If so, tell me about a time when you needed to respond to technological options in your food store.
- Where, when and why do you use in-store technology to serve yourself?
- Are there any other things you would want to say before we end the interview?

Thank you very much for your cooperation.

3. PROBE EXAMPLES

- What was it like to experience that?
- Tell me more about that.
- Tell me about your feelings, excitements, frustrations, …

- Can you give a more detailed description of what happened?
- Do you have further examples for this?
- What do you mean by "…"?
- I would like to ask another question now.

4. SPECIFIYING/ INTERPRETING QUESTIONS

- What did you think then?
- Have you also experienced this yourself?
- What did you actually do when you felt you are behind your shopping schedule?
- You then mean that …?
- Is this correct that you feel that …?
- Do you see any connections between ….?

5. GRAND TOUR FORM OF QUESTION

- Take me through that experience as if you are guiding me on a tour. What was going on then? What were you doing?
- Think about the last time you were in a store. Tell me the time of day, the day of week, and who was with you. Tell me about your typical routine.

OBSERVATION GUIDE

Observation is to be done within a week after the initial interview and takes about 30 minutes.

Take a store tour alone by sometime before the observation session to see the existing in-store technology options for self-service in the store where the observations will occur. Take a note pad and audio recorder with plenty blank tapes to the store. When asked, mention that this is a student project and you are talking to a friend for her shopping interests.

Explain to the respondent that as s/he goes through her/his shopping tour in her/his preferred store with in-store technology options, you want to know things s/he has been seeing, where s/he went first, next, and thorough the store. You want to know how that helped her/him or hindered her/his getting through the store.

QUESTIONS (During in-store shopping)

- Can I walk along with you while you are doing your shopping?
- Let me observe what you are doing and take some notes as you go through.
- Tell me every now and then what you are thinking or feeling while you are shopping.
- Could you describe in as much detail as possible the situation in which you are in now?

Thank you very much for your cooperation.

POST INTERVIEW GUIDE

Post interview is to be done right after the in-store observation and takes about 30 minutes.

Once the shopping is over and the items selected have been paid, put all perishable food items in a cooler with ice in trunk and conduct a post interview with the respondent while having drinks at the stores cafeteria.

QUESTIONS (After payment, in store cafeteria)

- What were the in-store technology options for self-service you realized and/or used in today's shopping?
- What stands out positively and negatively in your use of in-store technology options for self-service?
- Do they help or hinder you doing something?
- How do customers view in-store technology options for self-service in what they desire in their efficiency from retailers?
- Where does productivity fit in customers' overall value perceptions?
- What does it mean to customers to be productive?
- What are the external signs that productivity is occurring or has occurred?
- What are the component(s) of shopping productivity that customers experience as they undergo the use of in-store technology for self-service options thorough their shopping?
- What are some conditions under which customer desire productivity?

i. In what contexts do customers view the forces that drove productivity?

ii. What are the consequences of customer productivity?

- How do consumers view the forces that drove productivity?
- How important are those goals to you?
- What do these terms mean to you?
- Can you tell me more about it?

Thank you very much for your cooperation.

APPENDIX B

PRETEST SURVEY

PRE-TEST SURVEY

CONSUMERS' USAGE OF SELF-SERVICE OPTIONS IN GROCERY STORES

This survey is divided into 8 parts.

PART 1: Use of Self-Service Options

1. Below is a list of technology-based self-service options. Which service options have you noticed or used at retail stores? (Please check all choices that apply)

Self-service options in retail stores:	**Unaware**	**Aware**	**Used**
ATMs (automated teller machines)	□	□	□
Check-cashing machines	□	□	□
Coin machines	□	□	□
Coin-operated photocopy machines	□	□	□
Self-checkout systems	□	□	□
Produce scales	□	□	□
In-store service and information telephones for customers	□	□	□
Price checkers (price look up points)	□	□	□
Automatic coupon dispensers	□	□	□
Automatic recipe dispensers	□	□	□
Candy/ chocolate stations	□	□	□
Coffee grinding machines	□	□	□
Electronic kiosks for batteries, tires, or gift registry	□	□	□
Self-service photograph enlargement machines	□	□	□
Interactive monitors for electronic game demonstrations	□	□	□
Music CD or movie VHS/DVD sampling machines	□	□	□
Electronic blood pressure checking devices	□	□	□
Self-scanning payment devices at traditional checkout lanes	□	□	□
Postage stamp dispensers	□	□	□
Coin-automated game machines for a kiddie-ride or toy catch up	□	□	□
Mini-studios for self-photographing	□	□	□
Vending machines for drinks, chips, candies, or chocolate bars	□	□	□
Vending machines for personalized tags or stickers	□	□	□
Pay-at-the-pump gasoline terminals in the store's parking lot	□	□	□
Other (please specify): _____	□	□	□

For each question below, check only one choice that best describes your situation.

2. How many times had you used the self-checkout systems in a grocery store within the last year?
    - None
    - Once
    - Two or three times
    - Four or more times

    (If you picked "none", please skip to Q.6)

3. How frequently do you use the self-checkout?
    - More than once a week
    - Once a week
    - Biweekly
    - Once a month
    - Rarely

4. How well do you work with the self-checkout system?
    - Excellent
    - Very good
    - Good
    - Fair
    - Poor
    - Very poor

5. How much did you like the self-checkout system?
    - Disliked very much
    - Disliked somewhat
    - Neither disliked or liked
    - Liked somewhat
    - Liked very much

    (If you checked one of the last three choices, please skip to Q.7)

6. Do you plan to try the self-checkout system?
    - Plan to try
    - Do not plan to try
    - Depends on situation

    (Please skip to Q.8)

7. Do you plan to use the self-checkout system?
    - Plan to use
    - Do not plan to use
    - Depends on situation

8. How often do you shop for groceries?
    - More than once a week
    - Once a week
    - Once every two weeks
    - Once a month

9. How many people do you usually shop for when you do your grocery shopping?
    - 1
    - 2
    - 3
    - 4
    - 5 or more
10. How many adults (18 and over) live in your household?
    - 1
    - 2
    - 3
    - 4
    - 5 or more
11. How many children (under 18) live in your household?
    - 1
    - 2
    - 3
    - 4
    - 5 or more

12. How much do you normally spend for groceries in a month?
    - Less than $ 150
    - $ 151-300
    - $ 301-450
    - $ 451-600
    - $ 601-750
    - More than $ 750

13. How much did you spend in eating out last month?
    - Less than $ 50
    - $ 51-100
    - $ 101-150
    - $ 151-200
    - $ 201-250
    - More than $ 250

14. What is you gender?
    - Male
    - Female

15. What is your marital status?
    - Married
    - Not married

16. What is the latest school you have graduated from?
    - Elementary school
    - Middle school
    - High school
    - College with an Associate degree
    - College with a Bachelor's degree
    - College with an advanced degree

17. What is your age?
    - Under 20
    - 20-29
    - 30-39
    - 40-49
    - 50-59
    - 60-69
    - 70 and over

Directions:

For each statement below, please show the extent to which you believe that your experience with the self-check out systems has been described by the statement. Checking **1** means that you strongly disagree with the statement, and checking **7** means that you strongly agree. There are no right or wrong answers- what we are interested in is a response that best shows your perceptions about the self-checkout systems at grocery stores.

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
I feel like I am more in control when dealing with automated systems than with people.	□	□	□	□	□	□	□
The self-checkout gives me control.	□	□	□	□	□	□	□
The self-checkout lets the customer be in charge.	□	□	□	□	□	□	□
I love using the self-checkout.	□	□	□	□	□	□	□
Technology saves me time.	□	□	□	□	□	□	□
I feel completely at ease with the use of self-checkout.	□	□	□	□	□	□	□
I find it easy to recover from errors encountered while using the self-checkout.	□	□	□	□	□	□	□
I need to know someone is there, just in case, to listen to me if I have a question or problem.	□	□	□	□	□	□	□
I usually need face-to-face contact at the self-checkout to explain what I want and to answer my questions.	□	□	□	□	□	□	□
Interacting with self-checkout is often frustrating.	□	□	□	□	□	□	□
I often become confused when I use the self-checkout.	□	□	□	□	□	□	□

PART 2: Your Activities at the Self-Checkout:

Directions:
Based on a recent experience using a self-checkout system for each statement below, please show the extent to which you believe that your experience with the self-check out systems have been described by the statement.

Based on each of the following statements given, checking **1** means that you feel you spent minimum effort, and checking **7** means that you feel you spent maximum effort. There are no right or wrong answers- all we are interested in is a number that best shows your perceptions about the self-check out systems at grocery stores.

Based on each of the following statements given below, I feel that I spend minimum (or maximum) effort.	Minimum Effort ▼ **1**	**2**	**3**	**4**	**5**	**6**	Maximum Effort ▼ **7**
Even if it involves physical tasks, I usually prefer using the self-checkout rather than the traditional checkout. (X53)	□	□	□	□	□	□	□
I do not need to exert a lot of physical energy when I unload my items at the self-checkout. (X54)	□	□	□	□	□	□	□
I do not need to exert a lot of physical energy when I bag my items at the self-checkout. (X55)	□	□	□	□	□	□	□
It is usually more work for me to scan my produce items than regularly packaged food items at the self-checkout. (X56)	□	□	□	□	□	□	□
When I use the coins and paper money to pay for my items, I can usually put them into the right slots without any physical difficulty. (X57)	□	□	□	□	□	□	□
It is easier for me to get help in scanning produce than to do it by myself. (X58)	□	□	□	□	□	□	□
Instead of scanning by myself, I prefer getting help from a service employee. (X59)	□	□	□	□	□	□	□
Even if it involves a lot of thought, I usually prefer using the self-checkout rather than the traditional checkout. (X60)	□	□	□	□	□	□	□
I try to think very carefully about how to accomplish all requirements for a faster checkout when I am at the self-checkout. (X61)	□	□	□	□	□	□	□
I carefully check to make sure that I scanned every item in my shopping cart when the computer asks. (X62)	□	□	□	□	□	□	□
I usually answer the questions asked by the computer on the touch screen without putting a lot of thought into it. (X63)	□	□	□	□	□	□	□

	Minimum Effort ▼ 1	2	3	4	5	6	Maximum Effort ▼ 7
I usually read or listen to the instructions provided by the computer without any struggle. (X64)	□	□	□	□	□	□	□
I am very exact in following the instructions given by the computer. (X65)	□	□	□	□	□	□	□
I usually do not have to make much of an effort to find the code numbers for produce items. (X66)	□	□	□	□	□	□	□
At the self-checkout, I usually need to get help in finding the code numbers for my produce items. (X67)	□	□	□	□	□	□	□
I generally check the item prices one-by-one on the touch screen of the self-checkout. (X68)	□	□	□	□	□	□	□
If an item is scanned with an incorrect price, I usually call somebody for a correction. (X69)	□	□	□	□	□	□	□
I prefer to press the help button to call a service employee, rather than attempting to look for a nearby employee. (X70)	□	□	□	□	□	□	□
I often ask other customers for help in using the self-checkout. (X71)	□	□	□	□	□	□	□
When I use coins and paper money to pay for my items, I usually put them into the right slots without much thought. (X72)	□	□	□	□	□	□	□
I typically find it hard to use my credit or debit card with the card scanner. (X73)	□	□	□	□	□	□	□
I usually feel like an unpaid cashier working at the checkout register when I am using the self-checkout. (X74)	□	□	□	□	□	□	□
I resent having to do the work that a paid employee should do. (X75)	□	□	□	□	□	□	□
I generally attempt to stay patient while waiting in line for the self-checkout. (X76)	□	□	□	□	□	□	□
It is usually easy for me to be patient while waiting for help from a service employee. (X77)	□	□	□	□	□	□	□
When something goes wrong and I have to wait, I generally have difficulty in trying to remain calm. (X78)	□	□	□	□	□	□	□
I try to be pleasant even when I must work with an employee who is not proficient in knowing how to use the self-checkout. (X79)	□	□	□	□	□	□	□
When I get upset in using the self-checkout, I am able to keep from showing my frustration. (X80)	□	□	□	□	□	□	□
I personally bag the items I purchased without any complaining for my work. (X81)	□	□	□	□	□	□	□

PART 3: Quality of Your Activities at the Self-Checkout:

Based on a recent experience using a self-checkout system in a grocery store and as you reflect on the overall quality of your effort in participating in self-checkout activities, we would like to know what your self-evaluation was with regard to your use of the self-checkout system.

Please check the number that best describes what **your own overall performance at the self-checkout** was like.

	1 ▼	2 ▼	3 ▼	4 ▼	5 ▼	6 ▼	7 ▼	
Bad (X82)	□	□	□	□	□	□	□	Good
Weak (X83)	□	□	□	□	□	□	□	Strong
Inadequate (X84)	□	□	□	□	□	□	□	Superior
Ordinary (X85)	□	□	□	□	□	□	□	Impressive
Below my standards (X86)	□	□	□	□	□	□	□	Above my standards
Careless (X87)	□	□	□	□	□	□	□	Careful
Uncommitted (X88)	□	□	□	□	□	□	□	Dedicated
Amateur (X89)	□	□	□	□	□	□	□	Expert
Unfocused (X90)	□	□	□	□	□	□	□	Focused
Passive (X91)	□	□	□	□	□	□	□	Active

PART 4: Self-Checkout Performance

Based on a recent experience using a self-checkout system in a grocery store, please show the extent to which you believe that your perceptions of self-checkout performance have been described by each statement.

Please check the number that best describes **your perception of self-checkot performance.**

The self-checkout:	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
Performs accurately. (X92)	□	□	□	□	□	□	□
Provides error-free records (barcode prices, etc.) (X93)	□	□	□	□	□	□	□
Is a more enjoyable experience than traditional checkouts. (X94)	□	□	□	□	□	□	□
Tells me exactly what to do next. (X95)	□	□	□	□	□	□	□
Assures me that a given problem will be resolved. (X96)	□	□	□	□	□	□	□
Provides privacy throughout the self-checkout process. (X97)	□	□	□	□	□	□	□
Provides reasonable completion time. (X98)	□	□	□	□	□	□	□
Provides helpful guidance in performing tasks. (X99)	□	□	□	□	□	□	□
Provides information on how much each item scanned will cost. (X100)	□	□	□	□	□	□	□
Avoids technical jargon in communication. (X101)	□	□	□	□	□	□	□

PART 5: Service Employee Performance

Based on a recent experience using a self-checkout system in a grocery store, please show the extent to which you believe that your perceptions of the service employee helping you at self-check out systems have been described by each statement.

Please check the number that best describes **your perception of service employee performance.**

If you did not receive any help from a service employee during your recent experience at the self-checkout, please skip to Part 6.

A service employee at the self-checkout:	Strongly Disagree ▼ **1**	**2**	**3**	**4**	**5**	**6**	Strongly Agree ▼ **7**
Presents clean and neat appearance. (X102)	□	□	□	□	□	□	□
Shows sincere interest in solving my problems. (X103)	□	□	□	□	□	□	□
Quickly responds to my request for help. (X104)	□	□	□	□	□	□	□
Is willing to answer my questions. (X105)	□	□	□	□	□	□	□
Has the knowledge to answer my questions. (X106)	□	□	□	□	□	□	□
Instructs me as how to perform certain service tasks. (X107)	□	□	□	□	□	□	□
Is very willing to explain store policies regarding the self-checkout process. (X108)	□	□	□	□	□	□	□
Is consistently courteous with me. (X109)	□	□	□	□	□	□	□
Has my best interest at heart. (X110)	□	□	□	□	□	□	□
Instills confidence in me. (X111)	□	□	□	□	□	□	□
Is willing to listen to me. (X112)	□	□	□	□	□	□	□
Is consistently friendly to me. (X113)	□	□	□	□	□	□	□
Makes the effort to understand my needs. (X114)	□	□	□	□	□	□	□
Explains complicated service matters clearly. (X115)	□	□	□	□	□	□	□
Quickly responds to my specific needs. (X116)	□	□	□	□	□	□	□
Provides individualized attention when needed. (X117)	□	□	□	□	□	□	□
Recognizes me as a regular customer. (X118)	□	□	□	□	□	□	□

PART 6: Savings at the Self-Checkout

Based on a recent experience using a self-checkout system in a grocery store, please show the extent to which you believe that your perceptions of the personal savings have been described by the statement.

Please check the number that best describes **your perception of personal savings at the self-checkout.**

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
Compared to the traditional checkout, paying for the items at the self-checkout requires less effort. (X119)	□	□	□	□	□	□	□
I am able to just do the checkout by myself rather than struggling with a cashier. (X120)	□	□	□	□	□	□	□
The self-checkout saves me work. (X121)	□	□	□	□	□	□	□
I spend less effort at the self-checkout than the regular checkout. (X122)	□	□	□	□	□	□	□
My shopping would be more of a struggle if I would not use the self-checkout. (X123)	□	□	□	□	□	□	□
The self-checkout produces coupons for me without making me continuously search, clip or organize coupons. (X124)	□	□	□	□	□	□	□
I am able to complete my purchase more quickly at the self-checkout. (X125)	□	□	□	□	□	□	□
I am able to complete all service tasks myself immediately rather than depending on a cashier. (X126)	□	□	□	□	□	□	□
The time required to get through the self-checkout is less than what I usually spend at a regular checkout. (X127)	□	□	□	□	□	□	□
The self-checkout saves me time. (X128)	□	□	□	□	□	□	□
The self-checkout lets me check out quickly. (X129)	□	□	□	□	□	□	□
By using the self-checkout, I can reduce the time I spend on unproductive activities such as waiting for a cashier to perform during regular checkout. (X130)	□	□	□	□	□	□	□
When I have a limited number of items, I think self-scanning at a self-checkout is much faster than a cashier scanning the purchases at the tradiditional checkout. (X131)	□	□	□	□	□	□	□

PART 7: Service Quality at the Self-Checkout:

Based on a recent experience using a self-checkout system in a grocery store, we would like to know what your evaluation was with regard to the overall service quality of self-checkout system.

Please check the number that best describes **your perception of the overall service quality of the self-checkout.**

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
I think the overall service I usually receive at the self-checkout is of high quality. (X132)	□	□	□	□	□	□	□
I often rate the overall quality of the service at the self-checkout as excellent. (X133)	□	□	□	□	□	□	□
Most of the time, I perceive the overall quality of the service at the self-checkout as superior. (X134)	□	□	□	□	□	□	□

PART 8: Productivity and Value at the Self-Checkout

Based on a recent experience using a self-checkout system in a grocery store, we would like to know what your evaluation was with regard to your own productivity as a customer at the self-checkout system.

Please check the number that best describes **your perception of your overall productivity at the self-checkout.**

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
I usually try to be very productive when I shop. (X135)	□	□	□	□	□	□	□
I care about my productivity. (X136)	□	□	□	□	□	□	□
I accomplish more by using the self-checkout than would otherwise be possible. (X137)	□	□	□	□	□	□	□
I improve my checkout performance by using self-checkout. (X138)	□	□	□	□	□	□	□
I am more effective in shopping when I use the self-checkout. (X139)	□	□	□	□	□	□	□
I increase my productivity by using self-checkout. (X140)	□	□	□	□	□	□	□
I am more efficient in shopping when I use the self-checkout. (X141)	□	□	□	□	□	□	□
I feel more productive when I use the self-checkout. (X142)	□	□	□	□	□	□	□
Using the self-checkout contributes to my overall productivity. (X143)	□	□	□	□	□	□	□

Please check the number that best describes **your perception of the overall customer value at the self-checkout.**

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
The self-checkout service option is valuable to me. (X144)	□	□	□	□	□	□	□
Overall, I think the self-checkout service is worth the time and effort it requires. (X145)	□	□	□	□	□	□	□
When I use the self-checkout, I feel good about my ability to use technology. (X146)	□	□	□	□	□	□	□
When I use the self-checkout, I feel that I accomplish a great deal. (X147)	□	□	□	□	□	□	□
I feel good about myself when I use the self-checkout. (X148)	□	□	□	□	□	□	□
I have peace of mind when I use the self-checkout. (X149)	□	□	□	□	□	□	□
I feel more relaxed when I use the self-checkout. (X150)	□	□	□	□	□	□	□
The self-checkout service is valuable. (X151)	□	□	□	□	□	□	□
I feel more competent in finishing my shopping when I use the self-checkout. (X152)	□	□	□	□	□	□	□
I receive better overall value when I use the self-checkout service. (X153)	□	□	□	□	□	□	□

Thank you for your help in this survey.

DESCRIPTIVE STATISTICS

DESCRIPTIVE STATISTICS
FOR TOTAL PRE-TEST SAMPLE

Var	Mean	Std Dev	Var	Mean	Std Dev
X55	2.977	1.540	X106	4.811	1.243
X56	3.814	1.661	X107	5.057	1.215
X57	2.966	1.844	X108	4.614	1.434
X58	3.345	1.593	X109	4.792	1.242
X59	2.822	1.544	X110	4.193	1.327
X60	3.485	1.791	X111	4.148	1.424
X61	3.220	1.715	X112	4.614	1.360
X62	3.352	1.762	X113	4.655	1.339
X63	3.015	1.759	X114	4.394	1.372
X64	2.852	1.763	X115	4.561	1.391
X65	3.299	1.810	X116	4.689	1.380
X66	3.235	1.757	X117	4.746	1.417
X67	2.894	1.597	X118	4.159	1.717
X68	3.102	1.714	X119	4.227	1.792
X69	4.140	1.856	X120	4.856	1.587
X70	3.083	1.821	X121	4.011	1.754
X71	2.492	1.631	X122	3.864	1.886
X72	2.614	1.771	X123	3.803	1.682
X73	2.189	1.516	X124	3.962	1.706
X74	2.633	1.750	X125	4.883	1.617
X75	2.523	1.695	X126	4.811	1.592
X76	3.235	1.695	X127	5.038	1.603
X77	3.193	1.672	X128	5.106	1.644
X78	3.284	1.659	X129	5.140	1.615
X79	3.417	1.659	X130	5.144	1.561
X80	3.152	1.677	X131	5.580	1.496
X81	2.924	1.766	X132	4.973	1.439
X82	5.761	1.293	X133	4.860	1.435
X83	5.659	1.238	X134	4.739	1.522
X84	5.348	1.252	X135	5.417	1.337
X85	4.951	1.511	X136	5.481	1.331
X86	4.936	1.267	X137	4.758	1.509
X87	5.231	1.277	X138	4.799	1.551
X88	5.000	1.371	X139	4.644	1.606
X89	5.155	1.385	X140	4.716	1.633
X90	5.242	1.212	X141	4.602	1.624
X91	5.466	1.205	X142	4.777	1.593
X92	5.292	1.412	X143	4.701	1.656
X93	4.924	1.475	X144	5.273	1.546

Var	Mean	Std Dev	Var	Mean	Std Dev
X94	4.678	1.672	X145	5.299	1.542
X95	5.364	1.386	X146	5.208	1.490
X96	4.420	1.615	X147	4.902	4.717
X97	4.470	1.688	X148	4.629	1.540
X98	5.152	1.395	X149	4.538	1.574
X99	5.121	1.365	X150	4.538	1.668
X100	5.580	1.357	X151	5.205	1.458
X101	5.250	1.386	X152	4.655	1.572
X102	5.042	1.225	X153	4.689	1.676
X103	4.470	1.325			
X104	4.799	1.332			
X105	5.008	1.208			

PRINCIPAL COMPONENTS REPORT

Contact Employee Performance

Items included in the pre-test survey: X102-X118

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	12.5227	73.66	**73.66**	||||||||||||||
2	0.8766	5.16	78.82	||
3	0.6061	3.57	82.38	|
4	0.4684	2.76	85.14	|
5	0.3637	2.14	87.28	|
6	0.2936	1.73	89.01	|
7	0.2652	1.56	90.57	|
8	0.2392	1.41	91.97	|
9	0.2283	1.34	93.32	|
10	0.1918	1.13	94.44	|
11	0.1807	1.06	95.51	|
12	0.1717	1.01	96.52	|
13	0.1460	0.86	97.38	|
14	0.1356	0.80	98.17	|
15	0.1203	0.71	98.88	|
16	0.1048	0.62	99.50	|
17	0.0854	0.50	100.00	|

Self-Service Technology Performance

Items included in the pre-test survey: X92-X101

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	6.7549	67.55	**67.55**	|||||||||||||
2	0.7313	7.31	74.86	||
3	0.5348	5.35	80.21	||
4	0.4216	4.22	84.43	|
5	0.3537	3.54	87.96	|
6	0.3103	3.10	91.07	|
7	0.2607	2.61	93.67	|
8	0.2384	2.38	96.06	|
9	0.2177	2.18	98.23	|
10	0.1765	1.77	100.00	|

Physical Effort

Items included in the pre-test survey: X53-X59

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	3.5807	51.15	**51.15**	|||||||||||
2	1.0333	14.76	65.91	|||
3	0.7568	10.81	76.72	|||
4	0.6185	8.84	85.56	||
5	0.4654	6.65	92.21	||
6	0.4186	5.98	98.19	||
7	0.1268	1.81	100.00	|

Cognitive Effort

Items included in the pre-test survey: X60-X73

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	7.1736	51.24	**51.24**	|||||||||||
2	1.1989	8.56	59.80	||
3	0.9409	6.72	66.52	||
4	0.7778	5.56	72.08	||
5	0.6112	4.37	76.45	|
6	0.5338	3.81	80.26	|
7	0.5244	3.75	84.00	|
8	0.4444	3.17	87.18	|
9	0.4043	2.89	90.07	|
10	0.3727	2.66	92.73	|
11	0.3494	2.50	95.22	|
12	0.2963	2.12	97.34	|
13	0.2406	1.72	99.06	|
14	0.1316	0.94	100.00	|

Emotional Effort

Items included in the pre-test survey: X74-X81

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	5.3199	66.50	**66.50**	|||||||||||||
2	0.8287	10.36	76.86	|||
3	0.4722	5.90	82.76	||
4	0.3962	4.95	87.71	|
5	0.2865	3.58	91.30	|
6	0.2576	3.22	94.52	|
7	0.2412	3.01	97.53	|
8	0.1976	2.47	100.00	|

Effort Saving

Items included in the pre-test survey: X119-X124

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	4.0482	67.47	**67.47**	||||||||||||||
2	0.6573	10.96	78.43	|||
3	0.4632	7.72	86.15	||
4	0.4109	6.85	92.99	||
5	0.2692	4.49	97.48	|
6	0.1511	2.52	100.00	|

Time Saving

Items included in the pre-test survey: X125-X131

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	6.0164	85.95	**85.95**	||||||||||||||||||
2	0.3440	4.91	90.86	|
3	0.2328	3.33	94.19	|
4	0.1593	2.28	96.46	|
5	0.1123	1.60	98.07	|
6	0.0877	1.25	99.32	|
7	0.0475	0.68	100.00	|

Quality of Customer Labor

Items included in the pre-test survey: X82-X91

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	7.3514	73.51	**73.51**	|||||||||||||||
2	0.6407	6.41	79.92	||
3	0.4872	4.87	84.79	|
4	0.3308	3.31	88.10	|
5	0.2844	2.84	90.94	|
6	0.2418	2.42	93.36	|
7	0.2138	2.14	95.50	|
8	0.1931	1.93	97.43	|
9	0.1516	1.52	98.95	|
10	0.1052	1.05	100.00	|

Quality of Service

Items included in the pre-test survey: X132-X134

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	2.7553	91.84	**91.84**	||||||||||||||||||
2	0.1563	5.21	97.05	||
3	0.0884	2.95	100.00	|

Customer Productivity

Items included in the pre-test survey: X137-X143

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	6.5464	93.52	**93.52**	||||||||||||||||||
2	0.1458	2.08	95.60	|
3	0.0835	1.19	96.80	|
4	0.0679	0.97	97.77	|
5	0.0570	0.81	98.58	|
6	0.0529	0.76	99.34	|
7	0.0465	0.66	100.00	|

Customer Value

Items included in the pre-test survey: X144-X153

No.	Eigenvalue	Individual Percent	Cumulative Percent	Scree Plot
1	8.6818	86.82	**86.82**	|||||||||||||||||
2	0.4722	4.72	91.54	|
3	0.2031	2.03	93.57	|
4	0.1404	1.40	94.98	|
5	0.1128	1.13	96.10	|
6	0.1055	1.05	97.16	|
7	0.0952	0.95	98.11	|
8	0.0722	0.72	98.83	|
9	0.0638	0.64	99.47	|
10	0.0530	0.53	100.00	|

ITEM ANALYSIS REPORT

Contact Employee Performance

Reliability Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X104	4.746	1.422	19.000	4.744	0.845	0.697	0.502
X107	5.042	1.332	18.704	4.847	0.852	0.671	0.463
X108	4.533	1.521	19.213	4.640	0.841	0.715	0.530
X109	4.749	1.333	18.997	4.778	0.838	0.732	0.545
X117	4.676	1.541	19.070	4.658	0.849	0.687	0.476
Total			23.746	5.825	0.872		

Cronbacks Alpha 0.872058 Std. Cronbachs Alpha 0.873369

Correlation Section

	X104	X107	X108	X109	X117
X104	1.0000				
X107	0.5999	1.0000			
X108	0.5415	0.5672	1.0000		
X109	0.6045	0.5535	0.6528	1.0000	
X117	0.5703	0.5194	0.5978	0.5904	1.0000

Self-Service Technology Performance

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X92	5.290	1.415	25.651	5.703	0.857	0.711	0.516
X95	5.380	1.368	25.568	5.724	0.854	0.727	0.531
X96	4.430	1.587	26.515	5.755	0.883	0.567	0.354
X98	5.090	1.405	25.852	5.668	0.850	0.748	0.564
X100	5.520	1.375	25.423	5.751	0.859	0.698	0.537
X101	5.230	1.409	25.713	5.714	0.857	0.706	0.526
Total			30.944	6.783	0.881		

Cronbacks Alpha 0.880655 Std. Cronbachs Alpha 0.883046

Correlation
Section

	X92	X95	X96	X98	X100	X101
X92	1.0000					
X95	0.6065	1.0000				
X96	0.4828	0.5217	1.0000			
X98	0.6108	0.5975	0.5127	1.0000		
X100	0.6019	0.5686	0.3852	0.6305	1.0000	
X101	0.5478	0.6036	0.4386	0.6210	0.6291	1.0000

Physical Effort

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X53	3.420	1.590	9.046	4.172	0.810	0.412	0.188
X54	2.990	1.542	9.471	3.791	0.649	0.740	0.658
X55	3.020	1.539	9.440	3.836	0.668	0.704	0.640
X57	3.030	1.806	9.437	3.851	0.764	0.525	0.294
Total			12.465	5.040	0.780		

Cronbacks Alpha 0.780217 Std. Cronbachs Alpha 0.785853

Correlation
Section

	X53	X54	X55	X57
X53	1.0000			
X54	0.4254	1.0000		
X55	0.3526	0.7895	1.0000	
X57	0.2872	0.5056	0.5104	1.0000

Cognitive Effort

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X61	3.280	1.699	22.155	9.376	0.873	0.555	0.371
X62	3.450	1.752	21.991	9.298	0.870	0.582	0.388
X63	3.070	1.742	22.375	9.047	0.853	0.748	0.648
X64	2.960	1.765	22.477	8.982	0.849	0.778	0.735
X65	3.380	1.825	22.059	8.997	0.854	0.737	0.608
X66	3.330	1.805	22.108	9.214	0.867	0.611	0.414
X68	3.200	1.732	22.238	9.467	0.880	0.483	0.256
X72	2.760	1.833	22.675	9.140	0.864	0.644	0.443
Total			25.440	10.415	0.879		

Cronbacks Alpha 0.878845 Std. Cronbachs Alpha 0.878426

Correlation
Section

	X61	X62	X63	X64	X65	X66	X68
X61	1.0000						
X62	0.5036	1.0000					
X63	0.4668	0.5317	1.0000				
X64	0.3876	0.4855	0.7721	1.0000			
X65	0.4767	0.4788	0.6505	0.7438	1.0000		
X66	0.3609	0.3290	0.4798	0.5632	0.5065	1.0000	
X68	0.3540	0.3335	0.3713	0.3661	0.3668	0.4255	1.0000
X72	0.3735	0.3967	0.5376	0.6143	0.5375	0.5163	0.3583

	X72
X61	
X62	
X63	
X64	
X65	
X66	
X68	
X72	1.0000

Emotional Effort

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X76	3.350	1.713	16.352	6.434	0.817	0.621	0.419
X77	3.310	1.666	16.401	6.442	0.813	0.640	0.448
X78	3.350	1.671	16.358	6.533	0.825	0.575	0.383
X79	3.480	1.692	16.231	6.381	0.807	0.669	0.452
X80	3.190	1.653	16.515	6.391	0.805	0.684	0.472
X81	3.030	1.787	16.676	6.501	0.833	0.541	0.328
Total			19.707	7.618	0.842		

Cronbacks Alpha 0.842420 Std. Cronbachs Alpha 0.843291

Correlation
Section

	X76	X77	X78	X79	X80	X81
X76	1.0000					
X77	0.5421	1.0000				
X78	0.3633	0.5221	1.0000			
X79	0.4873	0.5171	0.5107	1.0000		
X80	0.5150	0.4914	0.4938	0.5553	1.0000	
X81	0.4544	0.3565	0.3282	0.4487	0.5064	1.0000

Effort Saving

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X119	4.100	1.835	11.566	3.990	0.665	0.655	0.468
X121	3.930	1.775	11.738	4.054	0.672	0.646	0.461
X123	3.710	1.702	11.963	4.292	0.740	0.518	0.271
X124	3.930	1.677	11.741	4.383	0.765	0.466	0.219
Total			15.669	5.374	0.769		

Cronbacks Alpha 0.768933 Std. Cronbachs Alpha 0.766954

Correlation
Section

	X119	X121	X123	X124
X119	1.0000			
X121	0.6445	1.0000		
X123	0.4534	0.4593	1.0000	
X124	0.4171	0.3912	0.3428	1.0000

Time Saving

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X126	4.760	1.622	15.354	4.325	0.857	0.690	0.493
X127	4.880	1.688	15.242	4.153	0.822	0.778	0.624
X130	4.980	1.650	15.137	4.163	0.814	0.797	0.646
X131	5.500	1.563	14.621	4.403	0.865	0.667	0.468
Total			20.118	5.568	0.876		

Cronbacks Alpha 0.875542 Std. Cronbachs Alpha 0.874996

Correlation
Section

	X126	X127	X130	X131
X126	1.0000			
X127	0.6663	1.0000		
X130	0.6341	0.7428	1.0000	
X131	0.5195	0.5924	0.6630	1.0000

Quality of Customer Labor

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X84	5.210	1.333	24.848	5.600	0.870	0.702	0.506
X85	4.890	1.509	25.170	5.491	0.875	0.676	0.467
X86	4.850	1.291	25.217	5.602	0.866	0.731	0.541
X88	4.920	1.408	25.146	5.543	0.871	0.699	0.506
X89	5.010	1.414	25.050	5.517	0.868	0.717	0.519
X90	5.180	1.269	24.879	5.634	0.868	0.719	0.534
Total			30.062	6.605	0.889		

Cronbacks Alpha 0.888813 Std. Cronbachs Alpha 0.890283

Correlation
Section

	X84	X85	X86	X88	X89	X90
X84	1.0000					
X85	0.5611	1.0000				
X86	0.6132	0.6022	1.0000			
X88	0.5206	0.5335	0.5840	1.0000		
X89	0.5735	0.5449	0.5881	0.5884	1.0000	
X90	0.5902	0.5230	0.5636	0.6221	0.6150	1.0000

Quality of Service

Reliability Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X132	4.900	1.484	9.422	2.863	0.885	0.867	0.780
X133	4.770	1.471	9.553	2.856	0.871	0.886	0.800
X134	4.650	1.550	9.671	2.861	0.933	0.810	0.658
Total			14.323	4.215	0.928		

Cronbacks Alpha 0.928437 Std. Cronbachs Alpha 0.929144

Correlation Section

	X132	X133	X134
X132	1.0000		
X133	0.8741	1.0000	
X134	0.7719	0.7954	1.0000

Customer Productivity

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X137	4.620	1.516	13.742	4.622	0.935	0.814	0.664
X141	4.490	1.625	13.877	4.464	0.920	0.861	0.750
X142	4.670	1.629	13.692	4.416	0.908	0.898	0.810
X143	4.580	1.660	13.788	4.436	0.922	0.857	0.746
Total			18.366	5.921	0.940		

Cronbacks Alpha 0.939875 Std. Cronbachs Alpha 0.939924

Correlation
Section

	X137	X141	X142	X143
X137	1.0000			
X141	0.7617	1.0000		
X142	0.7843	0.8443	1.0000	
X143	0.7513	0.7918	0.8449	1.0000

Customer Value

Reliability
Section

	Item Values		If This Item is Omitted				
Variable	Mean	Std.Dev.	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	R2 Other Items
X145	5.130	1.603	14.130	4.298	0.872	0.772	0.640
X146	5.090	1.538	14.167	4.353	0.872	0.775	0.643
X149	4.440	1.582	14.812	4.303	0.868	0.784	0.655
X153	4.600	1.691	14.660	4.211	0.871	0.778	0.650
Total			19.256	5.629	0.900		

Cronbacks Alpha 0.899963 Std. Cronbachs Alpha 0.900428

Correlation
Section

	X145	X146	X149	X153
X145	1.0000			
X146	0.7613	1.0000		
X149	0.6384	0.6796	1.0000	
X153	0.6733	0.6362	0.7710	1.0000

CONFIRMATORY FACTOR ANALYSIS LOADINGS

Factor Loadings after Varimax Rotation

Contact Employee Performance

Variables	Factor1
X104	-0.7580
X107	-0.7270
X108	-0.7800
X109	-0.7990
X117	-0.7440

Self-Service Technology Performance

Variables	Factor1
X92	-0.7660
X95	-0.7750
X96	-0.6040
X98	-0.8070
X100	-0.7610
X101	-0.7660

Physical Effort

Variables	Factor1
X53	-0.4540
X54	-0.9100
X55	-0.8600
X57	-0.5830

Cognitive Effort

Variables	Factor1
X61	-0.5820
X62	-0.6180
X63	-0.8150
X64	-0.8570
X65	-0.8020
X66	-0.6470
X68	-0.5040
X72	-0.6910

Emotional Effort

Variables	Factor1
X76	-0.6856
X77	-0.7101
X78	-0.6395
X79	-0.7426
X80	-0.7566
X81	-0.5947

Effort Saving

Variables	Factor1
X119	-0.7333
X121	-0.8703
X122	-0.8419
X123	-0.5806

Time Saving

Variables	Factor1
X126	-0.7430
X127	-0.8550
X130	-0.8800
X131	-0.7170

Quality of Customer Labor

Variables	Factor1
X84	-0.7540
X85	-0.7230
X86	-0.7840
X88	-0.7530
X89	-0.7730
X90	-0.7740

Quality of Service

Variables	Factor1
X132	-0.9218
X133	-0.9483
X134	-0.8386

Customer Productivity

Variables	Factor1
X137	-0.8420
X141	-0.8970
X142	-0.9410
X143	-0.8910

Customer Value

Variables	Factor1
X145	-0.8280
X146	-0.8310
X149	-0.8380
X153	-0.8330

APPENDIX C
FINAL SURVEY

INTERVIEWER SCRIPT

- Introduce yourself and the study.

> Hello, My name is ..... I am a student at the University of Tennessee. I am working in a study conducted by a doctoral student in the same University. The study is about CONSUMERS' USAGE OF SELF-SERVICE OPTIONS IN GROCERY STORES. Your opinions about this subject are very important for us.

- Ask if the respondent is willing to participate to the study.

> It will take only a few minutes at this time. Would you like to participate in this study?

- Ask the screening questions. (See the attachment)
- Fill out the Respondent ID number both on the screening survey and respondent invitation card.
- If the respondent has an internet connection :
  - Give on-line survey instructions on the card.
  - Read the card.
  - Remind that they need to go to the web link and enter the number on the card.
  - Remind that they need to complete the survey within 48 hours in order to get the $10 incentives in the form of a combination of store coupons and cash.
- If the respondent does not have an internet connection :
  - Ask if the respondent is willing to fill the paper-and-pencil test in store immediately.
    - If yes, make sure that you write the Respondent ID number on the survey.
    - If no, thank the respondent and stop.
  - Do not forget to collect the signed consent form with the completed survey.

SCREENING QUESTIONS

- What is your age?
  - Less than 21 (Stop)
  - 21-29
  - 30-39
  - 40-49
  - 50-59
  - 60-69
  - 70 and over

⇨ Please stop and thank the respondent for her/his willingness. There is an age limit in this study. Due to this limit we will not be able to go any further.

- How many times had you used the self-checkout systems in a grocery store within the last year?
  - None
  - Once
  - Two or three times
  - Five or more times

(If you picked "none", please skip to Q.6)

- How frequently do you use the self-checkout?
  - More than once a week
  - Once a week
  - Biweekly
  - Once a month
  - Rarely

- How well do you work with the self-checkout system?
  - Excellent
  - Very good
  - Good
  - Fair
  - Poor
  - Very poor

- How much did you like the self-checkout system?
  - Disliked very much
  - Disliked somewhat
  - Neither disliked or liked
  - Liked somewhat
  - Liked very much

- Do you plan to try/ use the self-checkout system?
  - Plan to try/ use
  - Do not plan to try/ use
  - Depends on situation

⇨ Please STOP and thank the respondent for her/his willingness. The sample includes only the users of self-checkout systems. Due to this limit we will not be able to go any further.

- Do you have an Internet connection that you can use within 48 hours?

  - o Yes ⇨ STOP. Fill out the Respondent ID number below and Respondent Invitation card. Follow script
  - o No

    - Are you willing to complete a paper and pencil survey right now?

      - o Yes ⇨ STOP. Fill out the Respondent ID number below and Respondent Invitation card. Follow script
      - o No ⇨ STOP. Thank the respondent.

Respondent ID Number:

__ __ __ __ __ __ __ __ __ __ __

RESPONDENT INVITATION CARD

The University of Tennessee

Consumers' Usage of Self-Service Options Survey

You can have a $10 reward!*

- If you are older than 21,
- Have recently used self-checkouts,
- Plan to use/ try self-checkouts in near future,
- Have an access to Internet through a windows-based PC,

Come and participate in a study exploring the usage of self-service options in grocery stores.

Please go to the following website link to take the online survey.

Web site link address:

www.integrated-scholarly-research.org

Please enter the following respondent ID number when you are connected to the website link.

If your connection is cut off for any reason, go to the same website link and re-enter the same respondent ID number. This way, you will be able to finish your survey.

Respondent ID Number:

Contact Information for Questions:

Ismet Anitsal
Tennessee Tech University
College of Business, Campus Box 5083
Cookeville, TN 38505
Phone: (931) 372-3471
E-Mail: ismet@utk.edu

* in a combination of cash and free merchandise coupons if the respondent completes the online survey within 2 days after the invitation.

SURVEY COVER LETTER

The University of Tennessee

Department of Marketing and Logistics
310 Stokely Management Center
Knoxville, Tennessee 37996-0530
(865) 974-0595
Fax: (865) 974-1932

August 12, 2004

Dear Shopper,

We are asking for your help in a study of consumers' usage of self-service options in grocery stores. This is an important academic research study supported by College of Business Administration of the University of Tennessee.

It is our understanding that you use self-checkout systems in your shopping. We are surveying a randomly selected sample of respondents from Tennessee to ask how they feel about the use of this self-service option.

Your answers are completely confidential. You would help us greatly by taking few minutes to share your in-store experiences in this voluntary survey.

Answering all questions in the survey will take approximately 20 minutes. Thank you very much for helping with this important study.

If you have any questions regarding this study, please let us know. Please feel free to contact Dr. David W. Schumann at (865) 974-1642 or dschuman@utk.edu or Ismet Anitsal at (865) 974-0595 or ismet@utk.edu.

Sincerely,

Ismet Anitsal and David W. Schumann
Principal Researchers

FINAL SURVEY

CONSUMERS' USAGE OF SELF-SERVICE OPTIONS IN GROCERY STORES

This survey is divided into 8 parts.

PART 1: Use of Self-Service Options

18. Below is a list of technology-based self-service options. Which service options have you noticed or used at retail stores? (Please check all choices that apply)

Self-service options in retail stores:	Unaware	Aware, But Not Used	Aware and Used
ATMs (automated teller machines)	□	□	□
Check-cashing machines	□	□	□
Coin machines	□	□	□
Coin-operated photocopy machines	□	□	□
Self-checkout systems in grocery stores	□	□	□
Produce scales	□	□	□
In-store service and information telephones for customers	□	□	□
Price checkers (price look up points)	□	□	□
Automatic coupon dispensers	□	□	□
Automatic recipe dispensers	□	□	□
Candy/ chocolate stations	□	□	□
Coffee grinding machines	□	□	□
Electronic kiosks for batteries, tires, or gift registry	□	□	□
Self-service photograph enlargement machines	□	□	□
Interactive monitors for electronic game demonstrations	□	□	□
Music CD or movie VHS/DVD sampling machines	□	□	□
Electronic blood pressure checking devices	□	□	□
Self-scanning payment devices at traditional checkout lanes	□	□	□
Postage stamp dispensers	□	□	□
Coin-automated game machines for a kiddie-ride or toy catch up	□	□	□
Mini-studios for self-photographing	□	□	□
Vending machines for drinks, chips, candies, or chocolate bars	□	□	□
Vending machines for personalized tags or stickers	□	□	□
Pay-at-the-pump gasoline terminals in the store's parking lot	□	□	□

For each question below, check only one choice that best describes your situation.

19. How many times had you used the self-checkout systems in a grocery store within the last year?
    - None
    - Once
    - Two or three times
    - Five or more times

    (If you picked "none", please skip to Q.6)

20. How frequently do you use the self-checkout?
    - More than once a week
    - Once a week
    - Biweekly
    - Once a month
    - Rarely
21. How well do you work with the self-checkout system?
    - Excellent
    - Very good
    - Good
    - Fair
    - Poor
    - Very poor

22. How much did you like the self-checkout system?
    - Disliked very much
    - Disliked somewhat
    - Neither disliked or liked
    - Liked somewhat
    - Liked very much

23. Do you plan to try/ use the self-checkout system?
    - Plan to try/ use
    - Do not plan to try/ use
    - Depends on situation

24. How often do you shop for groceries?
    - More than once a week
    - Once a week
    - Once every two weeks
    - Once a month

25. How many people do you usually shop for when you do your grocery shopping?
    - 1
    - 2
    - 3
    - 4
    - 5 or more

26. How many adults (18 and over) including yourself live in your household?
    - 1
    - 2
    - 3
    - 4
    - 5 or more

27. How many children (under 18) live in your household?
    - 0
    - 1
    - 2
    - 3
    - 4
    - 5 or more

28. How much do you normally spend for groceries in a month?
    - Less than $ 150
    - $ 151-300
    - $ 301-450
    - $ 451-600
    - $ 601-750
    - More than $ 750

29. How much did you spend in eating out last month?
    - Less than $ 50
    - $ 51-100
    - $ 101-150
    - $ 151-200
    - $ 201-250
    - More than $ 250

30. What is your gender?
    - Male
    - Female

31. What is your marital status?
    - Married
    - Not married

32. What is the latest school you have graduated from?
    - Elementary school
    - Middle school
    - High school
    - College with an Associate degree
    - College with a Bachelor's degree
    - College with an advanced degree

33. What is your age?
    - 21-29
    - 30-39
    - 40-49
    - 50-59
    - 60-69
    - 70 and over

Directions:
For each statement below, please show the extent to which you believe that your experience with the self-check out systems has been described by the statement. Checking **1** means that you strongly disagree with the statement, and checking **7** means that you strongly agree. There are no right or wrong answers- what we are interested in is a response that best shows your perceptions about the self-checkout systems at grocery stores.

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
I feel like I am more in control when dealing with automated systems than with people. (X40)	□	□	□	□	□	□	□
The self-checkout gives me control. (X41)	□	□	□	□	□	□	□
The self-checkout lets the customer be in charge. (X42)	□	□	□	□	□	□	□
I love using the self-checkout. (X43)	□	□	□	□	□	□	□
Technology saves me time. (X44)	□	□	□	□	□	□	□
I feel completely at ease with the use of self-checkout. (X45)	□	□	□	□	□	□	□
I find it easy to recover from errors encountered while using the self-checkout. (X46)	□	□	□	□	□	□	□
I need to know someone is there, just in case, to listen to me if I have a question or problem. (X47)	□	□	□	□	□	□	□
I usually need face-to-face contact at the self-checkout to explain what I want and to answer my questions. (X48)	□	□	□	□	□	□	□
Interacting with self-checkout is often frustrating. (X49)	□	□	□	□	□	□	□
I often become confused when I use the self-checkout. (X50)	□	□	□	□	□	□	□
It is easier for me to get help in scanning produce than to do it by myself. (X51)	□	□	□	□	□	□	□
Instead of scanning by myself, I prefer getting help from a service employee. (X52)	□	□	□	□	□	□	□
I usually feel like an unpaid cashier working at the checkout register when I am using the self-checkout. (X53)	□	□	□	□	□	□	□
I resent having to do the work that a paid employee should do. (X54)	□	□	□	□	□	□	□
I usually try to be very productive when I shop. (X55)	□	□	□	□	□	□	□
I care about my productivity. (X56)	□	□	□	□	□	□	□

PART 2: Your Activities at the Self-Checkout:

Directions:

Based on a recent experience using a self-checkout system for each statement below, please show the extent to which you believe that your experience with the self-check out systems have been described by the statement.

Based on each of the following statements given, checking **1** means that you feel you spent minimum effort, and checking **7** means that you feel you spent maximum effort. There are no right or wrong answers- all we are interested in is a number that best shows your perceptions about the self-check out systems at grocery stores.

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
Even if it involves physical tasks, I usually prefer using the self-checkout rather than the traditional checkout. (X57)	□	□	□	□	□	□	□
I do not need to exert a lot of physical energy when I unload my items at the self-checkout. (X58)	□	□	□	□	□	□	□
I do not need to exert a lot of physical energy when I bag my items at the self-checkout. (X59)	□	□	□	□	□	□	□
I do not need to exert a lot of physical energy when I scan my items at the self-checkout. (X60)	□	□	□	□	□	□	□
When I use the coins and paper money to pay for my items, I can usually put them into the right slots without any physical difficulty. (X61)	□	□	□	□	□	□	□
I try to think very carefully about how to accomplish all requirements for a faster checkout when I am at the self-checkout. (X62)	□	□	□	□	□	□	□
I carefully check to make sure that I scanned every item in my shopping cart when the computer asks. (X63)	□	□	□	□	□	□	□
I usually answer the questions asked by the computer on the touch screen without putting a lot of thought into it. (X64)	□	□	□	□	□	□	□
I usually read or listen to the instructions provided by the computer without any struggle. (X65)	□	□	□	□	□	□	□
I am very exact in following the instructions given by the computer. (X66)	□	□	□	□	□	□	□
I usually do not have to make much of an effort to find the code numbers for produce items. (X67)	□	□	□	□	□	□	□
I generally check the item prices one-by-one on the touch screen of the self-checkout. (X68)	□	□	□	□	□	□	□
When I use coins and paper money to pay for my items, I usually put them into the right slots without much thought. (X69)	□	□	□	□	□	□	□
I generally attempt to stay patient while waiting in line for the self-checkout. (X70)	□	□	□	□	□	□	□

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
It is usually easy for me to be patient while waiting for help from a service employee. (X71)	□	□	□	□	□	□	□
When something goes wrong and I have to wait, I generally have difficulty in trying to remain calm. (X72)	□	□	□	□	□	□	□
I try to be pleasant even when I must work with an employee who is not proficient in knowing how to use the self-checkout. (X73)	□	□	□	□	□	□	□
When I get upset in using the self-checkout, I am able to keep from showing my frustration. (X74)	□	□	□	□	□	□	□
I personally bag the items I purchased without any complaining for my work. (X75)	□	□	□	□	□	□	□

PART 3: Quality of Your Activities at the Self-Checkout:

Based on a recent experience using a self-checkout system in a grocery store and as you reflect on the overall quality of your effort in participating in self-checkout activities, we would like to know what your self-evaluation was with regard to your use of the self-checkout system.

Please check the number that best describes what **your own overall performance at the self-checkout** was like.

	1 ▼	2 ▼	3 ▼	4 ▼	5 ▼	6 ▼	7 ▼	
Inadequate (X76)	□	□	□	□	□	□	□	Superior
Ordinary (X77)	□	□	□	□	□	□	□	Impressive
Below my standards (X78)	□	□	□	□	□	□	□	Above my standards
Uncommitted (X79)	□	□	□	□	□	□	□	Dedicated
Amateur (X80)	□	□	□	□	□	□	□	Expert
Unfocused (X81)	□	□	□	□	□	□	□	Focused

PART 4: Self-Checkout Performance

Based on a recent experience using a self-checkout system in a grocery store, please show the extent to which you believe that your perceptions of self-checkout performance have been described by each statement.

Please check the number that best describes **your perception of self-checkout performance.**

The self-checkout:	Strongly Disagree ▼ **1**	**2**	**3**	**4**	**5**	**6**	Strongly Agree ▼ **7**
Performs accurately. (X82)	□	□	□	□	□	□	□
Tells me exactly what to do next. (X83)	□	□	□	□	□	□	□
Assures me that a given problem will be resolved. (X84)	□	□	□	□	□	□	□
Provides reasonable completion time. (X85)	□	□	□	□	□	□	□
Provides information on how much each item scanned will cost. (X86)	□	□	□	□	□	□	□
Avoids technical jargon in communication. (X87)	□	□	□	□	□	□	□

PART 5: Service Employee Performance

Based on a recent experience using a self-checkout system in a grocery store, please show the extent to which you believe that your perceptions of the service employee helping you at self-check out systems have been described by each statement.

Please check the number that best describes **your perception of service employee performance.**

Did you receive any help from a service employee during your recent experience at the self-checkout?
□ Yes
□ No (please skip to Part 6) (X88)

A service employee at the self-checkout:	Strongly Disagree ▼ **1**	**2**	**3**	**4**	**5**	**6**	Strongly Agree ▼ **7**
Quickly responds to my request for help. (X89)	□	□	□	□	□	□	□
Instructs me as how to perform certain service tasks. (X90)	□	□	□	□	□	□	□
Is very willing to explain store policies regarding the self-checkout process. (X91)	□	□	□	□	□	□	□
Is consistently courteous with me. (X92)	□	□	□	□	□	□	□
Provides individualized attention when needed. (X93)	□	□	□	□	□	□	□

PART 6: Savings at the Self-Checkout

Based on a recent experience using a self-checkout system in a grocery store, please show the extent to which you believe that your perceptions of the personal savings have been described by the statement.

Please check the number that best describes **your perception of personal savings at the self-checkout.**

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
Compared to the traditional checkout, paying for the items at the self-checkout requires less effort. (X94)	□	□	□	□	□	□	□
The self-checkout saves me work. (X95)	□	□	□	□	□	□	□
My shopping would be more of a struggle if I would not use the self-checkout. (X96)	□	□	□	□	□	□	□
The self-checkout produces coupons for me without making me continuously search, clip or organize coupons. (X97)	□	□	□	□	□	□	□
I am able to complete all service tasks myself immediately rather than depending on a cashier. (X98)	□	□	□	□	□	□	□
The time required to get through the self-checkout is less than what I usually spend at a regular checkout. (X99)	□	□	□	□	□	□	□
By using the self-checkout, I can reduce the time I spend on unproductive activities such as waiting for a cashier to perform during regular checkout. (X100)	□	□	□	□	□	□	□
When I have a limited number of items, I think self-scanning at a self-checkout is much faster than a cashier scanning the purchases at the tradiditional checkout. (X101)	□	□	□	□	□	□	□

PART 7: Service Quality at the Self-Checkout:

Based on a recent experience using a self-checkout system in a grocery store, we would like to know what your evaluation was with regard to the overall service quality of self-checkout system.

Please check the number that best describes **your perception of the overall service quality of the self-checkout.**

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
I think the overall service I usually receive at the self-checkout is of high quality. (X102)	□	□	□	□	□	□	□
I often rate the overall quality of the service at the self-checkout as excellent. (X103)	□	□	□	□	□	□	□
Most of the time, I perceive the overall quality of the service at the self-checkout as superior. (X104)	□	□	□	□	□	□	□

PART 8: Productivity and Value at the Self-Checkout

Based on a recent experience using a self-checkout system in a grocery store, we would like to know what your evaluation was with regard to your own productivity as a customer at the self-checkout system.

Please check the number that best describes **your perception of your overall productivity at the self-checkout.**

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
I accomplish more by using the self-checkout than would otherwise be possible. (X105)	□	□	□	□	□	□	□
I am more efficient in shopping when I use the self-checkout. (X106)	□	□	□	□	□	□	□
I feel more productive when I use the self-checkout. (X107)	□	□	□	□	□	□	□
Using the self-checkout contributes to my overall productivity. (X108)	□	□	□	□	□	□	□

Please check the number that best describes **your perception of the overall customer value at the self-checkout.**

	Strongly Disagree ▼ 1	2	3	4	5	6	Strongly Agree ▼ 7
Overall, I think the self-checkout service is worth the time and effort it requires. (X109)	□	□	□	□	□	□	□
When I use the self-checkout, I feel good about my ability to use technology. (X110)	□	□	□	□	□	□	□
I have peace of mind when I use the self-checkout. (X111)	□	□	□	□	□	□	□
I receive better overall value when I use the self-checkout service. (X112)	□	□	□	□	□	□	□

Thank you for your help in this survey.

Please provide us the following information, so that we will be able to mail you a token of appreciation worth of $10 in the form of a combination of Kroger coupons for free merchandise (subject to state and local taxes) and cash.

Name: _____
Address: _____
City _____ State_____ Zip_____
E-mail: _____

APPENDIX D
SAMPLE CHARACTERISTICS

PERCENTAGE FREQUENCY DISTRIBUTIONS OF THE SAMPLE CHARACTERISTICS

	Enthusiastic Adopters (n=271)	Reluctant Adopters (n=204)	Total Sample (n=475)
Frequency of self-checkout use			
More than once a week	45.02	18.63	33.68
Once a week	28.41	19.61	24.63
Biweekly	18.45	19.12	18.74
Once a month	7.75	24.02	14.74
Rarely	0.37	18.63	8.21
How well they work with self-checkout			
Excellent	61.25	14.22	41.05
Very Good	35.79	26.96	32.00
Good	2.58	38.24	17.89
Fair	0.00	18.14	7.79
Poor	0.00	1.96	0.84
Very Poor	0.37	0.49	0.42
Frequency for grocery shopping			
More than once a week	53.14	41.18	48.00
Once a week	35.42	41.67	38.11
Once every two weeks	10.33	11.76	10.95
Once a month	1.11	5.39	2.95
How many people you shop for			
1	18.08	21.08	19.37
2	47.97	41.18	45.05
3	14.39	19.12	16.42
4	12.18	11.27	11.79
5 or more	7.38	7.35	7.37
Number of adults (>18) in the household			
1	18.08	17.65	17.89
2	66.42	63.73	65.26
3	8.12	15.20	11.16
4	4.43	2.45	3.58
5 or more	2.95	0.98	2.11

	Enthusiastic Adopters (n=271)	Reluctant Adopters (n=204)	Total Sample (n=475)
Number of children (<18) in the household			
0	66.05	70.10	67.79
1	15.13	13.73	14.53
2	12.18	11.27	11.79
3	5.90	3.43	4.84
4	0.74	0.98	0.84
5 or more	0.00	0.49	0.21
Monthly grocery spending			
Less than $150	16.97	20.59	18.53
$151-300	41.70	31.86	37.47
$301-450	23.99	24.02	24.00
$451-600	11.44	15.69	13.26
$601-750	4.43	5.39	4.84
More than $750	1.48	2.45	1.89
Monthly spending in eating out			
Less than $50	16.97	17.65	17.26
$51-100	30.63	25.98	28.63
$101-150	19.93	19.61	19.79
$151-200	13.28	16.18	14.53
$201-250	9.23	10.78	9.89
More than $250	9.96	9.80	9.89
Gender			
Male	45.39	40.20	43.16
Female	54.61	59.80	56.84
Marital Status			
Married	59.41	60.29	59.79
Not married	40.59	39.71	40.21
Education			
Elementary School	0.00	0.00	0.00
Middle School	0.00	0.98	0.42
High School	22.88	23.53	23.16
Associate Degree	11.07	8.33	9.89
Bachelor's Degree	36.90	36.27	36.63
Master's/Doctorate Degree	29.15	30.88	29.89

	Enthusiastic Adopters (n=271)	Reluctant Adopters (n=204)	Total Sample (n=475)
Age			
21-29	26.57	28.43	27.37
30-39	21.40	15.20	18.74
40-49	16.97	22.06	19.16
50-59	23.62	19.61	21.89
60-69	9.59	7.84	8.84
70 and over	1.85	6.86	4.00
I feel like I am more in control with aoutomated systems			
Strongly Disagree = 1	4.43	6.86	5.47
2	2.58	15.20	8.00
3	9.59	20.10	14.11
4	29.15	33.33	30.95
5	16.61	13.73	15.37
6	16.24	5.88	11.79
Strongly Agree = 7	21.40	4.90	14.32
Self-checkout gives me control			
Strongly Disagree = 1	3.32	6.86	4.84
2	3.69	12.25	7.37
3	5.17	20.59	11.79
4	21.40	29.41	24.84
5	19.56	19.61	19.58
6	19.93	6.86	14.32
Strongly Agree = 7	26.94	4.41	17.26
Self-checkout lets the customer be in charge			
Strongly Disagree = 1	3.69	4.90	4.21
2	2.58	16.18	8.42
3	6.27	18.14	11.37
4	23.62	28.43	25.68
5	18.82	17.65	18.32
6	19.93	10.78	16.00
Strongly Agree = 7	25.09	3.92	16.00

	Enthusiastic Adopters (n=271)	Reluctant Adopters (n=204)	Total Sample (n=475)
I love using the self-checkout			
Strongly Disagree = 1	1.85	9.31	5.05
2	0.74	12.75	5.89
3	0.37	19.12	8.42
4	10.70	33.82	20.63
5	12.55	10.78	11.79
6	28.78	10.29	20.84
Strongly Agree = 7	45.02	3.92	27.37
Technology saves me time			
Strongly Disagree = 1	1.48	3.92	2.53
2	0.00	7.35	3.16
3	2.21	11.76	6.32
4	7.38	22.06	13.68
5	14.39	22.55	17.89
6	27.31	23.53	25.68
Strongly Agree = 7	47.23	8.82	30.74
I feel completely at ease with the use of self-checkout			
Strongly Disagree = 1	1.11	3.92	2.32
2	0.37	7.84	3.58
3	2.21	17.16	8.63
4	4.80	25.98	13.89
5	9.59	16.67	12.63
6	31.00	17.16	25.05
Strongly Agree = 7	50.92	11.27	33.89
I find it easy to recover from errors encountered while using the self-checkout			
Strongly Disagree = 1	2.95	19.12	9.89
2	6.64	18.14	11.58
3	10.70	20.10	14.74
4	19.19	13.73	16.84
5	23.62	15.69	20.21
6	20.66	8.82	15.58
Strongly Agree = 7	16.24	4.41	11.16

	Enthusiastic Adopters (n=271)	Reluctant Adopters (n=204)	Total Sample (n=475)
I need to know someone is there, just in case, to listen to me if I have a question or problem.			
Strongly Disagree = 1	5.17	0.98	3.37
2	6.64	4.90	5.89
3	9.23	4.41	7.16
4	9.96	10.78	10.32
5	14.76	21.08	17.47
6	21.77	29.90	25.26
Strongly Agree = 7	32.47	27.94	30.53
I usually need face-to-face contact at the self-checkout to explain what I want and to answer my questions			
Strongly Disagree = 1	32.10	14.22	24.42
2	27.68	27.45	27.58
3	13.65	17.16	15.16
4	10.70	15.20	12.63
5	8.12	11.76	9.68
6	4.06	8.33	5.89
Strongly Agree = 7	3.69	5.88	4.63
Interacting with self-checkout is often frustrating			
Strongly Disagree = 1	46.86	6.37	29.47
2	28.04	16.18	22.95
3	11.81	13.24	12.42
4	6.27	22.06	13.05
5	2.58	19.12	9.68
6	2.95	10.29	6.11
Strongly Agree = 7	1.48	12.75	6.32
I often become confused when I use self-checkout			
Strongly Disagree = 1	64.21	19.12	44.84
2	23.25	32.35	27.16
3	2.95	14.71	8.00
4	4.06	18.63	10.32
5	1.11	5.88	3.16
6	2.58	5.88	4.00
Strongly Agree = 7	1.85	3.43	2.53

		Enthusiastic Adopters (n=271)	Reluctant Adopters (n=204)	Total Sample (n=475)
It is easier for me to get help in scanning produce than do it by myself				
Strongly Disagree =	1	39.48	13.73	28.42
	2	23.62	16.67	20.63
	3	8.86	14.22	11.16
	4	9.59	21.57	14.74
	5	7.75	18.14	12.21
	6	5.90	10.78	8.00
Strongly Agree =	7	4.80	4.90	4.84
Instead of scanning by myself, I prefer getting help from a service employee				
Strongly Disagree =	1	59.41	16.18	40.84
	2	24.72	26.47	25.47
	3	6.64	18.63	11.79
	4	3.69	17.16	9.47
	5	1.48	8.82	4.63
	6	2.21	6.86	4.21
Strongly Agree =	7	1.85	5.88	3.58
I usually feel like an unpaid cashier working at the self-checkout register when I am using the self-checkout				
Strongly Disagree =	1	66.05	26.96	49.26
	2	18.45	20.10	19.16
	3	6.64	13.24	9.47
	4	2.21	13.73	7.16
	5	2.21	6.86	4.21
	6	2.95	10.78	6.32
Strongly Agree =	7	1.48	8.33	4.42
I resent having to do work that a paid employee should do				
Strongly Disagree =	1	71.22	35.29	55.79
	2	15.87	25.49	20.00
	3	4.06	10.78	6.95
	4	4.06	10.29	6.74
	5	1.11	5.88	3.16
	6	1.85	5.39	3.37
Strongly Agree =	7	1.85	6.86	4.00

	Enthusiastic Adopters (n=271)	Reluctant Adopters (n=204)	Total Sample (n=475)
I usually try to be very productive when I shop			
Strongly Disagree = 1	3.32	1.96	2.74
2	0.74	2.94	1.68
3	2.58	4.90	3.58
4	9.59	18.63	13.47
5	8.49	20.10	13.47
6	33.95	30.88	32.63
Strongly Agree = 7	41.33	20.59	32.42
I care about my productivity			
Strongly Disagree = 1	1.85	1.47	1.68
2	0.00	2.94	1.26
3	2.58	2.94	2.74
4	8.12	13.24	10.32
5	8.49	16.18	11.79
6	32.84	33.33	33.05
Strongly Agree = 7	46.13	29.90	39.16

TWO-SAMPLE TEST REPORT

TEST OF ASSUMPTIONS SECTION FOR NORMALITY AND EQUAL VARIANCES

Gr. 1 = Enthusiastic Adopters Gr. 2 = Reluctant Adopters

		Normality Test							Equal-Variance Test	
Var.	Gr.	Skewness	Prob.	Kurtosis	Prob.	Omnibus	Prob.	**Normal**	Variance Ratio	Modified Levene
X40	1	-2.466	0.014	-1.643	0.100	8.783	0.012	No		
	2	1.289	0.198	-0.464	0.643	1.875	0.392	Yes		
	I feel like I am more in control when dealing with automated								1.217	5.817
	systems than with people.								0.140	0.016
								Equal Variance		
								=>	Yes	No
X41	1	-4.306	0.000	-0.183	0.855	18.576	0.000	Yes		
	2	0.257	0.797	-1.002	0.316	1.070	0.586	Yes		
	The self-checkout gives me control.								1.178	4.031
									0.217	0.045
								Equal Variance		
								=>	Yes	No
X42	1	-3.965	0.000	-0.282	0.778	15.798	0.000	Yes		
	2	0.448	0.654	-2.361	0.018	5.773	0.056	No		
	The self-checkout lets the customer be in charge.								1.130	2.127
									0.359	0.145
								Equal Variance		
								=>	Yes	Yes

		Normality Test							Equal-Variance Test	
Var.	Gr.	Skewness	Prob.	Kurtosis	Prob.	Omnibus	Prob.		Variance Ratio	Modified Levene
X43	1	-8.171	0.000	4.936	0.000	91.137	0.000	No		
	2	0.580	0.562	-1.401	0.161	2.300	0.317	Yes		
	I love using the self-checkout.								1.441	7.092
									0.005	0.008
								Equal Variance		
								=>	No	No
X44	1	-8.163	0.000	4.980	0.000	91.435	0.000	No		
	2	-2.535	0.011	-1.619	0.105	9.047	0.011	Yes		
	Technology saves me time.								1.620	16.534
									0.000	0.000
								Equal Variance		
								=>	No	No
X45	1	-9.210	0.000	5.946	0.000	120.172	0.000	No		
	2	-0.604	0.546	-3.064	0.002	9.752	0.008	No		
	I feel completely at ease with the use of self-checkout.								1.960	22.075
									0.000	0.000
								Equal Variance		
								=>	No	No
X46	1	-2.950	0.003	-2.092	0.036	13.081	0.001	No		
	2	1.934	0.053	-5.011	0.000	28.849	0.000	No		
	I find it easy to recover from errors encountered while using the self-checkout.								1.238	4.588
									0.102	0.033
								Equal Variance		
								=>	Yes	No

		Normality Test							Equal-Variance Test	
Var.	Gr.	Skewness	Prob.	Kurtosis	Prob.	Omnibus	Prob.		Variance Ratio	Modified Levene
X47	1	-4.882	0.000	-2.126	0.034	28.355	0.000	No		
	2	-5.088	0.000	1.369	0.171	27.761	0.000	Yes		
	I need to know someone is there, just in case, to listen								1.628	0.000
	to me if I have a question or problem.								11.090	0.001
								Equal Variance =>	No	No
X48	1	5.795	0.000	0.443	0.658	33.781	0.000	Yes		
	2	2.975	0.003	-3.321	0.001	19.881	0.000	No		
	I usually need face-to-face contact at the self-checkout								1.092	0.498
	to explain what I want and to answer my questions.								2.399	0.122
								Equal Variance =>	Yes	Yes
X49	1	8.276	0.000	4.405	0.000	87.903	0.000	No		
	2	0.091	0.928	-5.071	0.000	25.721	0.000	No		
	Interacting with self-checkout is often frustrating.								1.618	0.000
									22.952	0.000
								Equal Variance =>	No	No
X50	1	10.483	0.000	6.511	0.000	152.291	0.000	No		
	2	4.263	0.000	-0.192	0.848	18.211	0.000	Yes		
	I often become confused when I use the self-checkout.								1.505	23.917
									0.002	0.000
								Equal Variance =>	No	No

		Normality Test							Equal-Variance Test	
Var.	Gr.	Skewness	Prob.	Kurtosis	Prob.	Omnibus	Prob.		Variance Ratio	Modified Levene
X51	1	5.860	0.000	-0.539	0.590	34.629	0.000	Yes		
	2	0.345	0.730	-5.431	0.000	29.612	0.000	No		
	It is easier for me to get help in scanning produce								1.125	0.178
	than to do it by myself.								0.377	0.673
								Equal Variance		
								=>	Yes	Yes
X52	1	10.039	0.000	6.215	0.000	139.402	0.000	No		
	2	3.471	0.001	-1.763	0.078	15.155	0.001	Yes		
	Instead of scanning by myself, I prefer getting help								1.736	0.000
	from a service employee.								29.504	0.000
								Equal Variance		
								=>	No	No
X53	1	10.156	0.000	6.140	0.000	140.848	0.000	No		
	2	3.101	0.002	-5.631	0.000	41.321	0.000	No		
	I usually feel like an unpaid cashier working at the checkout								2.238	70.433
	register when I am using the self-checkout.								0.000	0.000
								Equal Variance		
								=>	No	No
X54	1	10.814	0.000	6.833	0.000	163.630	0.000	No		
	2	5.158	0.000	-0.229	0.819	26.655	0.000	Yes		
	I resent having to do the work that a paid employee should do.								2.163	40.759
									0.000	0.000
								Equal Variance		
								=>	No	No

		Normality Test							Equal-Variance Test	
Var.	Gr.	Skewness	Prob.	Kurtosis	Prob.	Omnibus	Prob.		Variance Ratio	Modified Levene
X55	1	-8.411	0.000	4.686	0.000	92.703	0.000	No		
	2	-4.353	0.000	1.117	0.264	20.196	0.000	Yes		
	I usually try to be very productive when I shop.								1.011	3.138
									0.942	0.077
								Equal Variance =>	Yes	Yes
X56	1	-8.715	0.000	5.339	0.000	104.456	0.000	No		
	2	-5.626	0.000	2.363	0.018	37.238	0.000	No		
	I care about my productivity.								1.235	0.106
									2.026	0.155
								Equal Variance =>	Yes	Yes

TEST RESULTS COMPARING MEANS OF ENSTHUSIASTIC AND RELUCTANT ADOPTERS

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X40	1	4.852	1.619	0.098	4.660	5.045
	2	3.691	1.468	0.103	3.490	3.893

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	38847.500	75703.500	64498.000	1449.938
2	16436.500	37346.500	48552.000	1449.938

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	-7.728	0.000	-7.728	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X41	1	5.177	1.593	0.097	4.987	5.367
	2	3.809	1.468	0.103	3.607	4.010

Aspin-Welch Unequal-Variance Test Section

Alternative Hypothesis	T-Value	Prob Level	Decision	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	9.691	0.000	-0.050	1.000	1.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X42	1	5.114	1.584	0.096	4.926	5.303
	2	3.858	1.490	0.104	3.653	4.062

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	8.777	0.000	1.000	1.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
x43	1	5.978	1.273	0.077	5.826	6.129
	2	3.706	1.529	0.107	3.496	3.916

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	48057.500	84913.500	64498.000	1450.255
2	7226.500	28136.500	48552.000	1450.255

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	-14.077	0.000	-14.077	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
x44	1	6.041	1.218	0.074	5.896	6.186
	2	4.578	1.550	0.109	4.366	4.791

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	43049.000	79905.000	64498.000	1439.883
2	12235.000	33145.000	48552.000	1439.883

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	-10.700	0.000	-10.700	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X45	1	6.181	1.142	0.069	6.045	6.317
	2	4.402	1.599	0.112	4.183	4.621

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	45041.500	81897.500	64498.000	1435.697
2	10242.500	31152.500	48552.000	1435.697

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	-12.119	0.000	-12.119	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
x46	1	4.808	1.587	0.096	4.619	4.997
	2	3.328	1.766	0.124	3.086	3.571

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	40299.500	77155.500	64498.000	1463.037
2	14984.500	35894.500	48552.000	1463.037

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0	-0.050		-8.652	0.000	-8.651	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X47	1	5.177	1.841	0.112	4.958	5.396
	2	5.475	1.443	0.101	5.277	5.674

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	26314.000	63170.000	64498.000	1442.137
2	28970.000	49880.000	48552.000	1442.137

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	0.921	0.357	0.921	0.357

Decision: Means are not different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X48	1	2.620	1.678	0.102	2.420	2.820
	2	3.314	1.753	0.123	3.073	3.554

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	-4.376	0.000	0.992	0.963

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X49	1	2.044	1.384	0.084	1.879	2.209
	2	4.132	1.761	0.123	3.891	4.374

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	9661.500	46517.500	64498.000	1448.507
2	45622.500	66532.500	48552.000	1448.507

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	12.413	0.000	12.413	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
x50	1	1.697	1.313	0.080	1.541	1.854
	2	2.912	1.610	0.113	2.691	3.133

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	13459.500	50315.500	64498.000	1395.531
2	41824.500	62734.500	48552.000	1395.531

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	10.163	0.000	10.162	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X51	1	2.594	1.835	0.111	2.376	2.813
	2	3.657	1.731	0.121	3.419	3.894

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	-6.402	0.000	1.000	1.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
x52	1	1.771	1.308	0.079	1.616	1.927
	2	3.201	1.723	0.121	2.965	3.437

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	12785.500	49641.500	64498.000	1414.691
2	42498.500	63408.500	48552.000	1414.691

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	10.502	0.000	10.501	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
x53	1	1.708	1.333	0.081	1.550	1.867
	2	3.191	1.995	0.140	2.917	3.465

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	14628.500	51484.500	64498.000	1382.668
2	40655.500	61565.500	48552.000	1382.668

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	9.412	0.003	9.412	0.003

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X54	1	1.609	1.274	0.077	1.457	1.761
	2	2.696	1.874	0.131	2.439	2.953

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	16795.000	53651.000	64498.000	1338.996
2	38489.000	59399.000	48552.000	1338.996

Alternative Hypothesis	Exact Probability Prob Level	Decision	Approximation Without Correction Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.050	8.101	0.000	8.101	0.000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X55	1	5.863	1.432	0.087	5.693	6.034
	2	5.270	1.425	0.100	5.074	5.465

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	4.483	0.000	0.994	0.971

Decision: Means are different (at alpha = 0.05)

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X56	1	6.044	1.252	0.076	5.895	6.193
	2	5.593	1.392	0.097	5.402	5.784

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	3.704	0.000	0.959	0.868

Decision: Means are different.

USE OF SELF-CHECKOUT FREQUENCY V. GROCERY SHOPPING FREQUENCY

Use of Self-checkout Frequency

How frequently do you use the self-checkout?	Counts Section Enthusiastic Adopters	Reluctant Adopters	Total	Column Percentages Section Enthusiastic Adopters	Reluctant Adopters	Total
More than once a week	122	38	160	45.0	18.6	33.7
Once a week	77	40	117	28.4	19.6	24.6
Once every two weeks	50	39	89	18.5	19.1	18.7
Once a month	21	49	70	7.7	24.0	14.7
Rarely	1	38	39	0.4	18.6	8.2
Total	271	204	475	100.0	100.0	100.0

Chi-Square	95.92087
Degrees of Freedom	4
Probability Level	0.00000

Grocery Shopping Frequency

How often do you shop for groceries?	Counts Section Enthusiastic Adopters	Reluctant Adopters	Total	Column Percentages Section Enthusiastic Adopters	Reluctant Adopters	Total
More than once a week	144	84	228	53.1	41.2	48.0
Once a week	96	85	181	35.4	41.7	38.1
Once every two weeks	28	24	52	10.3	11.8	10.9
Once a month	3	11	14	1.1	5.4	2.9
Total	271	204	475	100.0	100.0	100.0

Chi-Square	12.12787
Degrees of Freedom	3
Probability Level	0.00696

Two-Sample Test Report

Test of Assumptions Section for Normality and Equal Variances

Gr. 1 = Enthusiastic Adopters Gr. 2 = Reluctant Adopters

		Normality Test							Equal-Variance Test	
Var.	Gr.	Skewness	Prob.	Kurtosis	Prob.	Omnibus	Prob.	**Normal**	Variance Ratio	Modified Levene
X26	1	4.8249	0.0000	0.0999	0.1003	8.783	0.012	No		
	2	-0.4751	0.0000	-12.0359	0.6347	1.875	0.392	Yes		
	How frequently do you use the self-checkout?								1.9907	39.9740
									0.0000	0.0000
								Equal Variance =>	No	No
X30	1	5.6800	0.0000	0.8942	0.3712	18.5759	0.0001	No		
	2	4.7520	0.0000	0.9517	0.3413	1.0703	0.5856	Yes		
	How often do you shop for groceries?								1.3832	0.4918
									0.0129	0.4835
								Equal Variance =>	No	Yes

Test Results Comparing Means of Enthusiastic and Reluctant Adopters

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X26	1	1.900	0.986	0.060	1.783	2.018
	2	3.044	1.391	0.097	2.853	3.235

Mann-Whitney U or Wilcoxon Rank-Sum Test for Difference in Medians

Gr.	Mann-Whitney U	W Sum Ranks	Mean of W	Std Dev of W
1	14815.50	51671.50	64498.00	1433.07
2	40468.50	61378.50	48552.00	1433.07

Alternative Hypothesis	Exact Probability Prob Level	Approximation Without Correction Decision	Z-Value	Prob Level	Approximation With Correction Z-Value	Prob Level
Diff<>0		-0.0500	8.9503	0.0000	8.9500	0.0000

Decision: Means are different.

Var.	Gr.	Mean	Std. Dev.	Standard Error	95% LCL of Mean	95% UCL of Mean
X30	1	1.594	0.718	0.044	1.509	1.680
	2	1.814	0.845	0.059	1.698	1.930

Equal-Variance T-Test Section

Alternative Hypothesis	T-Value	Prob Level	Power (Alpha=.05)	Power (Alpha=.01)
Difference <> 0	-3.056	0.002	0.862	0.681

Decision: Means are different

USE OF TECHNOLOGY-BASED SELF-SERVICE OPTIONS: UNAWARE

Self-service options in retail stores:	Unaware Enthusiastic	Unaware Reluctant	Unaware Total Sample
ATMs (automated teller machines)	0.37	3.43	1.68
Produce scales	1.11	2.94	1.89
Electronic blood pressure checking devices	3.69	2.94	3.37
Coffee grinding machines	3.32	4.41	3.79
Vending machines for drinks, chips, candies, or chocolate bars	4.06	6.37	5.05
Coin machines	5.54	8.82	6.95
Pay-at-the-pump gasoline terminals in the store's parking lot	6.27	8.82	7.37
Automatic coupon dispensers	6.64	9.31	7.79
Coin-operated photocopy machines	8.86	12.75	10.53
Coin-automated game machines for a kiddie-ride or toy catch up	11.44	13.24	12.21
Self-scanning payment devices at traditional checkout lanes	16.24	13.73	15.16
Postage stamp dispensers	14.76	20.10	17.05
Price checkers (price look up points)	15.87	20.10	17.68
Self-service photograph enlargement machines	16.97	20.10	18.32
Music CD or movie VHS/DVD sampling machines	19.56	27.94	23.16
Candy/ chocolate stations	25.46	28.43	26.74
Mini-studios for self-photographing	24.35	29.90	26.74
Interactive monitors for electronic game demonstrations	27.31	37.75	31.79
Electronic kiosks for batteries, tires, or gift registry	31.37	37.25	33.89
Vending machines for personalized tags or stickers	30.63	42.16	35.58
In-store service and information telephones for customers	34.69	39.22	36.63
Automatic recipe dispensers	38.01	35.29	36.84
Check-cashing machines	49.82	50.98	50.32

USE OF TECHNOLOGY-BASED SELF-SERVICE OPTIONS: AWARE, BUT NOT USED

Self-service options in retail stores:	Aware, but Not Used Enthusiastic	Aware, but Not Used Reluctant	Aware, but Not Used Total Sample
Self-scanning payment devices at traditional checkout lanes	7.75	8.33	8.00
Produce scales	10.70	17.65	13.68
Price checkers (price look up points)	14.39	14.71	14.53
Pay-at-the-pump gasoline terminals in the store's parking lot	14.02	19.61	16.42
Vending machines for drinks, chips, candies, or chocolate bars	19.93	25.98	22.53
Automatic coupon dispensers	22.51	24.02	23.16
Music CD or movie VHS/DVD sampling machines	25.83	20.10	23.37
Automatic recipe dispensers	22.14	27.45	24.42
Electronic kiosks for batteries, tires, or gift registry	24.35	29.90	26.74
Electronic blood pressure checking devices	32.10	34.80	33.26
Candy/ chocolate stations	33.95	37.75	35.58
In-store service and information telephones for customers	35.06	39.22	36.84
ATMs (automated teller machines)	36.53	39.71	37.89
Postage stamp dispensers	36.90	41.67	38.95
Check-cashing machines	40.59	38.24	39.58
Vending machines for personalized tags or stickers	42.44	36.76	40.00
Coin-automated game machines for a kiddie-ride or toy catch up	42.80	41.67	42.32
Interactive monitors for electronic game demonstrations	47.60	39.22	44.00
Self-service photograph enlargement machines	44.28	46.08	45.05
Mini-studios for self-photographing	47.97	43.14	45.89
Coin-operated photocopy machines	47.60	46.57	47.16
Coffee grinding machines	52.77	50.98	52.00
Coin machines	53.87	62.75	57.68

USE OF TECHNOLOGY-BASED SELF-SERVICE OPTIONS: AWARE AND USED

Self-service options in retail stores:	Aware and Used Enthusiastic	Aware and Used Reluctant	Aware and Used Total Sample
Check-cashing machines	9.59	10.78	10.11
Interactive monitors for electronic game demonstrations	25.09	23.04	24.21
Vending machines for personalized tags or stickers	26.94	21.08	24.42
In-store service and information telephones for customers	30.26	21.57	26.53
Mini-studios for self-photographing	27.68	26.96	27.37
Coin machines	40.59	28.43	35.37
Self-service photograph enlargement machines	38.75	33.82	36.63
Candy/ chocolate stations	40.59	33.82	37.68
Automatic recipe dispensers	39.85	37.25	38.74
Electronic kiosks for batteries, tires, or gift registry	44.28	32.84	39.37
Coin-operated photocopy machines	43.54	40.69	42.32
Postage stamp dispensers	48.34	38.24	44.00
Coffee grinding machines	43.91	44.61	44.21
Coin-automated game machines for a kiddie-ride or toy catch up	45.76	45.10	45.47
Music CD or movie VHS/DVD sampling machines	54.61	51.96	53.47
ATMs (automated teller machines)	63.10	56.86	60.42
Electronic blood pressure checking devices	64.21	62.25	63.37
Price checkers (price look up points)	69.74	65.20	67.79
Automatic coupon dispensers	70.85	66.67	69.05
Vending machines for drinks, chips, candies, or chocolate bars	76.01	67.65	72.42
Pay-at-the-pump gasoline terminals in the store’s parking lot	79.70	71.57	76.21
Self-scanning payment devices at traditional checkout lanes	76.01	77.94	76.84
Produce scales	88.19	79.41	84.42

APPENDIX E
SCALE CONFIRMATION

DESCRIPTIVE STATISTICS

DESCRIPTIVE STATISTICS FOR ENTHUSIASTIC ADOPTERS

Var	Mean	Standard Deviation	Var	Mean	Standard Deviation
X57	5.528	1.532	X85	6.022	1.078
X58	5.635	1.613	X86	6.317	0.928
X59	5.661	1.638	X87	6.299	0.929
X60	5.819	1.493	X89	5.977	1.175
X61	6.089	1.382	X90	6.015	1.302
X62	5.413	1.651	X91	5.871	1.469
X63	5.690	1.710	X92	6.182	1.324
X64	5.834	1.500	X93	6.167	1.261
X65	6.085	1.370	X94	4.705	1.762
X66	5.904	1.338	X95	4.339	1.808
X67	5.343	1.480	X96	4.483	1.875
X68	4.797	1.854	X97	3.782	1.886
X69	5.982	1.487	X98	5.764	1.397
X70	5.568	1.425	X99	5.923	1.426
X71	4.934	1.696	X100	5.845	1.485
X72	2.841	1.770	X101	6.332	1.247
X73	5.292	1.547	X102	6.096	1.121
X74	5.280	1.636	X103	6.059	1.153
X75	6.273	1.241	X104	5.937	1.164
X76	6.022	0.860	X105	5.236	1.504
X77	5.594	1.207	X106	5.273	1.584
X78	5.413	1.138	X107	5.465	1.495
X79	5.561	1.175	X108	5.446	1.502
X80	5.923	0.934	X109	6.240	1.014
X81	5.937	1.025	X110	5.934	1.286
X82	6.185	0.975	X111	5.657	1.338
X83	6.343	0.823	X112	4.952	1.667
X84	5.494	1.401			

DESCRIPTIVE STATISTICS FOR RELUCTANT ADOPTERS

Var	Mean	Standard Deviation	Var	Mean	Standard Deviation
X57	3.662	1.627	X85	4.980	1.455
X58	4.995	1.477	X86	5.706	1.228
X59	4.941	1.517	X87	5.667	1.293
X60	5.098	1.515	X89	5.159	1.610
X61	5.324	1.583	X90	5.068	1.602
X62	4.843	1.552	X91	4.788	1.699
X63	5.260	1.581	X92	5.386	1.486
X64	5.392	1.493	X93	5.417	1.503
X65	5.417	1.495	X94	3.377	1.693
X66	5.284	1.461	X95	3.064	1.544
X67	4.652	1.535	X96	3.186	1.629
X68	4.632	1.766	X97	3.088	1.542
X69	5.245	1.518	X98	4.490	1.574
X70	4.887	1.548	X99	4.564	1.664
X71	4.588	1.612	X100	4.578	1.744
X72	3.275	1.717	X101	5.319	1.625
X73	4.941	1.488	X102	4.868	1.420
X74	4.706	1.613	X103	4.632	1.514
X75	5.701	1.516	X104	4.402	1.491
X76	5.059	1.147	X105	3.926	1.482
X77	4.578	1.227	X106	3.873	1.545
X78	4.593	1.067	X107	4.034	1.533
X79	4.529	1.229	X108	4.029	1.585
X80	4.838	1.190	X109	4.603	1.520
X81	5.142	1.213	X110	4.608	1.567
X82	5.064	1.432	X111	4.211	1.508
X83	5.397	1.370	X112	3.593	1.559
X84	4.353	1.674			

DESCRIPTIVE STATISTICS
FOR BOTH ENTHUSIASTIC AND RELUCTANT ADOPTERS

Var	Mean	Standard Deviation	Var	Mean	Standard Deviation
X57	4.726	1.824	X85	5.575	1.355
X58	5.360	1.587	X86	6.055	1.109
X59	5.352	1.625	X87	6.027	1.142
X60	5.509	1.543	X89	5.568	1.465
X61	5.760	1.518	X90	5.542	1.532
X62	5.168	1.632	X91	5.330	1.676
X63	5.505	1.668	X92	5.784	1.460
X64	5.644	1.511	X93	5.792	1.435
X65	5.798	1.462	X94	4.135	1.852
X66	5.638	1.424	X95	3.792	1.812
X67	5.046	1.541	X96	3.926	1.885
X68	4.726	1.817	X97	3.484	1.778
X69	5.665	1.542	X98	5.217	1.603
X70	5.276	1.516	X99	5.339	1.673
X71	4.785	1.668	X100	5.301	1.719
X72	3.027	1.759	X101	5.897	1.507
X73	5.141	1.530	X102	5.568	1.397
X74	5.034	1.649	X103	5.446	1.496
X75	6.027	1.394	X104	5.278	1.517
X76	5.608	1.102	X105	4.674	1.628
X77	5.158	1.315	X106	4.672	1.713
X78	5.061	1.179	X107	4.851	1.668
X79	5.118	1.302	X108	4.838	1.689
X80	5.457	1.180	X109	5.537	1.494
X81	5.596	1.177	X110	5.364	1.558
X82	5.703	1.315	X111	5.036	1.583
X83	5.937	1.187	X112	4.368	1.754
X84	5.004	1.624			

ASSESSMENT OF NORMALITY

Assessment of Normality
For Enthusiastic and Reluctant Adopters

Variable	skew	c.r.	kurtosis	c.r.
X57	-0.404	-3.594	-0.862	-3.834
X58	-0.952	-8.467	0.196	0.872
X59	-0.970	-8.631	0.167	0.744
X60	-1.151	-10.238	0.746	3.317
X61	-1.321	-11.752	1.147	5.104
X62	-0.823	-7.323	-0.116	-0.516
X63	-1.115	-9.922	0.365	1.625
X64	-1.369	-12.178	1.432	6.369
X65	-1.607	-14.300	2.438	10.845
X66	-1.301	-11.578	1.528	6.796
X67	-0.681	-6.056	-0.123	-0.547
X68	-0.463	-4.117	-0.835	-3.714
X69	-1.256	-11.176	1.043	4.641
X70	-0.895	-7.965	0.278	1.235
X71	-0.502	-4.466	-0.588	-2.614
X72	0.615	5.471	-0.628	-2.793
X73	-0.765	-6.810	0.011	0.047
X74	-0.765	-6.811	-0.144	-0.642
X75	-1.917	-17.054	3.589	15.968
X76	-0.755	-6.717	0.456	2.031
X77	-0.650	-5.781	0.464	2.064
X78	-0.257	-2.290	0.068	0.303
X79	-0.466	-4.147	0.074	0.327
X80	-0.579	-5.156	-0.064	-0.284
X81	-0.755	-6.719	0.400	1.778
X82	-1.226	-10.911	1.509	6.715
X83	-1.559	-13.871	3.085	13.723
X84	-0.622	-5.537	-0.286	-1.273
X85	-1.103	-9.818	1.002	4.456
X86	-1.466	-13.043	2.358	10.492
X87	-1.634	-14.541	3.253	14.474
X89	-1.234	-10.980	0.928	4.131
X90	-1.289	-11.471	1.081	4.808
X91	-1.160	-10.318	0.391	1.740
X92	-1.504	-13.384	2.062	9.173
X93	-1.455	-12.949	1.813	8.067
X94	0.064	0.568	-0.990	-4.403
X95	0.314	2.793	-0.797	-3.548

Variable	skew	c.r.	kurtosis	c.r.
X96	0.154	1.368	-1.065	-4.740
X97	0.294	2.618	-0.787	-3.502
X98	-0.842	-7.487	-0.009	-0.038
X99	-0.864	-7.684	-0.153	-0.683
X100	-0.871	-7.753	-0.229	-1.020
X101	-1.436	-12.778	1.399	6.223
X102	-1.169	-10.401	1.168	5.197
X103	-1.004	-8.936	0.477	2.120
X104	-0.748	-6.659	-0.065	-0.288
X105	-0.285	-2.536	-0.627	-2.789
X106	-0.370	-3.294	-0.648	-2.881
X107	-0.484	-4.303	-0.557	-2.476
X108	-0.515	-4.582	-0.540	-2.403
X109	-1.128	-10.032	0.867	3.855
X110	-0.954	-8.485	0.316	1.404
X111	-0.576	-5.125	-0.234	-1.043
X112	-0.175	-1.555	-0.789	-3.511

Assessment of Normality
For Enthusiastic
Adopters

Variable	skew	c.r.	kurtosis	c.r.
X57	-1.071	-7.2	0.635	2.134
X58	-1.383	-9.296	1.178	3.959
X59	-1.456	-9.782	1.338	4.496
X60	-1.701	-11.432	2.525	8.486
X61	-1.997	-13.42	3.954	13.287
X62	-1.131	-7.603	0.44	1.479
X63	-1.376	-9.245	0.841	2.827
X64	-1.694	-11.386	2.494	8.381
X65	-2.186	-14.692	4.899	16.462
X66	-1.738	-11.682	3.376	11.345
X67	-1.016	-6.825	0.688	2.311
X68	-0.505	-3.397	-0.838	-2.815
X69	-1.831	-12.305	3.067	10.305
X70	-1.218	-8.189	1.239	4.165
X71	-0.621	-4.176	-0.488	-1.641
X72	0.791	5.317	-0.448	-1.504
X73	-0.957	-6.433	0.366	1.230
X74	-0.99	-6.651	0.298	1.001
X75	-2.509	-16.861	7.013	23.566
X76	-0.881	-5.923	1.212	4.071
X77	-1.133	-7.614	1.936	6.505
X78	-0.435	-2.922	0.092	0.308
X79	-0.606	-4.074	0.039	0.132
X80	-0.83	-5.581	0.894	3.004
X81	-0.989	-6.648	0.839	2.821
X82	-1.696	-11.396	4.538	15.25
X83	-1.744	-11.721	6.007	20.187
X84	-0.924	-6.212	0.62	2.084
X85	-1.554	-10.443	3.238	10.88
X86	-2.032	-13.657	6.072	20.405
X87	-2.127	-14.297	6.756	22.701
X89	-1.519	-10.209	2.529	8.499
X90	-1.816	-12.204	3.695	12.416
X91	-1.737	-11.674	2.792	9.381
X92	-2.249	-15.113	6.274	21.084
X93	-2.025	-13.607	4.907	16.490
X94	-0.169	-1.133	-0.966	-3.245
X95	0.086	0.575	-1.02	-3.426
X96	-0.219	-1.47	-1.006	-3.382
X97	0.11	0.74	-0.966	-3.245

Variable	skew	c.r.	kurtosis	c.r.
X98	-1.502	-10.091	2.266	7.616
X99	-1.559	-10.475	2.213	7.435
X100	-1.507	-10.127	1.799	6.045
X101	-2.414	-16.221	6.246	20.989
X102	-1.958	-13.157	5.09	17.103
X103	-1.669	-11.215	3.456	11.614
X104	-1.317	-8.852	1.909	6.416
X105	-0.635	-4.267	-0.143	-0.479
X106	-0.756	-5.083	-0.08	-0.267
X107	-0.872	-5.858	0.158	0.529
X108	-0.893	-5.999	0.218	0.731
X109	-2.139	-14.375	6.946	23.34
X110	-1.487	-9.991	2.302	7.735
X111	-0.928	-6.238	0.521	1.751
X112	-0.496	-3.332	-0.477	-1.603

Assessment of Normality
For Reluctant Adopters

Variable	skew	c.r.	kurtosis	c.r.
X57	0.204	1.192	-0.587	-1.713
X58	-0.497	-2.898	-0.363	-1.059
X59	-0.477	-2.783	-0.449	-1.308
X60	-0.643	-3.752	-0.210	-0.611
X61	-0.75	-4.375	-0.253	-0.737
X62	-0.506	-2.951	-0.378	-1.102
X63	-0.823	-4.796	0.056	0.164
X64	-1.036	-6.044	0.602	1.756
X65	-1.143	-6.662	1.119	3.263
X66	-0.918	-5.356	0.424	1.237
X67	-0.337	-1.967	-0.495	-1.445
X68	-0.416	-2.425	-0.815	-2.377
X69	-0.75	-4.371	-0.065	-0.191
X70	-0.578	-3.371	-0.255	-0.742
X71	-0.375	-2.188	-0.624	-1.820
X72	0.418	2.438	-0.689	-2.009
X73	-0.547	-3.189	-0.265	-0.771
X74	-0.553	-3.227	-0.392	-1.143
X75	-1.432	-8.348	1.558	4.543
X76	-0.39	-2.272	0.022	0.065
X77	-0.342	-1.995	0.530	1.546
X78	-0.256	-1.493	0.660	1.923
X79	-0.419	-2.442	0.479	1.398
X80	-0.125	-0.726	-0.238	-0.695
X81	-0.473	-2.757	0.298	0.868
X82	-0.748	-4.361	0.284	0.828
X83	-1.087	-6.336	1.132	3.300
X84	-0.233	-1.358	-0.677	-1.973
X85	-0.658	-3.837	0.034	0.099
X86	-0.976	-5.692	0.565	1.648
X87	-1.172	-6.836	1.381	4.028
X89	-0.799	-4.66	-0.350	-1.020
X90	-0.76	-4.434	-0.325	-0.948
X91	-0.599	-3.494	-0.814	-2.374
X92	-0.906	-5.283	0.150	0.436
X93	-0.938	-5.47	0.183	0.533
X94	0.373	2.178	-0.680	-1.983
X95	0.521	3.036	-0.252	-0.734
X96	0.595	3.472	-0.398	-1.159
X97	0.41	2.391	-0.533	-1.555
X98	-0.347	-2.021	-0.617	-1.798

Variable	skew	c.r.	kurtosis	c.r.
X99	-0.33	-1.926	-0.822	-2.398
X100	-0.338	-1.971	-0.902	-2.631
X101	-0.764	-4.454	-0.323	-0.940
X102	-0.707	-4.121	0.209	0.609
X103	-0.54	-3.148	-0.324	-0.944
X104	-0.234	-1.366	-0.335	-0.975
X105	0.008	0.048	-0.400	-1.166
X106	-0.115	-0.673	-0.519	-1.514
X107	-0.239	-1.393	-0.615	-1.793
X108	-0.234	-1.367	-0.672	-1.960
X109	-0.534	-3.116	-0.159	-0.463
X110	-0.573	-3.344	-0.342	-0.996
X111	-0.275	-1.602	-0.219	-0.640
X112	0.061	0.356	-0.626	-1.824

ITEM ANALYSES REPORT

Contact Employee Performance
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X89	5.9773	1.1752	12.1970	2.4849	0.8834	0.8432	0.7163
X90	6.0152	1.3017	12.1591	2.3858	0.8988	0.8202	0.6729
X92	6.1818	1.3240	11.9924	2.3330	0.8698	0.8555	0.7357
Total			18.1742	3.5328	0.9197		

Cronbach's Alpha 0.919687 Std. Cronbachs Alpha 0.921127

Correlation
Section

	X89	X90	X92
X89	1.0000		
X90	0.7737	1.0000	
X92	0.8220	0.7912	1.0000

Contact Employee Performance
for Reluctant Adopters

Reliability
Section

	-----Item Values-----			-------If This Item is Omitted ----------			R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X89	5.1591	1.6102	10.4545	2.8348	0.8113	0.8235	0.6789
X90	5.0682	1.6024	10.5455	2.8882	0.8488	0.7820	0.6231
X92	5.3864	1.4861	10.2273	3.0230	0.8706	0.7568	0.5794
Total			15.6136	4.2600	0.8909		

Cronbach's Alpha 0.890900 Std. Cronbachs Alpha 0.891083

Correlation
Section

	X89	X90	X92
X89	1.0000		
X90	0.7709	1.0000	
X92	0.7397	0.6845	1.0000

Contact Employee Performance
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X89	5.5682	1.4654	11.3258	2.8000	0.8572	0.8425	0.7097
X90	5.5417	1.5323	11.3523	2.7647	0.8803	0.8155	0.6686
X92	5.7841	1.4601	11.1098	2.8364	0.8824	0.8119	0.6628
Total			16.8939	4.1111	0.9118		

Cronbach's Alpha 0.911812 Std. Cronbachs Alpha 0.912137

Correlation
Section

	X89	X90	X92
X89	1.0000		
X90	0.7903	1.0000	
X92	0.7861	0.7509	1.0000

Self-Service Technology (SST) Performance
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X82	6.1845	0.9752	12.3653	1.6787	0.6937	0.7483	0.6400
X83	6.3432	0.8235	12.2066	1.8180	0.7211	0.7466	0.6303
X85	6.0221	1.0782	12.5277	1.6992	0.8715	0.5920	0.3505
Total			18.5498	2.4938	0.8267		

Cronbach's Alpha 0.826660 Std. Cronbachs Alpha 0.838327

Correlation
Section

	X82	X83	X85
X82	1.0000		
X83	0.7833	1.0000	
X85	0.5667	0.5504	1.0000

Self-Service Technology (SST) Performance
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X82	5.0637	1.4318	10.3775	2.4814	0.7027	0.6948	0.4827
X83	5.3971	1.3697	10.0441	2.5946	0.7618	0.6382	0.4127
X85	4.9804	1.4553	10.4608	2.5098	0.7534	0.6472	0.4244
Total			15.4412	3.6255	0.8103		

Cronbach's Alpha 0.810272 Std. Cronbachs Alpha 0.810430

Correlation
Section

	X82	X83	X85
X82	1.0000		
X83	0.6049	1.0000	
X85	0.6153	0.5427	1.0000

Self-Service Technology (SST) Performance
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X82	5.7032	1.3146	11.5116	2.2831	0.7548	0.7670	0.5974
X83	5.9368	1.1872	11.2779	2.4319	0.7948	0.7309	0.5536
X85	5.5747	1.3549	11.6400	2.3219	0.8360	0.6862	0.4735
Total			17.2147	3.3977	0.8538		

Cronbach's Alpha 0.853809 Std. Cronbachs Alpha 0.855908

Correlation
Section

	X82	X83	X85
X82	1.0000		
X83	0.7220	1.0000	
X85	0.6598	0.6115	1.0000

Physical Effort
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X58	5.6347	1.6134	11.4797	3.0512	0.9442	0.8686	0.7571
X59	5.6605	1.6384	11.4539	2.9734	0.9067	0.9174	0.8477
X60	5.8192	1.4934	11.2952	3.1355	0.9243	0.8973	0.8205
Total			17.1144	4.5238	0.9490		

Cronbach's Alpha 0.948984 Std. Cronbachs Alpha 0.949797

Correlation
Section

	X58	X59	X60
X58	1.0000		
X59	0.8594	1.0000	
X60	0.8318	0.8982	1.0000

Physical Effort
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X58	4.9951	1.4772	10.0392	2.9224	0.9233	0.9220	0.8713
X59	4.9412	1.5172	10.0931	2.8778	0.9186	0.9275	0.8774
X60	5.0980	1.5152	9.9363	2.9396	0.9621	0.8696	0.7566
Total			15.0343	4.3224	0.9557		

Cronbach's Alpha 0.955675 Std. Cronbachs Alpha 0.955818

Correlation
Section

	X58	X59	X60
X58	1.0000		
X59	0.9274	1.0000	
X60	0.8497	0.8575	1.0000

Physical Effort
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X58	5.3600	1.5868	10.8611	3.0774	0.9391	0.8942	0.8077
X59	5.3516	1.6254	10.8695	3.0063	0.9159	0.9251	0.8559
X60	5.5095	1.5431	10.7116	3.1232	0.9420	0.8907	0.8008
Total			16.2211	4.5520	0.9541		

Cronbach's Alpha 0.954107 Std. Cronbachs Alpha 0.954188

Correlation
Section

	X58	X59	X60
X58	1.0000		
X59	0.8907	1.0000	
X60	0.8451	0.8865	1.0000

Cognitive Effort
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X63	5.6900	1.7105	11.8856	2.4626	0.6804	0.5217	0.3160
X66	5.9041	1.3382	11.6716	2.6442	0.5307	0.6505	0.4231
X69	5.9815	1.4869	11.5941	2.6939	0.7001	0.4891	0.2774
Total			17.5756	3.6587	0.7237		

Cronbach's Alpha 0.723738 Std. Cronbachs Alpha 0.734191

Correlation
Section

	X63	X66	X69
X63	1.0000		
X66	0.5549	1.0000	
X69	0.3647	0.5184	1.0000

Cognitive Effort
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X63	5.2598	1.5807	10.5294	2.4077	0.4683	0.4581	0.3629
X66	5.2843	1.4613	10.5049	2.3478	0.2574	0.6026	0.4097
X69	5.2451	1.5179	10.5441	2.7225	0.7495	0.2501	0.0957
Total			15.7892	3.4326	0.6167		

Cronbach's Alpha 0.616729 Std. Cronbachs Alpha 0.619391

Correlation
Section

	X63	X66	X69
X63	1.0000		
X66	0.6012	1.0000	
X69	0.1478	0.3060	1.0000

Cognitive Effort
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X63	5.5053	1.6680	11.3032	2.5276	0.6200	0.5080	0.3405
X66	5.6379	1.4244	11.1705	2.5841	0.4541	0.6450	0.4245
X69	5.6653	1.5425	11.1432	2.7529	0.7304	0.4118	0.2047
Total			16.8084	3.6681	0.6984		

Cronbach's Alpha 0.698386 Std. Cronbachs Alpha 0.704334

Correlation
Section

	X63	X66	X69
X63	1.0000		
X66	0.5824	1.0000	
X69	0.2947	0.4507	1.0000

Emotional Effort
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X71	4.9336	1.6962	10.5720	2.6432	0.5489	0.3778	0.1514
X73	5.2915	1.5468	10.2140	2.6525	0.4212	0.4659	0.2174
X74	5.2804	1.6360	10.2251	2.6786	0.5312	0.3878	0.1628
Total			15.5055	3.6402	0.6005		

Cronbach's Alpha 0.600496 Std. Cronbachs Alpha 0.603225

Correlation
Section

	X71	X73	X74
X71	1.0000		
X73	0.3632	1.0000	
X74	0.2670	0.3788	1.0000

Emotional Effort
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X71	4.5882	1.6119	9.6471	2.6584	0.6370	0.3729	0.1558
X73	4.9412	1.4877	9.2941	2.5600	0.4128	0.5375	0.2937
X74	4.7059	1.6133	9.5294	2.5796	0.5539	0.4330	0.2274
Total			14.2353	3.5862	0.6353		

Cronbach's Alpha 0.635258 Std. Cronbachs Alpha 0.639013

Correlation
Section

	X71	X73	X74
X71	1.0000		
X73	0.3843	1.0000	
X74	0.2601	0.4689	1.0000

Emotional Effort
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X71	4.7853	1.6676	10.1747	2.6863	0.5973	0.3856	0.1597
X73	5.1411	1.5300	9.8189	2.6499	0.4332	0.5043	0.2561
X74	5.0337	1.6494	9.9263	2.6563	0.5482	0.4195	0.1977
Total			14.9600	3.6677	0.6256		

Cronbach's Alpha 0.625557 Std. Cronbachs Alpha 0.628754

Correlation
Section

	X71	X73	X74
X71	1.0000		
X73	0.3790	1.0000	
X74	0.2765	0.4270	1.0000

Effort Saving
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----			-------If This Item is Omitted ----------			R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X94	4.7048	1.7621	8.8229	3.2962	0.7507	0.7160	0.5470
X95	4.3395	1.8082	9.1882	3.2154	0.7189	0.7464	0.5771
X96	4.4834	1.8755	9.0443	3.3130	0.8384	0.6272	0.3958
Total			13.5277	4.7209	0.8342		

Cronbach's Alpha 0.834240 Std. Cronbachs Alpha 0.835407

Correlation
Section

	X94	X95	X96
X94	1.0000		
X95	0.7220	1.0000	
X96	0.5622	0.6013	1.0000

Effort Saving
for Reluctant Adopters

Reliability
Section

	-----Item Values-----			-------If This Item is Omitted ----------			R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X94	3.3775	1.6931	6.2500	2.8633	0.7705	0.7720	0.6765
X95	3.0637	1.5444	6.5637	2.9546	0.7350	0.8147	0.7037
X96	3.1863	1.6294	6.4412	3.0868	0.8977	0.6329	0.4079
Total			9.6275	4.3070	0.8607		

Cronbach's Alpha 0.860663 Std. Cronbachs Alpha 0.862045

Correlation
Section

	X94	X95	X96
X94	1.0000		
X95	0.8178	1.0000	
X96	0.5815	0.6276	1.0000

Effort Saving
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X94	4.1347	1.8518	7.7179	3.3653	0.7926	0.7719	0.6389
X95	3.7916	1.8120	8.0611	3.3644	0.7662	0.8015	0.6659
X96	3.9263	1.8851	7.9263	3.4636	0.8809	0.6758	0.4600
Total			11.8526	4.9371	0.8682		

Cronbach's Alpha 0.868232 Std. Cronbachs Alpha 0.868946

Correlation
Section

	X94	X95	X96
X94	1.0000		
X95	0.7874	1.0000	
X96	0.6211	0.6570	1.0000

Time Saving
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X98	5.7638	1.3969	11.7675	2.7984	0.9171	0.6671	0.4454
X99	5.9225	1.4264	11.6089	2.6081	0.7777	0.8281	0.7368
X100	5.8450	1.4851	11.6863	2.5606	0.7841	0.8199	0.7324
Total			17.5314	3.8727	0.8808		

Cronbach's Alpha 0.880755 Std. Cronbachs Alpha 0.880171

Correlation
Section

	X98	X99	X100
X98	1.0000		
X99	0.6450	1.0000	
X100	0.6375	0.8475	1.0000

Time Saving
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X98	4.4902	1.5741	9.1422	3.1754	0.8471	0.5704	0.3298
X99	4.5637	1.6641	9.0686	2.8845	0.6729	0.7472	0.5844
X100	4.5784	1.7444	9.0539	2.8548	0.7123	0.7099	0.5562
Total			13.6324	4.2735	0.8191		

Cronbach's Alpha 0.819111 Std. Cronbachs Alpha 0.818063

Correlation
Section

	X98	X99	X100
X98	1.0000		
X99	0.5541	1.0000	
X100	0.5098	0.7356	1.0000

Time Saving
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X98	5.2168	1.6034	10.6400	3.2360	0.9014	0.6799	0.4648
X99	5.3389	1.6728	10.5179	3.0037	0.7754	0.8236	0.7076
X100	5.3011	1.7186	10.5558	2.9878	0.7970	0.8002	0.6883
Total			15.8568	4.4830	0.8788		

Cronbach's Alpha 0.878816 Std. Cronbachs Alpha 0.878215

Correlation
Section

	X98	X99	X100
X98	1.0000		
X99	0.6631	1.0000	
X100	0.6347	0.8208	1.0000

Quality of Customer Labor
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X76	6.0221	0.8604	16.8967	2.7468	0.7947	0.6639	0.4826
X78	5.4133	1.1381	17.5055	2.5120	0.7886	0.6677	0.4502
X79	5.5609	1.1750	17.3579	2.4872	0.7951	0.6598	0.4397
X80	5.9225	0.9337	16.9963	2.6632	0.7776	0.6955	0.5186
Total			22.9188	3.3798	0.8329		

Cronbach's Alpha 0.832850 Std. Cronbachs Alpha 0.840641

Correlation
Section

	X76	X78	X79	X80
X76	1.0000			
X78	0.5202	1.0000		
X79	0.5262	0.5960	1.0000	
X80	0.6568	0.5670	0.5462	1.0000

Quality of Customer Labor
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X76	5.0588	1.1475	13.9608	2.9004	0.7747	0.7038	0.5482
X78	4.5931	1.0673	14.4265	2.9744	0.7802	0.6974	0.5045
X79	4.5294	1.2294	14.4902	2.9868	0.8488	0.5421	0.3053
X80	4.8382	1.1904	14.1814	2.8339	0.7590	0.7359	0.5565
Total			19.0196	3.7965	0.8353		

Cronbach's Alpha 0.835252 Std. Cronbachs Alpha 0.838009

Correlation
Section

	X76	X78	X79	X80
X76	1.0000			
X78	0.6512	1.0000		
X79	0.4353	0.4728	1.0000	
X80	0.6814	0.6265	0.5166	1.0000

Quality of Customer Labor
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X76	5.6084	1.1016	15.6358	3.1649	0.8295	0.7433	0.5902
X78	5.0611	1.1793	16.1832	3.1163	0.8357	0.7226	0.5225
X79	5.1179	1.3019	16.1263	3.0600	0.8598	0.6720	0.4565
X80	5.4568	1.1799	15.7874	3.0700	0.8158	0.7724	0.6214
Total			21.2442	4.0513	0.8710		

Cronbach's Alpha 0.870990 Std. Cronbachs Alpha 0.873559

Correlation
Section

	X76	X78	X79	X80
X76	1.0000			
X78	0.6356	1.0000		
X79	0.5648	0.6040	1.0000	
X80	0.7353	0.6486	0.6118	1.0000

Quality of Service
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X102	6.0959	1.1214	11.9963	2.2419	0.9315	0.8944	0.8139
X103	6.0590	1.1532	12.0332	2.1898	0.9103	0.9218	0.8517
X104	5.9373	1.1642	12.1550	2.2140	0.9444	0.8774	0.7756
Total			18.0923	3.2833	0.9514		

Cronbach's Alpha 0.951422 Std. Cronbachs Alpha 0.951572

Correlation
Section

	X102	X103	X104
X102	1.0000		
X103	0.8949	1.0000	
X104	0.8359	0.8718	1.0000

Quality of Service
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X102	4.8676	1.4202	9.0343	2.8671	0.9016	0.8746	0.8036
X103	4.6324	1.5142	9.2696	2.7419	0.8724	0.9091	0.8400
X104	4.4020	1.4906	9.5000	2.8553	0.9428	0.8206	0.6823
Total			13.9020	4.1665	0.9356		

Cronbach's Alpha 0.935637 Std. Cronbachs Alpha 0.935964

Correlation
Section

	X102	X103	X104
X102	1.0000		
X103	0.8936	1.0000	
X104	0.7746	0.8210	1.0000

Quality of Service
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X102	5.5684	1.3966	10.7242	2.9219	0.9361	0.9065	0.8438
X103	5.4463	1.4964	10.8463	2.7976	0.9132	0.9341	0.8781
X104	5.2779	1.5174	11.0147	2.8310	0.9545	0.8811	0.7832
Total			16.2926	4.2293	0.9556		

Cronbach's Alpha 0.955572 Std. Cronbachs Alpha 0.956298

Correlation
Section

	X102	X103	X104
X102	1.0000		
X103	0.9151	1.0000	
X104	0.8432	0.8800	1.0000

Customer Productivity
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X105	5.2362	1.5042	10.7196	2.9102	0.8746	0.7801	0.6089
X106	5.2731	1.5844	10.6827	2.8039	0.8507	0.8091	0.6589
X108	5.4465	1.5018	10.5092	2.8737	0.8441	0.8165	0.6685
Total			15.9557	4.1906	0.8997		

Cronbach's Alpha 0.899663 Std. Cronbachs Alpha 0.899927

Correlation
Section

	X105	X106	X108
X105	1.0000		
X106	0.7312	1.0000	
X108	0.7401	0.7782	1.0000

Customer Productivity
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		------If This Item is Omitted ----------				R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X105	3.9265	1.4821	7.9020	2.9678	0.8876	0.8551	0.7422
X106	3.8725	1.5452	7.9559	2.8927	0.8747	0.8694	0.7620
X108	4.0294	1.5848	7.7990	2.9064	0.9146	0.8216	0.6759
Total			11.8284	4.3043	0.9255		

Cronbach's Alpha 0.925522 Std. Cronbachs Alpha 0.926111

Correlation
Section

	X105	X106	X108
X105	1.0000		
X106	0.8434	1.0000	
X108	0.7790	0.7982	1.0000

Customer Productivity
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----			-------If This Item is Omitted ----------			R2
Variable	Mean	Standard Deviation	Total Mean	Total Std.Dev.	Coef Alpha	Corr Total	Other Items
X105	4.6737	1.6281	9.5095	3.2474	0.9024	0.8439	0.7129
X106	4.6716	1.7129	9.5116	3.1444	0.8867	0.8632	0.7452
X108	4.8379	1.6892	9.3453	3.1820	0.8969	0.8504	0.7243
Total			14.1832	4.7032	0.9278		

Cronbach's Alpha 0.927800 Std. Cronbachs Alpha 0.927952

Correlation
Section

	X105	X106	X108
X105	1.0000		
X106	0.8141	1.0000	
X108	0.7969	0.8222	1.0000

Customer Value
for Enthusiastic Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X110	5.9336	1.2864	10.6089	2.7288	0.7730	0.6931	0.5571
X111	5.6568	1.3376	10.8856	2.5973	0.6855	0.7818	0.6356
X112	4.9520	1.6671	11.5904	2.4491	0.8517	0.6356	0.4245
Total			16.5424	3.7373	0.8317		

Cronbach's Alpha 0.831683 Std. Cronbachs Alpha 0.843375

Correlation
Section

	X110	X111	X112
X110	1.0000		
X111	0.7422	1.0000	
X112	0.5391	0.6453	1.0000

Customer Value
for Reluctant Adopters

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X110	4.6078	1.5673	7.8039	2.7988	0.7987	0.7550	0.6336
X111	4.2108	1.5085	8.2010	2.7870	0.7419	0.8171	0.6868
X112	3.5931	1.5588	8.8186	2.9111	0.8833	0.6622	0.4531
Total			12.4118	4.1126	0.8649		

Cronbach's Alpha 0.864862 Std. Cronbachs Alpha 0.865546

Correlation
Section

	X110	X111	X112
X110	1.0000		
X111	0.7915	1.0000	
X112	0.5897	0.6652	1.0000

Customer Value
for Enthusiastic and Reluctant Adopters Together

Reliability
Section

	-----Item Values-----		-------If This Item is Omitted ----------				R2
		Standard	Total	Total	Coef	Corr	Other
Variable	Mean	Deviation	Mean	Std.Dev.	Alpha	Total	Items
X110	5.3642	1.5576	9.4042	3.0868	0.8279	0.7732	0.6630
X111	5.0358	1.5834	9.7326	2.9898	0.7687	0.8389	0.7236
X112	4.3684	1.7542	10.4000	2.9887	0.8954	0.7038	0.5123
Total			14.7684	4.4033	0.8803		

Cronbach's Alpha 0.880301 Std. Cronbachs Alpha 0.883473

Correlation
Section

	X110	X111	X112
X110	1.0000		
X111	0.8108	1.0000	
X112	0.6287	0.7100	1.0000

CONFIRMATORY FACTOR ANALYSIS LOADINGS

Contact Employee Performance
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X89	5.9773	1.175227
X90	6.0152	1.301701
X92	6.1818	1.32399

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.3890	100.0000	100.0000
2	0.0006	0.0300	100.0200
3	-0.0006	-0.0200	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X89	-0.8967
X90	-0.8633
X92	-0.9164

Contact Employee Performance for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X89	5.1591	1.6102
X90	5.0682	1.6024
X92	5.3864	1.4861

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.2028	100.0100	100.0100
2	0.0019	0.0900	100.0900
3	-0.0020	-0.0900	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X89	-0.9110
X90	-0.8455
X92	-0.8111

Contact Employee Performance
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X89	5.5682	1.4654
X90	5.5417	1.5323
X92	5.7841	1.4601

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.3292	100.0000	100.0000
2	0.0008	0.0400	100.0400
3	-0.0008	-0.0400	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X89	-0.9090
X90	-0.8692
X92	-0.8646

Self-Service Technology Performance for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X82	6.1845	0.9752
X83	6.3432	0.8235
X85	6.0221	1.0782

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.9657	99.9900	99.9900
2	0.0020	0.1000	100.0900
3	-0.0017	-0.0900	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X82	-0.8964
X83	-0.8741
X85	-0.6309

Self-Service Technology Performance for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X82	5.0637	1.4318
X83	5.3971	1.3697
X85	4.9804	1.4553

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.7708	100.0100	100.0100
2	0.0020	0.1100	100.1200
3	-0.0021	-0.1200	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X82	-0.8261
X83	-0.7314
X85	-0.7439

Self-Service Technology Performance
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X82	5.7032	1.3146
X83	5.9368	1.1872
X85	5.5747	1.3549

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.0064	100.0100	100.0100
2	0.0021	0.1000	100.1100
3	-0.0022	-0.1100	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X82	-0.8806
X83	-0.8193
X85	-0.7482

Physical Effort
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X58	5.6347	1.6134
X59	5.6605	1.6384
X60	5.8192	1.4934

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.5931	100.0000	100.0000
2	0.0010	0.0400	100.0400
3	-0.0010	-0.0400	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X58	-0.8924
X59	-0.9626
X60	-0.9328

Physical Effort
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X58	4.9951	1.4772
X59	4.9412	1.5172
X60	5.0980	1.5152

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.6405	100.0000	100.0000
2	0.0004	0.0200	100.0100
3	-0.0004	-0.0100	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X58	-0.9588
X59	-0.9671
X60	-0.8866

Physical Effort
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X58	5.3600	1.5868
X59	5.3516	1.6254
X60	5.5095	1.5431

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.6244	100.0000	100.0000
2	0.0011	0.0400	100.0400
3	-0.0011	-0.0400	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X58	-0.9219
X59	-0.9657
X60	-0.9175

Cognitive Effort
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X63	5.6900	1.7105
X66	5.9041	1.3382
X69	5.9816	1.4869

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.5035	100.2100	100.2100
2	0.0122	0.8100	101.0300
3	-0.0154	-1.0300	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X63	-0.6343
X66	-0.8674
X69	-0.5907

Cognitive Effort
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X63	5.2598	1.5807
X66	5.2843	1.4613
X69	5.2451	1.5179

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.3321	100.5100	100.5100
2	0.0609	4.5900	105.1100
3	-0.0677	-5.1100	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X63	-0.6596
X66	-0.8983
X69	-0.3000

Cognitive Effort
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X63	5.505263	1.667976
X66	5.637895	1.424409
X69	5.665263	1.54249

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.453725	100.37	100.37
2	0.023516	1.62	102
3	-0.028916	-2	100

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X63	-0.643123
X66	-0.895245
X69	-0.488523

Emotional Effort
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X71	4.9336	1.6962
X73	5.2915	1.5468
X74	5.2804	1.6360

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.0429	100.1500	100.1500
2	0.0062	0.5900	100.7400
3	-0.0077	-0.7400	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X71	-0.5102
X73	-0.7061
X74	-0.5330

Emotional Effort
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X71	4.5882	1.6119
X73	4.9412	1.4877
X74	4.7059	1.6133

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.1979	100.3000	100.3000
2	0.0148	1.2400	101.5500
3	-0.0185	-1.5500	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X71	-0.4696
X73	-0.8006
X74	-0.5799

Emotional Effort
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X71	4.7853	1.6676
X73	5.1411	1.5300
X74	5.0337	1.6494

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.1317	100.1800	100.1800
2	0.0084	0.7400	100.9300
3	-0.0105	-0.9300	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X71	-0.5002
X73	-0.7489
X74	-0.5663

Effort Saving
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X94	4.7048	1.7621
X95	4.3395	1.8082
X96	4.4834	1.8755

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.9149	100.0100	100.0100
2	0.0025	0.1300	100.1400
3	-0.0026	-0.1400	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X94	-0.8237
X95	-0.8762
X96	-0.6846

Effort Saving
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X94	3.3775	1.6931
X95	3.0637	1.5444
X96	3.1863	1.6294

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.0856	100.0000	100.0000
2	0.0047	0.2200	100.2200
3	-0.0047	-0.2200	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X94	-0.8747
X95	-0.9348
X96	-0.6683

Effort Saving
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X94	4.1347	1.8518
X95	3.7916	1.8120
X96	3.9263	1.8851

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.0951	100.0000	100.0000
2	0.0024	0.1100	100.1200
3	-0.0024	-0.1200	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X94	-0.8647
X95	-0.9104
X96	-0.7201

Time Saving
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X98	5.7638	1.3969
X99	5.9225	1.4264
X100	5.8450	1.4851

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.1806	99.9900	99.9900
2	0.0009	0.0400	100.0300
3	-0.0007	-0.0300	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X98	-0.6964
X99	-0.9255
X100	-0.9160

Time Saving
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X98	4.4902	1.5741
X99	4.5637	1.6641
X100	4.5784	1.7444

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.8591	100.0000	100.0000
2	0.0045	0.2400	100.2400
3	-0.0045	-0.2400	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X98	-0.6200
X99	-0.8893
X100	-0.8270

Time Saving
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X98	5.2168	1.6034
X99	5.3389	1.6728
X100	5.3011	1.7186

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.1557	100.0000	100.0000
2	0.0022	0.1000	100.1000
3	-0.0022	-0.1000	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X98	-0.7161
X99	-0.9241
X100	-0.8882

Quality of Customer Labor
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X76	6.0221	0.8604
X78	5.4133	1.1381
X79	5.5609	1.1750
X80	5.9225	0.9337

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.2789	100.0000	100.0000
2	0.1144	5.0200	105.0200
3	-0.0435	-1.9100	103.1100
4	-0.0709	-3.1100	100.0000

Factor Loadings after Varimax Rotation

Variables	Factors Factor1
X76	-0.7552
X78	-0.7365
X79	-0.7269
X80	-0.7987

Quality of Customer Labor
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X76	5.0588	1.1475
X78	4.5931	1.0673
X79	4.5294	1.2294
X80	4.8382	1.1904

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.3062	100.0000	100.0000
2	0.0470	2.0400	102.0400
3	0.0197	0.8600	102.8900
4	-0.0667	-2.8900	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X76	-0.8060
X78	-0.7834
X79	-0.5878
X80	-0.8350

Quality of Customer Labor
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X76	5.6084	1.1016
X78	5.0611	1.1793
X79	5.1179	1.3019
X80	5.4568	1.1799

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.5467	100.0000	100.0000
2	0.0687	2.7000	102.7000
3	-0.0158	-0.6200	102.0800
4	-0.0529	-2.0800	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X76	-0.8209
X78	-0.7838
X79	-0.7220
X80	-0.8586

Quality of Service
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X102	6.0959	1.1214
X103	6.0590	1.1532
X104	5.9373	1.1642

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.6056	100.0000	100.0000
2	0.0011	0.0400	100.0400
3	-0.0012	-0.0400	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X102	-0.9268
X103	-0.9652
X104	-0.9027

Quality of Service
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X102	4.8676	1.4202
X103	4.6324	1.5142
X104	4.4020	1.4906

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.5014	100.0000	100.0000
2	0.0023	0.0900	100.1000
3	-0.0024	-0.1000	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X102	-0.9195
X103	-0.9713
X104	-0.8440

Quality of Service
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X102	5.5684	1.3966
X103	5.4463	1.4964
X104	5.2779	1.5174

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.6425	100.0000	100.0000
2	0.0014	0.0500	100.0500
3	-0.0014	-0.0500	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X102	-0.9370
X103	-0.9762
X104	-0.9009

Customer Productivity
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X105	5.2362	1.5042
X106	5.2731	1.5844
X108	5.4465	1.5018

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.2519	100.0000	100.0000
2	0.0005	0.0200	100.0200
3	-0.0005	-0.0200	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X105	-0.8342
X106	-0.8768
X108	-0.8872

Customer Productivity
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X105	3.9265	1.4821
X106	3.8725	1.5452
X108	4.0294	1.5848

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.4245	100.0000	100.0000
2	0.0007	0.0300	100.0300
3	-0.0007	-0.0300	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X105	-0.9076
X106	-0.9290
X108	-0.8589

Customer Productivity
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X105	4.6737	1.6281
X106	4.6716	1.7129
X108	4.8379	1.6892

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.4338	100.0000	100.0000
2	0.0004	0.0200	100.0200
3	-0.0004	-0.0200	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X105	-0.8884
X106	-0.9162
X108	-0.8973

Customer Value
for Enthusiastic Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X110	5.9336	1.2864
X111	5.6568	1.3376
X112	4.9520	1.6671

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	1.9721	100.0600	100.0600
2	0.0076	0.3800	100.4400
3	-0.0088	-0.4400	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X110	-0.7931
X111	-0.9335
X112	-0.6868

Customer Value
for Reluctant Adopters

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X110	4.6078	1.5673
X111	4.2108	1.5085
X112	3.5931	1.5588

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.0876	100.0200	100.0200
2	0.0056	0.2700	100.2900
3	-0.0061	-0.2900	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X110	-0.8421
X111	-0.9389
X112	-0.7050

Customer Value
for Enthusiastic and Reluctant Adopters Together

Descriptive Statistics Section

Variables	Mean	Standard Deviation
X110	5.3642	1.5576
X111	5.0358	1.5834
X112	4.3684	1.7542

Eigenvalues after Varimax Rotation

No.	Eigenvalue	Individual Percent	Cumulative Percent
1	2.1819	100.0300	100.0300
2	0.0052	0.2400	100.2600
3	-0.0058	-0.2600	100.0000

Factor Loadings after Varimax Rotation

	Factors
Variables	Factor1
X110	-0.8510
X111	-0.9515
X112	-0.7431

SUMMARY OF CONFIRMATORY FACTOR LOADINGS FOR THE ENTHUSIASTIC ADOPTERS

	PE	CE	EE	QCUL	SSTP	CEP	ES	TS	QS	CP	CV
X58	0.79										
X59	0.95										
X60	0.91										
X63		0.61									
X66		0.82									
X69		0.62									
X71			0.55								
X73			0.65								
X74			0.55								
X76				0.89							
X78				0.77							
X79				0.78							
X80				0.85							
X82					0.91						
X83					0.91						
X85					0.67						
X89						0.94					
X90						0.90					
X92						0.94					
X94							0.87				
X95							0.79				
X96							0.58				
X98								0.62			
X99								0.95			
X100								0.81			
X102									0.93		
X103									0.96		
X104									0.90		
X105										0.75	
X106										0.86	
X108										0.87	
X110											0.80
X111											0.88
X112											0.72

SUMMARY OF CONFIRMATORY FACTOR LOADINGS FOR THE RELUCTANT ADOPTERS

	PE	CE	EE	QCUL	SSTP	CEP	ES	TS	QS	CP	CV
X58	0.90										
X59	0.97										
X60	0.83										
X63		0.66									
X66		0.82									
X69		0.33									
X71			0.51								
X73			0.71								
X74			0.54								
X76				0.84							
X78				0.78							
X79				0.60							
X80				0.82							
X82					0.75						
X83					0.68						
X85					0.76						
X89						0.95					
X90						0.74					
X92						0.86					
X94							0.87				
X95							0.89				
X96							0.65				
X98								0.62			
X99								0.78			
X100								0.70			
X102									0.86		
X103									0.96		
X104									0.79		
X105										0.83	
X106										0.89	
X108										0.82	
X110											0.76
X111											0.84
X112											0.71

APPENDIX F
STRUCTURAL EQUATION MODELING RESULTS

MODIFICIATION INDICES FOR MEASUREMENT MODEL
(For Enthusiastic and Reluctant Adopters Together)

			M.I.	Par Change
X108	<---	X79	4.007	0.046
X84	<---	X61	4.028	-0.080
X95	<---	X73	4.030	-0.062
X104	<---	X80	4.041	0.055
X110	<---	X100	4.041	-0.050
X95	<---	X98	4.044	-0.065
X77	<---	X68	4.047	0.042
X111	<---	X90	4.064	-0.065
X110	<---	X58	4.065	-0.066
X86	<---	X77	4.065	-0.059
X58	<---	X86	4.075	0.064
X66	<---	Time_Saving	4.078	-0.087
X103	<---	Physical_Effort	4.084	-0.050
X97	<---	X111	4.087	0.104
X63	<---	X68	4.091	0.069
X68	<---	X67	4.107	0.104
X111	<---	X104	4.108	-0.060
X101	<---	X69	4.109	0.069
X100	<---	X69	4.112	-0.056
X111	<---	Physical_Effort	4.115	-0.081
X79	<---	X90	4.116	-0.070
X73	<---	X64	4.123	-0.077
X69	<---	X98	4.125	0.076
X87	<---	X105	4.126	-0.057
X94	<---	X66	4.128	0.070
X61	<---	X112	4.131	0.080
X99	<---	X87	4.131	-0.075
X64	<---	X110	4.134	-0.084
X84	<---	X105	4.142	0.088
X58	<---	X100	4.150	0.044
X87	<---	X60	4.152	0.060
X104	<---	Time_Saving	4.161	0.069
X61	<---	X89	4.168	0.101
X65	<---	X80	4.175	-0.072
X101	<---	Quality of_Service	4.181	0.108
X85	<---	Physical_Effort	4.188	-0.091
X111	<---	X66	4.194	-0.056
X58	<---	X103	4.200	0.056
X63	<---	X76	4.202	-0.109
X95	<---	X89	4.211	-0.078
X83	<---	Quality of_Service	4.214	-0.067
X68	<---	X77	4.234	0.123

X90	<---	X105	4.239	0.049
X69	<---	Time_Saving	4.241	0.123
X98	<---	X75	4.245	0.079
X87	<---	X99	4.248	-0.051
X72	<---	X91	4.257	-0.108
X97	<---	X96	4.268	0.091
X80	<---	X59	4.271	0.051
X75	<---	X80	4.276	0.083
X100	<---	X78	4.277	-0.074
X108	<---	X86	4.279	0.058
X60	<---	Time_Saving	4.284	-0.068
X79	<---	Customer_Value	4.289	0.090
X62	<---	X65	4.291	-0.098
X84	<---	X75	4.294	-0.088
X89	<---	X81	4.298	-0.045
X62	<---	X95	4.299	0.085
X104	<---	X67	4.314	0.043
X77	<---	X60	4.329	-0.061
X80	<---	X100	4.331	0.044
X90	<---	Quality of_Customer Labor	4.332	0.069
X100	<---	X91	4.338	-0.061
X95	<---	SST_Performance	4.342	-0.107
X107	<---	X103	4.346	-0.048
X91	<---	X78	4.364	0.056
X107	<---	X77	4.365	-0.045
X94	<---	X102	4.374	0.091
X112	<---	X86	4.379	-0.105
X101	<---	X64	4.384	0.069
X105	<---	X74	4.388	0.054
X84	<---	X111	4.388	0.086
X91	<---	X58	4.390	0.054
X75	<---	Time_Saving	4.393	0.104
X76	<---	Customer_Value	4.395	-0.067
X105	<---	X59	4.398	0.066
X81	<---	Emotional_Effort	4.403	0.089
X101	<---	X103	4.427	0.088
X91	<---	X101	4.429	0.045
X78	<---	X61	4.431	-0.053
X95	<---	Contact_Employee_Performance	4.441	-0.105
X63	<---	X93	4.443	-0.109
X111	<---	X109	4.446	-0.061
X103	<---	X61	4.451	-0.034
X105	<---	X71	4.452	0.054
X60	<---	X62	4.456	0.041
X69	<---	X108	4.457	0.083
X67	<---	X59	4.467	0.098

X59	<---	X58	4.469	0.050
X87	<---	X89	4.471	-0.063
X76	<---	X103	4.484	-0.053
X110	<---	X81	4.485	0.072
X75	<---	X84	4.488	-0.064
X61	<---	X78	4.500	0.114
X69	<---	X76	4.502	0.104
X110	<---	X111	4.503	0.060
X103	<---	X91	4.510	-0.035
X112	<---	X65	4.528	-0.080
X83	<---	X90	4.530	-0.057
X94	<---	Cognitive_Effort	4.539	0.110
X58	<---	Cognitive_Effort	4.544	0.077
X107	<---	X68	4.546	0.033
X105	<---	X85	4.553	0.069
X91	<---	X81	4.554	0.057
X75	<---	X97	4.561	-0.058
X107	<---	X59	4.564	-0.045
X85	<---	X59	4.580	-0.069
X67	<---	X64	4.595	0.084
X71	<---	X96	4.634	-0.088
X96	<---	X110	4.642	0.097
X94	<---	X91	4.643	0.073
X81	<---	X107	4.645	0.059
X112	<---	X102	4.648	-0.104
X64	<---	Cognitive_Effort	4.651	-0.131
X102	<---	X83	4.653	0.049
X60	<---	X77	4.657	-0.052
X69	<---	X66	4.664	-0.088
X82	<---	X102	4.676	0.075
X95	<---	X105	4.676	-0.079
X98	<---	X112	4.676	0.070
X57	<---	X74	4.677	0.100
X83	<---	X85	4.683	-0.053
X59	<---	Cognitive_Effort	4.699	-0.066
X68	<---	X85	4.713	-0.131
X66	<---	X98	4.715	-0.059
X65	<---	Quality of_Customer Labor	4.731	-0.094
X81	<---	X108	4.735	0.059
X110	<---	X105	4.739	-0.065
X78	<---	X86	4.739	-0.076
X83	<---	X104	4.739	-0.054
X73	<---	X76	4.740	-0.111
X86	<---	Effort_Saving	4.750	-0.090
X92	<---	X77	4.758	-0.039
X76	<---	Quality of_Service	4.764	-0.068

X103	<---	X92	4.784	-0.043
X98	<---	X81	4.790	0.097
X94	<---	X65	4.793	0.074
X76	<---	X71	4.802	-0.041
X80	<---	X68	4.804	-0.040
X58	<---	Quality of_Service	4.819	0.076
X73	<---	Emotional_Effort	4.824	-0.140
X57	<---	X92	4.828	0.138
X112	<---	X71	4.836	-0.072
X70	<---	Physical_Effort	4.841	0.120
X75	<---	X65	4.842	0.072
X76	<---	X107	4.846	-0.047
X73	<---	X65	4.858	-0.091
X80	<---	X101	4.858	0.050
X98	<---	Physical_Effort	4.858	0.119
X79	<---	X110	4.861	0.065
X94	<---	X97	4.882	-0.062
X64	<---	X60	4.889	0.098
X103	<---	X59	4.893	-0.039
X70	<---	X95	4.899	0.071
X96	<---	X81	4.906	0.118
X57	<---	X93	4.918	0.142
X79	<---	X103	4.918	0.074
X62	<---	X100	4.942	0.095
X67	<---	X68	4.943	0.076
X95	<---	X90	4.945	-0.090
X98	<---	X89	4.951	0.091
X79	<---	Cognitive_Effort	4.958	0.097
X100	<---	X76	4.963	-0.081
X87	<---	X59	4.967	0.063
X104	<---	X76	4.970	0.062
X68	<---	X103	4.973	-0.141
X109	<---	X84	4.975	0.060
X66	<---	Customer_Value	4.983	-0.096
X68	<---	X102	4.986	-0.156
X112	<---	X75	4.996	-0.088
X65	<---	X96	4.997	-0.056
X60	<---	X75	5.006	0.051
X82	<---	X77	5.018	0.066
X76	<---	X87	5.020	-0.062
X98	<---	X86	5.021	0.109
X83	<---	X102	5.025	-0.064
X87	<---	Physical_Effort	5.028	0.088
X98	<---	X90	5.034	0.098
X84	<---	X58	5.039	-0.107
X67	<---	X71	5.051	0.084

X83	<---	X65	5.056	0.050
X104	<---	X60	5.064	0.056
X80	<---	X64	5.068	0.048
X60	<---	X99	5.072	-0.046
X94	<---	Contact_Employee_Performance	5.074	0.112
X76	<---	Customer_Productivity	5.079	-0.071
X62	<---	X108	5.085	0.106
X97	<---	X86	5.089	0.152
X85	<---	X99	5.101	0.063
X94	<---	Quality of_Service	5.102	0.113
X104	<---	X94	5.106	0.043
X68	<---	Quality of_Service	5.115	-0.181
X75	<---	X100	5.117	0.068
X58	<---	X63	5.126	0.047
X104	<---	X99	5.138	0.047
X69	<---	Customer_Productivity	5.146	0.133
X100	<---	X73	5.147	-0.061
X76	<---	X86	5.150	-0.065
X110	<---	X112	5.152	-0.056
X83	<---	X93	5.152	-0.061
X99	<---	X101	5.156	-0.063
X112	<---	X69	5.158	-0.080
X89	<---	X90	5.180	0.048
X94	<---	Emotional_Effort	5.184	0.121
X104	<---	X105	5.193	0.054
X73	<---	X62	5.203	-0.083
X108	<---	X106	5.210	-0.046
X59	<---	X102	5.212	-0.059
X75	<---	Cognitive_Effort	5.212	0.114
X89	<---	X58	5.214	-0.048
X67	<---	X70	5.215	0.095
X80	<---	X70	5.219	-0.051
X78	<---	X62	5.225	-0.052
X105	<---	X101	5.235	0.066
X78	<---	X110	5.268	-0.061
X108	<---	Effort_Saving	5.279	-0.073
X85	<---	X100	5.279	0.063
X112	<---	X85	5.288	-0.095
X105	<---	X60	5.291	0.075
X77	<---	X80	5.294	-0.075
X69	<---	X57	5.299	0.074
X101	<---	X63	5.302	0.072
X85	<---	Time_Saving	5.304	0.104
X105	<---	X81	5.308	0.083
X107	<---	X102	5.312	-0.058
X92	<---	X66	5.325	-0.038

X94	<---	X103	5.328	0.091
X65	<---	X77	5.332	-0.073
X95	<---	X59	5.338	-0.084
X59	<---	X75	5.339	-0.049
X95	<---	X92	5.340	-0.093
X67	<---	X96	5.344	0.086
X94	<---	X92	5.347	0.093
X95	<---	X101	5.347	-0.077
X107	<---	X109	5.351	-0.049
X109	<---	X79	5.359	0.076
X90	<---	X71	5.359	0.045
X67	<---	X80	5.362	0.121
X58	<---	X104	5.363	0.061
X107	<---	X58	5.372	-0.054
X94	<---	X70	5.392	0.076
X112	<---	X87	5.398	-0.114
X100	<---	X83	5.399	-0.087
X110	<---	Time_Saving	5.404	-0.097
X87	<---	X58	5.407	0.072
X79	<---	X71	5.417	0.058
X75	<---	X66	5.424	0.079
X91	<---	Quality of_Customer Labor	5.429	0.076
X67	<---	X90	5.442	0.120
X78	<---	X107	5.447	-0.061
X89	<---	X61	5.486	-0.041
X70	<---	X61	5.488	0.085
X90	<---	X63	5.497	0.045
X109	<---	X86	5.507	0.093
X101	<---	X102	5.517	0.108
X111	<---	X110	5.522	0.065
X111	<---	X103	5.538	-0.074
X102	<---	X66	5.540	0.043
X104	<---	Customer_Productivity	5.558	0.077
X107	<---	X87	5.558	-0.060
X57	<---	X68	5.581	0.099
X91	<---	X112	5.599	0.046
X106	<---	X99	5.604	0.058
X73	<---	X104	5.620	-0.109
X108	<---	X95	5.627	-0.043
X83	<---	X91	5.629	-0.053
X79	<---	X104	5.630	0.076
X64	<---	X97	5.636	0.079
X95	<---	X66	5.653	-0.083
X78	<---	Customer_Productivity	5.656	-0.091
X104	<---	X108	5.661	0.053
X65	<---	Contact_Employee_Performance	5.671	0.101

X66	<---	X57	5.671	-0.055
X91	<---	X68	5.672	0.041
X77	<---	Quality of_Service	5.675	-0.093
X85	<---	X94	5.687	0.061
X85	<---	X97	5.694	0.060
X111	<---	Quality of_Service	5.698	-0.094
X59	<---	X70	5.703	-0.047
X83	<---	Contact_Employee_Performance	5.716	-0.078
X109	<---	X105	5.724	0.076
X100	<---	X71	5.744	-0.061
X98	<---	X58	5.756	0.103
X73	<---	X74	5.757	0.087
X76	<---	X101	5.782	-0.050
X100	<---	X59	5.788	-0.076
X79	<---	Quality of_Service	5.789	0.102
X85	<---	X68	5.797	-0.057
X65	<---	X79	5.806	-0.077
X59	<---	X73	5.808	-0.044
X79	<---	X106	5.813	0.067
X79	<---	X63	5.826	0.060
X70	<---	X57	5.830	0.072
X81	<---	X70	5.832	0.063
X111	<---	Contact_Employee_Performance	5.837	-0.095
X85	<---	X111	5.844	0.074
X101	<---	Cognitive_Effort	5.849	0.132
X73	<---	X63	5.849	-0.087
X111	<---	X102	5.851	-0.083
X98	<---	X57	5.853	0.072
X107	<---	Quality of_Service	5.869	-0.070
X69	<---	X68	5.879	0.076
X103	<---	X89	5.902	-0.045
X110	<---	X99	5.902	-0.063
X61	<---	X74	5.907	0.094
X77	<---	X103	5.921	-0.075
X98	<---	Contact_Employee_Performance	5.923	0.129
X103	<---	Contact_Employee_Performance	5.948	-0.059
X62	<---	X72	5.950	0.095
X63	<---	X64	5.952	-0.096
X101	<---	Emotional_Effort	5.972	0.138
X107	<---	X105	5.998	-0.051
X85	<---	X109	5.998	0.080
X63	<---	X92	6.007	-0.125
X104	<---	X98	6.011	0.052
X101	<---	X99	6.014	-0.082
X80	<---	X77	6.016	-0.062
X105	<---	X86	6.020	0.097

X104	<---	X79	6.028	0.060
X73	<---	X60	6.035	-0.112
X105	<---	X82	6.038	0.082
X85	<---	X90	6.048	0.088
X90	<---	X97	6.051	0.045
X69	<---	X106	6.059	0.094
X60	<---	X90	6.071	-0.064
X98	<---	X69	6.071	0.084
X103	<---	X93	6.073	-0.049
X98	<---	X82	6.073	0.102
X58	<---	X112	6.077	0.052
X111	<---	X79	6.093	-0.073
X112	<---	Emotional_Effort	6.103	-0.145
X90	<---	Effort_Saving	6.109	0.084
X67	<---	X92	6.124	0.126
X69	<---	X109	6.140	0.107
X59	<---	X110	6.147	-0.052
X100	<---	X60	6.148	-0.081
X66	<---	X105	6.155	-0.076
X83	<---	X61	6.162	0.054
X66	<---	X107	6.230	-0.072
X85	<---	X106	6.259	0.072
X57	<---	X89	6.265	0.149
X73	<---	X66	6.274	-0.106
X110	<---	X106	6.282	-0.067
X85	<---	X89	6.286	0.085
X65	<---	X84	6.296	-0.066
X90	<---	X108	6.303	0.055
X100	<---	SST_Performance	6.307	-0.112
X102	<---	X61	6.345	0.044
X105	<---	Physical_Effort	6.348	0.110
X95	<---	Cognitive_Effort	6.348	-0.130
X98	<---	X91	6.351	0.091
X87	<---	X78	6.365	-0.081
X95	<---	Emotional_Effort	6.369	-0.134
X82	<---	X89	6.382	0.076
X59	<---	Quality of_Service	6.395	-0.075
X82	<---	X90	6.398	0.081
X70	<---	X99	6.407	0.087
X111	<---	X93	6.411	-0.082
X98	<---	X93	6.411	0.111
X73	<---	X111	6.413	-0.106
X105	<---	X58	6.433	0.088
X80	<---	X71	6.443	-0.051
X84	<---	X65	6.449	-0.103
X62	<---	X57	6.453	0.098

X98	<---	X83	6.488	0.118
X73	<---	X83	6.490	-0.134
X109	<---	X78	6.498	0.092
X76	<---	X108	6.507	-0.054
X89	<---	X59	6.517	-0.049
X109	<---	X77	6.527	0.083
X94	<---	X106	6.538	0.083
X98	<---	X78	6.541	0.114
X75	<---	X69	6.544	0.079
X62	<---	Effort_Saving	6.547	0.185
X91	<---	Customer_Value	6.549	0.084
X109	<---	X70	6.552	0.073
X87	<---	X90	6.556	-0.081
X90	<---	X98	6.560	0.054
X72	<---	X109	6.568	-0.146
X67	<---	X104	6.574	0.122
X107	<---	X82	6.576	-0.057
X112	<---	Cognitive_Effort	6.603	-0.146
X69	<---	X83	6.604	0.130
X102	<---	Cognitive_Effort	6.620	0.069
X108	<---	X85	6.623	0.059
X106	<---	X63	6.627	-0.059
X79	<---	X105	6.628	0.079
X91	<---	X111	6.638	0.057
X81	<---	X110	6.639	0.072
X79	<---	Emotional_Effort	6.644	0.116
X108	<---	X94	6.646	-0.046
X100	<---	Cognitive_Effort	6.657	-0.115
X90	<---	X107	6.666	0.058
X79	<---	X102	6.671	0.095
X61	<---	X93	6.709	0.137
X94	<---	X67	6.721	0.082
X100	<---	X58	6.732	-0.090
X75	<---	X60	6.742	0.095
X95	<---	Physical_Effort	6.785	-0.131
X98	<---	X73	6.799	0.086
X76	<---	X78	6.806	-0.068
X62	<---	X89	6.810	-0.139
X67	<---	X110	6.810	0.115
X106	<---	X112	6.814	0.061
X62	<---	Customer_Productivity	6.837	0.182
X79	<---	X76	6.841	-0.093
X67	<---	X93	6.872	0.136
X103	<---	X98	6.885	-0.041
X77	<---	X63	6.891	-0.061
X59	<---	X111	6.903	-0.054

X102	<---	Emotional_Effort	6.906	0.073
X67	<---	X57	6.919	0.092
X61	<---	X71	6.947	0.101
X66	<---	X81	6.950	0.092
X75	<---	X57	6.955	0.071
X104	<---	X106	6.968	0.056
X91	<---	X110	6.978	0.059
X91	<---	X94	7.011	0.049
X108	<---	X68	7.022	-0.044
X67	<---	X107	7.022	0.115
X66	<---	X65	7.031	0.076
X75	<---	X93	7.038	-0.106
X58	<---	X57	7.059	0.051
X65	<---	X81	7.065	-0.094
X94	<---	X105	7.069	0.097
X62	<---	X97	7.078	0.104
X89	<---	X83	7.091	-0.060
X102	<---	X109	7.100	0.051
X59	<---	X103	7.100	-0.063
X67	<---	Contact_Employee_Performance	7.114	0.167
X76	<---	Time_Saving	7.120	-0.086
X76	<---	SST_Performance	7.122	-0.086
X66	<---	X106	7.125	-0.073
X75	<---	X89	7.128	-0.099
X85	<---	Effort_Saving	7.131	0.123
X98	<---	X80	7.137	0.119
X73	<---	Quality of_Service	7.144	-0.162
X102	<---	X73	7.164	0.043
X90	<---	Customer_Productivity	7.205	0.088
X65	<---	Effort_Saving	7.226	-0.119
X87	<---	X64	7.239	0.065
X72	<---	X62	7.241	0.125
X61	<---	X84	7.250	0.108
X69	<---	X105	7.263	0.115
X74	<---	X64	7.266	-0.115
X83	<---	X69	7.277	0.056
X81	<---	X83	7.279	0.093
X106	<---	Effort_Saving	7.282	0.109
X97	<---	X84	7.286	0.124
X65	<---	X93	7.305	0.094
X58	<---	X98	7.320	0.061
X66	<---	X63	7.348	0.067
X86	<---	X82	7.349	-0.083
X75	<---	X92	7.362	-0.106
X64	<---	Physical_Effort	7.375	0.161
X61	<---	X91	7.378	0.119

X100	<---	X103	7.411	-0.093
X100	<---	Physical_Effort	7.422	-0.119
X64	<---	X74	7.455	-0.096
X72	<---	Contact_Employee_Performance	7.460	-0.210
X111	<---	X92	7.465	-0.087
X85	<---	X110	7.467	0.085
X63	<---	X80	7.478	-0.143
X66	<---	X111	7.507	-0.080
X73	<---	X94	7.513	-0.097
X73	<---	X103	7.514	-0.132
X57	<---	X63	7.518	0.126
X105	<---	X98	7.526	0.076
X72	<---	X93	7.555	-0.175
X97	<---	X112	7.556	0.124
X72	<---	X92	7.574	-0.172
X89	<---	X73	7.582	-0.044
X57	<---	Contact_Employee_Performance	7.598	0.213
X65	<---	X66	7.620	0.082
X104	<---	Quality of_Customer Labor	7.623	0.092
X59	<---	X109	7.625	-0.061
X66	<---	X108	7.634	-0.078
X81	<---	X68	7.638	0.060
X61	<---	X100	7.651	0.110
X76	<---	X84	7.660	-0.054
X95	<---	X104	7.670	-0.105
X107	<---	Time_Saving	7.695	-0.082
X84	<---	X94	7.729	0.096
X63	<---	X77	7.745	-0.131
X62	<---	X96	7.762	0.114
X102	<---	X85	7.769	0.055
X67	<---	X76	7.786	0.149
X98	<---	X65	7.787	0.101
X76	<---	X95	7.812	-0.052
X98	<---	X77	7.815	0.111
X107	<---	SST_Performance	7.836	-0.083
X89	<---	X87	7.843	-0.065
X78	<---	X108	7.864	-0.072
X86	<---	X94	7.871	-0.064
X102	<---	X65	7.876	0.050
X84	<---	X112	7.879	0.101
X89	<---	Physical_Effort	7.880	-0.074
X73	<---	X58	7.891	-0.137
X61	<---	Contact_Employee_Performance	7.922	0.181
X73	<---	Quality of_Customer Labor	7.923	-0.174
X85	<---	X105	7.929	0.091
X61	<---	X92	7.964	0.147

X100	<---	X102	7.967	-0.106
X58	<---	Time_Saving	7.971	0.101
X107	<---	X104	7.977	-0.062
X81	<---	X62	8.000	0.068
X72	<---	X96	8.004	0.129
X72	<---	X89	8.012	-0.167
X70	<---	X96	8.030	0.091
X73	<---	X81	8.032	-0.143
X95	<---	X65	8.054	-0.096
X66	<---	Customer_Productivity	8.090	-0.120
X87	<---	X81	8.098	0.092
X104	<---	X58	8.157	0.075
X67	<---	X108	8.160	0.122
X69	<---	X80	8.161	0.138
X59	<---	X57	8.164	-0.047
X73	<---	X70	8.169	-0.114
X66	<---	X64	8.196	-0.075
X81	<---	SST_Performance	8.202	0.118
X63	<---	X69	8.230	-0.116
X112	<---	X83	8.231	-0.137
X96	<---	X111	8.236	0.128
X95	<---	Customer_Value	8.240	-0.147
X98	<---	X97	8.248	0.087
X69	<---	X63	8.264	-0.099
X105	<---	X84	8.266	0.077
X59	<---	X74	8.266	-0.051
X95	<---	X110	8.268	-0.101
X59	<---	X108	8.302	-0.058
X90	<---	X112	8.302	0.057
X62	<---	X91	8.315	-0.136
X66	<---	X112	8.340	-0.074
X90	<---	X94	8.360	0.055
X76	<---	Quality of_Customer Labor	8.384	-0.091
X89	<---	X60	8.385	-0.057
X90	<---	X109	8.431	0.070
X62	<---	X90	8.438	-0.164
X58	<---	X96	8.445	0.060
X67	<---	X78	8.445	0.152
X96	<---	X78	8.508	0.155
X65	<---	X95	8.520	-0.073
X96	<---	X103	8.523	0.148
X76	<---	X100	8.529	-0.056
X104	<---	X95	8.532	0.057
X62	<---	X107	8.533	0.139
X104	<---	Physical_Effort	8.554	0.097
X62	<---	X93	8.561	-0.167

X59	<---	Emotional_Effort	8.563	-0.093
X87	<---	X82	8.566	-0.088
X96	<---	X109	8.607	0.139
X58	<---	X74	8.609	0.061
X105	<---	X78	8.621	0.105
X98	<---	X61	8.631	0.105
X95	<---	X100	8.635	-0.091
X58	<---	X99	8.663	0.065
X76	<---	X66	8.684	-0.064
X98	<---	Cognitive_Effort	8.692	0.163
X74	<---	X73	8.702	0.125
X59	<---	X65	8.730	-0.060
X81	<---	Cognitive_Effort	8.750	0.122
X90	<---	X99	8.765	0.061
X105	<---	X83	8.773	0.111
X79	<---	X66	8.781	0.087
X107	<---	X100	8.856	-0.053
X112	<---	SST_Performance	8.900	-0.170
X95	<---	X109	8.915	-0.110
X85	<---	Customer_Value	8.945	0.135
X73	<---	Cognitive_Effort	8.974	-0.188
X73	<---	X80	8.986	-0.151
X67	<---	X69	9.015	0.121
X90	<---	X100	9.019	0.061
X71	<---	X70	9.030	0.136
X84	<---	X86	9.037	-0.163
X99	<---	X112	9.037	-0.076
X65	<---	X67	9.078	-0.082
X104	<---	X59	9.082	0.072
X100	<---	Quality of_Service	9.103	-0.130
X90	<---	X83	9.111	0.086
X70	<---	X94	9.119	0.095
X112	<---	X66	9.137	-0.116
X73	<---	X100	9.138	-0.113
X96	<---	X94	9.145	0.113
X73	<---	X69	9.160	-0.117
X90	<---	X111	9.169	0.069
X110	<---	X57	9.171	-0.068
X66	<---	X61	9.188	-0.085
X94	<---	X90	9.197	0.123
X109	<---	X80	9.252	0.110
X75	<---	Contact_Employee_Performance	9.272	-0.147
X67	<---	X91	9.290	0.130
X83	<---	X89	9.292	-0.076
X112	<---	X82	9.293	-0.130
X77	<---	X102	9.297	-0.104

X61	<---	X90	9.304	0.160
X65	<---	X68	9.317	-0.070
X105	<---	X79	9.353	0.099
X106	<---	X96	9.390	0.070
X91	<---	Effort_Saving	9.422	0.103
X70	<---	Effort_Saving	9.520	0.174
X70	<---	X58	9.521	0.134
X57	<---	X64	9.545	0.150
X75	<---	X91	9.585	-0.102
X96	<---	X79	9.587	0.149
X57	<---	X91	9.609	0.163
X112	<---	X72	9.647	0.096
X67	<---	X105	9.652	0.143
X59	<---	Customer_Value	9.671	-0.095
X64	<---	X59	9.716	0.134
X91	<---	X95	9.718	0.059
X86	<---	X84	9.743	-0.076
X102	<---	X75	9.758	0.058
X57	<---	X90	9.821	0.198
X104	<---	X112	9.825	0.062
X62	<---	Contact_Employee_Performance	9.838	-0.217
X107	<---	X99	9.856	-0.057
X98	<---	X87	9.859	0.149
X98	<---	X84	9.883	0.104
X76	<---	X94	9.897	-0.057
X61	<---	X72	9.914	-0.113
X100	<---	X84	9.919	-0.084
X73	<---	X96	9.952	-0.113
X64	<---	X68	9.987	-0.101
X75	<---	X109	10.029	0.113
X75	<---	X101	10.035	0.102
X95	<---	X107	10.039	-0.109
X105	<---	X97	10.167	0.078
X73	<---	X95	10.180	-0.115
X67	<---	X98	10.193	0.130
X104	<---	X97	10.222	0.059
X90	<---	X110	10.235	0.073
X112	<---	X61	10.321	-0.118
X67	<---	X106	10.325	0.132
X105	<---	X90	10.337	0.113
X101	<---	X75	10.374	0.122
X84	<---	Effort_Saving	10.405	0.200
X67	<---	Customer_Productivity	10.422	0.204
X67	<---	X84	10.493	0.127
X98	<---	SST_Performance	10.526	0.179
X98	<---	Emotional_Effort	10.537	0.185

X73	<---	X59	10.553	-0.144
X73	<---	X99	10.576	-0.125
X59	<---	X105	10.577	-0.070
X107	<---	X83	10.640	-0.082
X106	<---	X94	10.653	0.074
X84	<---	X71	10.663	0.115
X95	<---	X99	10.672	-0.104
X109	<---	X76	10.674	0.120
X90	<---	X84	10.756	0.066
X70	<---	X105	10.775	0.130
X95	<---	X106	10.802	-0.107
X76	<---	Effort_Saving	10.808	-0.107
X104	<---	Effort_Saving	10.894	0.113
X73	<---	Physical_Effort	10.965	-0.202
X109	<---	Quality of_Customer Labor	10.978	0.146
X96	<---	X102	10.979	0.186
X67	<---	Quality of_Customer Labor	11.007	0.213
X62	<---	X58	11.053	0.186
X65	<---	X92	11.135	0.114
X102	<---	SST_Performance	11.136	0.090
X78	<---	X87	11.159	-0.113
X70	<---	X106	11.172	0.118
X57	<---	X62	11.176	0.156
X69	<---	X67	11.183	0.124
X95	<---	Time_Saving	11.194	-0.172
X105	<---	X92	11.196	0.117
X79	<---	X70	11.225	0.093
X66	<---	X69	11.228	-0.090
X67	<---	Customer_Value	11.280	0.217
X90	<---	Time_Saving	11.282	0.113
X62	<---	X92	11.283	-0.188
X77	<---	X101	11.295	-0.087
X68	<---	X91	11.300	-0.182
X105	<---	X91	11.302	0.098
X67	<---	X111	11.392	0.148
X100	<---	X61	11.404	-0.097
X71	<---	X84	11.419	0.144
X96	<---	X76	11.463	0.183
X98	<---	Quality of_Customer Labor	11.492	0.185
X84	<---	X95	11.499	0.120
X61	<---	X77	11.547	0.163
X96	<---	X77	11.583	0.163
X96	<---	Quality of_Service	11.610	0.219
X95	<---	Customer_Productivity	11.632	-0.171
X67	<---	X112	11.754	0.131
X112	<---	X108	11.797	0.128

X73	<---	Customer_Value	11.809	-0.213
X70	<---	X107	11.816	0.128
X83	<---	X97	11.823	-0.064
X104	<---	X77	11.847	0.084
X100	<---	X104	11.873	-0.113
X58	<---	X71	12.037	0.071
X61	<---	X81	12.039	0.186
X95	<---	X108	12.074	-0.117
X59	<---	X106	12.107	-0.067
X112	<---	X81	12.112	-0.160
X89	<---	X86	12.123	-0.082
X95	<---	X58	12.148	-0.140
X73	<---	Time_Saving	12.171	-0.217
X84	<---	X85	12.184	0.156
X105	<---	X80	12.301	0.126
X95	<---	X102	12.461	-0.154
X105	<---	X77	12.546	0.114
X96	<---	X101	12.553	0.151
X73	<---	X107	12.594	-0.148
X100	<---	Emotional_Effort	12.607	-0.163
X65	<---	X97	12.679	-0.085
X98	<---	X76	12.766	0.161
X59	<---	Customer_Productivity	12.779	-0.106
X110	<---	X94	12.826	-0.085
X64	<---	X66	12.858	-0.147
X109	<---	X66	12.921	0.109
X79	<---	X107	12.927	0.104
X105	<---	SST_Performance	12.933	0.160
X61	<---	X101	12.993	0.154
X61	<---	X87	13.020	0.207
X95	<---	X103	13.064	-0.143
X73	<---	X106	13.103	-0.143
X73	<---	Effort_Saving	13.107	-0.229
X105	<---	X93	13.175	0.129
X112	<---	X107	13.240	0.138
X109	<---	X98	13.268	0.102
X61	<---	X80	13.271	0.195
X61	<---	X79	13.280	0.177
X81	<---	X86	13.295	0.133
X79	<---	Customer_Productivity	13.392	0.155
X95	<---	Quality of_Service	13.422	-0.183
X110	<---	X95	13.479	-0.088
X109	<---	X87	13.586	0.142
X105	<---	X57	13.696	0.089
X59	<---	X107	13.751	-0.076
X70	<---	Customer_Productivity	13.827	0.202

X58	<---	Emotional_Effort	13.833	0.138
X82	<---	X86	13.857	-0.134
X71	<---	X93	13.877	0.211
X102	<---	X104	13.935	0.074
X90	<---	Customer_Value	14.016	0.125
X90	<---	X85	14.036	0.092
X62	<---	X59	14.058	0.191
X109	<---	X101	14.065	0.108
X106	<---	X105	14.074	0.106
X75	<---	X64	14.110	0.113
X82	<---	X87	14.136	-0.132
X100	<---	X70	14.170	-0.107
X64	<---	X63	14.179	-0.131
X109	<---	X83	14.197	0.142
X71	<---	X92	14.274	0.210
X67	<---	X77	14.276	0.177
X57	<---	X86	14.351	0.268
X96	<---	X57	14.450	0.135
X109	<---	X85	14.463	0.124
X91	<---	X90	14.476	0.099
X71	<---	X75	14.528	-0.187
X104	<---	X96	14.589	0.074
X57	<---	X66	14.604	0.207
X105	<---	Contact_Employee_Performance	14.653	0.165
X84	<---	X97	14.707	0.129
X73	<---	X108	14.740	-0.157
X61	<---	X106	14.798	0.162
X70	<---	X71	14.876	0.124
X96	<---	X80	14.958	0.206
X70	<---	X108	15.000	0.142
X112	<---	Customer_Productivity	15.204	0.215
X65	<---	X62	15.320	-0.100
X73	<---	X109	15.442	-0.176
X73	<---	X57	15.489	-0.132
X96	<---	Quality of_Customer Labor	15.519	0.257
X105	<---	X76	15.521	0.144
X105	<---	X89	15.538	0.130
X98	<---	X67	15.572	0.135
X102	<---	X82	15.593	0.080
X61	<---	X105	15.636	0.186
X90	<---	SST_Performance	15.689	0.133
X110	<---	Effort_Saving	15.718	-0.168
X109	<---	X69	15.764	0.110
X61	<---	X62	15.772	0.154
X105	<---	X110	15.871	0.121
X110	<---	X96	15.880	-0.096

X81	<---	X79	16.026	0.120
X98	<---	X74	16.030	0.128
X62	<---	Physical_Effort	16.150	0.282
X72	<---	X71	16.206	-0.184
X58	<---	X70	16.300	0.092
X96	<---	X104	16.509	0.197
X102	<---	X91	16.540	0.072
X66	<---	X60	16.852	-0.130
X73	<---	Customer_Productivity	16.852	-0.249
X109	<---	X58	16.882	0.143
X96	<---	Customer_Value	16.907	0.270
X85	<---	X84	16.954	0.113
X105	<---	X107	16.976	0.122
X61	<---	X104	17.039	0.202
X109	<---	X91	17.168	0.122
X100	<---	X67	17.256	-0.114
X109	<---	Cognitive_Effort	17.271	0.186
X96	<---	X60	17.343	0.202
X90	<---	X82	17.391	0.106
X79	<---	X108	17.397	0.119
X66	<---	X59	17.617	-0.129
X61	<---	X99	17.651	0.172
X109	<---	X65	17.680	0.124
X75	<---	X90	17.714	-0.166
X61	<---	X73	17.881	0.169
X81	<---	X63	17.971	0.100
X71	<---	X89	18.066	0.223
X67	<---	X97	18.197	0.152
X79	<---	X81	18.241	0.150
X96	<---	X112	18.300	0.166
X71	<---	Contact_Employee_Performance	18.449	0.294
X62	<---	X60	18.525	0.226
X76	<---	X81	18.643	-0.112
X112	<---	X105	18.696	0.174
X57	<---	X70	18.715	0.221
X109	<---	X82	18.729	0.146
X105	<---	Quality of_Customer Labor	18.771	0.191
X61	<---	X76	19.006	0.237
X112	<---	X97	19.067	0.136
X85	<---	Customer_Productivity	19.225	0.194
X71	<---	X91	19.262	0.204
X96	<---	X97	19.320	0.159
X109	<---	X100	19.397	0.118
X57	<---	X67	19.421	0.219
X71	<---	X72	19.495	-0.170
X109	<---	X90	19.621	0.156

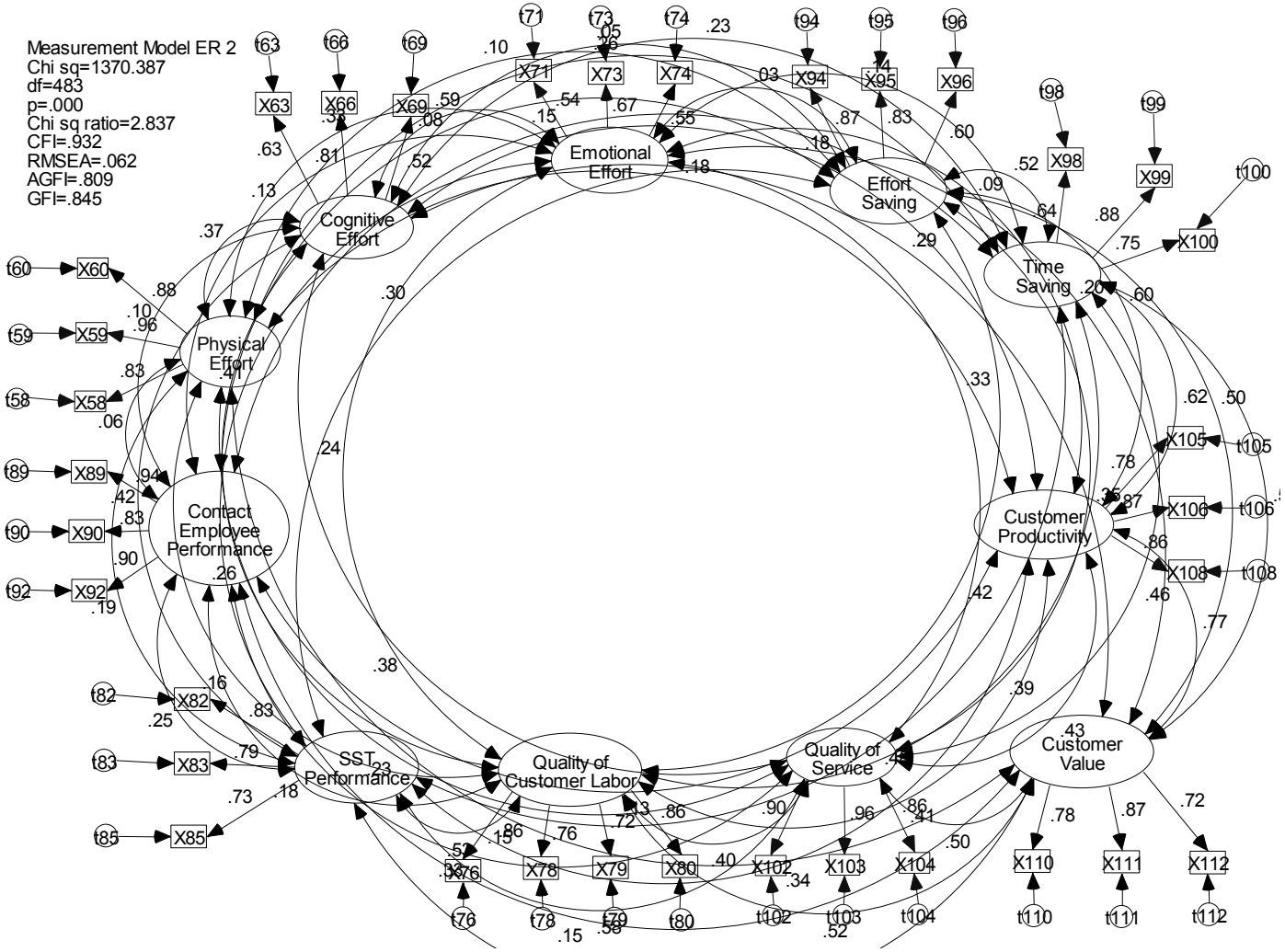
X96	<---	X105	19.733	0.208
X90	<---	X104	19.888	0.110
X109	<---	X59	20.163	0.143
X57	<---	X87	20.252	0.311
X81	<---	X66	20.308	0.125
X66	<---	Physical_Effort	20.527	-0.192
X57	<---	X69	20.555	0.225
X109	<---	X89	20.661	0.151
X61	<---	Time_Saving	20.826	0.302
X102	<---	Quality of_Service	20.852	0.119
X71	<---	X90	21.006	0.256
X105	<---	X111	21.022	0.137
X61	<---	X86	21.034	0.270
X96	<---	X108	21.070	0.199
X68	<---	X92	21.075	-0.297
X61	<---	X85	21.112	0.223
X85	<---	X108	21.217	0.137
X112	<---	X94	21.223	0.148
X57	<---	X75	21.274	0.256
X61	<---	X103	21.315	0.236
X109	<---	X72	21.369	-0.112
X61	<---	X98	21.420	0.192
X112	<---	X96	21.427	0.151
X105	<---	X102	21.463	0.175
X102	<---	X103	21.477	0.096
X85	<---	X107	21.582	0.141
X61	<---	Quality of_Customer Labor	21.699	0.306
X112	<---	X106	21.795	0.168
X96	<---	X95	21.854	0.178
X109	<---	X60	22.095	0.154
X96	<---	X107	22.098	0.207
X57	<---	X65	22.480	0.250
X61	<---	X107	22.626	0.211
X109	<---	Emotional_Effort	22.674	0.220
X66	<---	X58	22.690	-0.161
X105	<---	X104	22.756	0.156
X68	<---	X93	22.777	-0.314
X73	<---	X105	23.069	-0.212
X105	<---	X99	23.145	0.132
X112	<---	X95	23.244	0.157
X105	<---	X103	23.298	0.165
X68	<---	X89	23.567	-0.297
X96	<---	Effort_Saving	23.595	0.324
X68	<---	Contact_Employee_Performance	23.634	-0.387
X96	<---	X98	23.823	0.201
X61	<---	X111	23.849	0.218

X105	<---	X96	23.905	0.125
X57	<---	Emotional_Effort	24.096	0.407
X61	<---	X63	24.124	0.187
X61	<---	X68	24.222	0.171
X105	<---	X108	24.707	0.145
X102	<---	X89	25.001	0.100
X96	<---	X59	25.009	0.235
X109	<---	SST_Performance	25.216	0.225
X109	<---	X75	25.446	0.156
X68	<---	X90	25.460	-0.328
X61	<---	X64	25.543	0.203
X61	<---	X82	25.785	0.254
X109	<---	Physical_Effort	25.891	0.223
X61	<---	Customer_Productivity	26.003	0.330
X57	<---	X97	26.071	0.224
X61	<---	X108	26.163	0.223
X109	<---	X92	26.293	0.180
X109	<---	Time_Saving	26.297	0.228
X105	<---	Quality of_Service	26.665	0.223
X109	<---	X99	26.692	0.142
X109	<---	X93	26.714	0.185
X61	<---	Quality of_Service	26.864	0.334
X57	<---	X61	26.908	0.269
X112	<---	Effort_Saving	26.910	0.299
X75	<---	X71	27.009	-0.149
X61	<---	X57	27.028	0.186
X109	<---	Contact_Employee_Performance	27.057	0.225
X61	<---	X67	27.089	0.214
X96	<---	Customer_Productivity	27.337	0.336
X67	<---	X94	27.418	0.192
X96	<---	Physical_Effort	27.654	0.340
X109	<---	X61	27.657	0.152
X67	<---	X95	27.848	0.197
X62	<---	X63	27.919	0.217
X109	<---	X57	27.965	0.127
X96	<---	X106	28.431	0.223
X81	<---	X87	28.493	0.189
X90	<---	X103	29.169	0.140
X57	<---	Cognitive_Effort	29.254	0.434
X102	<---	X93	29.506	0.117
X61	<---	X102	29.659	0.307
X102	<---	X90	30.036	0.116
X102	<---	Contact_Employee_Performance	30.718	0.144
X105	<---	X109	30.787	0.177
X67	<---	Effort_Saving	30.844	0.366
X102	<---	X92	30.891	0.117

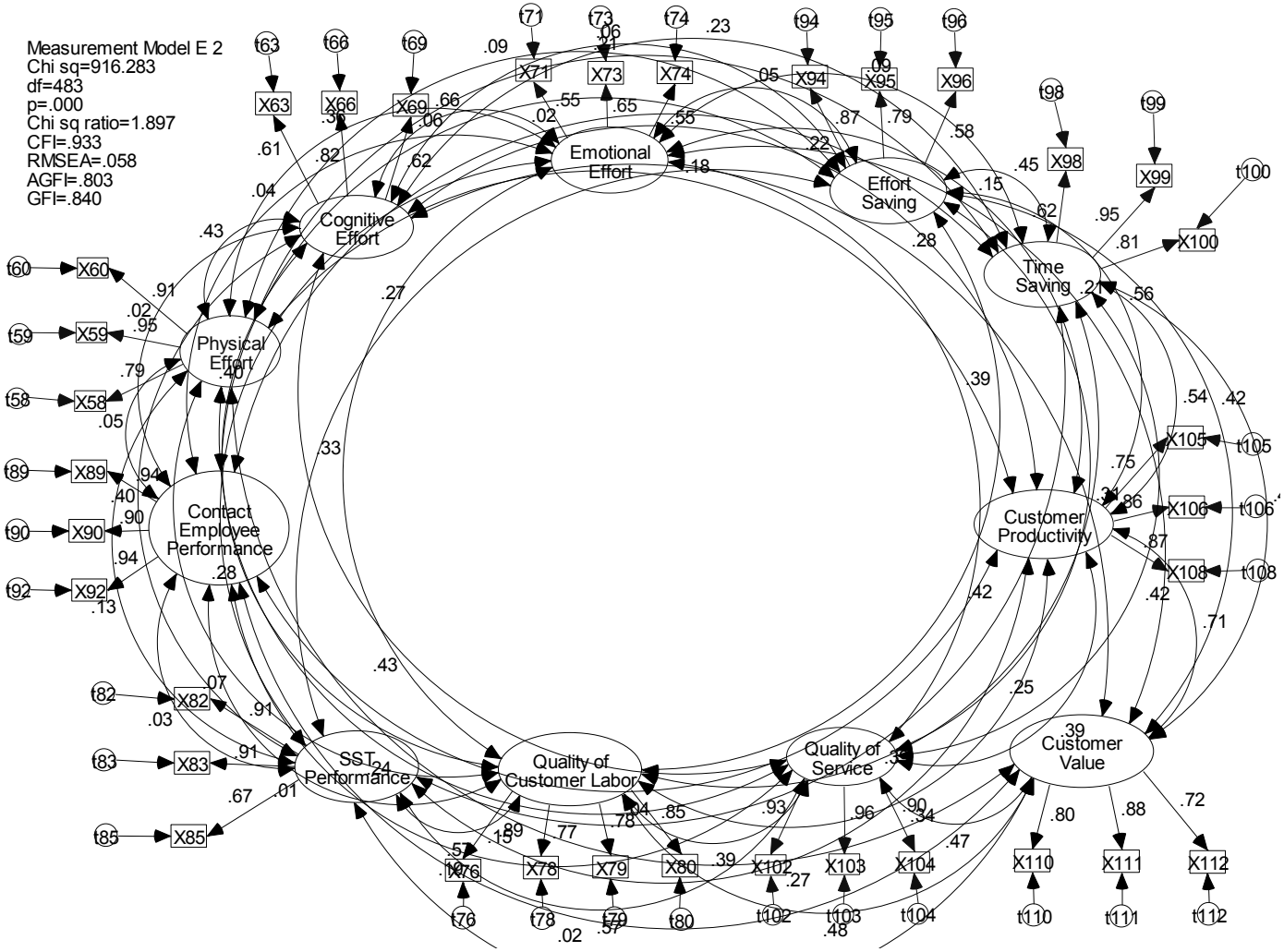
X109	<---	X104	31.087	0.183
X105	<---	X100	31.126	0.149
X105	<---	X112	31.332	0.147
X105	<---	Customer_Productivity	31.391	0.242
X105	<---	Time_Saving	31.501	0.249
X90	<---	X102	32.604	0.163
X90	<---	Quality of_Service	32.640	0.187
X61	<---	X110	32.779	0.259
X76	<---	X79	33.514	-0.136
X96	<---	X58	33.556	0.299
X57	<---	X78	33.811	0.375
X96	<---	X100	34.459	0.232
X57	<---	X84	34.797	0.284
X105	<---	Customer_Value	35.174	0.263
X57	<---	X81	35.457	0.385
X57	<---	X82	35.695	0.360
X105	<---	X95	35.831	0.153
X57	<---	X83	35.848	0.404
X61	<---	X75	36.981	0.280
X96	<---	X99	37.100	0.248
X61	<---	X70	37.433	0.259
X63	<---	X62	38.044	0.234
X61	<---	Customer_Value	40.800	0.422
X96	<---	Time_Saving	41.361	0.423
X61	<---	X83	42.378	0.365
X57	<---	X77	42.990	0.379
X61	<---	X66	44.164	0.298
X61	<---	SST_Performance	44.173	0.442
X57	<---	X79	44.976	0.392
X57	<---	X85	45.576	0.394
X105	<---	X94	47.178	0.173
X61	<---	X109	47.590	0.329
X57	<---	X101	49.036	0.361
X86	<---	X87	50.081	0.248
X105	<---	Effort_Saving	53.207	0.329
X109	<---	X103	54.398	0.254
X105	<---	X106	55.729	0.211
X109	<---	Quality of_Service	55.928	0.325
X87	<---	X86	57.556	0.268
X109	<---	X102	58.631	0.290
X61	<---	Emotional_Effort	60.365	0.534
X57	<---	X102	60.534	0.528
X57	<---	SST_Performance	63.686	0.639
X57	<---	X80	63.695	0.514
X57	<---	X76	64.045	0.525
X58	<---	X60	64.336	0.211

X61	<---	X65	68.041	0.361
X57	<---	X104	68.403	0.487
X57	<---	X98	74.280	0.431
X58	<---	Physical_Effort	76.340	0.305
X57	<---	X96	78.249	0.407
X58	<---	X59	79.522	0.227
X90	<---	X93	80.596	0.241
X57	<---	Quality of_Customer Labor	82.773	0.720
X90	<---	X92	84.201	0.242
X57	<---	X100	84.975	0.442
X57	<---	X99	85.323	0.455
X57	<---	X103	87.385	0.576
X61	<---	Cognitive_Effort	88.890	0.628
X57	<---	Quality of_Service	91.807	0.745
X57	<---	X110	92.614	0.524
X57	<---	X95	108.022	0.478
X57	<---	X112	111.371	0.497
X90	<---	Contact_Employee_Performance	112.995	0.345
X69	<---	X61	116.731	0.420
X57	<---	X94	122.919	0.501
X57	<---	Time_Saving	123.757	0.887
X90	<---	X89	123.791	0.278
X57	<---	X111	126.578	0.606
X57	<---	X109	148.554	0.700
X57	<---	X105	149.679	0.694
X90	<---	X91	150.973	0.272
X57	<---	X106	153.821	0.629
X57	<---	X108	156.755	0.657
X57	<---	Effort_Saving	162.154	1.033
X57	<---	X107	179.620	0.715
X57	<---	Customer_Value	187.238	1.090
X61	<---	X69	191.513	0.570
X57	<---	Customer_Productivity	199.133	1.099

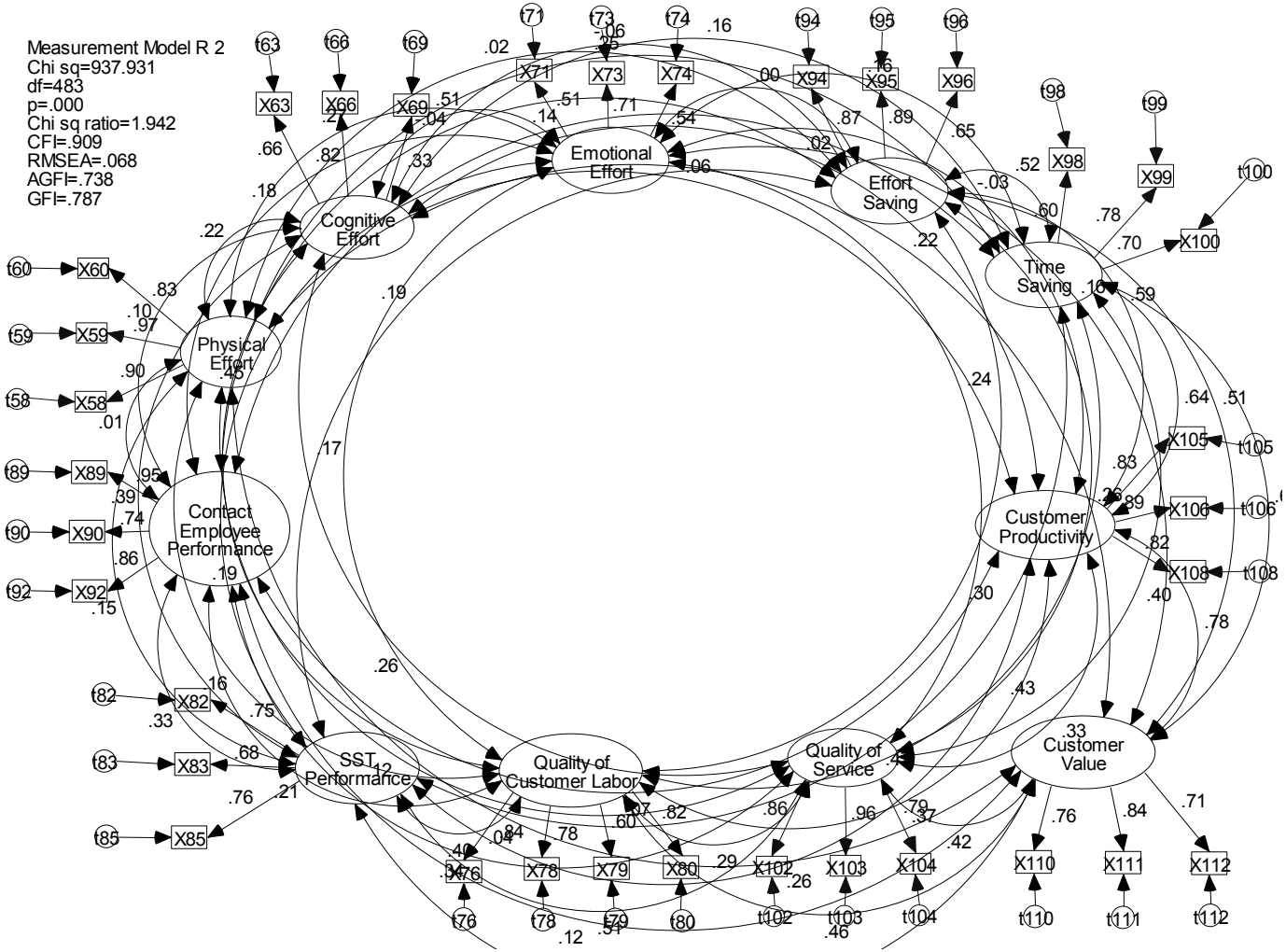
THE MEASUREMENT MODEL AFTER ITEM MODIFICATION FOR THE TOTAL SAMPLE



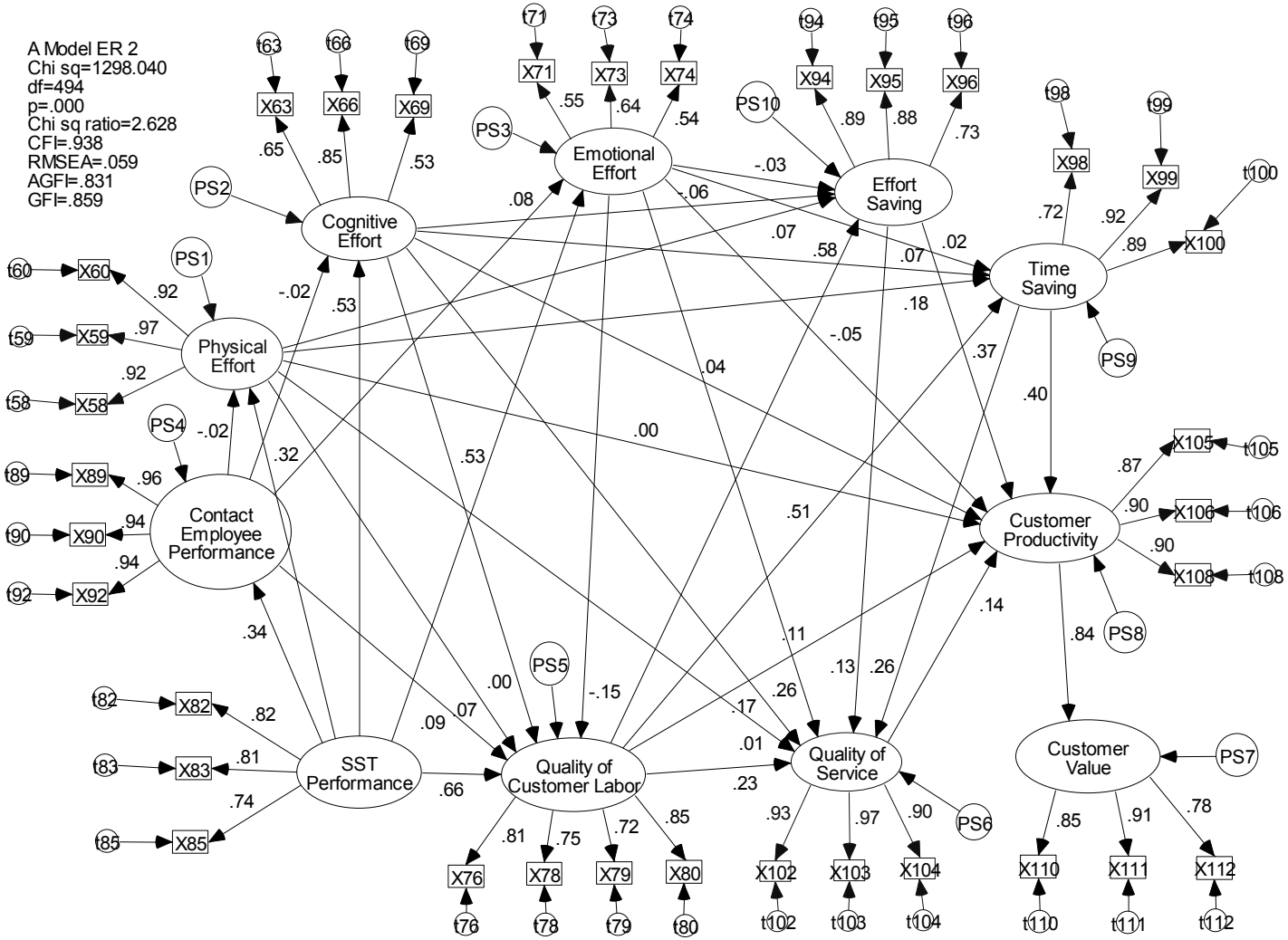
THE MEASUREMENT MODEL AFTER ITEM MODIFICATION FOR ENTHUSIASTIC ADOPTERS



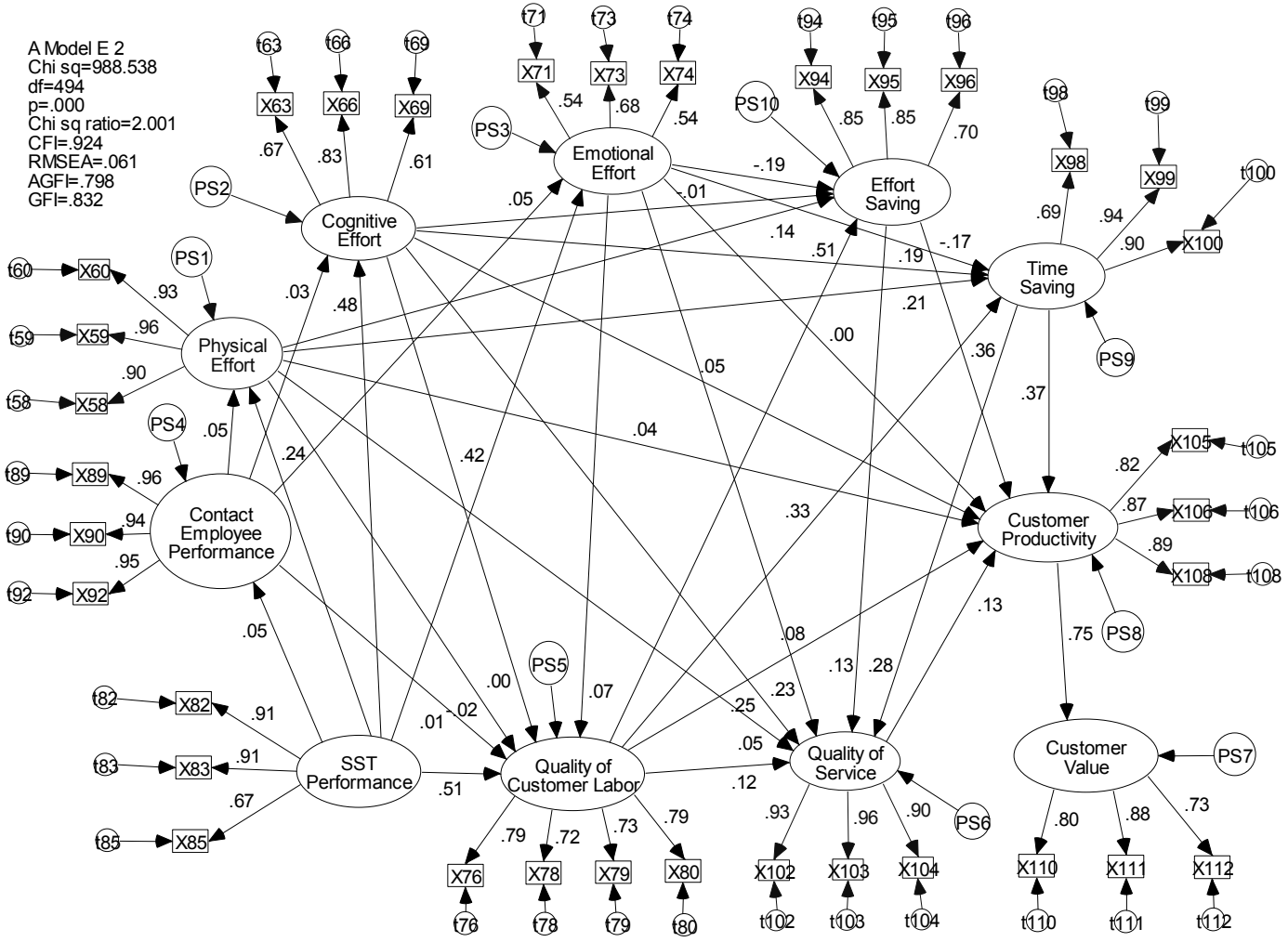
THE MEASUREMENT MODEL AFTER ITEM MODIFICATION FOR RELUCTANT ADOPTERS



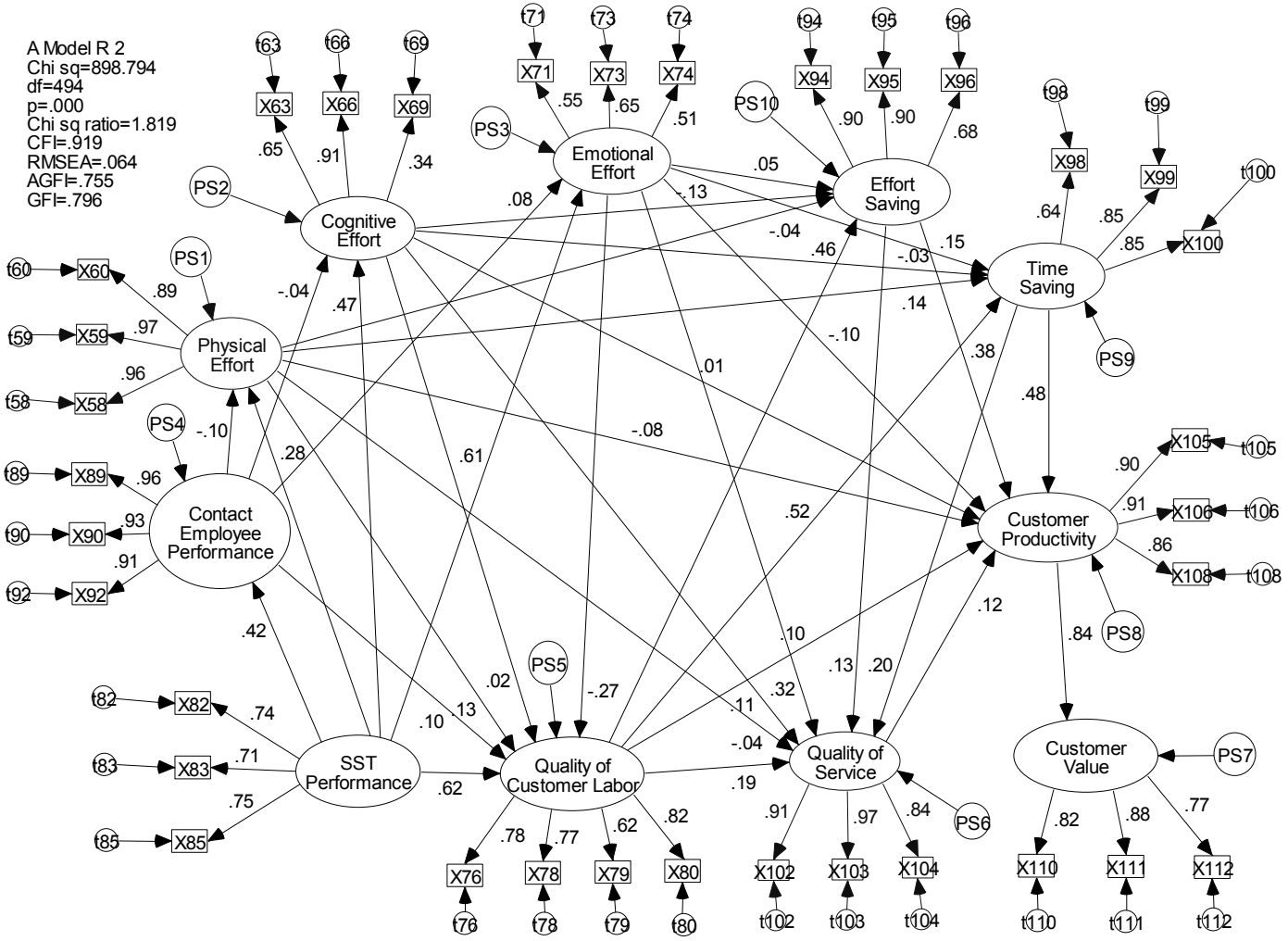
THE STRUCTURAL MODEL AFTER ITEM MODIFICATION FOR THE TOTAL SAMPLE



THE STRUCTURAL MODEL AFTER ITEM MODIFICATION FOR ENTHUSIASTIC ADOPTERS



THE STRUCTURAL MODEL AFTER ITEM MODIFICATION FOR RELUCTANT ADOPTERS



VITA

İsmet Anıtsal was born in İstanbul, Turkey in 1964. He received a B.S. in Petroleum Engineering from İstanbul Technical University in 1985. He holds his master's degrees from Boğaziçi University (M.A.– with an emphasis on finance) and University of West Georgia (M.B.A. – with an emphasis on marketing), respectively. In May of 2005, he completed the requirements for the Ph.D. in Business Administration with a major in Marketing and minor in Retail Management at The University of Tennessee, Knoxville. His dissertation deals with the relationship between customer productivity and customer value in a technology-based self-service retail environment.

Before joining the academic world, he had worked in several sectors including engineering, commercial banking and retailing. He served in numerous positions from the sales associate level to CEO level for different domestic and global organizations, namely, Desa, Wal-Mart, Pamukbank, Spectrum, Metro and Mudo.

İsmet Anıtsal is currently an Assistant Professor of Marketing at Tennessee Tech University. He had previously taught in the areas of marketing, management and

quantitative methods as a teaching associate at The University of Tennessee, Knoxville, as a lecturer at Işık University, and as an adjunct instructor both at Boğaziçi University and University of West Georgia. His primary teaching interests include principles of marketing, services marketing, consumer behavior and strategic marketing (both traditional MBA and distance MBA levels). He has presented at numerous major marketing conferences and has published nearly two dozens of refereed papers in conference proceedings and marketing journals.