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Identification and Analysis of Quality Gaps for Online Service Retailers Using Multi Structural Equation Models for Different Demographic and Product Categories

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IDENTIFICATION AND ANALYSIS OF QUALITY GAPS FOR ONLINE SERVICE RETAILERS USING MULTI STRUCTURAL EQUATION MODELS FOR DIFFERENT DEMOGRAPHIC AND PRODUCT CATEGORIES

By

Asem Majed Othman

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There has been a steady growth in e-commerce in the United States, especially during the past seven years. Online Service Retailers (OSRs), as e-commerce retailers, continue to invest heavily in the enhancement of the services provided to their customers. The success of OSRs depends heavily on their ability to understand and mitigate any gaps in quality. This study was conducted in three phases. In Phase I, we developed a conceptual framework for OSRs, based on a review of pertinent literature on service quality studies for online retailers. The purpose of the conceptual framework was to understand and establish the relationship that connects the customer, the OSR, and the retail industry. Phase I of this study then produced and identified nine quality gaps of OSRs and the influential mitigation strategies for each gap. Phase II, the model testing phase, was conducted to test the conceptual framework of OSRs. The purpose of the model-testing phase was to assess the feasibility of a larger study, and to apply the lessons learned from this phase to the work in Phase III. Hence, Phase II involved the development of a model testing survey instrument used to measure the significance of the quality gaps on customers' willingness to shop online. Additionally for Phase II, data from a total of 253 survey respondents were analyzed using linear regression. The results from this model testing phase were used to modify and refine a comprehensive survey instrument for the

third phase. In Phase III, a comprehensive survey instrument was developed and used to gather nationwide survey data. In this phase, the analysis of the data was carried out using structural equation modeling (SEM). The comprehensive survey instrument was used to test three structural models. A Customers' Willingness Structural Model was developed to measure the nine quality gaps' significance on customers' willingness to shop online. Additionally, a Customer Satisfaction Structural Model was developed to measure the nine quality gaps' significance on customer satisfaction with online shopping. Lastly, Phase III of this study generated Mitigation Strategy-Customers' Willingness (MSCW) Structural Model, and offers multi-mitigation strategies for each quality gap. The sample size for the comprehensive survey instrument was 4,937 completed responses, with at least 100 respondents in each demographic category (gender, levels of education, and age groups), and using four different product categories (Computers & Consumer Electronics, Apparel & Accessories, Books/ Music/ Video, and Health & Personal Care). This dissertation thesis tested multiple structural models in terms of the significance of each of the nine quality gaps on customers' willingness to shop online, as well as customer satisfaction for various demographic and product categories. The results showed significant association between different quality gaps and customers' willingness to shop online as well as customer satisfaction with online shopping. It also determined the influence of the quality gaps on customers' willingness and customer satisfaction based on different demographic and product categories. The association between significant quality gaps and customers' willingness and customer satisfaction with online shopping for different groups by demographic and product categories was examined using Chi-square difference test. The

conclusions revealed differences in customers' willingness and customer satisfaction by gender, level of education, age, and product categories.

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Dedicated to my dear parents, Mrs. Haifa Barradah & Dr. Majed Othman

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LIST OF ABBREVIATIONS

Age (1) – Age Group One (18 – 38 Years Old)

Age (2) – Age Group Two (39 – 59 Years Old)

Age (3) – Age Group Three (60 Years Old and Older)

CFA – Confirmatory Factor Analysis

CAQ – Customer Agreement Quotient

CFI – Comparative Fit Index

GUI – Graphical User Interface

IIT – Image Interactivity Technology

MSCW – Mitigation Strategy-Customers' Willingness

RAQ – Respondent Agreement Quotient

RDQ – Respondent Disagreement Quotient

OSR – Online Service Retailer

PC (1) – Product Category One (Computer & Consumer Electronics)

PC (2) – Product Category Two (Apparel & Accessories)

PC (3) – Product Category Three (Books/ Music/ Video)

PC (4) – Product Category Four (Health & Personal Care)

RMSEA – Root Mean Square Error of Approximation

SEM – Structural Equation Modeling

TLI – Tucker Lewis Index

WLSM - Weighted Least Squares, Robust Standard Errors, & Mean Adjusted Chi-square Test Statistic

Chapter 1: Introduction

E-commerce refers to business transactions that take place over the Internet (Keeney, 1999). More specifically, e-commerce refers to transactions related to customers, suppliers, and outsourced partners generated by different processes in sales, procurements, marketing, customer service, and payments between two or more entities using computers or any other electronic channel (Bartels, 2000). To facilitate e-commerce for retail companies, retailers' websites allow consumers to seek information about products and services, such as price and item details, and enables them to buy their products or services. This study focuses on product-related items (tangible items). Examples of OSRs are Amazon.com, Alibaba.com, eBay.com, and Dhgate.com. In recent years, in an effort to save time, many people have elected to shop from home rather than shopping via traditional stores (Farag, Schwanen, Dijst, & Faber, 2007). It becomes crucial for major retailer companies to invest in their own online services to enhance overall customer experience. Examples of major retail companies are: Walmart, Home Depot, Macy's, Best Buy, Sears, Costco, Nordstrom, Target, and Neiman Marcus.

1.1 E-commerce Importance and Expansion

The recent rapid growth of e-commerce has been documented by eMarketer. In 2013, e-commerce sales in the United States reached $263.3 billion, and the number of digital buyers reached 157.1 million, representing 73% of Internet users. eMarketer projects that, by 2018, sales will reach $491.5 billion and that the number of digital buyers will reach 185.5 million, representing 79.6% of Internet users (Wurmser, 2014). The following (Figures 1 and 2) illustrate eMarketer findings.

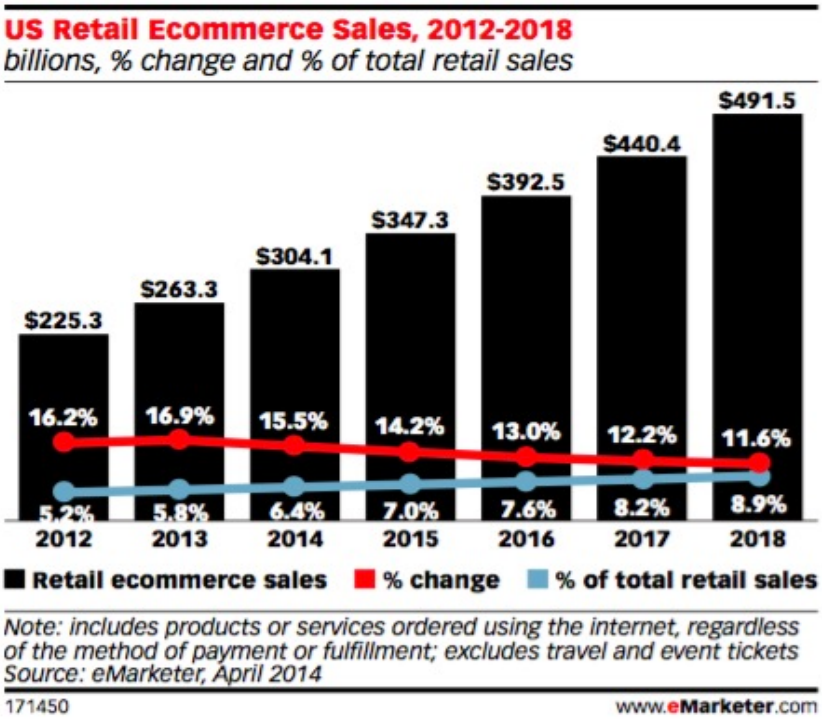


Figure 1: US Retail E-commerce Sales, 2012-2018

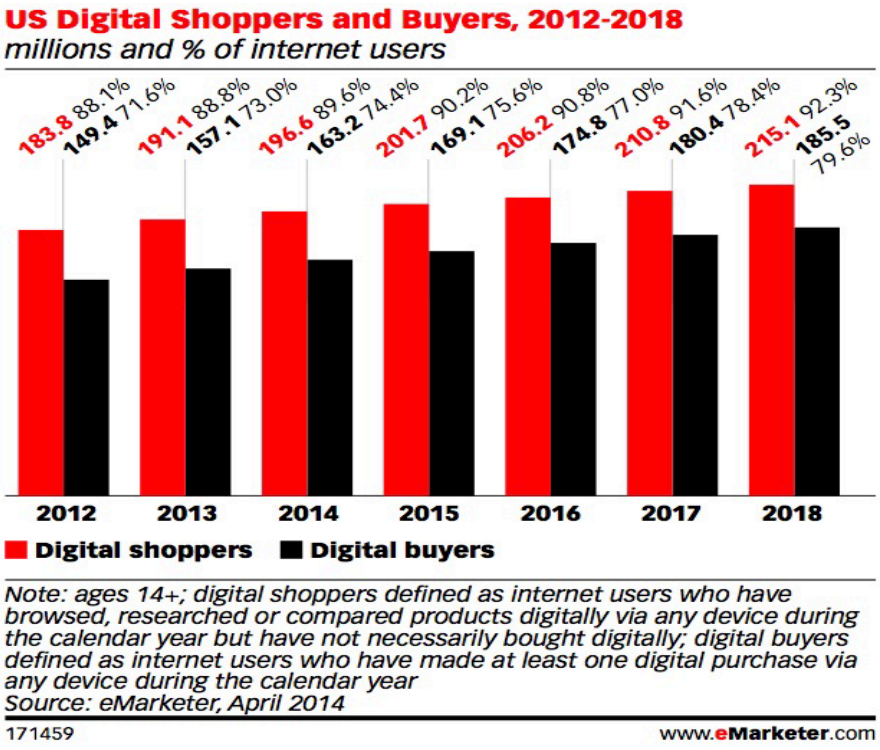


Figure 2: US Digital Shoppers and Buyers, 2012 - 2018

Figure 3 shows the e-commerce sales by product category across different years. Due to its rapid expansion, e-commerce is a sector that warrants more attention and research.

US Retail Ecommerce Sales, by Product Category, 2012-2018

billions

	2012	2013	2014	2015	2016	2017	2018
Computer & consumer electronics	$49.0	$57.4	$66.4	$76.1	$86.1	$96.9	$108.4
Apparel & accessories	$38.0	$44.7	$52.0	$59.7	$67.9	$76.6	$86.0
Auto & parts	$23.3	$27.3	$31.6	$36.2	$41.1	$46.2	$51.6
Books/music/video	$19.6	$23.2	$27.2	$31.5	$36.0	$41.0	$46.2
Furniture & home furnishings	$15.2	$17.7	$20.3	$23.1	$26.0	$29.1	$32.3
Health & personal care	$12.9	$15.0	$17.3	$19.6	$22.1	$24.7	$27.4
Toys & hobby	$8.9	$10.5	$12.1	$13.8	$15.6	$17.5	$19.5
Office equipment & supplies	$6.3	$7.3	$8.3	$9.3	$10.4	$11.4	$12.6
Food & beverage	$5.3	$6.1	$7.0	$7.9	$8.8	$9.7	$10.9
Other	$46.7	$54.1	$62.0	$70.1	$78.5	$87.3	$96.6
Total	**$225.3**	**$263.3**	**$304.1**	**$347.3**	**$392.5**	**$440.4**	**$491.5**

Note: includes products or services ordered using the internet, regardless of the method of payment or fulfillment; excludes travel and event tickets
Source: eMarketer, April 2014

171460 www.eMarketer.com

Figure 3: US Retail E-commerce Sales, by Product Category, 2012-2018

The growth and expansion of some major retailer companies' online services have been documented. For example, the Fortune magazine, reported in March 2016 that Nordstrom's online sales revenue acquired 21% of their total sales due to their heavy investment on the infrastructure of their retail website (Wahba, 2016b).

In the second quarter of 2016, Walmart's online sales increased by 11.8% due to their massive investment in online service. However, Walmart's sales are still substantially less than Amazon.com sales; Walmart's online sales totaled $14 billion in 2015, which is one-sixth of Amazon.com total sales (Wahba, 2016a).

The growth and expansion of OSRs is not limited to the United States. In China, by the end of 2015, online shopping increased by more than 70%, and it is projected that 15% of

China's population will purchase online by the end of 2016, with the total projected sales of $85.76 billion (eMarketer, 2016).

In 2014 in the United Kingdom, Marks & Spencer, a major multinational British retailer, invested in their website by taking control of their merchandise online sales from Amazon.com (Butler, 2014), and the result was an increase in their e-commerce sales of 38.7% in the first quarter of 2015 (Rigby, 2015).

These examples confirm that major retail companies in different countries have been investing significantly in online services. These companies have realized that providing exceptional services through their websites to consumers is not just an option, rather an essential strategy to remaining competitive in the retail market. eMarketer projects that by 2019, worldwide retail e-commerce sales will reach $27.916 trillion (eMarketer, 2015). Figure 4 shows the projected total annual worldwide retail sales for e-commerce:

Total Retail Sales Worldwide, by Region, 2014-2019
trillions and CAGR

	2014	2015	2016	2017	2018	2019	CAGR (2014-2019)
Asia-Pacific	$7.915	$8.573	$9.276	$10.000	$10.736	$11.460	7.7%
North America	$5.090	$5.254	$5.431	$5.615	$5.799	$5.989	3.3%
Western Europe	$4.207	$4.249	$4.289	$4.330	$4.375	$4.420	1.0%
Latin America	$1.737	$1.828	$1.920	$2.018	$2.131	$2.249	5.3%
Central & Eastern Europe	$1.664	$1.743	$1.821	$1.921	$2.033	$2.146	5.2%
Middle East & Africa	$0.715	$0.864	$1.037	$1.228	$1.430	$1.652	18.2%
Worldwide	**$21.328**	**$22.512**	**$23.775**	**$25.112**	**$26.505**	**$27.916**	**5.5%**

Note: excludes travel and event tickets
Source: eMarketer, Dec 2015

201816 www.eMarketer.com

Figure 4: Total E-commerce Retail Sale Worldwide, by Region, 2014 - 2019

1.2. Objective and Scope of Research

This research was undertaken to enhance the service quality of Online Service Retailers (OSRs) by identifying the quality gaps that affect customers' willingness to purchase online and customer satisfaction with online shopping. We executed this study in three phases. In Phase I, we developed a conceptual framework of OSRs based on pertinent literature review. Phase I then proceeded with a description and the identification of OSRs' nine quality gaps and the influential mitigation strategies for each quality gap. The purpose of the conceptual framework produced in Phase I is to understand and establish the relationship that connects the customer, the OSR, and the retail industry.

In Phase II of this study, we developed a model testing survey instrument to test the conceptual framework of OSRs. The purpose of the model testing phase is to assess the feasibility of a larger study, and to apply the lessons learned from this phase to the work in Phase III. In Phase II of this study, we used linear regression to analyze a model testing survey instrument by measuring the significance of the nine quality gaps on customers' willingness. One of the objectives of Phase II was to verify the existence of the identified quality gaps. In addition to that, lessons learned from Phase II results allowed us to initiate Phase III by refining the model testing survey instrument to develop a comprehensive study survey instrument using a nationwide respondent group.

In Phase III, the comprehensive study survey instrument was used to test three structural models using structural equation modeling (SEM). The Customers' Willingness Structural Model was used to measure the significant association of the nine quality gaps with customers' willingness to shop online. The Customer Satisfaction Structural Model was used to measure the significant association of the nine quality gaps with customer

satisfaction with online shopping. Finally, the MSCW Structural Model was used to measure the influence of the mitigation strategies of each of the quality gaps on customers' willingness to shop online. Utilizing the mitigation strategies that have significant association with customers' willingness may result in an increase in customers' willingness to shop online.

In Phase III of this research, our study took into consideration various demographic and product categories to address and derive recommendations and conclusions using Customers' Willingness and Customer Satisfaction Structural Models. The aim was to assess OSRs' service quality by identifying and measuring the effect of the quality gaps and the mitigation strategies of each quality gap. For both Customers' Willingness and Customer Satisfaction Structural Models, we measured the degree of association of each quality gap with customers' willingness and customer satisfaction. We also examined whether there was a significant difference between path coefficients whenever multiple group confirmatory factor analyses were incorporated (gender, age groups, level of education, and product categories) using Chi-square difference test.

1.3. Research Questions

In Phase II of this research, (based on linear regression), this study attempts to answer the following research question:

1. Are quality gaps associated with customers' willingness to shop online?

In Phase III of this research, this study attempts to answer the following research questions using Customers' Willingness Structural Model:

2. Are quality gaps associated with customers' willingness to shop online?

3. Which quality gap(s) has/have stronger association with customers' behavior based on different demographic and product categories?
4. Which group of respondents from different demographic and product categories is more willing to shop online?
5. Which significant quality gap(s) has/have stronger association with customers' willingness to shop online for different groups by demographic and product categories?

In Phase III of this research, this study attempts to answer the following research questions using Customer Satisfaction Structural Model:

6. Are quality gaps associated with customer satisfaction with online shopping?
7. Which quality gap(s) has/have stronger association with customer satisfaction based on different demographic and product categories?
8. Which group of respondents from different demographic and product categories is more satisfied with online shopping?
9. Which significant quality gap(s) has/have stronger association with customer satisfaction with online shopping for different groups by demographic and product categories?

In Phase III of this research, this study attempts to answer the following research questions using Mitigation Strategy-Customers' Willingness Structural Model:

10. Are mitigation strategies associated with customers' willingness to shop online?
11. Which mitigation strategies have stronger associations with customers' willingness to shop online?

1.4. Organization of the Research

This research is divided into five chapters, of which the first has been covered. Chapters 2 and 3 are considered as Phase I of this research.

Chapter 2 of this research presents an extensive literature review of service quality, OSRs' service quality, and quality gap models.

Chapter 3 of this research presents the quality gaps of OSRs. In Chapter 3, we describe and identify each quality gap and their influential mitigation strategies. We have used pertinent literature sources to establish each quality gap, and verified each influential mitigation strategy through literature. Chapter 3 of this research ends with a conceptual framework of OSRs' quality gaps.

Chapter 4 describes the methodology used in the research. It provides in detail the three phases of this research. Chapter 4 presents the purpose and use of Phase II, which is the model testing phase. The development of the model testing survey instrument, the sampling plan and data collection, findings, and results of Phase II were also covered. It shows the transitioning analysis from Phase II to Phase III. In Chapter 4, we describe the methodology of Phase III. Chapter 4 presents the purpose and use of Phase III, which is the comprehensive (nationwide) study. The development of the comprehensive study survey instrument and the sampling plan and data collection were addressed.

Chapter 5 presents the analysis of the data that were collected from the comprehensive study survey instrument (Phase III of this study). In Chapter 5, the results from the Customers' Willingness and Customer Satisfaction Structural Models were analyzed. For both models, we have results using the aggregate data and for demographic and product categories. Chapter 5 shows the results of the Mitigation Strategy-Customers' Willingness

(MSCW) Structural Model and then summarizes the findings and recommendations for the three structural models.

Finally, Chapter 6 presents the conclusion of this research, implications for policy, limitations of this research, and opportunities for future studies.

The appendices contain the model testing survey instrument in Appendix A and the comprehensive study survey instrument in Appendix B, and examples of Mplus software syntax for the different structural models in Appendix C.

Chapter 2: Literature Review

Several studies have focused on the quality of the retailers' website design and overall website functionality (prepurchase phase) but have not given equal attention to the quality of the services delivered by the online retailers (purchase phase and postpurchase phase). For example, Loiacono (2000) provides a set quality criteria, the WebQual model of website design, that addresses: (a) ease of use, (b) usefulness, (c) entertainment, and (d) complementary relationships. Other researchers have developed similar criteria to evaluate the website interface only (Barnes & Vidgen, 2002; Liu & Arnett, 2000; O'Neill, Wright, & Fitz, 2001; Van Reil, Liljander, & Jurriens, 2001). In this study, we go beyond website design to address the website as a service provider. We treat retail e-commerce websites, such as Amazon.com, eBay.com, Alibaba.com, and others as Online Service Retailers (OSRs). Indeed, these websites handle payment transactions, shipping, returns, and refunds and many other service processes, which are the focus of this study.

The SERVQUAL model is used to assess customer perceptions of service quality in service and retail organizations through five dimensions: (a) tangibility (the actual and physical appearance of the facilities, personnel, items, and products), (b) reliability (the ability to accomplish the promised service precisely and dependably), (c) responsiveness (the willingness to serve customers and fulfill the required service promptly), (d) assurance (the knowledge and courtesy of employees and their ability to communicate trust and confidence), and (e) empathy (the level of caring and individual attention that the firm provides to its customers) (Parasuraman, Zeithaml, & Berry, 1988). Many studies have used the SERVQUAL model or similar models (Parasuraman, Berry, & Zeithaml, 1991) to identify the quality dimensions of service delivered and the perceived service provided

by the retail website (Cox & Dale, 2001; Francis, 2009; Francis & White, 2002). Unlike these studies, we measure customer willingness to shop online rather than in-store. We also measure customer satisfaction with online shopping. Specifically, we identify the quality gaps that hinder the consumers' ability to use OSRs. Additionally, we measure the strategies that could be used to mitigate those gaps. We measure the significant impact of the quality gaps on customers' willingness, and customer satisfaction.

Table 1 represents different studies (2001-2012) on online retailers' websites and the identified quality dimensions for each one of them:

Table 1: Identified Quality Dimensions for Different Studies of OSRs

Study	Quality Dimensions
(Yoo & Donthu, 2001) SITEQUAL	Four factor dimensions: ease of use, aesthetic design, processing speed, and security.
(Cox & Dale, 2001)	Five dimensions: Accessibility, communication, credibility, understanding, appearance, and availability.
(Barnes & Vidgen, 2002) WEBQUAL 4.0	Three dimensions: website usability, information quality, and service interaction quality.
(Francis & White, 2002) PIRQUAL	Six dimensions: web store functionality, product attribute description, ownership conditions, delivered products, customer service, and security.
(Janda, Trocchia, & Gwinner, 2002)	Five dimensions: performance, access, security, sensation, and information.
(Y. N. Li, Tan, & Xie, 2002)	Six dimensions: responsiveness, competence, quality of information, empathy, web assistance, and call-back systems.
(Madu & Madu, 2002)	Fifteen dimensions: performance, features, structure, aesthetics, reliability, storage capacity, serviceability, security and system integrity, trust, responsiveness, product/ service differentiation and customization, web store policies, reputation, assurance, and empathy.
(Cai & Jun, 2003)	Four dimensions: website design/content, trustworthiness, prompt/reliable service, and communication.
(Wolfinbarger & Gilly, 2003) eTailQ	Four factor dimensions: website design, fulfillment/reliability, privacy/security, and customer service.
(Jun, Yang, & Kim, 2004)	Six dimensions: reliable/prompt response, access, ease of use, attentiveness, security, and credibility.

(S. Kim & Stoel, 2004)	Six dimensions: web appearance, entertainment, informational fit-to-task, transaction capability, response time, and trust.
(Long & McMellon, 2004)	Five dimensions: tangibility, assurance, reliability, purchasing, and trust.
(G.-G. Lee & Lin, 2005)	Five dimensions: website design, reliability, responsiveness, trust, and personalization.
(Parasuraman, Zeithaml, & Malhotra, 2005) E-S-QUAL E-RecS-QUAL	Four dimensions (E-S-QUAL): efficiency, fulfillment, system availability, and privacy. Three dimensions (E-RecS-QUAL): responsiveness, compensation, and contact.
(Bauer, Falk, & Hammerschmidt, 2006) eTransQual	Five dimensions: functionality/design, enjoyment, process, reliability, and responsiveness.
(Cristobal, Flavián, & Guinalíu, 2007) PeSQ	Four multidimensional constructs: web design, customer service, assurance, and order management.
(Ha & Stoel, 2009)	Four dimensions: website design, customer service, privacy/security, and atmospheric/ experiential.
(Francis, 2009) RECIPEs	Four category-specific quality measurement scales: website, exchange, customer service, and security
(Azam, Qiang, & Abdullah, 2012)	Two components: 1) information satisfaction (relevancy, understandability consistency, and currency); 2) system satisfaction (users' interface, security, personalization, tele-presence, and navigability).
(Ha & Stoel, 2012)	Four dimensions: privacy/security, website content/functionality, customer service, and experiential/atmospheric.

The term *service encounter* has long been used to denote the interplay between the customer and the service provider (Bitner, Booms, & Tetreault, 1990). A customer's global satisfaction with the service can be understood through the dyadic interaction between the customer and the service provider (Solomon, Surprenant, Czepiel, & Gutman, 1985). Zeithaml, Parasuraman, and Berry (1990), based on their study of focus group interviews, explained service quality by saying that "The key to ensuring good service quality is meeting or exceeding what customers expect from the service" (p. 18). In short, service quality is the discrepancy between customers' expectations and perception (Zeithaml et al., 1990).

Figure 5, in their conceptual model of service quality, Parasuraman, Zeithaml, and Berry (1985) identified four main quality gaps between customers and the organizational functions associated with design, marketing, and service delivery. These four main quality gaps are as follows:

Gap 1: The difference between customer expectations and management perceptions of customer expectations.

Gap 2: The difference between management perceptions of customer expectation and the translation of those perceptions into service quality specifications and designs.

Gap 3: The difference between specifications of service quality and the actual service delivered to customers.

Gap 4: The difference between service delivery and the promise to the customers by the organization about its service quality.

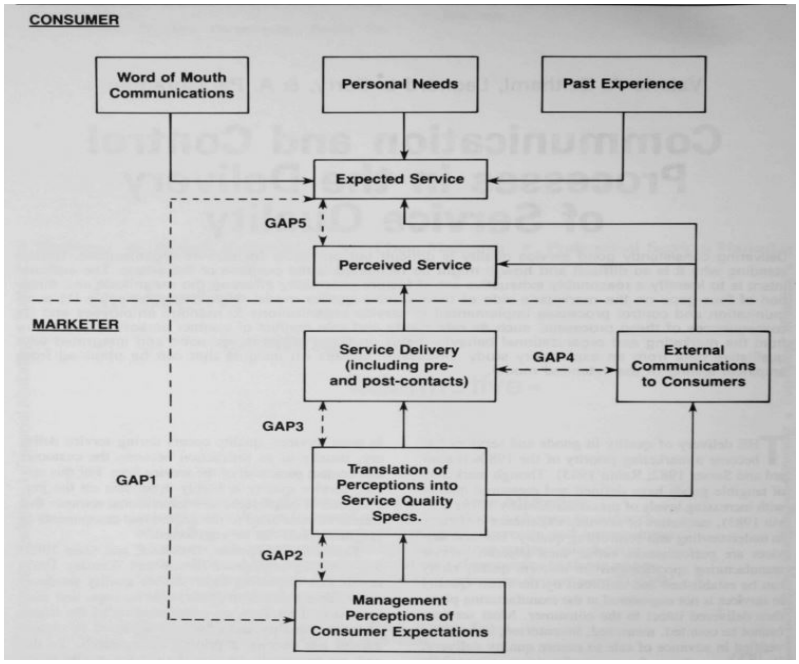


Figure 5: Conceptual Model of Service Quality (Parasuraman et al., 1985)

Zeithaml, Parasuraman, and Malhotra (2002) identified four conceptual gaps for the e-Service Quality (e-SQ) from two perspectives: organization and the customer. The organization's perspective has three gaps: (a) information, (b) design, and (c) communication gap, while the customer's perspective has one gap: fulfillment, which "stems from a combination of the information, design, and communication gaps" (p. 370). Zeithaml et al. illustrated the four conceptual gaps in Figure 6 titled "the conceptual gaps model for understanding and improving e-service quality."

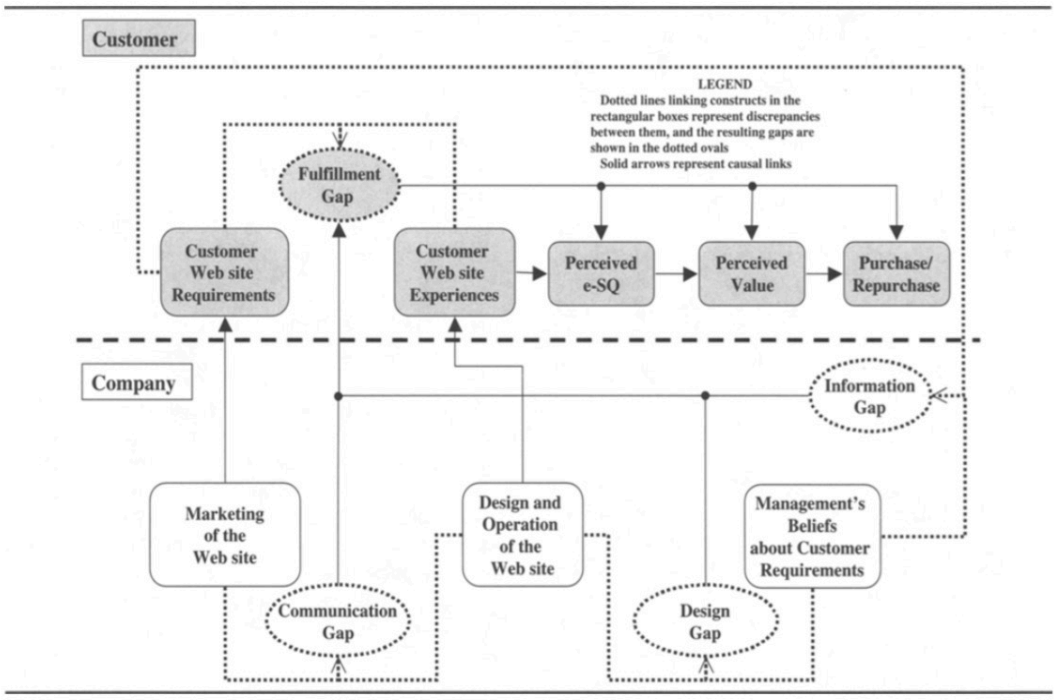


Figure 6: Conceptual Model for Understanding and Improving e-SQ (Zeithaml et al., 2002)

This research study is related to the recommendation of Zeithaml et al. regarding what they stated in their article "direct effects are subject to future research" (p. 370). In other words, this research undertakes the verification task via theoretical and empirical research, as presented in depth in Chapters 3, 4, and 5. In fact, during the past 14 years, since such recommendations were delivered in 2002, there have been many advances in technology and in the retail field; the use of the Internet and online shopping have become ubiquitous.

Chapter 3: Quality Gaps for Online Service Retailers

When shopping online, customers pay greater attention to positive feedback than negative feedback collected from previous customers (Ong, 2011; Utz, Kerkhof, & van den Bos, 2012). Website reputation has a significant positive effect on customers' feelings about shopping online (Kim & Lennon, 2013), and the reputation of OSRs contributes to customer loyalty by increasing customer satisfaction (Jin, Jin Yong, & Kim, 2008). In addition, customers' experience with past service affect their expectations about future service (Zeithaml et al., 1990).

A consumer who visits retail websites often interacts directly with website interfaces that are managed and controlled by the OSR and indirectly, by the industry in which the OSR operates, as shown in Figure 7.

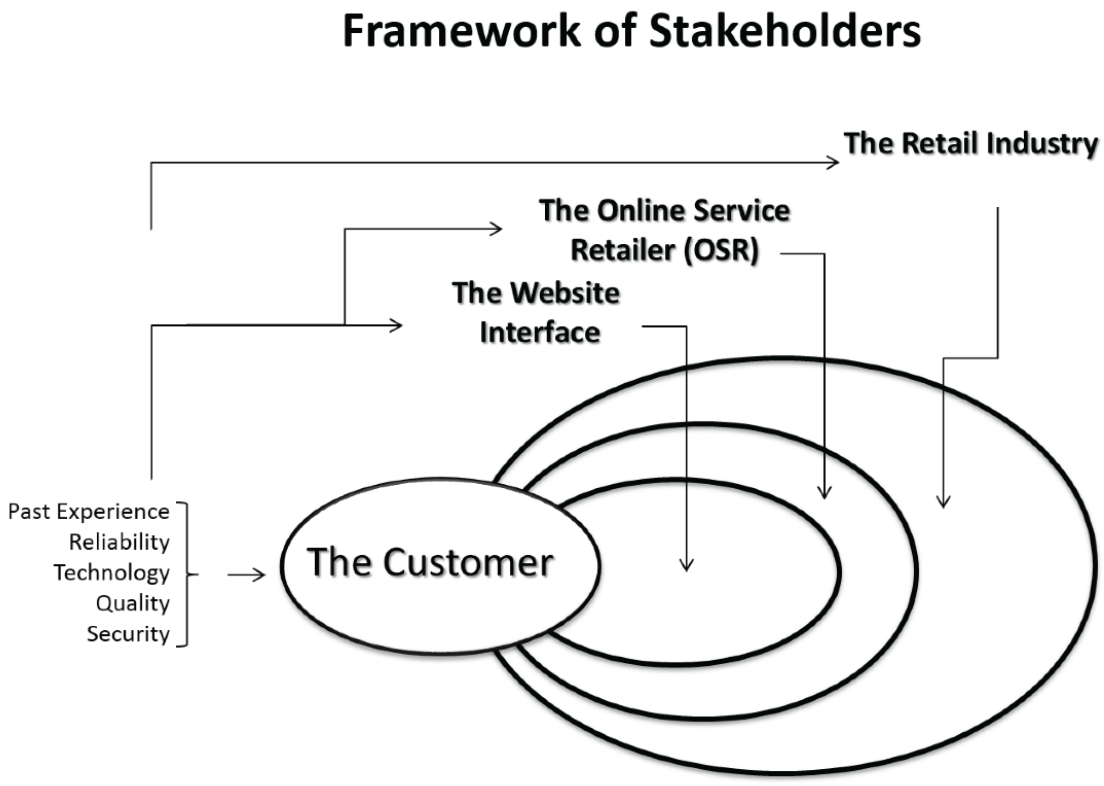


Figure 7: Retail Industry Framework of Stakeholder Interaction

This study aims first to establish the relationship that connects the customer, the OSR, and the retail industry. Once this relationship is established, it becomes possible to analyze the quality gaps. A literature review on the service quality of online retailers was conducted to identify the quality gaps of OSR. The quality gaps also were measured through data collection from two survey instruments (refer to Appendix A and Appendix B), as outlined in Chapter 4, which discusses research methodology.

3.1. Identification of the Quality Gaps for Online Service Retailers

The following paragraph describe the quality gaps as well as the influential mitigation strategies of each quality gap.

Each quality gap has been justified by literature, and each influential mitigation strategy has been verified by literature sources. Below is a description of nine quality gaps and their mitigation strategies:

Quality Gap 1: Tactile Feedback. This is the gap between how the product looks online and how it might look when viewed in person, which would permit touching the item. Customers prefer to see an item prior to purchasing, which is one of the reasons that they prefer to shop in-store (Ofek, Katona, & Sarvary, 2011), and the inability to touch a product is a reasonable objection to online shopping (Suki & Suki, 2013). Customers are concerned about the size, appearance, fit, and smell of such items as shoes, jewelry, clothes, and fragrances (Pintro, 2013). When shopping online, a high level of uncertainty and intangibility represents a risk, which may deter the customer from making a purchase (Pavlou & Fygenson, 2006). We postulate that when customers are unable to touch the product, they create an expectation that is often linked to a known similar or familiar product based on their previous experience.

Influential Mitigation Strategies for Tactile Feedback. Websites must either provide a detailed description of items, as does Amazon.com, or, when possible, take the customer through a step-by-step process to customize an order. The latter is done through websites such as Shoefitr.com or Makeyourownjeans.com. In addition, a website can increase customers' perceived diagnosticity of products by providing virtual control, which is categorized into two dimensions: visual and functional (Jiang & Benbasat, 2004). Visual control enables customers to manipulate a website's interface product images and to view the product from different angles and distances. Functional control allows a customer to explore different product functions. Researchers have termed this technology *image interactivity technology* (IIT) and have observed that IIT has a positive effect on customers' responses and intention to purchase online (Fiore & Hyun-Jeong, 2003; Fiore, Hyun-Jeong, & Kim, 2005; Fiore, Kim, & Hyun-Hwa, 2005). In addition to enabling customers to enlarge images or zoomin on images, IIT facilitates 3D virtual models and allows the customer to interact with the product (Kim, Fiore, & Lee, 2007; Li, Daugherty, & Biocca, 2003).

Some OSRs also address this gap (Tactile Feedback) by offering customers the ability to order an item, receive it, try it on, and then return it if the item does not fit or otherwise meet with their approval. For example, Warby Parker, an online eyeglass store whose Home Try-On program allows its customers to receive five pairs in five days delivered without charge (Bell, Gallino, & Moreno, 2015). Other OSRs offer to send to customers multiple items of the product in different sizes to allow customers select the desired product, then return unwanted items with no shipping cost (Pintro, 2013). Finally, the availability of product information is one of the essential factors that helps customers make

more informed decisions. Notably, perceived information quality influences customer satisfaction (Song, Baker, Lee, & Wetherbe, 2012) and is intimately related to closing this gap. The ability to ask previous users and/or buyers of the same item that the customer is intending to purchase is another means to help customers better understand what they are purchasing and get answers to their questions and concerns. Amazon.com, for example, allows its customers to ask previous users about items through the website and to share feedback about inquiries and concerns.

Gap 2: Delayed Acquisition. This is the gap between payment transaction and eventual item ownership. After an online item is purchased, ownership is not instant; the item is delivered to the customer after a certain number of days (shipping time). In contrast, items purchased from a traditional brick-and-mortar store are owned immediately. Individuals opt to purchase less from OSRs due to the fact that the time required to deliver items purchased online is longer than the time required to purchase items in person (Koyuncu & Bhattacharya, 2004).

Influential Mitigation Strategies for Delayed Acquisition. OSRs should provide shorter shipping time options for an extra shipping fee. Speed of delivery positively affects customers' willingness to shop online (Koyuncu & Bhattacharya, 2004). Amazon.com is a pioneer in offering its Amazon Prime service. For an annual membership fee, any of the many offered items in its website can be shipped within two business days. Amazon.com also has recently released "Amazon Prime Now," which allows Prime members to receive certain ordered items within two hours of ordering, with free shipping, with the condition that the overall purchase value totals at least $15. Customers are even able to receive the

items within an hour for an extra fee of $7.99. These types of features offered by OSRs mitigate the gap of delayed ownership.

Gap 3: Delivery Reliability. This is the gap between customers' expectations of delivery and OSRs' shipping reliability. When customers purchase items online, they might be charged a shipping cost. OSRs usually provide customers with a range of options with regard to delivery speed, and items are delivered based on the shipping method selected by the customer (e.g., ground shipping, overnight shipping). Customers build their expectations based on the available shipping options and the one selected. Delivery reliability is one of the important factors that affect customers' decision to shop online. Customer tend to shop online less when there is a delay in delivery (Suki & Suki, 2013). According to ComputerWorld, 85% of buyers who receive their orders on time would shop again from the same OSR (Machlis, 1999). The degree to which an OSR can be relied upon to deliver an item in a timely fashion as promised determines an OSR's reliability in the opinion of the customer (Jarvenpaa & Todd, 1996).

Influential Mitigation Strategies for Delivery Reliability. OSRs have different delivery options to choose from among an array of courier services, including UPS, FedEx, and USPS. An OSR's specification of courier service on its website, specifically UPS or FedEx, leads to a stronger delivery expectation among customers (Esper, Jensen, Turnipseed, & Burton, 2003). When selecting the courier service, OSRs need to consider factors such as price, reliability, tracking accuracy, and the weight of the merchandise. When carrier information is clearly disclosed on the website, the perception of delivery time, product condition, delivery satisfaction, and reliability will be positively influenced

(Esper et al., 2003). To mitigate uncertainty, customers prefer to be updated frequently updated about product processing and shipping status (Jifeng, Sulin, & Han, 2012).

Gap 4: Confounding Technological Trust. This is the gap between customers' perceived trust and OSRs' graphical user interface (GUI) quality and usability. Perceived trust is one of the major factors that influence a customer's decision to shop online (Chang, Cheung, & Tang, 2013; Kim, Ferrin, & Rao, 2008; Ponte, Carvajal-Trujillo, & Escobar-Rodriguez, 2015); thus, it is essential for organizations to both develop and continuously nurture customers' trust (Palvia, 2009). For online shoppers, trust creates a psychological state that affects their willingness to make purchases (Hong & Cho, 2011).

One of the primary differences among OSRs is interface quality (Spiller & Lohse, 1997). Customers' initial trust is derived from perceived website usefulness and ease of use (Koufaris & Hampton-Sosa, 2004); there a strong positive relationship between GUI and trust (Roy, Dewit, & Aubert, 2001). Moreover, customers' loyalty is positively influenced by easier-to-navigate website usability (Flavián, Guinalíu, & Gurrea, 2006).

High-quality search engines and website design will affect customers' evaluations of and trust in OSRs (Montoya-Weiss, Voss, & Grewel, 2003). A badly designed search engine, for example, may make it difficult for customers to find the products they are seeking (Wolfinbarger & Gilly, 2001); This factor will have a negative impact on trust. To improve website usability, search, grouping, and filtering capabilities collectively must be addressed (Song et al., 2012). In addition, an effective graphical user interface plays a significant role in enhancing customer retention (Song & Zahedi, 2005). Overall, OSRs should focus on website usability because perceived ease of use and perceived trust induce customers to shop online more frequently (Cho & Sagynov, 2015).

Influential Mitigation Strategies for Confounding Technological Trust. For OSRs to remain competitive and positively influence customers' perceived trust, the GUI must be enhanced. McKnight et al.'s (2002) model concerns three factors that build customer trust: structural assurance (customer perception of website safety), perceived website reputation, and perceived website quality. Thus, OSRs should assure website environment safety, focus on their reputation, and enhance the GUI (McKnight et al., 2002). Moreover, graphics, appealing layouts, attention to detail, and privacy policy statements also build trust with online shoppers (Xiling & Xiangchun, 2005). In this regard, a website's colors also affect customers' trust. Colors that are vivid and high in saturation decrease customers trust, whereas colors low in brightness and saturation increase customers' trust (Pelet & Papadopoulou, 2012). Overall, OSRs should emphasize the quality of the GUI, search engines, and website colors as a means to create a positive perception of the website for potential online customers (Lepkowska-White, 2004) .

Gap 5: Transaction Security. This is the gap between a customer's expectations of security and privacy and the level of security offered by the OSR. Customers' privacy in cyberspace refers to the protection of personal information, such as name, address, and credit card details. It also refers to the protection of information regarding customers' purchasing behavior. The invasion of privacy in e-commerce is usually interpreted as the unauthorized collection, disclosure, or other use of personal information as a direct result of transactions conducted via the Internet (Lee, Wang, & Wang, 1998). Due to the critical nature of personal data, customers tend to be unwilling to provide it when shopping online (Culnan & Armstrong, 1999), and many online shoppers prefer not to use their debit or credit cards in making payments (Pintro, 2013). The provision of privacy among OSRs

has a significant influence on customers' evaluations (Parasuraman, Zeithaml, & Malhotra, 2005). As shown in studies cited in this paper, the Internet security of OSRs plays a significant role in customers' online buying behavior and willingness to make a purchase (Jiang, Jones, & Javie, 2008; Lei-da, Gillenson, & Sherrell, 2004; Yoo & Donthu, 2001). In fact, 75% of Internet users either agree (39%) or strongly agree (36%) that they are uncomfortable in providing their credit card or personal information online (Horrigan, 2008), which can affect their desire to shop online (Ha & Stoel, 2012; Suki & Suki, 2013).

Influential Mitigation Strategies for Transaction Security. OSRs need to ensure customer confidence in terms of security and privacy (Cristobal, Flavián, & Guinalíu, 2007). Based on customers' concerns, alternative payment options, such as cash on delivery or Internet banking, should be considered by OSRs (Pintro, 2013). Because customers' perceived security is also affected by website interface design, OSRs must enhance its quality (Kamoun & Halaweh, 2012). OSRs also should consider acquiring a third-party assurance seal. Third-party certification companies, such as BBBonline and TRUSTe, provide OSRs with a certification that assures customers that the OSRs offer the required technology to ensure payment security and privacy requirements, hence increasing customers' perceived security and privacy (Jiang, Jones, & Javie, 2008; Ponte et al., 2015).

Gap 6: Sales Information. This is the gap between customers' expectation of accuracy and the accuracy of the information provided by OSRs. Information is an important resource for online shoppers. Horrigan (2008) found that 43% of US Internet buyers have been frustrated by lack of information, while 32% have been confused by the information that was provided during their shopping or research experience. Useful product-related information will increase customer retention by enhancing customer

satisfaction (Lynch & Ariely, 2000). Price is a significant product detail and perhaps the most influential factor in terms of customers' perceptions and the number of purchases (Blakney & Sekely, 1994; Jarvenpaa & Todd, 1996; Li, Kuo, & Rusell, 1999), and customers tend to compare prices between multiple websites (Wolfinbarger & Gilly, 2001). Thus, allowing customers to compare products will lead customers to make appropriate choices (Cristobal et al., 2007). Finally, the quality and reliability of customer reviews are the types of information that relates to the customer decision to purchase.

Influential Mitigation Strategies for Sales Information. Because the accuracy of information provided by various websites positively influences customers' decisions to purchase and their satisfaction, OSRs must maintain accuracy and provided detailed information on their websites (Azam et al., 2012; Janda, Trocchia, & Gwinner, 2002; Kim & Stoel, 2004). In addition, OSRs should monitor customer reviews for misleading information. Providing accurate and precise product information will make OSRs a valuable alternative to traditional retail stores (Zellweger, 1997).

Gap 7: Wirelessness. This is the gap between the customers' need for person-to-person interaction and cyberspace communications offerings. OSRs are considered spaces for human-computer interaction, which by definition implies the absence of human-to-human interaction. Because there is no human present to process the purchase or to answer questions and clarify certain concerns regarding the items, a gap occurs (Long & McMellon, 2004). Customers, in general, require assistance and advice. Salespeople in traditional stores have the qualifications to assist customers, and their physical presence increases the likelihood of customer purchases and reduced returns (Ofek et al., 2011). Furthermore, the social environment of a traditional retail store also creates a greater

feeling of psychological arousal in customers than does a low social environment (Baker, Levy, & Grewal, 1992). Therefore, a customer who is shopping online may have less psychological motivation to make a purchase. Additionally, for many people, shopping is an essential social activity (Jarvenpaa & Todd, 1996). For the elderly, shopping as a social activity may be associated with reduced risk for mortality and institutionalization (Pynnönen, Törmäkangas, Heikkinen, Rantanen, & Lyyra, 2012).

Influential Mitigation Strategies for Wirelessness. As with conventional stores, higher levels of perceived social presence in OSRs have a positive impact on customers' perceived trust, usefulness, and enjoyment, and can lead to more favorable customer attitudes while shopping online (Hassanein & Head, 2007). Thus, OSRs must employ personalization practices. Personalization of OSRs makes it possible for customers to have certain items recommended to them based on previous items purchased or researched (Ho & Tam, 2005; Liang, Lai, & Ku, 2006). Using personalized recommendation systems has the potential to compensate for lack of human interaction in cyberspace, as customers feel a greater sense of social presence in OSRs through personalized recommendations (Choi, Lee, & Kim, 2011). Mulpuru, Johnson, and Wright (2007) found that 34% of customers buy products based on personalized recommendations, and 23% of customers perceived personalization as valuable and 8% see it as extremely valuable. Personalization also increases customer satisfaction and minimizes search efforts (Tam & Ho, 2006). Moreover, customer satisfaction increases when personalized recommendation systems provide accurate recommendations (Liang et al., 2006).

Gap 8: Buyers' Remorse. This is the gap between customers' expectations with regard to refunds and returns and OSR responsiveness in handling these matters.

Customers return products for a variety of reasons, including product defects and failure to match customer expectations (e.g., different color, size, or fit than expected). Online retailers have return policies that vary widely in effectiveness, and, for online shoppers, the return process can be difficult (Ofek et al., 2011). Approximately nine out of ten customers will evaluate the OSR's return policy before deciding to shop (Trager, 2000). Some OSRs charge a fee to customers when a product is returned, but this has a negative impact on customers' future purchasing behavior with the OSR (Bower & Maxham, 2012).

Influential Mitigation Strategies for Buyers' Remorse. An OSR's ability to handle customer returns is an important part of its responsiveness (Parasuraman et al., 2005; Zeithaml et al., 2002). OSRs should have a clear policy and be consistent in terms of returns and refunds. Online consumers prefer to have a short, straightforward privacy statement over a lengthy, legalistic one (Pan & Zinkhan, 2006) and that this privacy information be readily accessible (Tsai, Egelman, Cranor, & Acquisti, 2011). In addition, a liberal return policy is important to remaining competitive in the retail industry (Rogers, Tibben-Lembke, & Council, 1999). OSRs should allow their customers to return products with no shipping fee. While customers seldom formally complain about return fees, these fees will decrease their likelihood of repurchase even if the fault lies with the customer. Hence, providing customers with the ability to return unwanted items with no shipping fee will increase the customers' loyalty and likelihood of repurchasing and, subsequently, increase the OSR's postreturn sales (Bower & Maxham, 2012; Raphel, 2004).

Gap 9: Confounding Knowledge Technology. This is the gap between customers' level of technical knowledge and the level of technology and complexity offered by the OSRs. Some customers may refuse to buy through OSRs due to the customers' lack of

technological knowledge. Moreover, some websites may inadvertently develop complicated interface designs that confuse users. Not surprisingly, experienced Internet users search and buy online more often than do inexperienced Internet users (Farag et al., 2007). For example, elderly people (aged 65+) often resist change in general and technological change in particular (Zeithaml & Gilly, 1987). The elderly who find it difficult to shop online due to technological challenges may prefer to shop in-store (Jarvenpaa & Todd, 1996).

Influential Mitigation Strategies for Confounding Knowledge Technology. Website ease, level of workability of website technology, and design of use play a significant role in customers' perceived quality and their intention to shop online (Ha & Stoel, 2009; Yen, 2005). For example, the level of technology used in the website must be tested among elderly people, in particular, to ensure its user-friendliness for this group and for other users who may not be as comfortable with technology. Website ease has a critical influence on traffic and sales (Lohse & Spiller, 1998) and plays a significant role in customers' perceived quality of the OSR (Yoo & Donthu, 2001).

Figure 8 shows the conceptual framework of gaps in OSRs quality; it illustrates each gap by the relationship between the website interface (core) and the customer (peripheral).

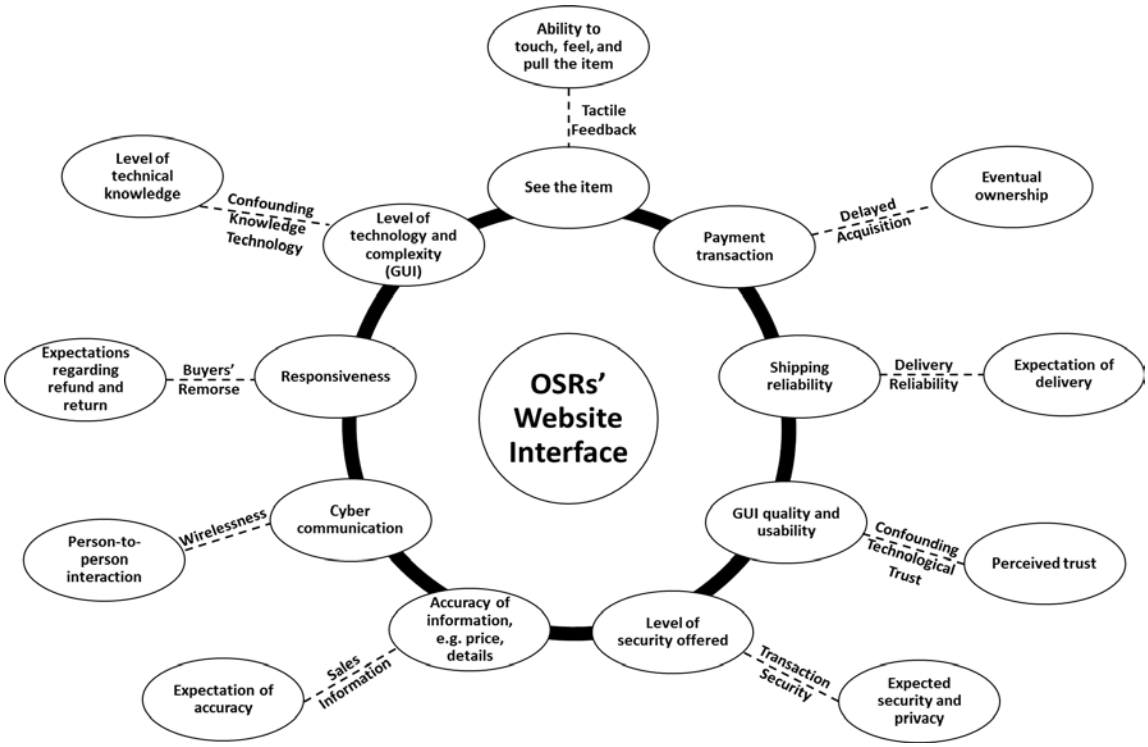


Figure 8: OSRs Quality Gaps Conceptual Framework

Table 2 summarizes each quality gap and influential mitigation strategies.

Table 2: Summary of OSRs' Quality Gaps and Influential Mitigation Strategies for Each Quality Gap

No.	Quality Gap	Description	Influential Mitigation Strategies
1	Tactile Feedback	Difference between seeing the item and touching, feeling, and pulling the item.	-Provide full detailed description of items, size chart, and the ability to enlarge (zoomin) images. -Offer ability to ask previous users and/or buyers of the same item.
2	Delayed Acquisition	Difference between payment transaction and eventual ownership of item.	Expedite shipping with yearly membership fee.
3	Delivery Reliability	Difference between customers' expectations of delivery and OSR shipping reliability	-Frequently update customers with shipping status. -Disclose carrier information.
4	Confounding Technological Trust	Difference between customers' perceived trust and OSR's graphic user interface (GUI) quality and usability	-Enhance GUI quality and usability. -Employ efficient search engines. -Use colors low in saturation and brightness.
5	Transaction Security	Difference between customers' expectations of security and privacy and the level of security offered by the OSR.	-Offer alternative payment options, such as cash on delivery or Internet banking. -Acquire a third-party assurance seal. -Enhance the quality of the GUI.
6	Sales Information	Difference between customers' expectation of accuracy and OSR accuracy of provided information.	-Enhance accuracy of the provided information. -Provide the ability to return products without cost if the delivered product fails to meet the product description.
7	Wirelessness	Difference between customers' need for person-to-person interaction and cyberspace communication.	Offer personalized recommender systems.
8	Buyers' Remorse	Difference between customers' need of refund and return policies and OSR responsiveness.	-Make available a clear and short return policy that is consistent. -Provide the ability to return products without cost.
9	Confounding Knowledge Technology	Difference between customers' level of technical knowledge and the level of technology and complexity offered by the OSR.	-Test the website with an elderly group. -Enhance GUI quality and usability.

Chapter 4: Methodology

This study methodology is executed in the following three phases:

Phase I: Developing a conceptual framework for Online Service Retailers

Phase II: Model Testing of Conceptual Framework

Phase III: Comprehensive (nationwide) study and the development and application of structural equation modeling (SEM)

4.1. Phase I: Conceptual Framework for Online Service Retailers

In this phase, the focus of the study is to develop a conceptual framework for Online Service Retailers (OSRs). The purpose of the conceptual framework is to understand and establish the relationship that connects the customer, the OSR, and the retail industry.

This phase consists of the following activities:

- Extensive review of the literature (as presented in Chapter 2)
- Development of the conceptual framework (as presented in Chapter 3)
- Identification of quality gaps for OSR (as presented in Chapter 3)
- Identification of mitigation strategies (as presented in Chapter 3)

4.2. Phase II: Model-Testing

In this phase, the focus of the study is to test the conceptual framework of OSRs developed in Phase I. The purpose of the model-testing phase is to assess the feasibility of a larger study, and to apply the lessons learned from this phase to the work in Phase III. More specifically, Phase II consists of the following activities:

- Statement of purpose and research questions.
- Development of a survey instrument (refer to model testing survey instrument in Appendix A).

- Sampling plan and data collection for model-testing survey instrument.
- Model-testing results and what we learned from it to proceed to Phase III.
- Transitioning from Phase II to Phase III.

4.2.1. Phase II: Statement of Purpose and Research Questions

In this part of the research, the focus is to evaluate which quality gap has a stronger association with customers' behavior while shopping online. Hence, the objective is to measure the significant association of the quality gaps with customers' willingness to shop.

Consequently, the research question is as follows:

Are quality gaps associated with customers' willingness to shop online?

The following is the statement of the hypotheses:

H_{ti}: Quality Gap_i has a significant association with customers' willingness to shop online,

where i = 1, 2, 3, 4….9

4.2.2. Phase II: Development of a Model-Testing Survey Instrument

In order to determine the best approach to conducting and analyzing this research, we developed a model-testing survey instrument (refer to model-testing survey instrument in Appendix A).

Several studies have highlighted the significance of the quality dimensions of OSRs for overall customer satisfaction (Bauer, Falk, & Hammerschmidt, 2006; Collier & Bienstock, 2006; Jun, Yang, & Kim, 2004; Lee & Lin, 2005; Wolfinbarger & Gilly, 2003). Researchers also have measured the influence of quality dimensions on customers' intention to shop online (Azam, Qiang, & Abdullah, 2012; Ha & Stoel, 2009, 2012) and

the significance of the quality dimensions on consumer expectations and perceptions of quality (Francis & White, 2002).

Unlike previous studies, the purpose of this model-testing survey instrument is to measure the quality gaps' significance on consumers' willingness to shop online. In the model-testing survey instrument, we have used one statement per gap construct as an independent variable.

4.2.3. Phase II: Sampling Plan and Data Collection

The participants in this model-testing phase of the study were college students in the United States, mainly from the University of Miami, who had purchased products through OSRs in the six months prior to November 2014. Many research studies in the online service quality field have used only students as survey respondents (Aladwani & Palvia, 2002; Cai & Jun, 2003; Collier & Bienstock, 2006; O'Neill et al., 2001), and student samples have been found to adequately represent the online consumer population (Harrison McKnight, Choudhury, & Kacmar, 2002). Moreover, with regard to purchase intentions, students and nonstudents do not differ significantly in their quality/reliability perceptions (Peterson & Jolibert, 1995). In addition, younger people, such as students, tend to have more Internet experience and a positive attitude toward online shopping (Farag et al., 2007).

An online survey software and insight platform, Qualtrics, was used to collect the data from the respondents. The average time required to complete and submit the survey instrument was seven minutes. Response from nonengaged respondents (defined as those who spent less than three minutes completing the survey) were excluded due to insufficient or unusable data. The data from those who selected the same answer for every question

were also eliminated. Therefore, the 253 completed survey responses were reduced to 239 usable survey instruments for analysis.

4.2.4. Phase II: Model-Testing Results

Although this is a chapter on methodology, the results from Phase II were used to inform the methodology in Phase III. IBM SPSS Statistics, Version 22, software was used to perform OLS regression to identify the significance of the quality gaps (independent variables) as related to the willingness to shop online (dependent variable).

The overall model was significant ($p < 0.001$, $Adj\ R^2 = 0.086$, $F(9,229) = 3.480$. Table (3) presents each quality gap question in the survey instrument as an independent variable and shows the "willingness to shop" online question as the dependent variable. A 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) was used to address each item. Table 3 shows the significance of each gap to the dependent variable: customer willingness to shop online.

Table 3: The Significance of Quality Gaps in Model Testing Phase

Dependent variable question: I consider Online Service Retailers my first choice to purchase consumer goods.			
No.	Independent Variable	Question	*p*
H_{t1}	Tactile Feedback	In some cases, I prefer not to buy online because of my inability to touch, feel, smell, try, and pull the item, e.g., clothes, shoes, jewelry, perfumes.	0.006**
H_{t2}	Delayed Acquisition	In some cases, shopping online is not preferable since I cannot own the item immediately. I have to wait for the item to be shipped.	0.403
H_{t3}	Delivery Reliability	In some cases, Online Service Retailers' failure (in general) to deliver some products on time makes me prefer to shop in-store.	0.026*
H_{t4}	Confounding Technological Trust	Ineffective search engines and inferior website design affect my trust.	0.298
H_{t5}	Transaction Security	Inability to pay by using different secure transaction methods, such as PayPal, affects my decision to buy online.	0.322
H_{t6}	Sales Information	In some cases, the information provided by the shopping website provided is not accurate.	0.012*
H_{t7}	Wirelessness	The inability to interact with a customer service representatives inperson makes me prefer shopping in-store rather than shopping online	0.094
H_{t8}	Buyers' Remorse	In some cases, an inconvenient refund policy makes me prefer shopping in-store rather than shopping online.	0.966
H_{t9}	Confounding Knowledge Technology	In some cases, customers' lack of technology experience may hinder their ability to shop online.	0.022*

$^{*}p < 0.05$, $^{**}p < 0.01$

Table 4: Linear Regression Model Coefficients

	Unstandardized Coefficients		Standardized Coefficients			95% CI for B		Collinearity Statistics	
Gap	*B*	Std. Error	Beta	*t*	*p*	Lower Bound	Upper Bound	TOL	VIF
Constant	3.140	0.506		6.209		2.143	4.136		
1	-0.279	0.101	-0.202	-2.758	0.006	-0.479	-0.080	0.713	1.402
2	0.073	0.087	0.067	0.837	0.403	-0.099	0.245	0.608	1.646
3	-0.203	0.090	-0.171	-2.248	0.026	-0.38	-0.025	0.667	1.499
4	0.085	0.081	0.074	1.043	0.298	-0.075	0.245	0.767	1.303
5	0.076	0.077	0.072	0.993	0.322	-0.075	0.228	0.722	1.385
6	0.235	0.093	0.178	2.54	0.012	0.053	0.418	0.783	1.277
7	-0.143	0.085	-0.137	-1.684	0.094	-0.311	0.024	0.582	1.718
8	-0.004	0.095	-0.004	-0.043	0.966	-0.192	0.183	0.54	1.852
9	0.221	0.096	0.160	2.313	0.022	0.033	0.409	0.799	1.252

Table 5: Linear Regression Model Correlations

	Dependent	Gap1	Gap2	Gap3	Gap4	Gap5	Gap6	Gap7	Gap8	Gap9
Dependent	1	-0.126	-0.058	-0.122	0.075	0.087	0.180	-0.067	-0.047	0.154
Gap1	-	1	0.402	0.206	0.244	0.123	0.170	0.099	0.329	0.262
Gap2	-	-	1	0.486	0.222	0.341	0.142	0.359	0.335	0.144
Gap3	-	-	-	1	0.286	0.348	0.214	0.349	0.399	0.143
Gap4	-	-	-	-	1	0.348	0.318	0.272	0.311	0.258
Gap5	-	-	-	-	-	1	0.316	0.331	0.306	0.252
Gap6	-	-	-	-	-	-	1	0.251	0.305	0.325
Gap7	-	-	-	-	-	-	-	1	0.582	0.241
Gap8	-	-	-	-	-	-	-	-	1	0.307
Gap9	-	-	-	-	-	-	-	-	-	1

Figure 9 shows the significance (p-value) of each gap in terms of the dependent variable after controlling for other gaps on the x-axis, with the customer agreement quotient (CAQ) on the y-axis.

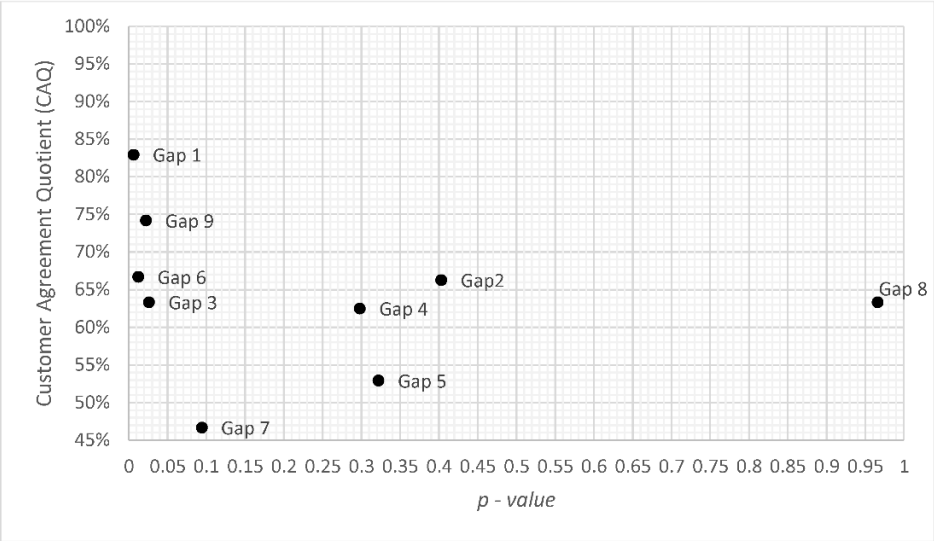


Figure 9: Model Testing Phase Gap Importance

Figure 10 shows four quadrants of gap importance. The greater the significance (the lower the p-value) and the greater the CAQ, the greater the importance of the gap. Consequently, as shown in Quadrant I, gaps 1, 3, 6, and 9 (Tactile Feedback, Delivery Reliability, Sales Information, and Confounding Knowledge Technology) are the gaps with the highest significance and the highest CAQ. All other gaps (Delayed Acquisition, Confounding Technological Trust, Transaction Security, Wirelessness, and Buyers' Remorse) have high CAQ, but are not significant. Hence, Figures 9 and 10 confirm the importance of the quality gaps based on the results of the model testing survey.

Quadrant I: High Significance, High Agreement
Quadrant II: High Significance, Low Agreement
Quadrant III: Low Significance, High Agreement
Quadrant IV: Low Significance, Low Agreement

Figure 10: Model Testing Phase Four Quadrants of Gap Importance

Respondent Agreement Quotient (RAQ) is the combined percentage of those respondents who "strongly agree" and "agree"; and Respondent Disagreement Quotient (RDQ) is the combined percentage of those respondents who "strongly disagree" and "disagree." In answering gap questions, the greater the RAQ, the greater the importance of the gap. Excluding those respondents who responded "neither agree nor disagree," Table

6 shows the RAQ and RDQ, which proves that the majority of the respondents agree on each gap.

Table 6: RAQ and RDQ of Each Gap

No.	Agreement (RAQ)	Disagreement (RDQ)
Gap1	95.60%	4.40%
Gap2	82.20%	17.80%
Gap3	82.50%	17.50%
Gap4	82.30%	17.70%
Gap5	73.60%	26.40%
Gap6	88.60%	11.40%
Gap7	66.20%	33.80%
Gap8	81.70%	18.30%
Gap9	92.10%	7.90%

By looking into the dependent variable question and excluding those respondents who "neither agree nor disagree," the outcome shows that 37.4% is RDQ and 62.6% is RAQ. This indicates that the majority of the participants consider online shopping as their first choice over traditional shopping in retail stores. However, the outcome shows that there is a variation in response about whether online shopping is their first choice when shopping. Also, there is variation in the level of agreement within each gap. In fact, while most respondents agree that online shopping is their first choice they also agree that those gaps do exist and may affect their willingness to shop online. Excluding those respondents who said "neither agree nor disagree," Tables 7 through 15 show a cross tabulation between each gap and the dependent variable question reflected in RAQ and RDQ in both of them. As an example, Table 7 shows that the majority of respondents agree on Tactile Feedback (Gap 1) with a percentage of 95.6%. It also shows that the majority of respondents who disagree to shop online, do agree on Tactile Feedback with a percentage of 98.4%. The interpretation of the remaining tables is the same.

Table 7: Cross Tabulation of Gap 1 and the Dependent Variable Reflected in RDQ and RAQ

Gap1 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap1	Disagreement (RDQ)	Count	1	6	7
		% within dependent variable	1.6%	6.2%	4.4%
	Agreement (RAQ)	Count	62	91	153
		% within dependent variable	98.4%	93.8%	95.6%
Total		Count	63	97	160
		% within dependent variable	100.0%	100.0%	100.0%

Table 8: Cross Tabulation of Gap 2 and the Dependent Variable Reflected in RDQ and RAQ

Gap2 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap2	Disagreement (RDQ)	Count	11	17	28
		% within dependent variable	17.7%	17.9%	17.8%
	Agreement (RAQ)	Count	51	78	129
		% within dependent variable	82.3%	82.1%	82.2%
Total		Count	62	95	157
		% within dependent variable	100.0%	100.0%	100.0%

Table 9: Cross Tabulation of Gap 3 and the Dependent Variable Reflected in RDQ and RAQ

Gap3 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap3	Disagreement (RDQ)	Count	8	17	25
		% within dependent variable	14.0%	19.8%	17.5%
	Agreement (RAQ)	Count	49	69	118
		% within dependent variable	86.0%	80.2%	82.5%
Total		Count	57	86	143
		% within dependent variable	100.0%	100.0%	100.0%

Table 10: Cross Tabulation of Gap 4 and the Dependent Variable Reflected in RDQ and RAQ

Gap4 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap4	Disagreement (RDQ)	Count	11	14	25
		% within dependent variable	21.6%	15.6%	17.7%
	Agreement (RAQ)	Count	40	76	116
		% within dependent variable	78.4%	84.4%	82.3%
Total		Count	51	90	141
		% within dependent variable	100.0%	100.0%	100.0%

Table 11: Cross Tabulation of Gap 5 and the Dependent Variable Reflected in RDQ and RAQ

Gap5 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap5	Disagreement (RDQ)	Count	19	19	38
		% within dependent variable	33.9%	21.6%	26.4%
	Agreement (RAQ)	Count	37	69	106
		% within dependent variable	66.1%	78.4%	73.6%
Total		Count	56	88	144
		% within dependent variable	100.0%	100.0%	100.0%

Table 12: Cross Tabulation of Gap 6 and the Dependent Variable Reflected in RDQ and RAQ

Gap6 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap6	Disagreement (RDQ)	Count	11	5	16
		% within dependent variable	20.8%	5.7%	11.4%
	Agreement (RAQ)	Count	42	82	124
		% within dependent variable	79.2%	94.3%	88.6%
Total		Count	53	87	140
		% within dependent variable	100.0%	100.0%	100.0%

Table 13: Cross Tabulation of Gap 7 and the Dependent Variable Reflected in RDQ and RAQ

Gap7 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap7	Disagreement (RDQ)	Count	15	31	46
		% within dependent variable	30.0%	36.0%	33.8%
	Agreement (RAQ)	Count	35	55	90
		% within dependent variable	70.0%	64.0%	66.2%
Total		Count	50	86	136
		% within dependent variable	100.0%	100.0%	100.0%

Table 14: Cross Tabulation of Gap 8 and the Dependent Variable Reflected in RDQ and RAQ

Gap8 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap8	Disagreement (RDQ)	Count	8	18	26
		% within dependent variable	14.8%	20.5%	18.3%
	Agreement (RAQ)	Count	46	70	116
		% within dependent variable	85.2%	79.5%	81.7%
Total		Count	54	88	142
		% within dependent variable	100.0%	100.0%	100.0%

Table 15: Cross Tabulation of Gap 9 and the Dependent Variable Reflected in RDQ and RAQ

Gap9 vs. Dependent Variable Cross Tabulation					
			Dependent Variable Question		Total
			Disagreement (RDQ)	Agreement (RAQ)	
Gap9	Disagreement (RDQ)	Count	7	5	12
		% within dependent variable	12.7%	5.2%	7.9%
	Agreement (RAQ)	Count	48	92	140
		% within dependent variable	87.3%	94.8%	92.1%
Total		Count	55	97	152
		% within dependent variable	100.0%	100.0%	100.0%

Table 16 summarizes the information presented in Tables 7 through 15, which demonstrate the percentages of agreement and disagreement within each gap, and the percentages of agreement and disagreement within the dependent variable question:

Table 16: Cross Tabulation of Each Gap RDQ and RAQ within the Dependent Variable

Cross Tabulation: Gap i vs. Dependent Variable				
		Dependent Variable Question		Total
		Disagreement (RDQ)	Agreement (RAQ)	
Gap1	Disagreement (RDQ) within DV	1.6%	6.2%	4.4%
	Agreement (RAQ) within DV	98.4%	93.8%	95.6%
Gap2	Disagreement (RDQ) within DV	17.7%	17.9%	17.8%
	Agreement (RAQ) within DV	82.3%	82.1%	82.2%
Gap3	Disagreement (RDQ) within DV	14.0%	19.8%	17.5%
	Agreement (RAQ) within DV	86.0%	80.2%	82.5%
Gap4	Disagreement (RDQ) within DV	21.6%	15.6%	17.7%
	Agreement (RAQ) within DV	78.40%	84.40%	82.30%
Gap5	Disagreement (RDQ) within DV	33.90%	21.60%	26.40%
	Agreement (RAQ) within DV	66.10%	78.40%	73.60%
Gap6	Disagreement (RDQ) within DV	20.80%	5.70%	11.40%
	Agreement (RAQ) within DV	79.20%	94.30%	88.60%
Gap7	Disagreement (RDQ) within DV	30.00%	36.00%	33.80%
	Agreement (RAQ) within DV	70.00%	64.00%	66.20%
Gap8	Disagreement (RDQ) within DV	14.80%	20.50%	18.30%
	Agreement (RAQ) within DV	85.20%	79.50%	81.70%
Gap9	Disagreement (RDQ) within DV	12.70%	5.20%	7.90%
	Agreement (RAQ) within DV	87.30%	94.80%	92.10%

4.2.5. Phase II: Transitioning from Phase II to Phase III

Tables 7 to 16 confirm the importance of the quality gaps based on the results from the model testing survey. This reaffirms the need for Phase III of this research. In the model testing phase, the study was performed to measure the significance of each quality gap on "customers' willingness" by analyzing the responses of 239 college students. One statement was developed to represent each gap, and linear regression was used to measure

the significance of the quality gap in terms of customer willingness to shop online. As such, the results were limited by participant type (college students) and to one statement per gap. Hence, the findings could differ with the use of a diverse sample or different statement.

For example, in terms of Gap 4, college students may be more comfortable with website interfaces than are older people. In addition, as related to Gap 5, students may be more at ease with providing credit card information online. Because college students are more accustomed to shopping online, they are less likely to need in-person assistance from service representatives, as related to Gap 7. Therefore, a larger sample size that includes nonstudents would be highly informative. In the following section, our next step will be to build on the lessons learned from Phase II, and to collect data that will allow us to refine this study. To do so, we developed a survey instrument that contains several items per construct, for which the use of SEM would be more appropriate. SEM provides more reliable measures of the degree to which the customer experienced a particular gap.

4.3. Phase III: Comprehensive (Nationwide) Study and the Development and Application of Structural Equation Modeling (SEM)

The purpose of this phase was to conduct a national survey using different demographic and product categories to derive results about quality gaps' influence on customers' willingness and customer satisfaction, and to recommend mitigation strategies for each quality gap. This phase consists of the following activities:

- Incorporating lessons learned from Phase II (already addressed).
- Development of a comprehensive study survey instrument (Appendix B).
- Comprehensive study survey instrument validation.

- Sampling plan and data collection.
- Development and application of structural equation modeling (SEM) to test three structural models:
    - Customers' Willingness Structural Model
    - Customer Satisfaction Structural Model
    - Mitigation Strategy-Customers' Willingness (MSCW) Structural Model
- Running the models using different demographic and product categories (Chapter 5).
- Results and analysis of the three structural models within each run (Chapter 5).

4.3.1 Phase III: Development of a Comprehensive Study Survey Instrument

In this phase, a survey instrument was developed to test three structural equation models. The comprehensive study survey instrument contains multiple items per construct (Gap) (refer to Appendix B, Q17 in the comprehensive survey instrument). It also contains multiple items per construct (mitigation strategy) (refer to Appendix B, Q18 in the comprehensive survey instrument). A 5-point Likert scale (1 = strongly disagree to 5 = strongly agree) was used to respond to each item on the survey related to the quality gaps or the mitigation strategies. Since there was prior knowledge of the underlying latent variable (factor) structure (Byrne, 2013), we can postulate the relations between the observed measures and the factors based on our knowledge of theory and empirical research that has been done in the previous sections. Consequently, confirmatory factor analysis (CFA) was used for data analysis. In addition, the survey instrument includes statements about strategies to mitigate the gaps and their influence on customers'

willingness and customer satisfaction. The contribution of this research will lead to better measurement of OSRs' service quality.

4.3.2. Phase III: Comprehensive Study Survey Instrument Validation

The survey instrument was validated by observing five randomly selected participants to query the survey items. Those participants were Ph.D. students from the University of Miami. The objective was to determine if there was any ambiguity or dissonance in the interpretation and understanding of the survey questions.

4.3.3 Phase III: Sampling Plan and Data Collection

The target respondents of this national survey involved a diverse sample of participants who had purchased products through OSRs in the preceding six months prior to the survey (which was conducted from April to May 2016). More specifically, participants were at least 18 years old, male and female, from different ethnic groups, from different age groups, from different socioeconomic groups, and different levels of education. Participants of this survey were asked to answer the questions based on their most recent product purchase. They were asked to choose from four different product categories (Q8, Appendix B). An online survey software and insight platform, Qualtrics, was used to collect data from participants. The average time to complete the survey was 10 minutes. For validation purposes, the data from participants who completed the survey in less than five minutes were excluded.

Many different rules for determining the sample size requirements for SEM exist. The sample size required to apply SEM depends on many factors, including the size of the model, distribution of the variables, missing data, and the relation between variables (Muthén & Muthén, 2002). For covariance-based SEM, it is generally advisable that the

"sample size should exceed 100 observations regardless of other data characteristics to avoid problematic solutions and obtain acceptable fit concurrently" (Nasser & Wisenbaker, 2003, p. 754). However, in e-commerce, online shopping behavior and perception generally differ between males and females (Chiu et al., 2005, Rodgers & Harris 2003, Van Slyke et al., 2002). Additionally, Sorce et al. (2005) have found that purchasing behavior does not differ significantly between younger (29 years and younger) and older (30 years and older) consumers. On the other hand, Bellman et al. (1999) has concluded that different demographics such as income, education, ethnicity, and age have a slight influence on customers' behavior toward purchasing online. Additionally, eMarketer has documented this recent rapid growth in two product categories. In 2013, e-commerce sales in the United States for computer and consumer electronics as well as apparel and accessories accounted for most of the retail sales, representing 42.9% of the total sales. eMarketer projects that by 2016, sales for computer and consumer electronics as well as apparel and accessories will reach 45.6% of the total (Grau, 2013). In addition to that, in the model-testing phase, our survey confirmed eMarketer's numbers, that online shoppers were inclined to purchase mostly from Computers & Consumer Electronics, Apparel & Accessories, Books/ Music/ Video, and Health & Personal Care. Those four categories represents 67% of the purchases of survey respondents.

In this study, the collected sample size of the survey respondents was 4,937, with at least 100 in each demographic category (gender groups, levels of education, and age groups) using the four product categories (Computers & Consumer Electronics, Apparel & Accessories, Books/ Music/ Video, and Health & Personal Care). Qualtrics was responsible for collecting survey data in order to meet the criteria of the required sample size. Qualtrics

charged $1.50 per each completed usable response and was paid to collect 4,800 usable responses. We were able to collect 137 responses through personal contacts. The total collected survey data were 4,937. Tables 17 to 20 stratify each group within each demographic and product category:

Table 17: Levels of Education Groups

Education Group (1)	Non-college-educated
Education Group (2)	College-educated (Associate Degree, Bachelor Degree or higher)

Table 18: Age Groups

Age Group (1)	18 – 39 years old
Age Group (2)	39 – 59 years old
Age Group (3)	60 years old and older

Table 19: Gender Groups

Gender	Male
	Female

Table 20: Product Categories

Product Category (1)	Computers & Consumer Electronics
Product Category (2)	Apparel & Accessories
Product Category (3)	Books/ Music/ Video
Product Category (4)	Health & Personal Care

The selected sample size makes it possible to gather a sufficient sample in each subgroup. Hence, there are 48 categories with 100 respondents each. The objective of collecting a diverse sample for each demographic category is to make comparison among different demographic and product categories. The other advantage of a diverse sample is to set the stage for a more detailed analysis.

Table 21 represents the stratification of the collected sample:

Table 21: Stratification of the Collected Sample for Comprehensive Study Survey Instrument

		Product Category (1)	Product Category (2)	Product Category (3)	Product Category (4)	
Male	Education (1)	101	104	102	102	Age Group (1)
	Education (2)	107	109	103	103	
Female	Education (1)	101	108	104	101	
	Education (2)	107	111	102	102	
Male	Education (1)	103	105	101	106	Age Group (2)
	Education (2)	105	100	103	100	
Female	Education (1)	102	105	103	104	
	Education (2)	104	102	104	105	
Male	Education (1)	103	100	102	100	Age Group (3)
	Education (2)	102	101	105	101	
Female	Education (1)	100	103	100	101	
	Education (2)	100	100	100	100	

Total	**4937**

4.3.4 Phase III: Development and Application of Structural Equation Modeling (SEM)

In this phase, we developed three different models using SEM. The three structural models are as follows:

- Customers' Willingness Structural Model
- Customer Satisfaction Structural Model
- Mitigation Strategy-Customers' Willingness (MSCW) Structural Model

Chapter 5, that cover the results illustrates each of the three models' conclusions across varied demographic and product categories.

4.3.5. Phase III: Statement of Purpose and Research Questions

In this section, we illustrate each of the three structural model purpose and research questions. We also state the hypotheses that were measured from the data collected from the comprehensive study survey instrument. The path diagrams for each structural model are also covered.

Customers' Willingness Structural Model

In this model, each quality gap is considered as a factor (latent variable) affecting customers' willingness to shop online. Each quality gap has multiple observed variables (refer to Appendix B, Q17 for the observed variables). Hence, there are nine different factors that will be tested to measure their significant association with customers' willingness to shop online; where customers' willingness is considered as an observed variable (refer to Appendix B, Q19). Consequently, the following research questions apply:

1. Do quality gaps have a significant association with customers' willingness to shop online?
2. Which quality gap(s) has/have stronger association with customers' behavior based on different demographic and product categories?

The focus of this part of the research is to evaluate which quality gap has more influence on customers' behavior with regard to online shopping. Hence, the objective is to measure the significant association of the quality gaps with customers' willingness to shop, by determining which quality gap is more important to the customer. The hypotheses statements follow:

H_{1i}: Quality Gap_i has a significant association with customers' willingness to shop online,

where i = 1,2,3,4….9

The following structural equation model is used to test the significant association of each of the nine quality gaps with regard to customers' willingness to purchase:

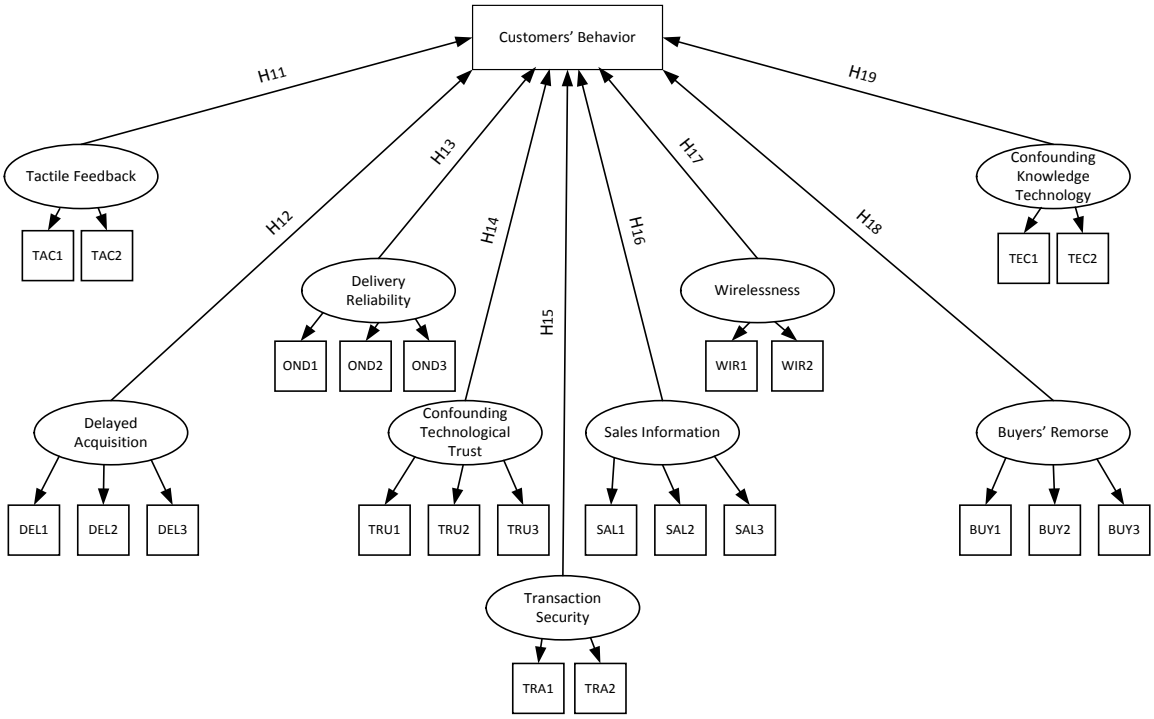


Figure 11: Customers' Willingness Structural Model Hypotheses

Figure 11 shows the path diagram of the Customers' Willingness Structural Model. Each quality gap (latent variable) has two to three observed variables (Appendix B, Q17) that were tested against customers' willingness as an observed variable (Appendix B, Q19).

The Customers' Willingness Structural Model is tested across different demographic categories (gender, levels of education, and age groups), and product categories (Computers & Consumer Electronics, Apparel & Accessories, Books/ Music/ Video, and Health & Personal Care). The objective of this model is to measure the significance of the quality gaps within each demographic and product categories, and testing whether significant quality gaps vary in effectiveness among different categories. As an example, an objective is to determine if Tactile Feedback has a significant association with customers' willingness to shop for both males and females. We also investigate if there is a significant difference on the association of Tactile Feedback with the behavior between

males and females. From this model, we postulate that the customers' behavior toward Online Service Retailers in terms of willingness can be understood in the context of the gaps presented, as stated below:

Customers' Willingness = f(Gap1,Gap2,Gap3 … GapN)

Customer Satisfaction Structural Model

In this model, each quality gap is considered as a factor (latent variable) affecting customer satisfaction to shop online. Each quality gap has multiple observed variables (refer to Appendix B, Q17 for the observed variables). Hence, there are nine different factors that will be tested to measure their significant association with customer satisfaction with online shopping; where customer satisfaction is considered as an observed variable (refer to Appendix B, Q20). Consequently, the following research questions apply:

1. Do quality gaps have significant association with customer satisfaction with online shopping?
2. Which quality gap(s) has/have stronger association with customer satisfaction based on different demographic and product categories?

The focus of this part of research is to evaluate which quality gap has more significant influence on customer satisfaction with regard to online shopping. Hence, the objective is to measure the significant association of the quality gaps with customer satisfaction with online shopping, by determining which quality gap is more important to the customer. The hypotheses statements follow:

H_{2i}: Quality Gap_i has a significant association with customer satisfaction with online shopping,

where i = 1,2,3,4….9

The following structural equation model is used to test the significant association of each of the nine quality gaps with regard to customer satisfaction:

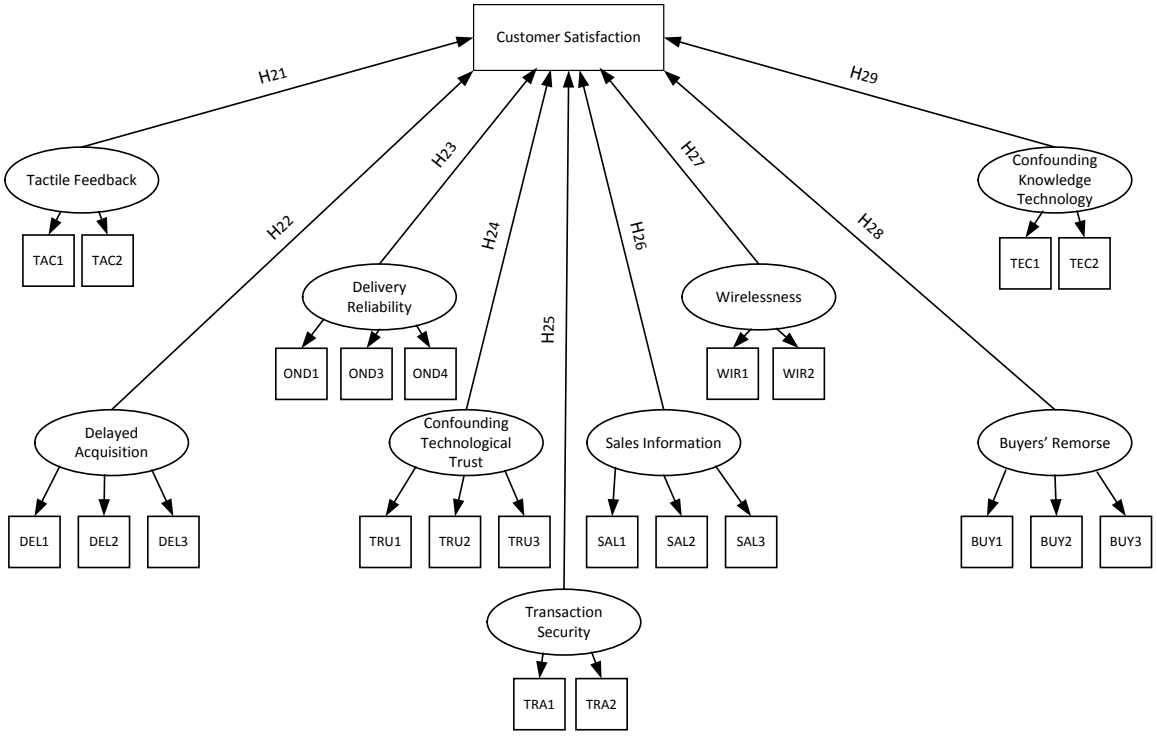


Figure 12: Customer Satisfaction Structural Model Hypotheses

Figure 12 shows the path diagram of the Customer Satisfaction Structural Model. Each quality gap (latent variable) has two to three observed variables (Appendix B, Q17) that were tested against customer satisfaction as an observed variable (Appendix B, Q20).

The Customer Satisfaction Structural Model is tested across varied demographic categories (gender, levels of education, and age groups), and product categories (Computers & Consumer Electronics, Apparel & Accessories, Books/ Music/ Video, and Health & Personal Care). Similar to Customers' Willingness Structural Model, the objective of this model is to measure the significance of the quality within each demographic and product categories, and to test whether significant quality gaps differ in effectiveness among distinct categories. As an example, an objective would be to determine if Delayed Acquisition has a significant association with customer satisfaction to shop for

both males and females. We also investigate to determine if there is a significant difference on the association of Delayed Acquisition with the satisfaction between males and females. From this model, we postulate that the customer satisfaction toward Online Service Retailers in terms of satisfaction can be understood in the context of the gaps presented, as stated below:

$$\text{Customer Satisfaction} = f(\text{Gap1},\text{Gap2},\text{Gap3} \ldots \text{GapN})$$

Mitigation Strategy-Customers' Willingness (MSCW) Structural Model

In this model, multiple mitigation strategies for each quality gap is considered as a factor (latent variable) affecting customers' willingness to shop online. Each quality gap mitigation strategies has multiple observed variables (refer to Appendix B, Q18 for the observed variables). Hence, there will be nine different factors that will be tested to measure their significant association with customers' willingness to shop online; where customers' willingness is considered as an observed variable (refer to Appendix B, Q19). Consequently, the following research questions apply:

1. Do mitigation strategies have a significant association with customers' willingness to shop online?
2. Which mitigation strategies have stronger association with customers' willingness to shop online?

The focus of this part of the research is to evaluate which mitigation strategies for each gap has a significant association with customers' willingness to shop online

Utilizing these strategies may result in an increase in customers' willingness to shop online. The hypotheses statements follow:

H_{3i}: Quality Gap_i mitigation strategies has a significant association with customers' willingness to shop online,

where i = 1,2,3,4….9

The following structural equation model is used to test the significant association of each of the nine quality gaps mitigation strategies with regard to customers' willingness to purchase:

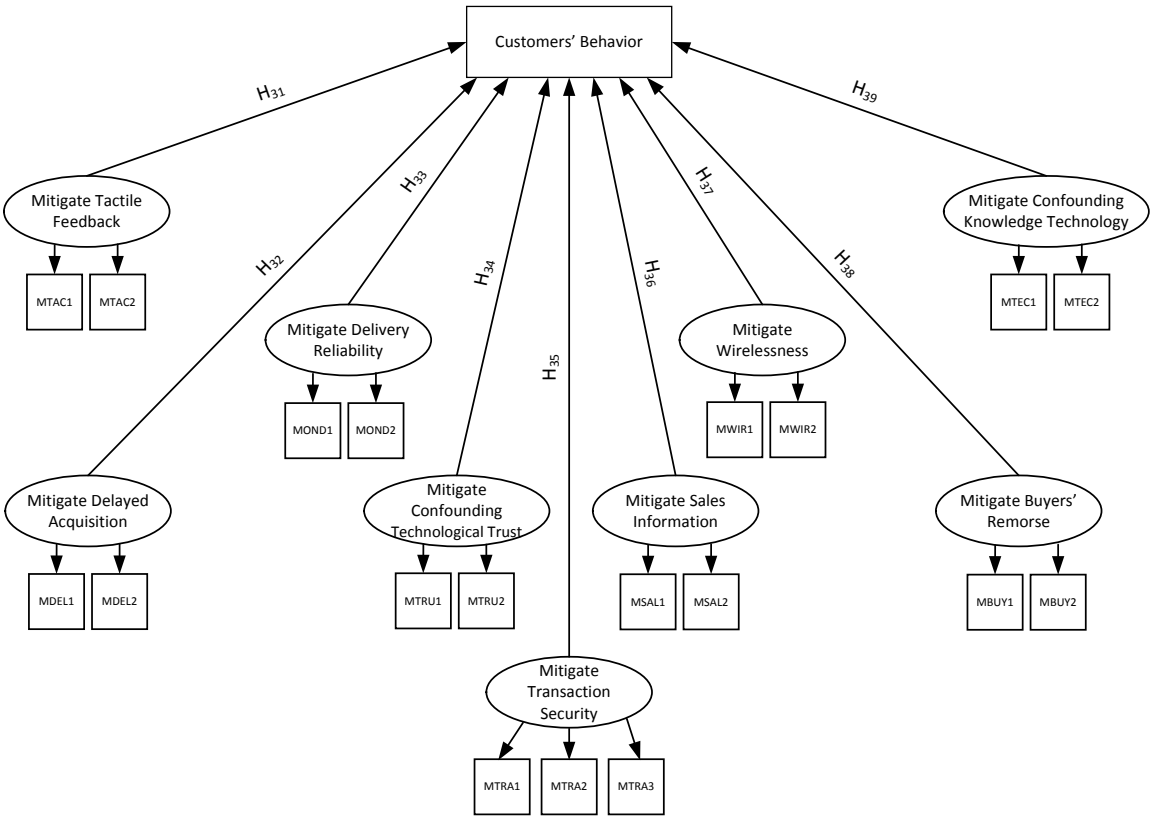


Figure 13: Mitigation Strategy-Customers' Willingness Structural Model

Figure 13 shows the path diagram of the MSCW Structural Model. Each quality gap mitigation strategies is considered as a latent variable and has two to three observed variables (Appendix B, Q18) that were tested against customers' willingness as an observed variable (Appendix B, Q19).

From this model, we postulate that the online service retailer quality of service can be optimized by utilizing the mitigation strategies of each quality gap as follows:

Customers' Willingness Optimization = f(Mitigation Strategy of Gap1, Mitigation Strategy of Gap2 … Mitigation Strategy of GapN)

Chapter 5: Results

The chapter is presented in four steps:

I. Comprehensive study Survey data analyses, which consists of the following activities:
   - Details of the software that were used.
   - Model estimators, goodness-of-fit, and reliability.

II. Customers' Willingness Structural Model Results, which consists of the following activities:
   - Runs and analysis of:
     - Customers' Willingness Structural Model using aggregate data.
     - Customers' Willingness Structural Model using different demographic and product categories as predictors.
     - Customers' Willingness Structural Model by gender groups.
     - Customers' Willingness Structural Model for different levels of education.
     - Customers' Willingness Structural Model for different age groups.
     - Customers' Willingness Structural Model for different product categories.
   - Results summary of all previous runs.

III. Customer Satisfaction Structural Model Results, which consists of the following activities:
   - Runs and analysis of:
     - Customer Satisfaction Structural Model using aggregate data.
     - Customer Satisfaction Structural Model using different demographic and product categories as predictors.

- Customer Satisfaction Structural Model by gender groups.
- Customer Satisfaction Structural Model for different levels of education.
- Customer Satisfaction Structural Model for different age groups.
- Customer Satisfaction Structural Model for different product categories.

o Results summary of all previous runs.

IV. Mitigation Strategy-Customers' Willingness Structural Model using aggregate data.

5.1. Phase III: Comprehensive Study Survey Data Analyses

Mplus version 7.4 statistical software was used to perform statistical analyses for all models (Muthén & Muthén, 1998 - 2015). IBM SPSS Statistics 23 was used to screen data for nonengaged respondents, influential observations detection, and checked for assumptions of linearity, independency, and normality.

5.2.1 Model Estimators, Goodness of Fit, and Reliability

Weighted Least Squares, Robust Standard Errors, & Mean Adjusted Chi-square Test Statistic (WLSM) is one of the model estimators that is used when running a structural model in Mplus software. Model estimators are used for path coefficients, loadings, and standard errors for significance tests. WLSM was used for all three structural model, Customers' Willingness, Customer Satisfaction Structural Models and Mitigation Strategy-Customers' Willingness Structural Model. In this dissertation and across various models tested, several fit indices were used to assess model goodness of fit. We reported Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI) as indicators for goodness of fit.

Hu & Bentler (1999) stated that CFI and TLI values larger than or equal to 0.90 indicate reasonable and acceptable fit, and values larger than or equal to 0.95 indicate very good fit. They also reported that RMSEA values less than 0.06 indicate an acceptable fit, between 0.06 and 0.08 indicate a reasonable fit, and values greater than 0.10 indicate poor fit. All of the tests conducted using different models produced CFI and TLI values greater than 0.95, which is considered a very good fit. Results of the tested models also showed that RMSEA values were between 0.05 and 0.071, which is considered acceptable or reasonable fit.

Another important aspect of the collected data is to determine data reliability as a measurement of accuracy (Straub, 1989). The reliability of the observed variables (of each quality gap or each mitigation strategy) were tested using Cronbach's coefficient alpha. Cronbach's alpha coefficient is a measure of the extent to which the respondent answered the same or approximately the same question similarly each time for each gap (Cronbach, 1951). Numally (1978) suggested that a Cronbach's alpha value of 0.7 is considered acceptable.

5.2. Customers' Willingness Structural Model Results

In this model, data were tested to measure the significant association of the nine quality gaps with customers' willingness to shop online. Each quality gap was considered as a latent variable and has two to three observed variables. Refer to Appendix B, Q17, in the comprehensive study survey instrument, for the multiple observed variables of each quality gap. Those quality gaps were measured against Q19 (Customers' Willingness) on the comprehensive survey instrument. We used the collected data to test Customers' Willingness Structural Model six times, with a total of eight runs. The reason for testing

the model six times was to acquire details and analysis of various demographic and product categories. In the following pages, we discuss each of the eight runs separately. Path diagrams were generated to show standardized path coefficients of each quality gap association with customers' willingness for each run. The path diagrams also showed the significant association of the quality gaps with customers' behavior in terms of willingness. Furthermore, each of the Customers' Willingness Structural Model six tests are demonstrated in a table that shows the loadings of observed variables of each quality gap. The table shows the means of each observed variable and presents Cronbach's alpha value to measure the consistency of the observed variables on each latent variable. Goodness-of-fit indexes were also reported for each run. A second table was generated to summarize the significant hypotheses.

Additionally, the Chi-square difference test was used to examine whether there was a significant difference between path coefficients whenever multiple group confirmatory factor analyses were incorporated (gender, age groups, level of education, and product categories). At the end of this section, Tables 37 and 38 summarize the six tests, the eight runs, and the significant hypotheses among different categories.

5.2.1. Customers' Willingness Structural Model Using Aggregate Data

First run: responses from 4,937 participants were analyzed using Customers' Willingness (Q19) as an observed variable for all nine quality gaps:

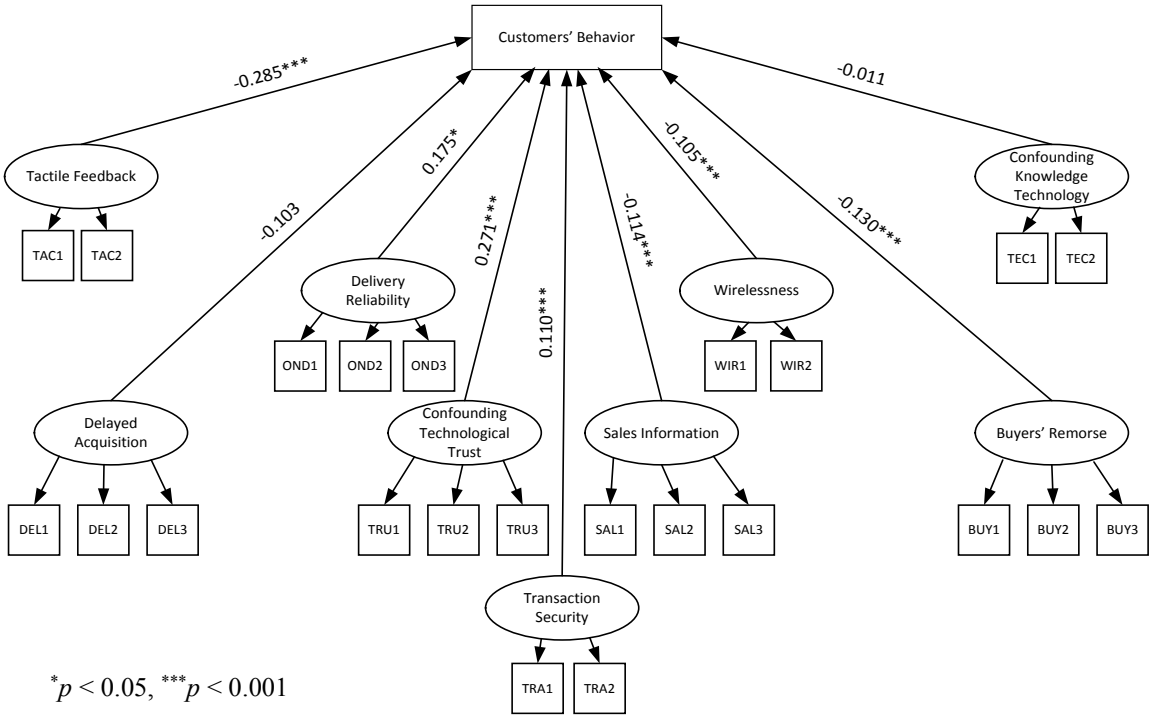


Figure 14: Standardized Path Diagram Results for Customers' Willingness Structural Model Using Aggeregate Data

Figure 14 shows the standardized path coefficients. The results illustrate that Tactile Feedback, Delivery Reliability, Confounding Technological Trust, Transaction Security, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness to shop online. In other words, mitigating those quality gaps will increase customers' willingness to shop online.

Tactile Feedback, Sales Information, Wirelessness, and Buyers' Remorse have a negative association with customers' willingness to shop online. Hence, the more that customers agree on those gaps, the less likely they are to purchase online. Meanwhile, Delivery Reliability, Confounding Technological Trust, and Transaction Security have a

positive association with customers' willingness to shop online. This means that the more important those gaps are to the customer, the more customers are willing to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customers' willingness to purchase online. However, when a quality gap has a negative path coefficient, it means that the customers who expressed a higher degree of agreement (strongly agree or agree) on this gap, are less likely to purchase online.

As described in Chapter 4, Table 22 summarizes the significant hypotheses and values of the standardized estimates (path coefficients):

Table 22: First Run Results for Customers' Willingness Structural Model Using Aggregate Data

Hypothesis	Quality Gap	Standardized Estimate
H_{11}	Tactile Feedback	-0.285***
H_{12}	Delayed Acquisition	-0.103
H_{13}	Delivery Reliability	0.175*
H_{14}	Confounding Technological Trust	0.271***
H_{15}	Transaction Security	0.110***
H_{16}	Sales Information	-0.114***
H_{17}	Wirelessness	-0.105***
H_{18}	Buyers' Remorse	-0.130***
H_{19}	Confounding Knowledge Technology	-0.011

$^{*}p < 0.05$, $^{***}p < 0.001$

By using the aggregate data, Customers' Willingness Structural Model results of standardized path coefficients show that:

1. For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness to shop online, followed by Buyers' Remorse, Sales Information, and Wirelessness, respectively.
2. For those quality gaps with positive path coefficients we conclude that Confounding Technological Trust has the strongest association with customers' willingness to shop online, followed by Delivery Reliability, and Transaction Security, respectively.

Consequently, Online Service Retailers should seek to understand the barriers affecting customers' willingness to shop online.

As discussed earlier, the following table (23) shows loadings, mean, Cronbach's alpha, and goodness of fit indexes of Customers' Willingness Structural Model using aggregate data:

Table 23: Output of First Run of Customers' Willingness Structural Model Using Aggregate Data

	CFA Loadings		
Factor	Loadings[1]	Mean[2]	Cronbach's α
Tactile Feedback			0.808
TAC1	0.839	3.16	
TAC2	0.877	3.29	
Delayed Acquisition			0.738
DEL1	0.683	3.49	
DEL2	0.750	4.15	
DEL3	0.861	3.87	
Delivery Reliability			0.766
OND1	0.774	3.80	
OND2	0.815	3.71	
OND3	0.756	4.11	
Confounding Technological Trust			0.739
TRU1	0.726	3.46	
TRU2	0.728	3.67	
TRU3	0.773	3.53	
Transaction Security			0.697
TRA1	0.832	4.30	
TRA2	0.769	4.30	
Sales Information			0.765
SAL1	0.794	4.18	
SAL2	0.816	4.23	
SAL3	0.775	4.13	
Wirelessness			0.685
WIR1	0.755	2.56	
WIR2	0.767	2.59	
Buyers' Remorse			0.843
BUY1	0.814	3.42	
BUY2	0.820	3.37	
BUY3	0.886	3.52	
Confounding Knowledge Technology			0.744
TEC1	0.767	3.37	
TEC2	0.853	3.52	
Goodness-of-fit Statistics	Model Estimator: WLSM		
χ^2	4715.808*	CFI	0.980
Scaling Correction Factor	0.4742	TLI	0.974
df	208	RMSEA	0.066

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

1. These are standardized loading estimates from CFA.
2. Average response of each item (5-point Likert scale).

5.2.2. Customers' Willingness Structural Model Using Different Demographic and Product Categories as Predictors

The objective of analyzing the Customers' Willingness Structural Model using predictors/covariates is to compare the behavior of different demographic and product category purchasers and variations in inclination to shop online. At the end of this section, we analyze the comparison between different groups.

For example, we attempted to determine if there is a difference in customers' willingness between male and female online shoppers. Consequently, the research question is as follows: Which gender group is more inclined to shop online?

Hence, for each demographic and product category comparison, we defined a hypothesis, and in order to derive conclusions for different categories, it was necessary to run the model using the predictors three times. The three runs are for the second, third, and fourth runs for the Customers' Willingness Structural Model for the different demographic and product categories. In the second run, the reference group for age was age group three (60 years old and older), and for product category, the reference group was product category four (Personal & Health Care). In the third run, the reference group for age was age group two (39 – 59 years old), and for product category, the reference group was product category three (Books/ Music/ Video). In the fourth run, the reference group for age was age group two (39 – 59 years old), and for product category, the reference group was product category two (Apparel & Accessories).

The three runs had the same path coefficient estimates for the gaps in customers' willingness, with same loadings, means, and Cronbach's alpha. The only parameters that

changed are the goodness-of-fit indexes. Therefore, by the end of each run, we present the values of goodness-of-fit indexes.

Second run: responses from 4,937 participants were analyzed using Customers' Willingness (Q19) as an observed variable for all nine quality gaps with different demographic and product categories as covariates/predictors. In this run, the reference group for age was age group three (60 years old and older), and for product category, the reference group was product category four (Health & Personal Care):

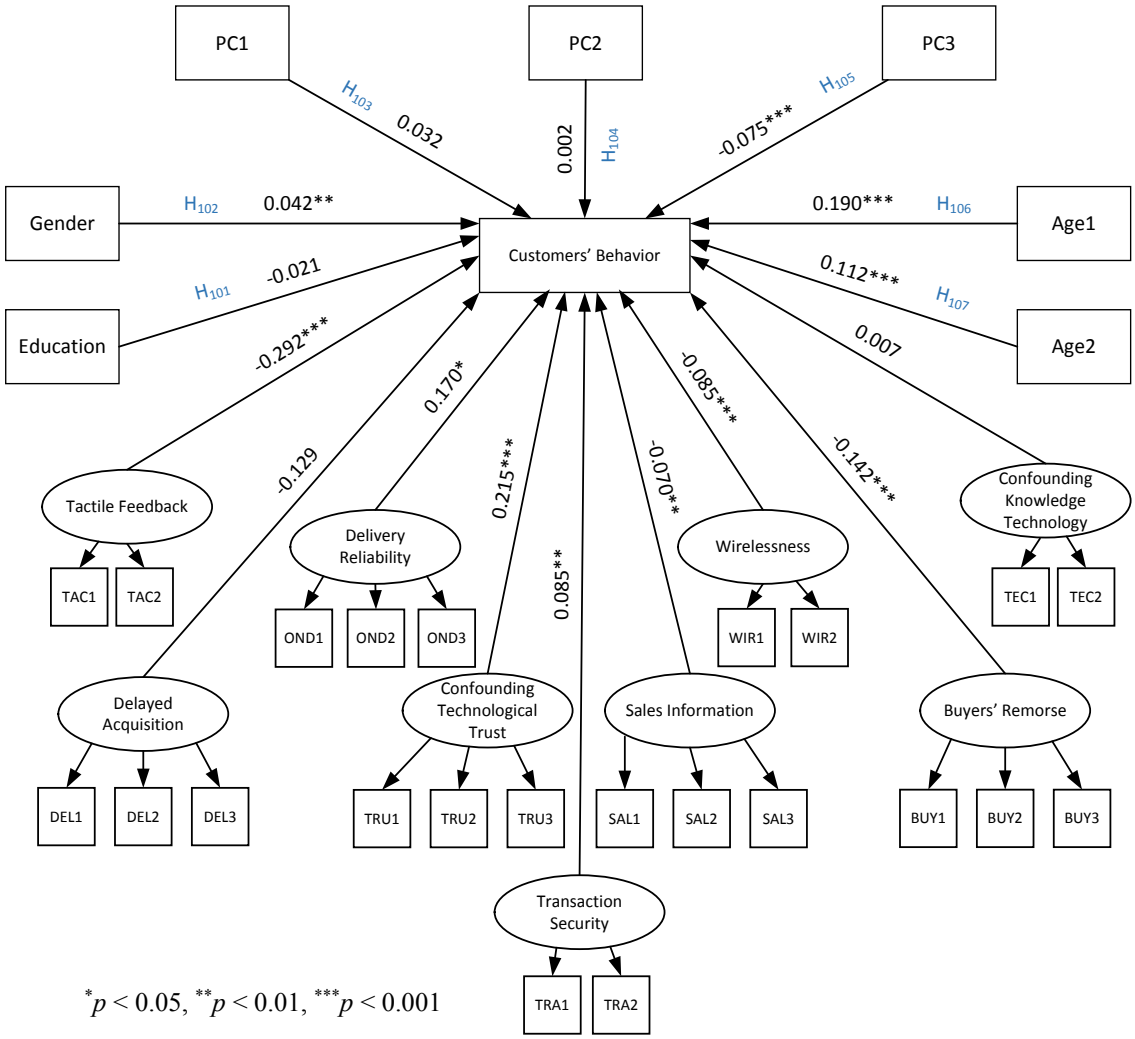


Figure 15: Standardized Path Diagram Results for Customers' Willingness Structural Model Using Different Demographic and Product Categories as Predictors (1)

H_{101}: There is a significant difference on customers' willingness between lower-educated and higher-educated customers.

H_{102}: There is a significant difference on customers' willingness between males and females.

H_{103}: There is a significant difference on customers' willingness between product category one purchasers and product category four purchasers.

H_{104}: There is a significant difference on customers' willingness between product category two purchasers and product category four purchasers.

H_{105}: There is a significant difference on customers' willingness between product category three purchasers and product category four purchasers.

H_{106}: There is a significant difference on customers' willingness between age group one purchasers and age group three purchasers.

H_{107}: There is a significant difference on customers' willingness between age group two purchasers and age group three purchasers.

Developed dummy variables:

Table 24: Developed Dummy Variables of the Second Run of Customers' Willingness Structural Model

Gender	
Males	0
Females	1

Education	
Lower-Educated	0
Higher-Educated	1

Age Groups	Age1	Age2
Age (1)	1	0
Age (2)	0	1
Age (3)	0	0

Product Category	PC1	PC2	PC3
Product Category (1)	1	0	0
Product Category (2)	0	1	0
Product Category (3)	0	0	1
Product Category (4)	0	0	0

Goodness-of-fit Statistics	Model Estimator: WLSM		
χ^2	6187.290*	CFI	0.972
Scaling Correction Factor	0.7051	TLI	0.967
df	369	RMSEA	0.059

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

Third run: responses from 4,937 participants were analyzed using Customers' Willingness (Q19) as an observed variable for all nine quality gaps with different demographic and product categories as covariates/predictors. In this run, the reference group for age was age group two (39 – 59 years old), and for product category, the reference group was product category three (Books/ Music/ Video):

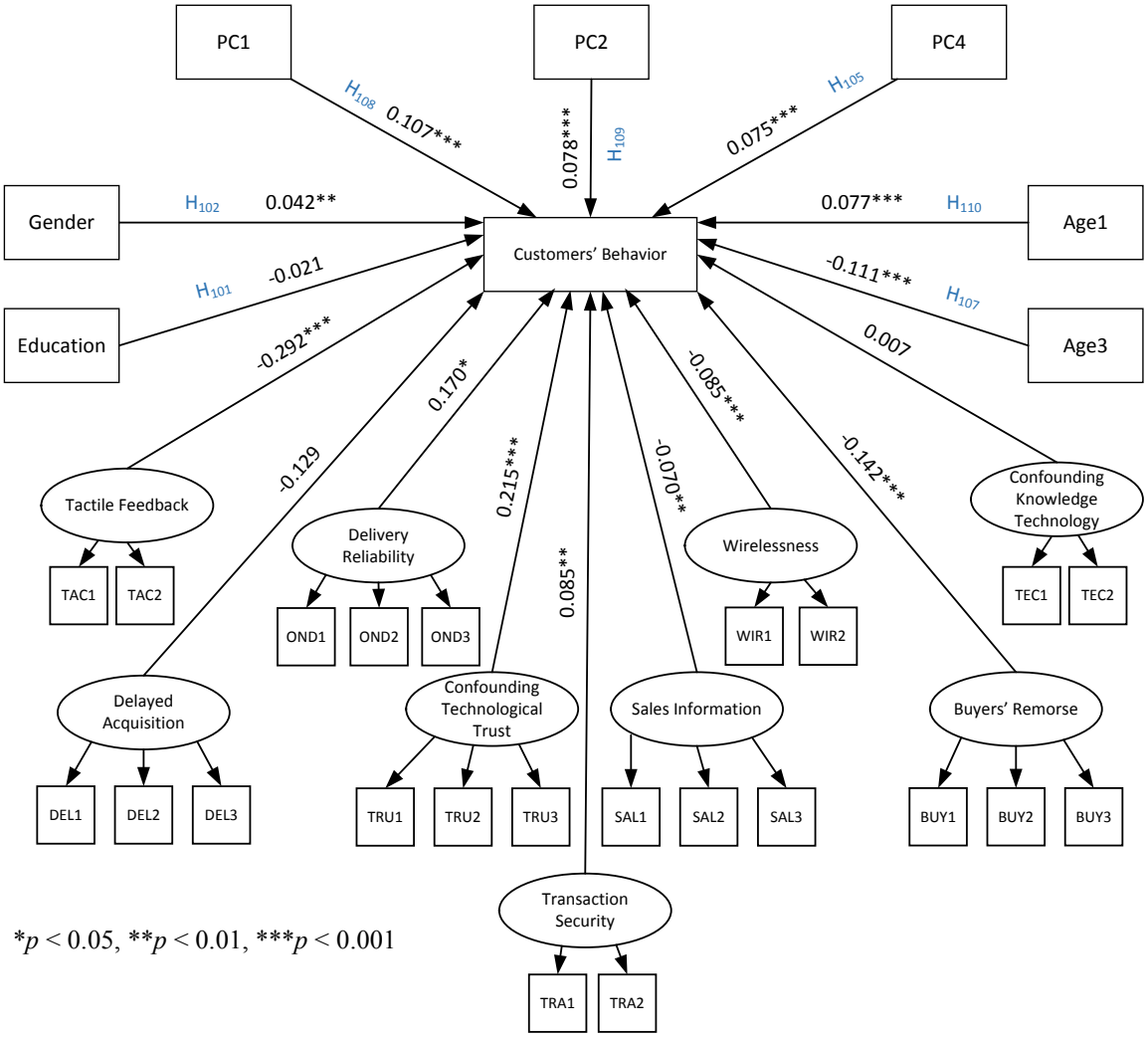


Figure 16: Standardized Path Diagram Results for Customers' Willingness Structural Model Using Different Demographic and Product Categories as Predictors (2)

H_{101}: There is a significant difference on customers' willingness between lower-educated and higher-educated customers.

H_{102}: There is a significant difference on customers' willingness between males and females.

H_{108}: There is a significant difference on customers' willingness between product category one purchasers and product category three purchasers.

H_{109}: There is a significant difference on customers' willingness between product category two purchasers and product category three purchasers.

H_{105}: There is a significant difference on customers' willingness between product category four purchasers and product category three purchasers.

H_{110}: There is a significant difference on customers' willingness between age group one purchasers and age group two purchasers.

H_{107}: There is a significant difference on customers' willingness between age group three purchasers and age group two purchasers.

Developed dummy variables:

Table 25: Developed Dummy Variables of the Third Run of Customers' Willingness Structural Model

Gender	
Males	0
Females	1

Education	
Lower-Educated	0
Higher-Educated	1

Age Groups	Age1	Age3
Age (1)	1	0
Age (2)	0	0
Age (3)	0	1

Product Category	PC1	PC2	PC4
Product Category (1)	1	0	0
Product Category (2)	0	1	0
Product Category (3)	0	0	0
Product Category (4)	0	0	1

Goodness-of-fit Statistics	Model Estimator: WLSM		
χ^2	4898.622*	CFI	0.978
Scaling Correction Factor	0.7051	TLI	0.974
df	369	RMSEA	0.052

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

Fourth run: responses from 4,937 participants were analyzed using Customers' Willingness (Q19) as an observed variable for all nine quality gaps with different demographic and product categories as covariates/predictors. In this run, the reference group for age was age group two (39 – 59 years old), and for product category, the reference group was product category two (Apparel & Accessories):

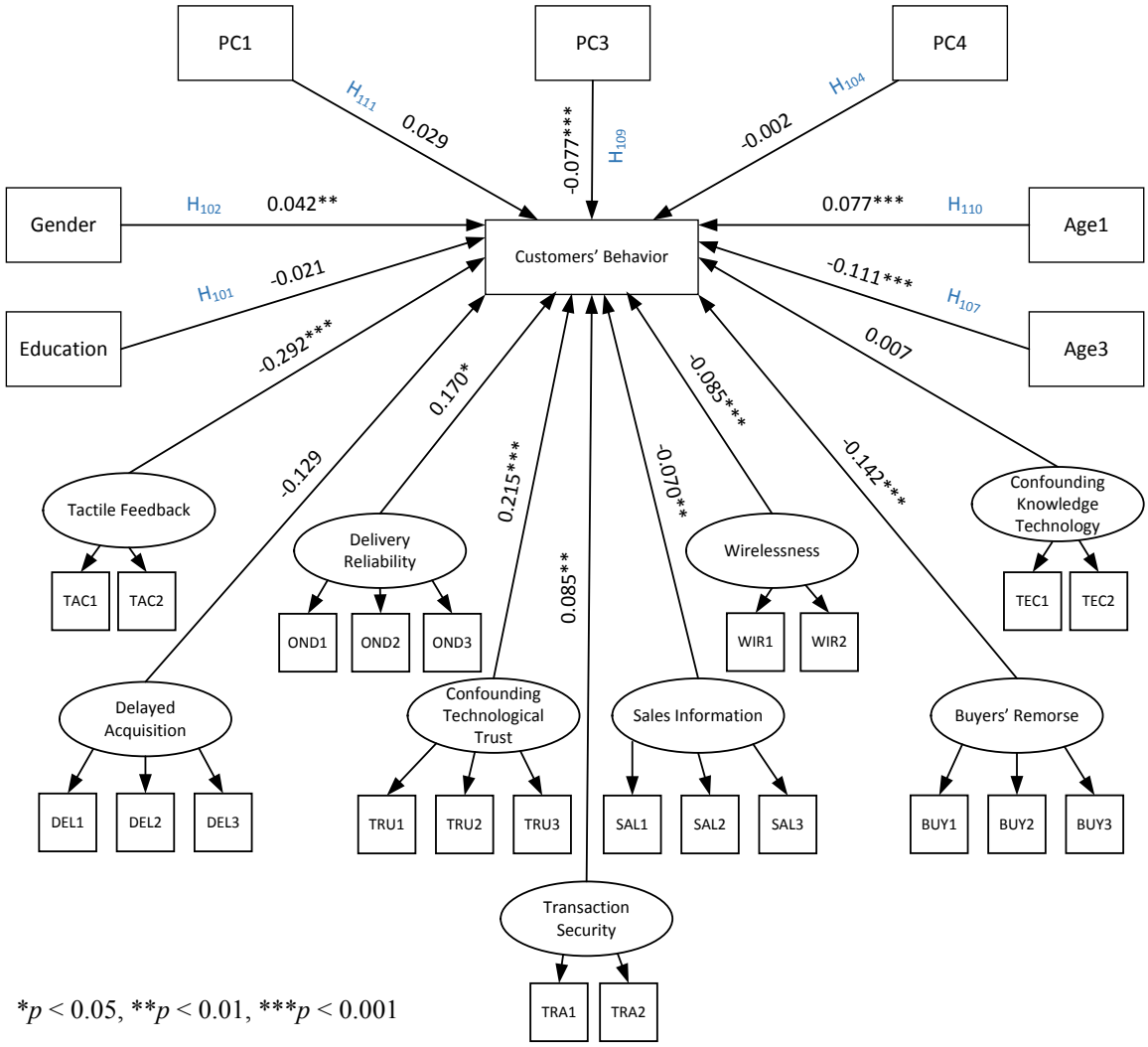


Figure 17: Standardized Path Diagram Results for Customers' Willingness Structural Model Using Different Demographic and Product Categories as Predictors (3)

H_{101}: There is a significant difference on customers' willingness between lower-educated and higher-educated customers.

H_{102}: There is a significant difference on customers' willingness between males and females.

H_{111}: There is a significant difference on customers' willingness between product category one purchasers and product category two purchasers.

H_{109}: There is a significant difference on customers' willingness between product category three purchasers and product category two purchasers.

H_{104}: There is a significant difference on customers' willingness between product category four purchasers and product category two purchasers.

H_{110}: There is a significant difference on customers' willingness between age group one purchasers and age group two purchasers.

H_{107}: There is a significant difference on customers' willingness between age group three purchasers and age group two purchasers.

Developed dummy variables:

Table 26: Developed Dummy Variables of the Fourth Run of Customers' Willingness Structural Model

Gender	
Males	0
Females	1

Education	
Low Educated	0
High Educated	1

Age Groups	Age1	Age3
Age (1)	1	0
Age (2)	0	0
Age (3)	0	1

Product Category	PC1	PC3	PC4
Product Category (1)	1	0	0
Product Category (2)	0	0	0
Product Category (3)	0	1	0
Product Category (4)	0	0	1

Goodness-of-fit Statistics	Model Estimator: WLSM		
χ^2	4984.202*	CFI	0.978
Scaling Correction Factor	0.7051	TLI	0.973
df	369	RMSEA	0.052

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

The results illustrate that Tactile Feedback, Delivery Reliability, Confounding Technological Trust, Transaction Security, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness to shop online. Table 27 summarizes the significant hypotheses and values of the standardized estimates.

Table 27: Results for Customers' Willingness Structural Model Using Different Demographic and Product Categories as Predictors

Hypothesis	Quality Gap	Standardized Estimate
H_{11}	Tactile Feedback	-0.292^{***}
H_{12}	Delayed Acquisition	-0.129
H_{13}	Delivery Reliability	0.170^{*}
H_{14}	Confounding Technological Trust	0.215^{***}
H_{15}	Transaction Security	0.085^{**}
H_{16}	Sales Information	-0.070^{**}
H_{17}	Wirelessness	-0.085^{***}
H_{18}	Buyers' Remorse	-0.142^{***}
H_{19}	Confounding Knowledge Technology	0.007

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

For the purpose of comparison between different demographic and product categories, as presented in Chapter 4, demographic categories selected were gender, levels of education, and age groups. Gender groups were male and female. Levels of education were non-college-educated and college-educated (Associate's Degree, Bachelor's Degree or higher). Age group one was defined as 18 to 38 years old, age group two was defined as 39 to 59 years old, and age group three was defined as 60 years old and older. Product categories were as follows: Computers & Consumer Electronics (defined as product category one), Apparel & Accessories (defined as product category two), Books/Music/Video (defined as product category three), and Health & Personal Care (defined as product category four).

From the previous three runs, the results show the following differences between demographic and product categories:

1. Females are significantly more willing to shop online than males.
2. There is no significant difference between respondents with a low level of education and respondents with a high level of education with regard to willingness to shop online.
3. Online shoppers in age group one are significantly more willing to shop online than online shoppers in age groups two and three, while online shoppers in age group two are significantly more willing to shop online than online shopper in age group three.
4. Online shoppers who purchased from product category three are significantly less willing to shop online than online shoppers who purchased from product categories one, two, and four.
5. There is no significant difference in customers' willingness between online shoppers who purchased from product category one and online shoppers who purchased from product category two.
6. There is no significant difference in customers' willingness between online shoppers who purchased from product categories one and two and online shoppers who purchased from product category four.

Consequently, Online Service Retailers should seek to understand the barriers affecting customers' willingness to shop online from different demographic and product categories.

Table 28 shows loadings, mean, and Cronbach's alpha for the second, third, and fourth run, which were the same, because only reference groups were changing:

Table 28: Output of Second, Third, and Fourth Runs of Customers' Willingness Structural Model Using Demographic and Product Categories as Predictors

		CFA Loadings		
	Factor	Loadings[1]	Mean[2]	Cronbach's α
Tactile Feedback				0.808
	TAC1	0.853	3.16	
	TAC2	0.867	3.29	
Delayed Acquisition				0.738
	DEL1	0.668	3.49	
	DEL2	0.740	4.15	
	DEL3	0.855	3.87	
Delivery Reliability				0.766
	OND1	0.765	3.80	
	OND2	0.814	3.71	
	OND3	0.755	4.11	
Confounding Technological Trust				0.739
	TRU1	0.712	3.46	
	TRU2	0.721	3.67	
	TRU3	0.764	3.53	
Transaction Security				0.697
	TRA1	0.832	4.30	
	TRA2	0.760	4.30	
Sales Information				0.765
	SAL1	0.792	4.18	
	SAL2	0.816	4.23	
	SAL3	0.779	4.13	
Wirelessness				0.685
	WIR1	0.749	2.56	
	WIR2	0.774	2.59	
Buyers' Remorse				0.843
	BUY1	0.811	3.42	
	BUY2	0.818	3.37	
	BUY3	0.884	3.52	
Confounding Knowledge Technology				0.744
	TEC1	0.769	3.37	
	TEC2	0.847	3.52	

1. These are standardized loading estimates from CFA.
2. Average response of each item (5-point Likert scale).

5.2.3. Customers' Willingness Structural Model by Gender Groups

Group: Males

Fifth run: running multiple group confirmatory factor analysis of gender. Responses from 2,468 males were analyzed using Customer Willingness (Q19) as an observed variable for all nine quality gaps:

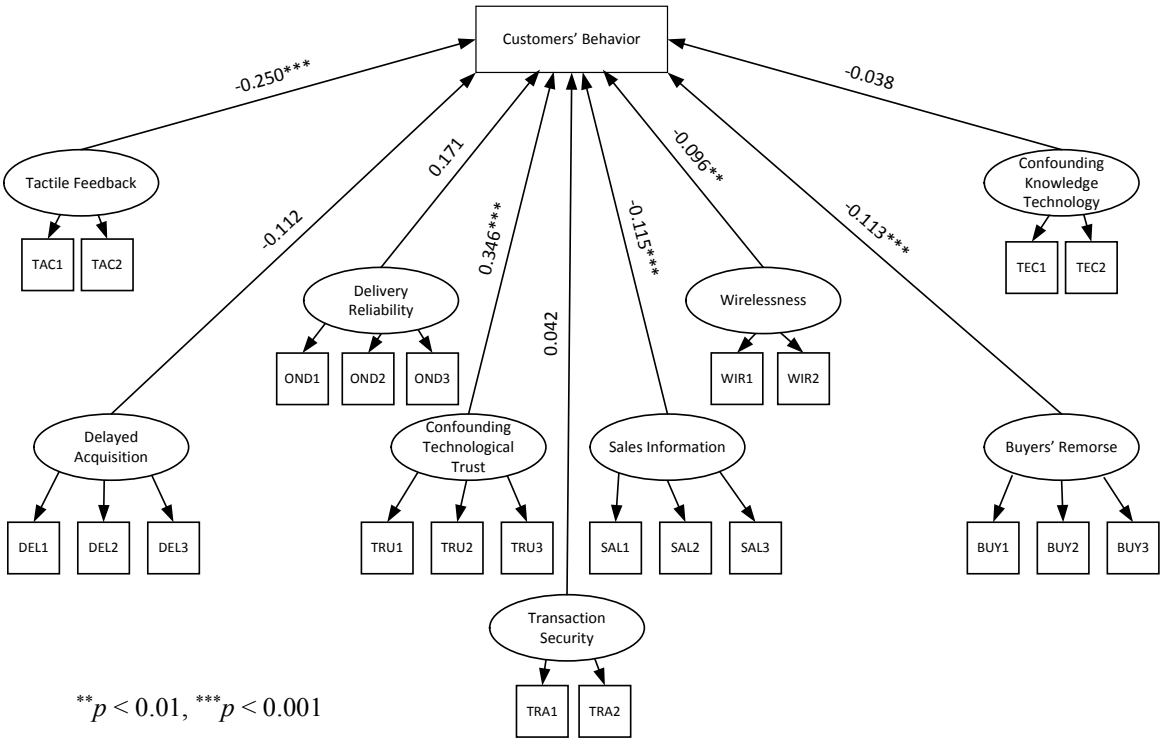


Figure 18: Standardized Path Diagram Results for Customers' Willingness Structural Model for Male Online Shoppers

The results illustrate that Tactile Feedback, Confounding Technological Trust, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for male online shoppers. Mitigating those quality gaps will increase the willingness for male online shoppers.

Tactile Feedback, Sales Information, Wirelessness, and Buyers' Remorse negatively associated with customers' willingness to purchase for male online shoppers. Hence, the more that male online shoppers agree on those gaps, the less likely they are to purchase

online. Meanwhile, Confounding Technological Trust have a positive association with customers' willingness to purchase for male online shoppers. This means that the more important this gap is to male online shoppers, the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in males' willingness to purchase online. However, when a quality gap has a negative path coefficient, it means that males who expressed a higher degree of agreement (strongly agree or agree) on this gap, are less likely to purchase online.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for male online shoppers, followed by Sales Information, Buyers' Remorse, and Wirelessness respectively.

Group: Females

Responses from 2,469 females were analyzed using Customer Preference (Q19) as an observed variable for all nine quality gaps:

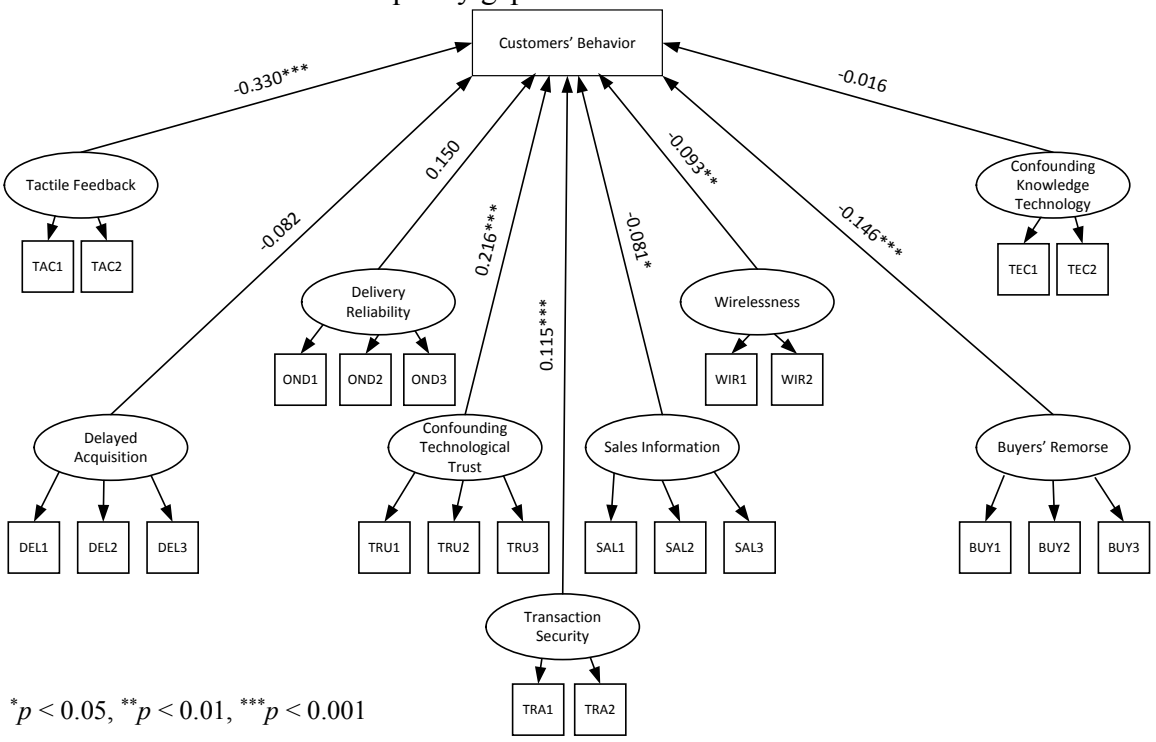


Figure 19: Standardized Path Diagram Results for Customers' Willingness Structural Model for Female Online Shoppers

The results indicate that Tactile Feedback, Confounding Technological Trust, Transaction Security, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for female online shoppers. Mitigating those quality gaps will increase customers' willingness for female online shoppers.

Tactile Feedback, Sales Information, Wirelessness, and Buyers' Remorse have a negative association with customers' willingness for female online shoppers. Hence, the more that female online shoppers agree on those gaps, the less likely they are to purchase online. Meanwhile, Confounding Technological Trust and Transaction Security have a positive associated with customers' willingness for female online shoppers. This means that the more important those gaps are to female online shoppers, the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in females' willingness to purchase online. However, when a quality gap has a negative path coefficient, it means that females who expressed a higher degree of agreement (strongly agree or agree) on this gap, are less likely to purchase online.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for female online shoppers, followed by Buyers' Remorse, Wirelessness, and Sales Information, respectively. For those quality gaps with positive path coefficients, Confounding Technological Trust has the strongest association with customers' willingness for female online shoppers, followed by Transaction Security.

Table 29 shows the loadings, mean, and Cronbach's alpha of both males and females. It also shows the goodness of fit indexes of the fifth run:

Table 29: Output of Fifth Run of Customers' Willingness Structural Model by Gender Groups

	Male				Female			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.773				0.840
TAC1	1.000	0.820	3.20		1.000	0.875	3.11	
TAC2	1.023	0.840	3.29		1.023	0.897	3.30	
Delayed Acquisition				0.719				0.754
DEL1	1.000	0.651	3.45		1.000	0.710	3.57	
DEL2	1.111	0.724	4.10		1.111	0.771	4.23	
DEL3	1.307	0.851	3.82		1.307	0.864	3.69	
Delivery Reliability				0.766				0.765
OND1	1.000	0.777	3.78		1.000	0.766	3.87	
OND2	1.049	0.815	3.69		1.049	0.817	3.78	
OND3	0.973	0.756	4.10		0.973	0.765	4.17	
Confounding Technological Trust				0.725				0.751
TRU1	1.000	0.713	3.48		1.000	0.740	3.48	
TRU2	1.009	0.720	3.69		1.009	0.746	3.67	
TRU3	1.060	0.756	3.55		1.06	0.792	3.54	
Transaction Security				0.688				0.702
TRA1	1.000	0.836	4.26		1.000	0.835	4.36	
TRA2	0.887	0.742	4.24		0.887	0.777	4.38	
Sales Information				0.741				0.786
SAL1	1.000	0.780	4.12		1.000	0.812	4.25	
SAL2	1.007	0.785	4.21		1.007	0.843	4.26	
SAL3	0.967	0.754	4.08		0.967	0.802	4.19	
Wirelessness				0.689				0.674
WIR1	1.000	0.766	2.68		1.000	0.745	2.48	
WIR2	0.986	0.755	2.74		0.986	0.773	2.47	
Buyers' Remorse				0.826				0.875
BUY1	1.000	0.801	3.38		1.000	0.824	3.50	
BUY2	1.007	0.806	3.35		1.007	0.831	3.42	
BUY3	1.069	0.856	3.50		1.069	0.908	3.58	
Confounding Knowledge Technology				0.726				0.757
TEC1	1.000	0.754	3.31		1.000	0.791	3.44	
TEC2	1.099	0.829	3.46		1.099	0.859	3.60	

Goodness-of-fit Statistics		Model Estimator: WLSM	
χ^2	4672.414*	CFI	0.981
Scaling Correction Factor	0.5093	TLI	0.978
df	490	RMSEA	0.061

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

1. Unstandardized loading estimates.
2. Standardized loading estimates.
3. Average response of each item (5-point Likert scale).
4- Cronbach's alpha.

There are differences in the values of path coefficients (estimates) of quality gaps on customers' behavior between males and females in terms of willingness. Consequently, the research question would be: Which significant quality gaps have stronger association with customers' willingness by gender groups?

To do so, the Chi-square difference test was used to determine if there is a statistically significant difference in path coefficients of quality gaps' association with customers' willingness between different groups. In the case that there was a statistically significant difference, unstandardized path coefficients are used to compare the association between the groups.

In this case, we are studying the significant difference on path coefficients between males and females. To do so, we have to run the model twice; one model treats the estimates as if they were different/separate, which is called the *comparison model*. The other model constrains the estimates to be equal, this is the *nested model*. For each estimate, we are going to have a nested model. In this case, each estimate means each quality gap. Hence, we have to run nine nested models for each of the nine quality gaps, by constraining each estimate to be equal and comparing it with the comparison model. Using the WLSM estimator, and in order to apply the Chi-square difference test, we have to utilize the formulas provided in statmodel.com. We compute the following:

1. The difference test scaling correction c_d.

$$c_d = \frac{d_0 * c_0 - d_1 * c_1}{d_0 - d_1}$$

$where$

$d_0 : is\ the\ df\ of\ the\ nested\ model$

$d_1 : is\ the\ df\ of\ the\ comparison\ model$

c_0: *is the scaling correction factor of the nested model*

c_1: *is the scaling correction factor of the comparison model*

2. Satorra-Bentler scaled Chi-square difference test TR_d.

$$TR_d = \frac{T_0 * c_0 - T_1 * c_1}{c_d}$$

From comparing the Chi-square critical value with the TRd value, we can conclude if there is significant difference between path coefficients. Table 30 summarizes the significant hypotheses, values of the unstandardized and standardized estimates (path coefficients) of both males and females, and indicates if there is a significant difference in path coefficients between males and females.

Table 30: Results for Customers' Willingness Structural Model by Gender Groups

Hypothesis	Quality Gap	Males		Females		Chi-Square diff. test[3]
		Unstd.[1]	Std[2]	Unstd[1]	Std.[2]	
H_{11}	Tactile Feedback	-0.564***	-0.250***	-0.699***	-0.330***	Sig.
H_{12}	Delayed Acquisition	-0.319	-0.112	-0.222	-0.082	Sig.
H_{13}	Delivery Reliability	0.408	0.171	0.351	0.150	Sig.
H_{14}	Confounding Technological Trust	0.897***	0.346***	0.536***	0.216***	Sig.
H_{15}	Transaction Security	0.093	0.042	0.246***	0.115***	Sig.
H_{16}	Sales Information	-0.274***	-0.115***	-0.183*	-0.081*	Sig.
H_{17}	Wirelessness	-0.233**	-0.096**	-0.214**	-0.093**	Sig.
H_{18}	Buyers' Remorse	-0.262***	-0.113***	-0.307***	-0.146***	Sig.
H_{19}	Confounding Knowledge Technology	-0.092	-0.038	-0.037	-0.016	Sig.

1. Unstandardized path coefficients
2. Standardized path coefficients.
3. Path coefficients Chi-square difference test.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Gender group comparison:

1. The Chi-Square difference test of path coefficients between males and females shows statistically significant difference of all quality gaps as an association with behavior between males and females. For those gaps that were significant on both

males and females, using unstandardized path coefficients for comparison between males and females, we conclude the following:

a. Tactile Feedback and Buyers' Remorse gaps have a stronger association with females than males with regard to customers' willingness to shop online.
b. Confounding Technological Trust, Sales Information, and Wirelessness gaps have a stronger association with males than females with regard to customers' willingness to shop online.

2. There is no significant association between Transaction Security and customers' willingness for male online shoppers. Meanwhile, Transaction Security has a significant association with customer willingness for female online shoppers.

Consequently, Online Service Retailers should seek to understand the barriers affecting customers' willingness for male and female online shoppers.

5.2.4. Customers' Willingness Structural Model for Different Levels of Education

Group: Lower-educated; Non-college-educated

Sixth run: running multiple group confirmatory factor analysis of education. Responses from 2,461 lower-educated (non-college-educated) participants were analyzed using Customer Willingness (Q19) as an observed variable for all nine quality gaps:

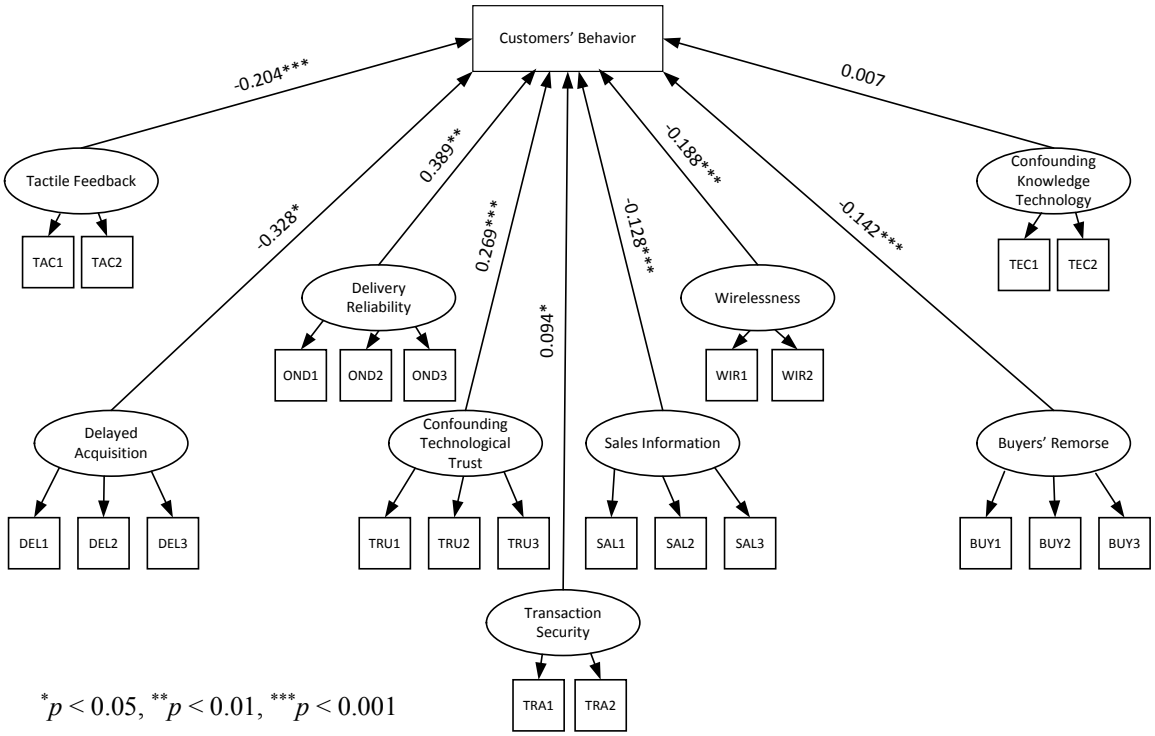


Figure 20: Standardized Path Diagram Results for Customers' Willingness Structural Model for Respondents with a Low Level of Education (Non-college-educated)

The results illustrate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with willingness to shop online for respondents with a low level of education. Mitigating those quality gaps will increase customers' willingness to shop online for respondents with a low level of education.

Tactile Feedback, Delayed Acquisition, Sales Information, Wirelessness, and Buyers' Remorse have a negative association with willingness to shop online for respondents with a low level of education. Hence, the more that lower-educated respondents agree on those gaps, the less likely they are to purchase online. Meanwhile, Delivery Reliability, Confounding Technological Trust, and Transaction Security have a positive association with willingness to shop online for respondents with a low level of education. This means that the more important those gaps are to lower-educated respondents, the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness to purchase online for respondents with a low level of education.

For those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with customers' willingness to shop online for respondents with a low level of education, followed by Tactile Feedback, Wirelessness, Buyers' Remorse, and Sales Information, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with customers' willingness to shop online for respondents with a low level of education, followed by Confounding Technological Trust, and Transaction Security, respectively.

Group: Higher-educated; College-educated (Associate's Degree, Bachelor's Degree or higher) - Responses from 2,476 higher-educated participants were analyzed using Customer Preference (Q19) as an observed variable for all nine quality gaps:

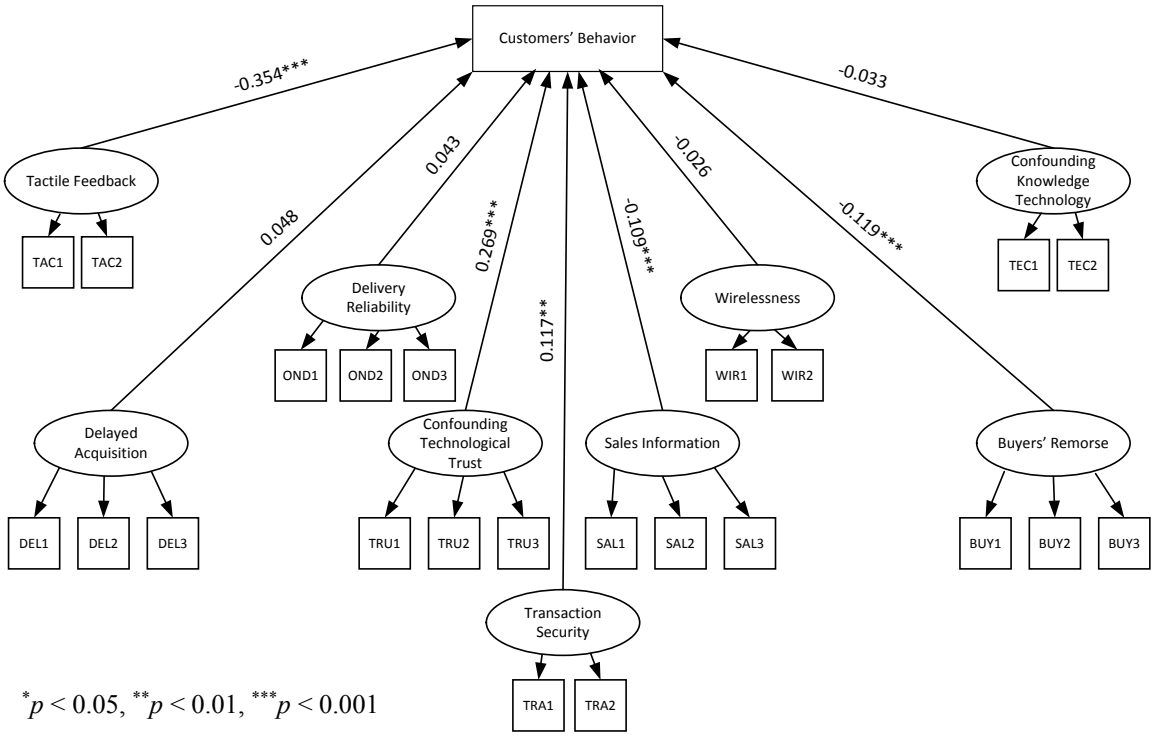


Figure 21: Standardized Path Diagram Results for Customers' Willingness Structural Model for Respondents with a High Level of Education (College-educated)

The results illustrate that Tactile Feedback, Confounding Technological Trust, Transaction Security, Sales Information, and Buyers' Remorse have a significant association with willingness to shop online for respondents with a high level of education. Mitigating those quality gaps will increase customers' willingness to shop online for respondents with a high level of education.

Tactile Feedback, Sales Information, and Buyers' Remorse have a negative association with willingness to shop online for respondents with a high level of education. Hence, the more that higher-educated respondents agree on those gaps, the less likely they are to

purchase online. Meanwhile, Confounding Technological Trust and Transaction Security have a positive association with willingness to shop online for respondents with a high level of education. This means that the more important those gaps are to higher-educated respondents, the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness to purchase online for respondents with a high level of education.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness to shop online for respondents with a high level of education, followed by Buyers' Remorse and Sales Information, respectively. For those quality gaps with positive path coefficients, Confounding Technological Trust has the strongest association with customers' willingness to shop online for respondents with a high level of education, followed by Transaction Security.

Table 31 shows the loadings, mean, and Cronbach's alpha of both lower-educated and higher-educated respondents. It also shows the goodness-of-fit indexes of the sixth run:

Table 31: Output of Sixth Run of Customers' Willingness Structural Model for Different Levels of Education

	Lower-educated				Higher-educated			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.809				0.809
TAC1	1.000	0.834	3.15		1.000	0.845	3.16	
TAC2	1.059	0.883	3.23		1.059	0.872	3.35	
Delayed Acquisition				0.738				0.738
DEL1	1.000	0.678	3.44		1.000	0.688	3.53	
DEL2	1.119	0.759	4.14		1.119	0.742	4.16	
DEL3	1.261	0.856	3.83		1.261	0.865	3.91	
Delivery Reliability				0.764				0.768
OND1	1.000	0.777	3.79		1.000	0.772	3.82	
OND2	1.046	0.813	3.70		1.046	0.817	3.72	
OND3	0.968	0.752	4.10		0.968	0.759	4.13	
Confounding Technological Trust				0.721				0.753
TRU1	1.000	0.707	3.39		1.000	0.741	3.52	
TRU2	1.009	0.713	3.63		1.009	0.739	3.70	
TRU3	1.078	0.762	3.46		1.078	0.783	3.61	
Transaction Security				0.697				0.697
TRA1	1.000	0.815	4.30		1.000	0.847	4.30	
TRA2	0.965	0.787	4.32		0.965	0.753	4.29	
Sales Information				0.766				0.764
SAL1	1.000	0.798	4.16		1.000	0.790	4.20	
SAL2	1.013	0.808	4.21		1.013	0.822	4.25	
SAL3	0.964	0.770	4.11		0.964	0.779	4.15	
Wirelessness				0.689				0.682
WIR1	1.000	0.772	2.52		1.000	0.740	2.61	
WIR2	0.984	0.759	2.58		0.984	0.774	2.60	
Buyers' Remorse				0.845				0.841
BUY1	1.000	0.821	3.40		1.000	0.806	3.44	
BUY2	0.993	0.816	3.35		0.993	0.824	3.38	
BUY3	1.084	0.890	3.52		1.084	0.883	3.51	
Confounding Knowledge Technology				0.739				0.749
TEC1	1.000	0.764	3.35		1.000	0.770	3.38	
TEC2	1.110	0.848	3.51		1.110	0.858	3.52	
Goodness-of-fit Statistics					Model Estimator: WLSM			
χ^2		4984.380*			CFI	0.980		
Scaling Correction Factor		0.5108			TLI	0.978		
df		490			RMSEA	0.061		

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation;
1. Unstandardized loading estimates.
2. Standardized loading estimates.
3. Average response of each item (5-point Likert scale).
4. Cronbach's alpha.

As previously explained, the Chi-square difference test can be used to determine if there is a statistically significant difference in path coefficients of quality gaps' association with customers' behavior between different groups. In this case, lower-educated and higher-educated respondents. Consequently, the research question would be: Which significant quality gaps have a stronger association with customers' willingness of respondents with a low level of education than respondents with a high level of education?

Table 32 summarizes the significant hypotheses, values of the unstandardized and standardized estimates (path coefficients) of both lower-educated and higher-educated respondents, and shows if there is a significant difference in path coefficients between lower-educated and higher-educated respondents.

Table 32: Results for Customers' Willingness Structural Model for Different Levels of Education

Hypothesis	Quality Gap	Lower-educated		Higher-educated		Chi-Square diff. test[3]
		Unstd.[1]	Std[2]	Unstd[1]	Std.[2]	
H_{11}	Tactile Feedback	-0.477***	-0.204***	-0.788***	-0.354***	Sig.
H_{12}	Delayed Acquisition	-0.944*	-0.328*	0.137	0.048	Sig.
H_{13}	Delivery Reliability	0.978**	0.389**	0.106	0.043	Sig.
H_{14}	Confounding Technological Trust	0.742***	0.269***	0.676***	0.269***	Not Sig.
H_{15}	Transaction Security	0.226*	0.094*	0.277**	0.117**	Not Sig.
H_{16}	Sales Information	-0.314***	-0.128***	-0.258***	-0.109***	Not Sig.
H_{17}	Wirelessness	-0.475***	-0.188***	-0.062	-0.026	Sig.
H_{18}	Buyers' Remorse	-0.337***	-0.142***	-0.279***	-0.119***	Not Sig.
H_{19}	Confounding Knowledge Technology	0.018	0.007	-0.081	-0.033	Not Sig.

1. Unstandardized path coefficients.
2. Standardized path coefficients.
3. Path coefficients Chi-square difference test.

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Using standardized path coefficients, as previously explained, we can distinguish the degree of association of the quality gaps with customers' willingness, by determining which quality gap has a stronger association with customers' willingness in different

education groups. Using Chi-square path coefficient difference test and by using unstandardized path coefficients, we conclude that Tactile Feedback has a stronger association with customers' willingness among higher-educated respondents than lower-educated respondents.

Comparison of education groups:

1- Tactile Feedback, Confounding Knowledge Technology, Transaction Security, Sales Information, and Buyers' Remorse have a significant association with customers' willingness for online respondents with low and high level of education.

2- Delayed Acquisition, Delivery Reliability, and Wirelessness have a significant association with customers' willingness for online respondents with a low level of education. While those gaps were not significantly associated with customers' willingness for online respondents with a high level of education.

Consequently, Online Service Retailers should seek to understand the barriers affecting customers' willingness for respondents with low and high levels of education.

5.2.5. Customers' Willingness Structural Model for Different Age Groups

Group: Age Group One (18 – 38 years old)

Seventh run: running multiple group confirmatory factor analysis of age groups. Responses from 1,667 participants from age group one (18 – 38 years old) were analyzed using Customer Willingness (Q19) as an observed variable for all nine quality gaps:

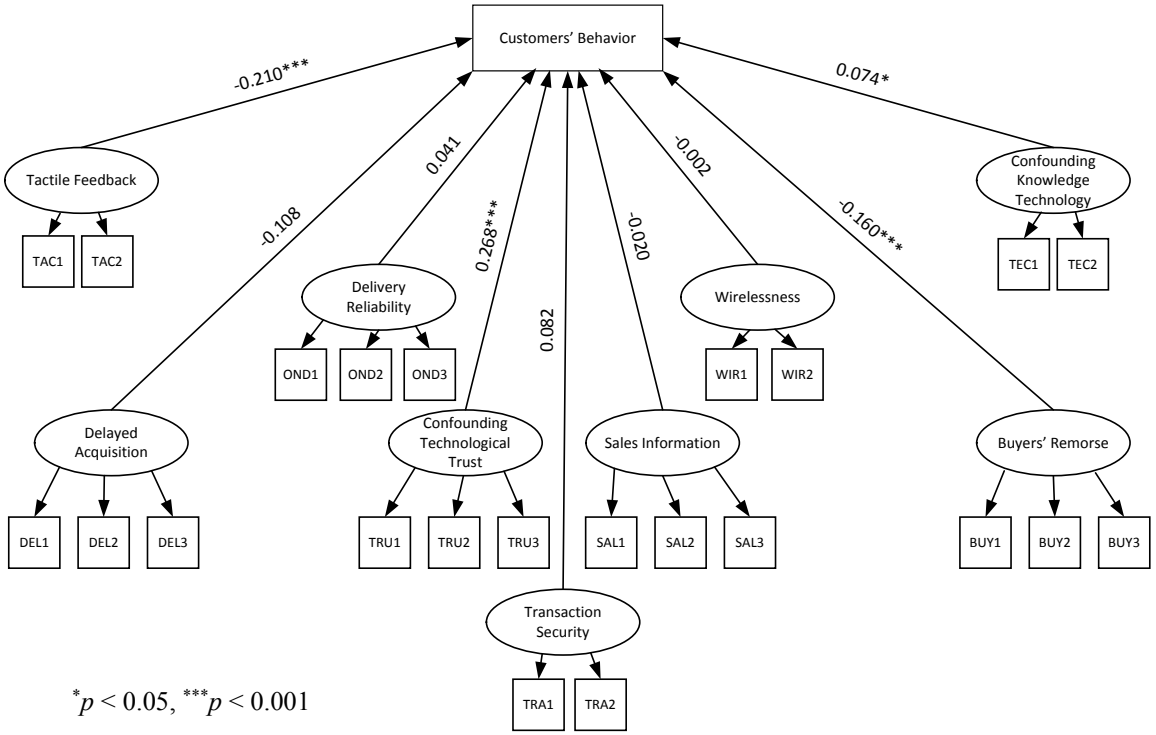


Figure 22: Standardized Path Diagram Results for Customers' Willingness Structural Model for Online Shoppers in Age Group One (18 – 38 Years Old)

The results illustrate that Tactile Feedback, Confounding Technological Trust, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with customers' willingness for online shoppers in age group one. Mitigating those quality gaps will increase customers' willingness for online shoppers in age group one.

Tactile Feedback and Buyers' Remorse have a negative association with customers' willingness for online shoppers in age group one. Hence, the more that online shoppers in

age group one agree on those gaps, the less likely they are to purchase online. Meanwhile, Confounding Technological Trust and Confounding Knowledge Technology have a positive association with customers' willingness for online shoppers in age group one. This means that the more important those gaps are to online shoppers in age group one, the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness for online shoppers in age group one to purchase online.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for online shoppers in age group one, followed by Buyers' Remorse. For those quality gaps with positive path coefficients, Confounding Technological Trust has the strongest association with customers' willingness for online shoppers in age group one, followed by Confounding Knowledge Technology.

Group: Age Group Two (39 – 59 years old)

Responses from 1,652 participants from age group two (39 – 59 years old) were analyzed using Customer Willingness (Q19) as an observed variable for all nine quality gaps:

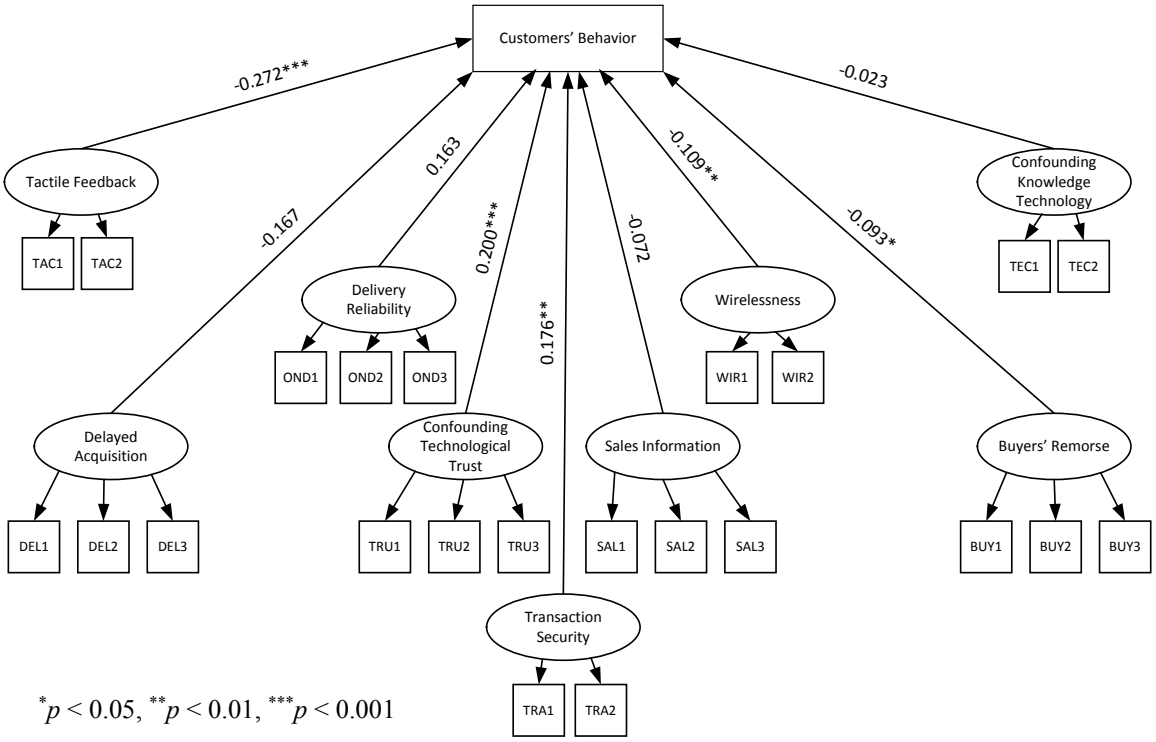


Figure 23: Standardized Path Diagram Results for Customers' Willingness Structural Model for Online Shoppers in Age Group Two (39 – 59 Years Old)

The results illustrate that Tactile Feedback, Confounding Knowledge Trust, Transaction Security, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for online shoppers in age group two. Mitigating those quality gaps will increase customers' willingness for online shoppers in age group two.

Tactile Feedback, Wirelessness, and Buyers' Remorse have a negative association with customers' willingness for online shoppers in age group two. Hence, the more that online shoppers in age group two agree on those gaps, the less likely they are to purchase online. Meanwhile, Confounding Knowledge Trust and Transaction Security have a

positive association with customers' willingness for online shoppers in age group two. This means that the more important those gaps are to online shoppers in age group two, the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness for online shoppers in age group two to purchase online.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for online shoppers in age group two, followed by Wirelessness, and Buyers' Remorse, respectively. For those quality gaps with positive path coefficients, Confounding Technological Trust has the strongest association with customers' willingness for online shoppers in age group two, followed by Transaction Security.

Group: Age Group Three (60 years old and older)

Responses from 1,618 participants from age group three (60 years old and older) were analyzed using Customer Willingness (Q19) as an observed variable for all nine quality gaps:

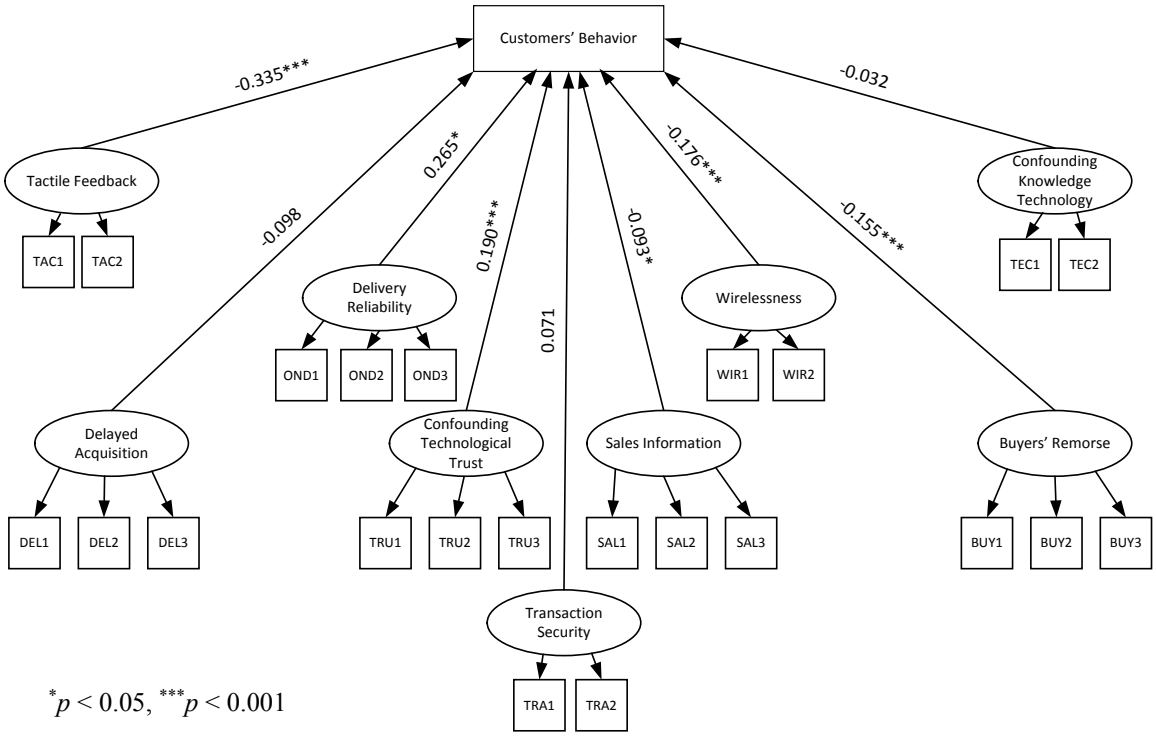


Figure 24: Standardized Path Diagram Results for Customers' Willingness Structural Model for Online Shoppers in Age Group Three (60 Years Old and Older)

The results illustrate that Tactile Feedback, Delivery Reliability, Confounding Knowledge Trust, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for online shoppers in age group three. Mitigating those quality gaps will increase customers' willingness for online shoppers in age group three.

Tactile Feedback, Sales Information, Wirelessness, and Buyers' Remorse have a negative association with customers' willingness for online shoppers in age group three. Hence, the more that online shoppers in age group three agree on those gaps, the less likely

they are to purchase online. Meanwhile, Confounding Technological Trust and Delivery Reliability have a positive association with customers' willingness for online shoppers in age group three. This means that the more important those gaps are to online shoppers in age group three, the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness for online shoppers in age group three to purchase online.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for online shoppers in age group three, followed by Wirelessness, Buyers' Remorse, and Sales Information, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with customers' willingness for online shoppers in age group three, followed by Confounding Technological Trust.

Table 33 shows the loadings, mean, and Cronbach's alpha of different age groups. It also shows the goodness-of-fit indexes of the seventh run.

Table 33: Output of Seventh Run of Customers' Willingness Structural Model for Different Age Groups

	Age Group One				Age Group Two			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.754				0.805
TAC1	1.000	0.798	3.23		1.000	0.833	3.12	
TAC2	1.039	0.829	3.41		1.039	0.879	3.26	
Delayed Acquisition				0.721				0.743
DEL1	1.000	0.675	3.76		1.000	0.685	3.46	
DEL2	1.109	0.748	4.30		1.109	0.741	4.15	
DEL3	1.234	0.833	4.03		1.234	0.865	3.84	
Delivery Reliability				0.764				0.772
OND1	1.000	0.741	3.96		1.000	0.793	3.78	
OND2	1.028	0.762	3.86		1.028	0.826	3.69	
OND3	1.019	0.755	4.26		1.019	0.742	4.10	
Confounding Technological Trust				0.710				0.728
TRU1	1.000	0.703	3.72		1.000	0.707	3.44	
TRU2	0.980	0.689	3.86		0.980	0.724	3.63	
TRU3	1.077	0.758	3.75		1.077	0.769	3.51	
Transaction Security				0.720				0.690
TRA1	1.000	0.847	4.36		1.000	0.839	4.33	
TRA2	0.939	0.796	4.33		0.939	0.762	4.31	
Sales Information				0.757				0.769
SAL1	1.000	0.792	4.19		1.000	0.785	4.17	
SAL2	1.007	0.798	4.23		1.007	0.834	4.20	
SAL3	0.957	0.758	4.14		0.957	0.786	4.10	
Wirelessness				0.673				0.694
WIR1	1.000	0.716	2.65		1.000	0.750	2.49	
WIR2	1.112	0.796	2.53		1.112	0.783	2.56	
Buyers' Remorse				0.808				0.857
BUY1	1.000	0.775	3.55		1.000	0.837	3.39	
BUY2	1.003	0.777	3.48		1.003	0.839	3.35	
BUY3	1.118	0.866	3.62		1.118	0.889	3.50	
Confounding Knowledge Technology				0.743				0.719
TEC1	1.000	0.763	3.35		1.000	0.726	3.27	
TEC2	1.114	0.850	3.42		1.114	0.855	3.49	

Table 33 (cont'd): Output of Seventh Run of Customers' Willingness Structural Model for Different Age Groups

	Age Group Three			
	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]		
Tactile Feedback				0.857
TAC1	1.000	0.884	3.12	
TAC2	1.039	0.912	3.20	
Delayed Acquisition				0.725
DEL1	1.000	0.660	3.23	
DEL2	1.109	0.745	4.00	
DEL3	1.234	0.872	3.73	
Delivery Reliability				0.782
OND1	1.000	0.774	3.67	
OND2	1.028	0.859	3.57	
OND3	1.019	0.751	3.98	
Confounding Technological Trust				0.740
TRU1	1.000	0.734	3.20	
TRU2	0.98	0.743	3.51	
TRU3	1.077	0.762	3.33	
Transaction Security				0.673
TRA1	1.000	0.791	4.21	
TRA2	0.939	0.749	4.26	
Sales Information				0.770
SAL1	1.000	0.799	4.17	
SAL2	1.007	0.828	4.25	
SAL3	0.957	0.790	4.15	
Wirelessness				0.701
WIR1	1.000	0.774	2.55	
WIR2	1.112	0.767	2.68	
Buyers' Remorse				0.858
BUY1	1.000	0.825	3.32	
BUY2	1.003	0.841	3.26	
BUY3	1.118	0.902	3.42	
Confounding Knowledge Technology				0.768
TEC1	1.000	0.802	3.50	
TEC2	1.114	0.869	3.63	
Goodness-of-fit Statistics	Model Estimator: WLSM			
χ^2	5562.337*	CFI	0.979	
Scaling Correction Factor	0.5276	TLI	0.978	
df	772	RMSEA	0.061	

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

1. Unstandardized loading estimates.
2. Standardized loading estimates.
3. Average response of each item (5-point Likert scale).
4. Cronbach's alpha.

As previously explained, Chi-square difference test can be used to determine if there is statistically significant difference on path coefficients of quality gaps association with customer's behavior between different groups; in this case, online shoppers in age groups one, two, and three. Consequently, the research question would be: Which significant quality gaps have stronger association with customers' willingness in different age groups?

The following table (34) summarizes the significant hypotheses, values of the unstandardized and standardized estimates (path coefficients) of age groups, and illustrates if there is a significant difference in path coefficients between them.

Table 34: Results for Customers' Willingness Structural Model for Different Age Groups

Hypo-thesis	Quality Gap	Age Group One		Age Group Two		Age Group Three		Chi-Sqr diff. test[3]
		Unstd.[1]	Std.[2]	Unstd.[1]	Std.[2]	Unstd.[1]	Std.[2]	
H_{11}	Tactile Feedback	-0.443***	-0.210***	-0.599***	-0.272***	-0.769***	-0.335***	Sig.
H_{12}	Delayed Acquisition	-0.268	-0.108	-0.480	-0.167	-0.361	-0.098	Not Sig.
H_{13}	Delivery Reliability	0.093	0.041	0.406	0.163	0.816*	0.265*	Not Sig.
H_{14}	Confounding Technological Trust	0.641***	0.268***	0.563***	0.200***	0.626***	0.190***	Not Sig.
H_{15}	Transaction Security	0.163	0.082	0.430**	0.176**	0.236	0.071	Not Sig.
H_{16}	Sales Information	-0.043	-0.020	-0.178	-0.072	-0.297*	-0.093*	Not Sig.
H_{17}	Wirelessness	-0.004	-0.002	-0.317**	-0.109**	-0.619***	-0.176***	Sig.
H_{18}	Buyers' Remorse	-0.347***	-0.160***	-0.213*	-0.093*	-0.436***	-0.155***	Not Sig.
H_{19}	Confounding Knowledge Technology	0.162*	0.074*	-0.060	-0.023	-0.091	-0.032	Sig.

1. Unstandardized path coefficients
2. Standardized path coefficients.
3. Path coefficients Chi-square difference test.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Using standardized path coefficients, we can distinguish the degree of association of the quality gaps with customers' willingness by determining which quality gap has the most significant association for online shoppers in different age groups (age groups one,

two, and three). Using the Chi-square path coefficient different test, using unstandardized path coefficients, we can conclude that Tactile Feedback has a stronger association with online shoppers in age group three than online shoppers in age group one with regard to willingness to shop online. Additionally, Wirelessness has a stronger association with online shoppers in age group three than online shoppers in age group two with regard to willingness to shop online.

Comparison of age groups:

1. Tactile Feedback, Confounding Technological Trust, and Buyer's Remorse have a significant association with customers' willingness for online shoppers in age groups one, two, and three.
2. Confounding Knowledge Technology has a significant association with customers' willingness for online shoppers in age group one, while customers' willingness for online shoppers in age groups two and three do not.
3. Transaction Security has a significant association with customers' willingness for online shoppers in age group two, while customers' willingness for online shoppers in age groups one and three do not.
4. Delivery Reliability and Sales Information have a significant association with customers' willingness for online shoppers in age group three, while customers' willingness for online shoppers in age groups one and two do not.
5. Wirelessness has a significant association with customers' willingness for online shoppers in age groups two and three, while customers' willingness for online shoppers in age group one does not.

Consequently, Online Service Retailers should seek to understand the barriers affecting customers' willingness for online shoppers in age groups one, two, and three.

5.2.6. Customers' Willingness Structural Model for Different Product Categories

Prodcut Category One (Computer & Consumer Electronics)

Eighth run: running multiple group confirmatory factor analysis for different product categories. Responses from 1,235 participants who purchased from product category one (Computer & Consumer Electronics) were analyzed using Customer Willingness (Q19) as an observed variable for all nine quality gaps:

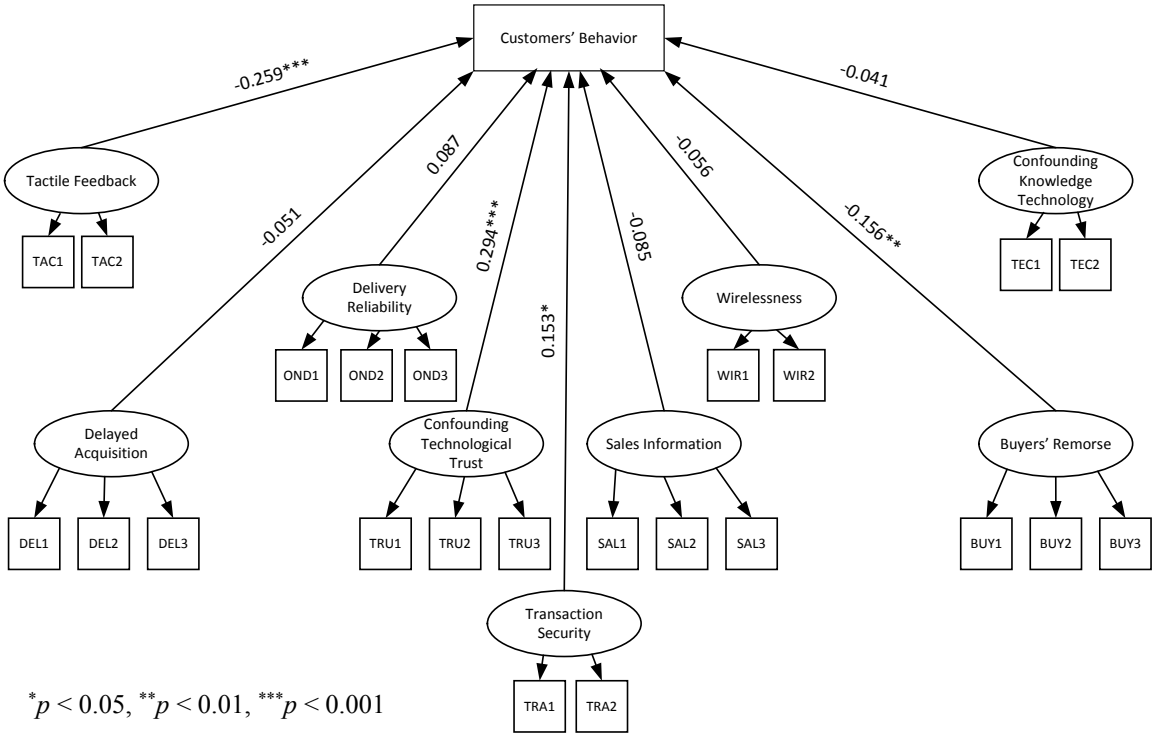


Figure 25: Standardized Path Diagram Results for Customers' Willingness Structural Model for Online Shoppers who Purchased from Product Category One (Computer & Consumer Electronics)

The results illustrate that Tactile Feedback, Confounding Technological Trust, Transaction Security, and Buyers' Remorse have a significant association with customers' willingness for online shoppers who purchased from product category one. Mitigating

those quality gaps will increase customers' willingness for online shoppers who purchased from product category one.

Tactile Feedback and Buyers' Remorse have a negative association with customers' willingness for online shoppers who purchased from product category one. Hence, the more that online shoppers (who purchased from product category one) agree on those gaps, the less likely they are to purchase online. Meanwhile, Confounding Technological Trust and Transaction Security have a positive association with customers' willingness for online shoppers who purchased from product category one. This means that the more important those gaps are to online shoppers (who purchased from product category one), the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness for online shoppers who purchased from product category one.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for online shoppers who purchased from product category one, followed by Buyers' Remorse. For those quality gaps with positive path coefficients, Confounding Technological Trust has the strongest association with customers' willingness for online shoppers who purchased from product category one, followed by Transaction Security.

Prodcut Category Two (Apparel & Accessories)

Responses from 1,248 participants who purchased from product category two (Apparel & Accessories) were analyzed using Customer Preference (Q19) as an observed variable for all nine quality gaps:

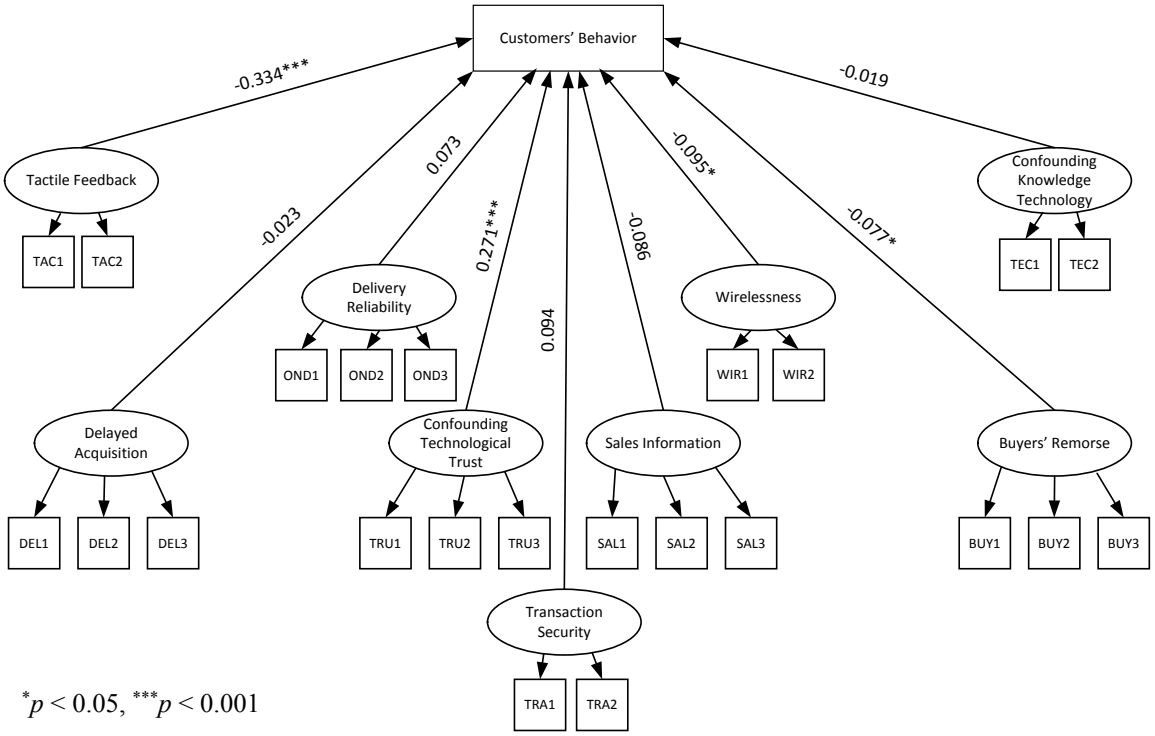


Figure 26: Standardized Path Diagram Results for Customers' Willingness Structural Model for Online Shoppers who Purchased from Product Category Two (Apparel & Accessories)

The results illustrate that Tactile Feedback, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for online shoppers who purchased from product category two. Mitigating those quality gaps will increase customers' willingness for online shoppers who purchased from product category two.

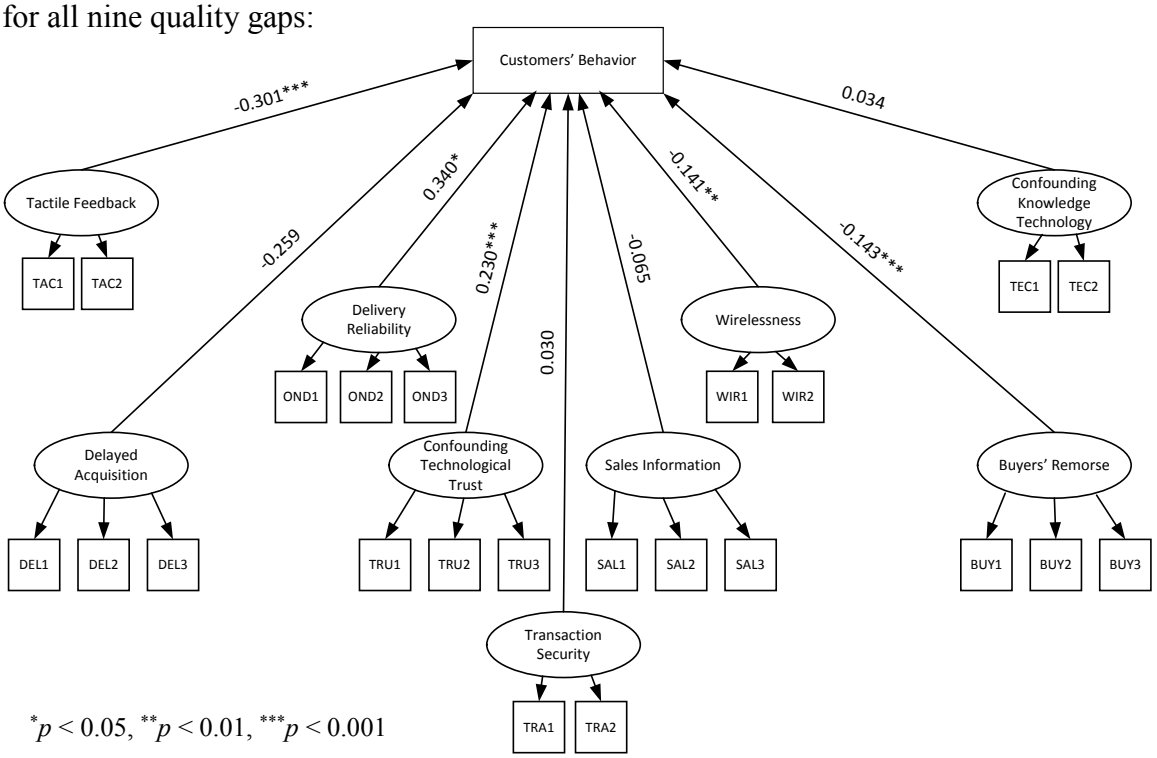
Tactile Feedback, Wirelessness, and Buyers' Remorse have a negative association with customers' willingness for online shoppers who purchased from product category two. Hence, the more that online shoppers (who purchased from product category two) agree on those gaps, the less likely they are to purchase online. Meanwhile, Confounding

Technological Trust have a positive association with customers' willingness for online shoppers who purchased from product category one. This means that the more important this gap is to online shoppers (who purchased from product category two), the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness for online shoppers who purchased from product category two.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for online shoppers who purchased from product category two, followed by Wirelessness, and Buyers' Remorse, respectively.

Group: Prodcut Category Three (Books/ Music/ Video)

Responses from 1,229 participants who purchased from product category three (Books/ Music/ Video) were analyzed using Customer Willingness (Q19) as an observed variable for all nine quality gaps:



$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Figure 27: Standardized Path Diagram Results for Customers' Willingness Structural Model for Online Shoppers who Purchased from Product Category Three (Books/ Music/ Video)

The results illustrate that Tactile Feedback, Delivery Reliability, Confounding Technological Trust, Wirelessness, and Buyers' Remorse affect customers' willingness for online shoppers who purchased from product category three. Mitigating those quality gaps will increase customers' willingness for online shoppers who purchased from product category three.

Tactile Feedback, Wirelessness, and Buyers' Remorse have a negative association with customers' willingness for online shoppers who purchased from product category three. Hence, the more that online shoppers (who purchased from product category three) agree on those gaps, the less likely they are to purchase online. Meanwhile, Delivery Reliability and Confounding Technological Trust have a positive association with customers' willingness for online shoppers who purchased from product category three. This means that the more important those gaps are to online shoppers (who purchased from product category three), the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness to shop online for online shoppers who purchased from product category three.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for online shoppers who purchased from product category three, followed by Buyers' Remorse, and Wirelessness, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with customers' willingness for online shoppers who purchased from product category three, followed by Confounding Technological Trust.

Prodcut Category Four (Health & Personal Care)

Responses from 1,225 participants from customers who purchased from product category four (Health & Personal Care) were analyzed using Customer Willingness (Q19) as an observed variable for all nine quality gaps:

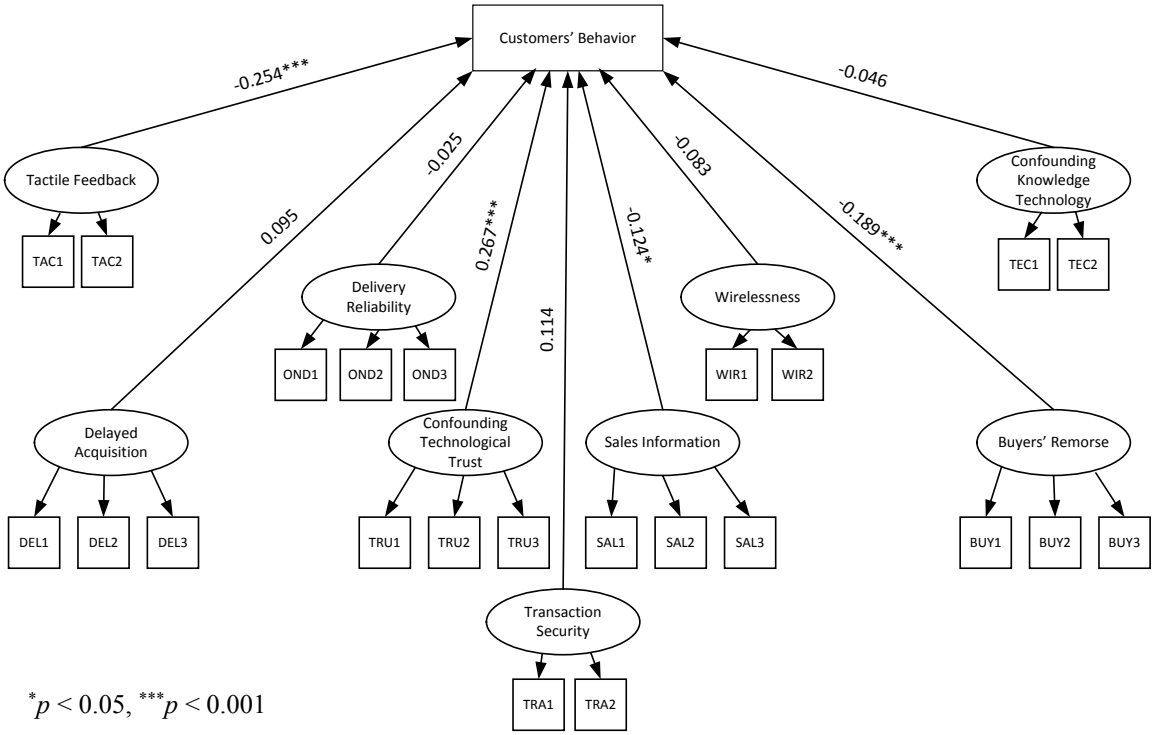


Figure 28: Standardized Path Diagram Results for Customers' Willingness Structural Model for Online Shoppers who Purchased from Product Category Four (Health & Personal Care)

The results illustrate that Tactile Feedback, Confounding Technological Trust, Sales Information, and Buyers' Remorse have a significant association with customers' willingness for online shoppers who purchased from product category four. Mitigating those quality gaps will increase customers' willingness for online shoppers who purchased from product category four.

Tactile Feedback, Sales Information, and Buyers' Remorse have a negative association with customers' willingness for online shoppers who purchased from product category one. Hence, the more that online shoppers (who purchased from product category four) agree

on those gaps, the less likely they are to purchase online. Meanwhile, Confounding Technological Trust have a positive association with customers' willingness for online shoppers who purchased from product category four. This means that the more important this gap is to online shoppers (who purchased from product category four), the more likely they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer willingness for online shoppers who purchased from product category four.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customers' willingness for online shoppers who purchased from product category four, followed by Buyers' Remorse, and Sales Information, respectively.

Table 35 shows the loadings, mean, and Cronbach's alpha of different product categories. It also shows the goodness-of-fit indexes of the eighth run:

Table 35: Output of Eighth Run of Customers' Willingness Structural Model for Different Product Categories

	Product Category One				Product Category Two			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.807				0.830
TAC1	1.000	0.856	3.09		1.000	0.860	3.17	
TAC2	1.010	0.864	3.23		1.010	0.892	3.28	
Delayed Acquisition				0.742				0.750
DEL1	1.000	0.690	3.51		1.000	0.675	3.43	
DEL2	1.061	0.732	4.14		1.061	0.754	4.11	
DEL3	1.243	0.857	3.88		1.243	0.865	3.80	
Delivery Reliability				0.767				0.773
OND1	1.000	0.768	3.78		1.000	0.771	3.75	
OND2	1.059	0.814	3.73		1.059	0.816	3.67	
OND3	0.973	0.748	4.15		0.973	0.764	4.09	
Confounding Technological Trust				0.758				0.741
TRU1	1.000	0.732	3.47		1.000	0.759	3.45	
TRU2	1.041	0.762	3.68		1.041	0.722	3.65	
TRU3	1.085	0.794	3.50		1.085	0.783	3.51	
Transaction Security				0.716				0.720
TRA1	1.000	0.870	4.31		1.000	0.869	4.29	
TRA2	0.879	0.765	4.31		0.879	0.770	4.28	
Sales Information				0.757				0.789
SAL1	1.000	0.778	4.18		1.000	0.822	4.14	
SAL2	1.056	0.821	4.23		1.056	0.813	4.19	
SAL3	1.022	0.795	4.17		1.022	0.795	4.09	
Wirelessness				0.691				0.689
WIR1	1.000	0.757	2.58		1.000	0.783	2.52	
WIR2	1.011	0.766	2.63		1.011	0.757	2.56	
Buyers' Remorse				0.827				0.843
BUY1	1.000	0.790	3.35		1.000	0.829	3.40	
BUY2	1.022	0.808	3.36		1.022	0.820	3.30	
BUY3	1.112	0.879	3.46		1.112	0.884	3.47	
Confounding Knowledge Technology				0.764				0.709
TEC1	1.000	0.776	3.30		1.000	0.762	3.33	
TEC2	1.110	0.862	3.48		1.110	0.801	3.49	

Table 35 (cont'd): Output of Eighth Run of Customers' Willingness Structural Model for Different Product Categories

	Product Category Three				Product Category Four			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.801				0.793
TAC1	1.000	0.831	3.19		1.000	0.838	3.18	
TAC2	1.010	0.875	3.34		1.010	0.860	3.32	
Delayed Acquisition				0.742				0.714
DEL1	1.000	0.683	3.46		1.000	0.679	3.55	
DEL2	1.061	0.765	4.15		1.061	0.752	4.20	
DEL3	1.243	0.866	3.87		1.243	0.849	3.91	
Delivery Reliability				0.759				0.766
OND1	1.000	0.773	3.83		1.000	0.770	3.86	
OND2	1.059	0.823	3.69		1.059	0.817	3.75	
OND3	0.973	0.775	4.12		0.973	0.768	4.09	
Confounding Technological Trust				0.723				0.731
TRU1	1.000	0.697	3.39		1.000	0.731	3.51	
TRU2	1.041	0.694	3.65		1.041	0.738	3.69	
TRU3	1.085	0.783	3.53		1.085	0.735	3.58	
Transaction Security				0.688				0.659
TRA1	1.000	0.800	4.30		1.000	0.803	4.29	
TRA2	0.879	0.767	4.31		0.879	0.737	4.32	
Sales Information				0.761				0.748
SAL1	1.000	0.823	4.17		1.000	0.768	4.22	
SAL2	1.056	0.823	4.24		1.056	0.793	4.26	
SAL3	1.022	0.762	4.14		1.022	0.767	4.12	
Wirelessness				0.697				0.663
WIR1	1.000	0.772	2.59		1.000	0.723	2.55	
WIR2	1.011	0.775	2.59		1.011	0.764	2.57	
Buyers' Remorse				0.859				0.842
BUY1	1.000	0.831	3.41		1.000	0.806	3.53	
BUY2	1.022	0.834	3.36		1.022	0.820	3.44	
BUY3	1.112	0.898	3.52		1.112	0.879	3.61	
Confounding Knowledge Technology				0.738				0.762
TEC1	1.000	0.770	3.41		1.000	0.800	3.41	
TEC2	1.110	0.854	3.53		1.110	0.855	3.56	

Goodness-of-fit Statistics		Model Estimator: WLSM	
χ^2	5547.913*	CFI	0.980
Scaling Correction Factor	0.5245	TLI	0.979
df	1054	RMSEA	0.061

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

1. Unstandardized loading estimates.
2. Standardized loading estimates.
3. Average response of each item (5-point Likert scale).
4. Cronbach's alpha.

Table 36 summarizes the significant hypotheses, values of the unstandardized and standardized estimates (path coefficients) of product categories, and shows if there is a significant difference in path coefficients between them.

Table 36: Results for Customers' Willingness Structural Model for Different Product Categories

Hypothesis	Quality Gap	Product Category One		Product Category Two	
		Unstd.[1]	Std[2]	Unstd[1]	Std.[2]
H_{11}	Tactile Feedback	-0.549***	-0.259***	-0.761***	-0.334***
H_{12}	Delayed Acquisition	-0.133	-0.051	-0.065	-0.023
H_{13}	Delivery Reliability	0.206	0.087	0.179	0.073
H_{14}	Confounding Technological Trust	0.728***	0.294***	0.739***	0.271***
H_{15}	Transaction Security	0.319*	0.153*	0.223	0.094
H_{16}	Sales Information	-0.199	-0.085	-0.218	-0.086
H_{17}	Wirelessness	-0.135	-0.056	-0.241*	-0.095*
H_{18}	Buyers' Remorse	-0.358**	-0.156**	-0.186*	-0.077*
H_{19}	Confounding Knowledge Technology	-0.097	-0.041	-0.053	-0.019

1. Unstandardized path coefficients.
2. Standardized path coefficients.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Table 36 (cont'd): Results for Customers' Willingness Structural Model for Different Product Categories

Hypothesis	Quality Gap	Product Category Three		Product Category Four		Chi-Square diff. test[3]
		Unstd.[1]	Std[2]	Unstd[1]	Std.[2]	
H_{11}	Tactile Feedback	-0.677***	-0.301***	-0.565***	-0.254***	Sig.
H_{12}	Delayed Acquisition	-0.752	-0.259	0.276	0.095	Not Sig.
H_{13}	Delivery Reliability	0.906*	0.340*	-0.064	-0.025	Not Sig.
H_{14}	Confounding Technological Trust	0.676***	0.230***	0.773***	0.267***	Not Sig.
H_{15}	Transaction Security	0.073	0.030	0.289	0.114	Not Sig.
H_{16}	Sales Information	-0.172	-0.065	-0.343*	-0.124*	Not Sig.
H_{17}	Wirelessness	-0.365***	-0.141***	-0.220	-0.083	Not Sig.
H_{18}	Buyers' Remorse	-0.360***	-0.143***	-0.466***	-0.189***	Not Sig.
H_{19}	Confounding Knowledge Technology	0.093	0.034	-0.119	-0.046	Not Sig.

1. Unstandardized path coefficients.
2. Standardized path coefficients.
3. Path coefficients Chi-square difference test.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

As previously explained, using standardized path coefficients, we can distinguish the degree of association of the quality gaps by determining which quality gap has the strongest association with customers' willingness for online shoppers who purchased from product category one, two, three, and four. The Chi-square difference test can be used to determine if there is a statistically significant difference in path coefficients of quality gaps association with customer's behavior between different groups; in this case, online shoppers who purchased from different product categories. Consequently, the research question would be: Which significant quality gaps have the strongest association with customers' willingness in different product categories?

Using the Chi-square path coefficient difference test, by using unstandardized path coefficients, we conclude that Tactile Feedback has a stronger association with customers' willingness for online shoppers who purchased from product category two (Apparel & Accessories) than online shoppers who purchased from product category three (Books/ Music/ Video). This is considered intuitive, since customers who purchased apparel products are more willing to touch the item than customers who purchased books.

Comparison of four product categories:

1. Customers' willingness for online shoppers who purchased from product categories one, two, three, and four, has a significant association with Tactile Feedback, Confounding Technological Trust, and Buyer's Remorse.
2. Customers' willingness for online shoppers who purchased from product category one has a significant association with Transaction Security, while customers' willingness for online shoppers who purchased from product categories two, three, and four do not.

3. Customers' willingness for online shoppers who purchased from product categories two and three has a significant association with Wirelessness, while customers' willingness for online shoppers who purchased from product categories one and four do not.
4. Customers' willingness for online shoppers who purchased from product category four has a significant association with Sales Information, while customers' willingness for online shoppers who purchased from product categories one, two, and three do not.

Consequently, Online Service Retailers should seek to understand the barriers affecting customers' willingness for online shoppers who purchased from product categories one, two, three, and four.

5.2.7. Customers' Willingness Structural Model Summary

Table 37 summarizes goodness-of-fit indexes and the significant hypotheses of all models used on analyzing the association of the quality gaps with customers' behavior in terms of willingness:

Table 37: Summary of Customers' Willingness Structural Model (1)

No.	Model	CFI	TLI	RMSEA	Significant Hypotheses	
1	Customers' Willingness on Quality Gaps	0.980	0.974	0.066	H_{11}, H_{13}, H_{14}, H_{15}, H_{16}, H_{17}, H_{18}	
2	Customers' Willingness on Quality Gaps, Using Different Demographic and Product Categories as Predictors	0.972	0.967	0.059	H_{11}, H_{13}, H_{14}, H_{15}, H_{16},H_{17}, H_{18}, H_{102}, H_{105}, H_{106}, H_{107}	Reference groups: Age (3) and, Product Category (4)
		0.978	0.974	0.052	H_{11}, H_{13}, H_{14}, H_{15}, H_{16}, H_{17}, H_{18}, H_{102}, H_{108}, H_{109}, H_{105}, H_{110}, H_{107}	Reference groups: Age (2) and, Product Category (3)
		0.978	0.973	0.052	H_{11}, H_{13}, H_{14}, H_{15}, H_{16}, H_{17}, H_{18}, H_{102}, H_{109}, H_{110}, H_{107}	Reference groups: Age (2) and, Product Category (2)
3	Customers' Willingness on Quality Gaps, Grouping for Gender	0.981	0.978	0.061	Males: H_{11}, H_{14}, H_{16}, H_{17}, H_{18}	
					Females: H_{11}, H_{14}, H_{15}, H_{16}, H_{17}, H_{18}	
4	Customers' Willingness on Quality Gaps, Grouping for Education	0.980	0.978	0.061	Lower-educated: H_{11}, H_{12}, H_{13}, H_{14}, H_{15}, H_{16}, H_{17}, H_{18}	
					Higher-educated: H_{11}, H_{14}, H_{15}, H_{16}, H_{18}	
5	Customers' Willingness on Quality Gaps, Grouping for Age	0.979	0.978	0.061	Age (1): H_{11}, H_{14}, H_{18}, H_{19}	
					Age (2): H_{11}, H_{14}, H_{15}, H_{17}, H_{18}	
					Age (3): H_{11}, H_{13}, H_{14}, H_{16}, H_{17}, H_{18}	
6	Customers' Willingness on Quality Gaps, Grouping for Product Category	0.980	0.979	0.061	PC (1): H_{11}, H_{14}, H_{15}, H_{18}	
					PC (2): H_{11}, H_{14}, H_{17}, H_{18}	
					PC (3): H_{11}, H_{13}, H_{14}, H_{17}, H_{18}	
					PC (4): H_{11}, H_{14}, H_{16}, H_{18}	

Table 38 summarizes the significant quality gaps based on different demographics and product categories:

Table 38: Summary of Customers' Willingness Structural Model (2)

	Significant Quality Gaps on Customers' Willingness										
	Gender		Level of Education		Age Group			Product Category			
Quality Gap	Males	Females	Low	High	(1)	(2)	(3)	(1)	(2)	(3)	(4)
Tactile Feedback	√	√	√	√	√	√	√	√	√	√	√
Delayed Acquisition			√								
Delivery Reliability			√				√			√	
Confounding Knowledge Trust	√	√	√	√	√	√	√	√	√	√	√
Transaction Security		√	√	√		√		√			
Sales Information	√	√	√	√			√				√
Wirelessness	√	√	√			√	√		√	√	
Buyers' Remorse	√	√	√	√	√	√	√	√	√	√	√
Confounding Knowledge Technology					√						

5.3. Customer Satisfaction Structural Model Results

In this model, data were tested to measure the significance of the nine quality gaps on customer satisfaction. Each quality gap was considered as a latent variable and has two to three observed variables. Refer to Appendix B, Q17, in the comprehensive study survey instrument, for the multiple observed variables of each quality gap. Those quality gaps were measured against Q20 (Customer Satisfaction) on the comprehensive study survey instrument. We used the collected data to test Customer Satisfaction Structural Model six times, with a total of eight runs. The reason for testing the model six times was to acquire details and analysis of different demographic and product categories. In the following pages, we discuss each of the eight runs separately. Path diagrams were generated to show standardized path coefficients of each quality gap on customer satisfaction for each run. The path diagrams also showed the significant association of the quality gaps with customer satisfaction. Furthermore, each of Customer Satisfaction Structural Model six tests are demonstrated in a table that shows the loadings of observed variables of each quality gap. The table shows the means of each observed variable and presents Cronbach's alpha value to measure the consistency of the observed variables on each latent variable. Goodness-of-fit indexes were also reported for each run. A second table was generated to summarize the significant hypotheses.

Additionally, the Chi-square difference test was used to examine whether there was a significant difference between path coefficients whenever multiple group confirmatory factor analysis were incorporated (gender, age groups, level of education, and product categories). At the end of this section, Tables 54 and 55 summarize the six tests, the eight runs, and the significant hypotheses among different categories.

5.3.1. Customer Satisfaction Structural Model Using Aggregate Data

First run: responses from 4,937 participants were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

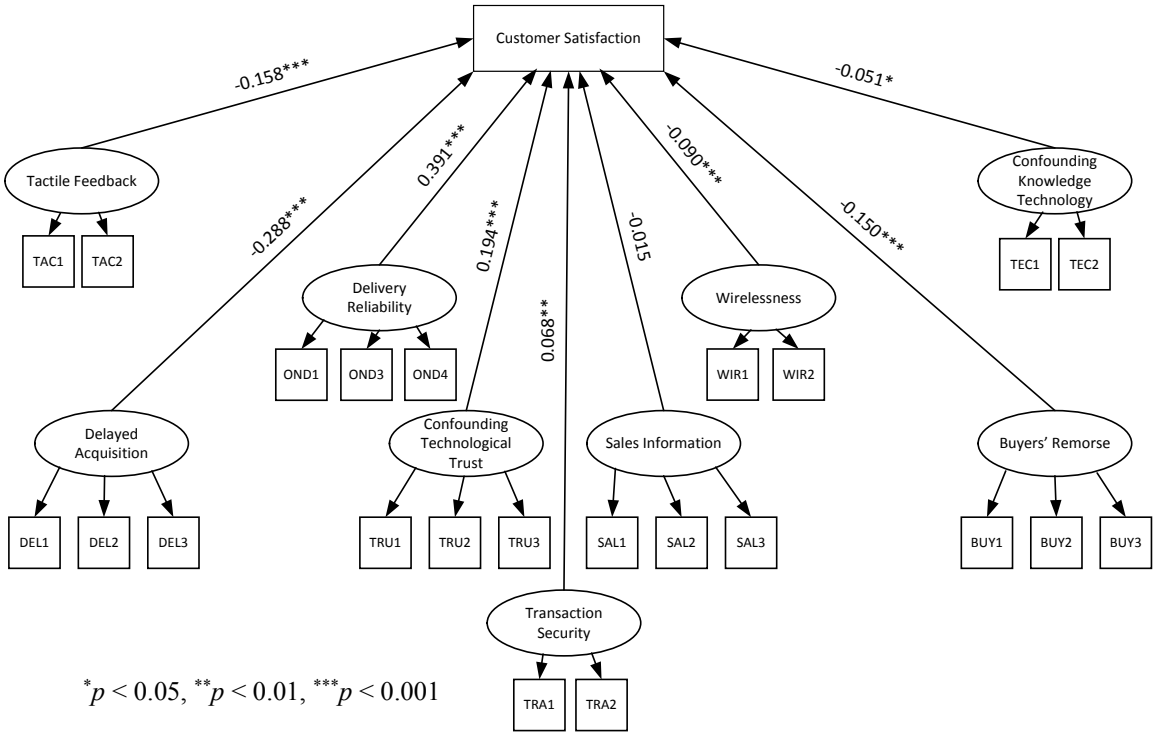


Figure 29: Standardized Path Diagram Results for Customer Satisfaction Structural Model Using Aggregate Data

The results illustrate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Wirelessness, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with the satisfaction of online-shopper customers. In other words, mitigating those quality gaps will increase the satisfaction of online-shopper customers.

Tactile Feedback, Delayed Acquisition, Wirelessness, Buyers' Remorse, and Confounding Knowledge Technology have a negative association with customer satisfaction, which means that the more that customers agree on those gaps, the less they are satisfied to shop online. Meanwhile, Delivery Reliability, Confounding Technological

Trust, and Transaction Security have a positive association with customer satisfaction. This means that the more important those gaps are to the customer, the more customers are satisfied. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer satisfaction for online shoppers. However, when a quality gap has a negative path coefficient, it means that the customers who expressed a higher degree of agreement (strongly agree or agree) on this gap, are less satisfied to purchase online.

Table 39 summarizes the significant hypotheses, and values of the standardized estimates (path coefficients):

Table 39: First Run Results for Customer Satisfaction Structural Model Using Aggregate Data

Hypothesis	Quality Gap	Standardized Estimate
H_{21}	Tactile Feedback	-0.158^{***}
H_{22}	Delayed Acquisition	-0.288^{***}
H_{23}	Delivery Reliability	0.391^{***}
H_{24}	Confounding Technological Trust	0.194^{***}
H_{25}	Transaction Security	0.068^{**}
H_{26}	Sales Information	-0.015
H_{27}	Wirelessness	-0.090^{***}
H_{28}	Buyers' Remorse	-0.150^{***}
H_{29}	Confounding Knowledge Technology	-0.051^{*}

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

When using the aggregate data, without controlling for any group, from Table 39, for those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with the satisfaction of online-shopper customers, followed by Tactile Feedback, Buyers' Remorse, Wirelessness, and Confounding Knowledge Technology, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with the satisfaction of online-shopper customer, followed by Confounding Technological Trust, and Transaction Security, respectively.

Consequently, Online Service Retailers should seek to understand the barriers affecting customer satisfaction with online shopping.

Table 40 shows loadings, mean, Cronbach's alpha, and goodness-of-fit indexes of the first run:

Table 40: Output of First Run of Customer Satisfaction Structural Model Using Aggregate Data

	CFA Loadings			
Factor	Loadings[1]	Mean[2]	Cronbach's α	
Tactile Feedback			0.808	
TAC1	0.848	3.16		
TAC2	0.871	3.29		
Delayed Acquisition			0.738	
DEL1	0.670	3.49		
DEL2	0.773	4.15		
DEL3	0.846	3.87		
Delivery Reliability			0.725	
OND1	0.757	3.80		
OND3	0.812	4.11		
OND4	0.729	4.12		
Confounding Technological Trust			0.739	
TRU1	0.724	3.46		
TRU2	0.738	3.67		
TRU3	0.773	3.53		
Transaction Security			0.697	
TRA1	0.841	4.30		
TRA2	0.756	4.30		
Sales Information			0.765	
SAL1	0.804	4.18		
SAL2	0.812	4.23		
SAL3	0.775	4.13		
Wirelessness			0.685	
WIR1	0.758	2.56		
WIR2	0.766	2.59		
Buyers' Remorse			0.843	
BUY1	0.813	3.42		
BUY2	0.819	3.37		
BUY3	0.886	3.52		
Confounding Knowledge Technology			0.744	
TEC1	0.773	3.37		
TEC2	0.847	3.52		
Goodness-of-fit Statistics	Model Estimator: WLSM			
χ^2	5069.965*		CFI	0.976
Scaling Correction Factor	0.4759		TLI	0.968
df	208		RMSEA	0.071

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

1. These are standardized loading estimates from CFA.
2. Average response of each item (5-point Likert scale).

5.3.2. Customer Satisfaction Structural Model Using Different Demographic and Product Categories as Predictors

The objective of running Customer Satisfaction Structural Model using predictors/covariates is to compare the variation in satisfaction with online shopping of different demographic and product category purchasers. At the end of this section, we analyze the comparison between different groups.

For example, we attempted to determine if there is a significant difference in customer satisfaction between male and female online shoppers. Consequently, the research question is as follows: Which gender group is more satisfied with online shopping?

Hence, for each demographic and product category comparison, we defined a hypothesis, and in order to derive conclusions for different categories, it was necessary to run the model using the predictors three times. The three runs are for the second, third, and fourth runs for Customer Satisfaction Structural Model for different demographic and product categories. In the second run, the reference group for age was age group three (60 years old and older), and for product category, the reference group was product category four (Personal & Health Care). In the third run, the reference group for age was age group two (39 – 59 years old), and for product category, the reference group was product category three (Books/ Music/ Video). In the fourth run, the reference group for age was age group two (39 – 59 years old), and for product category, the reference group was product category two (Apparel & Accessories).

The three runs had the same path coefficient estimates for the gaps in customer satisfaction. The runs have the same loadings, means, and Cronbach's alpha. The only

parameters that changed are the goodness-of-fit indexes. Therefore, by the end of each run, we present the values of goodness-of-fit indexes.

Second run: responses from 4,937 participants were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps with different demographic and product categories as covariates/predictors. In this run, the reference group for age was age group three (60 years old and older), and for product category, the reference group was product category four (Health & Personal Care):

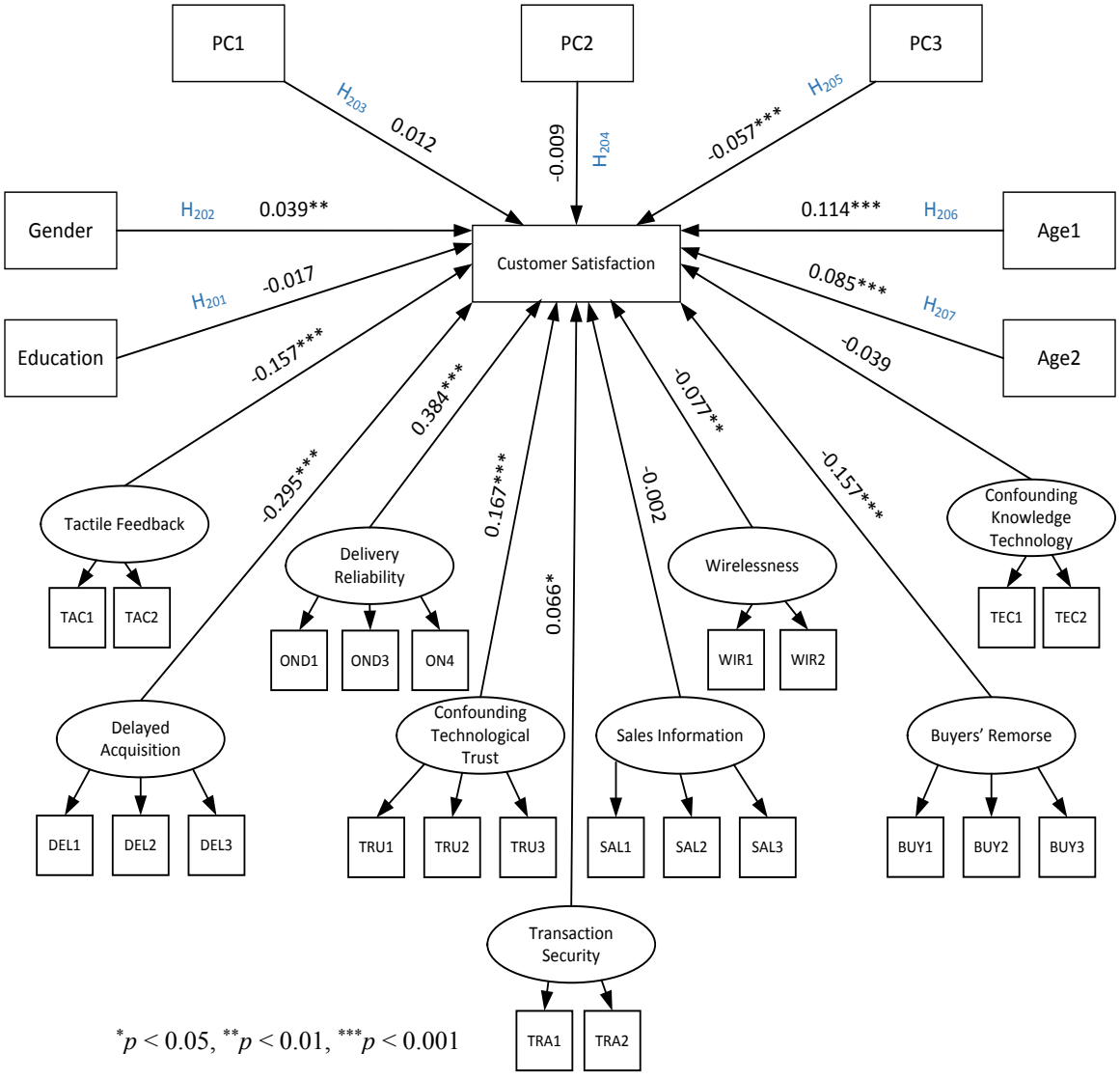


Figure 30: Standardized Path Diagram Results for Customer Satisfaction Structural Model Using Different Demographic and Product Categories as Predictors (1)

H_{201}: There is a significant difference on customer satisfaction between lower-educated and higher-educated customers.

H_{202}: There is a significant difference on customer satisfaction between males and females.

H_{203}: There is a significant difference on customer satisfaction between product category one purchasers and product category four purchasers.

H_{204}: There is a significant difference on customer satisfaction between product category two purchasers and product category four purchasers.

H_{205}: There is a significant difference on customer satisfaction between product category three purchasers and product category four purchasers.

H_{206}: There is a significant difference on customer satisfaction between age group one purchasers and age group three purchasers.

H_{207}: There is a significant difference on customer satisfaction between age group two purchasers and age group three purchasers.

Developed dummy variables:

Table 41: Developed Dummy Variables of the Second Run of Customer Satisfaction Structural Model

Gender	
Males	0
Females	1

Education	
Lower-Educated	0
Higher-Educated	1

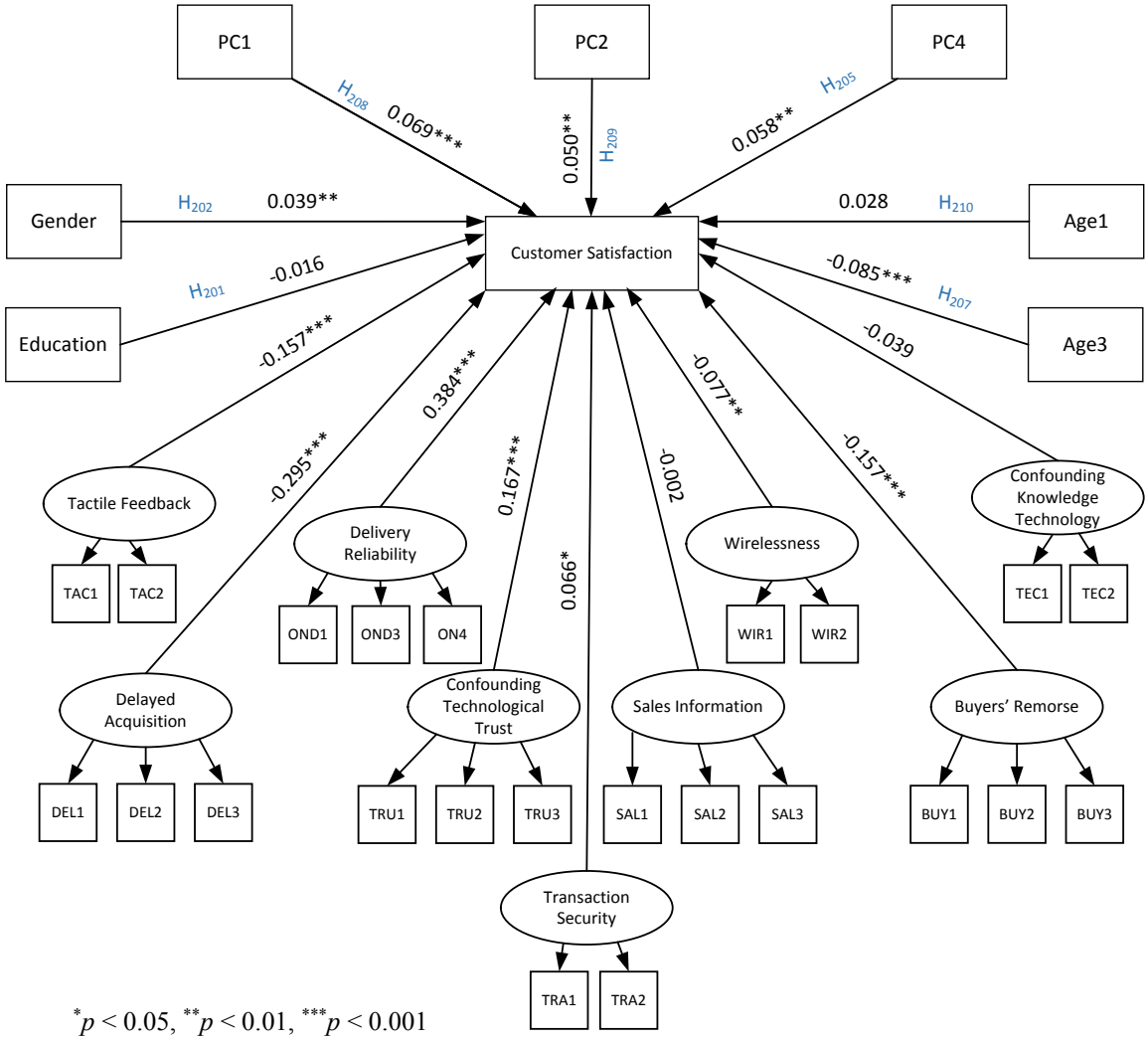
Age Groups	Age1	Age2
Age (1)	1	0
Age (2)	0	1
Age (3)	0	0

Product Category	PC1	PC2	PC3
Product Category (1)	1	0	0
Product Category (2)	0	1	0
Product Category (3)	0	0	1
Product Category (4)	0	0	0

Goodness-of-fit Statistics	Model Estimator: WLSM		
χ^2	6700.637*	CFI	0.968
Scaling Correction Factor	0.7094	TLI	0.962
df	369	RMSEA	0.061

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation;

Third run: responses from 4,937 participants were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps with different demographic and product categories as covariates/predictors. In this run, the reference group for age was age group two (39 – 59 years old), and for product category, the reference group was product category three (Books/ Music/ Video):



$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Figure 31: Standardized Path Diagram Results for Customer Satifaction Structural Model Using Different Demographic and Product Categories as Predictors (2)

H_{201}: There is a significant difference on customer satisfaction between lower-educated and higher-educated customers.

H_{202}: There is a significant difference on customer satisfaction between males and females.

H_{208}: There is a significant difference on customer satisfaction between product category one purchasers and product category three purchasers.

H_{209}: There is a significant difference on customer satisfaction between product category two purchasers and product category three purchasers.

H_{205}: There is a significant difference on customer satisfaction between product category four purchasers and product category three purchasers.

H_{210}: There is a significant difference on customer satisfaction between age group one purchasers and age group two purchasers.

H_{207}: There is a significant difference on customer satisfaction between age group three purchasers and age group two purchasers.

Developed dummy variables:

Table 42: Developed Dummy Variables of the Third Run of Customer Satisfaction Structural Model

Gender	
Males	0
Females	1

Education	
Lower-Educated	0
Higher-Educated	1

Age Groups	Age1	Age3
Age (1)	1	0
Age (2)	0	0
Age (3)	0	1

Product Category	PC1	PC2	PC4
Product Category (1)	1	0	0
Product Category (2)	0	1	0
Product Category (3)	0	0	0
Product Category (4)	0	0	1

Goodness-of-fit Statistics	Model Estimator: WLSM		
χ^2	5369.064*	CFI	0.975
Scaling Correction Factor	0.7094	TLI	0.970
df	369	RMSEA	0.054

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

Fourth run: responses from 4,937 participants were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps with different demographic and product categories as covariates/predictors. In this run, the reference group for age was age group two (39 – 59 years old), and for product category, the reference group was product category two (Apparel & Accessories):

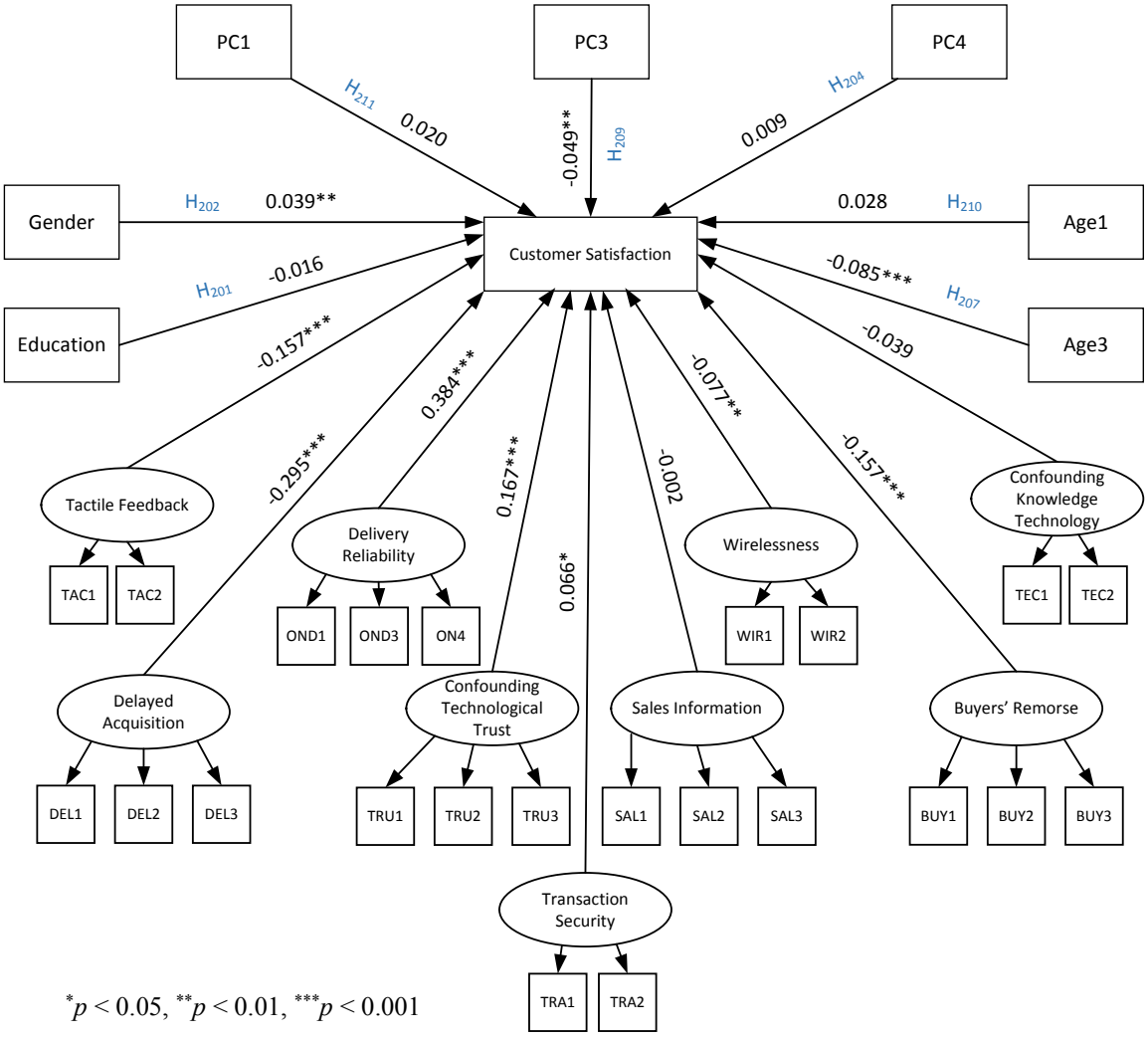


Figure 32: Standardized Path Diagram Results for Customer Satisfaction Structural Model Using Different Demographic and Product Categories as Predictors (3)

H_{201}: There is a significant difference on customer satisfaction between lower-educated and higher-educated customers.

H_{202}: There is a significant difference on customer satisfaction between males and females.

H_{211}: There is a significant difference on customer satisfaction between product category one purchasers and product category two purchasers.

H_{209}: There is a significant difference on customer satisfaction between product category three purchasers and product category two purchasers.

H_{204}: There is a significant difference on customer satisfaction between product category four purchasers and product category two purchasers.

H_{210}: There is a significant difference on customer satisfaction between age group one purchasers and age group two purchasers.

H_{207}: There is a significant difference on customer satisfaction between age group three purchasers and age group two purchasers.

Developed dummy variables:

Table 43: Developed Dummy Variables of the Fourth Run of Customer Satisfaction Structural Model

Gender	
Males	0
Females	1

Education	
Lower-Educated	0
Higher-Educated	1

Age Groups	Age1	Age3
Age (1)	1	0
Age (2)	0	0
Age (3)	0	1

Product Category	PC1	PC2	PC4
Product Category (1)	1	0	0
Product Category (2)	0	1	0
Product Category (3)	0	0	0
Product Category (4)	0	0	1

Goodness-of-fit Statistics	Model Estimator: WLSM		
χ^2	5453.045*	CFI	0.974
Scaling Correction Factor	0.7094	TLI	0.969
df	369	RMSEA	0.055

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

The results illustrate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction with online shopping. Table 44 summarizes the significant hypotheses and values of the standardized estimates (path coefficients).

Table 44: Results for Customer Satisfaction Structural Model Using Different Demographic and Product Categories as Predictors

Hypothesis	Quality Gap	Standardized Estimate
H_{21}	Tactile Feedback	-0.157^{***}
H_{22}	Delayed Acquisition	-0.295^{***}
H_{23}	Delivery Reliability	0.384^{***}
H_{24}	Confounding Technological Trust	0.167^{***}
H_{25}	Transaction Security	0.066^{*}
H_{26}	Sales Information	-0.002
H_{27}	Wirelessness	-0.077^{**}
H_{28}	Buyers' Remorse	-0.157^{***}
H_{29}	Confounding Knowledge Technology	-0.039

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

For the purpose of comparison between different demographic and product categories, as presented in Chapter 4, demographic categories selected were gender, levels of education, and age groups. Gender groups were male and female. Levels of education were non-college-educated and college-educated (Associates' Degree, Bachelor's Degree or higher). Age group one was defined as18 to 38 years old, age group two was defined as 39 to 59 years old, and age group three was defined as 60 years old and older. Product categories were as follows: Computers & Consumer Electronics (defined as product category one), Apparel & Accessories (defined as product category two), Books/Music/Video (defined as product category three), and Health & Personal Care (defined as product category four).

From the three previous runs, the results show the following differences between demographic and product categories:

1. The level of customer satisfaction for female online shoppers is significantly more than for male online shoppers.
2. There is no significant difference on the level of customer satisfaction between respondents with a low level of education and respondents with a high level of education.
3. The level of customer satisfaction for online shoppers in age group one is significantly more than for online shoppers in age group three.
4. The level of customer satisfaction for online shoppers in age group two is significantly more than online shoppers in age group three.
5. The level of customer satisfaction for online shoppers who purchased from product category three is significantly less than online shoppers who purchased from product categories one, two, and four.
6. There is no significant difference in the level of customer satisfaction between online shoppers who purchased from product category one than in online shoppers who purchased from product category four.
7. There is no significant difference in the level of customer satisfaction between online shoppers who purchased from product category two and in online shoppers who purchased from product category four.
8. There is no significant difference in the level of customer satisfaction between online shoppers who purchased from product category one and in online shoppers who purchased from product category two.

Consequently, Online Service Retailers should seek to understand the barriers affecting customer satisfaction with online shopping for different demographic and product categories.

Table 45 shows loadings, mean, and Cronbach's alpha for the second, third, and fourth run, which was the same, because only reference groups were changing:

Table 45: Output of Second, Third, and Fourth Runs of Customer Satisfaction Structural Model

		CFA Loadings		
	Factor	Loadings[1]	Mean[2]	Cronbach's α
Tactile Feedback				0.808
	TAC1	0.855	3.16	
	TAC2	0.865	3.29	
Delayed Acquisition				0.738
	DEL1	0.655	3.49	
	DEL2	0.764	4.15	
	DEL3	0.843	3.87	
Delivery Reliability				0.725
	OND1	0.751	3.80	
	OND3	0.809	4.11	
	OND4	0.719	4.12	
Confounding Technological Trust				0.739
	TRU1	0.707	3.46	
	TRU2	0.728	3.67	
	TRU3	0.762	3.53	
Transaction Security				0.697
	TRA1	0.836	4.30	
	TRA2	0.756	4.30	
Sales Information				0.765
	SAL1	0.797	4.18	
	SAL2	0.815	4.23	
	SAL3	0.776	4.13	
Wirelessness				0.685
	WIR1	0.747	2.56	
	WIR2	0.776	2.59	
Buyers' Remorse				0.843
	BUY1	0.811	3.42	
	BUY2	0.818	3.37	
	BUY3	0.884	3.52	
Confounding Knowledge Technology				0.744
	TEC1	0.766	3.37	
	TEC2	0.850	3.52	

1. These are standardized loading estimates from CFA.
2. Average response of each item (5-point Likert scale).

5.3.3. Customer Satisfaction Structural Model by Gender Groups

Group: Males

Fifth run: running multiple group confirmatory factor analysis of gender. Responses from 2,468 males were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

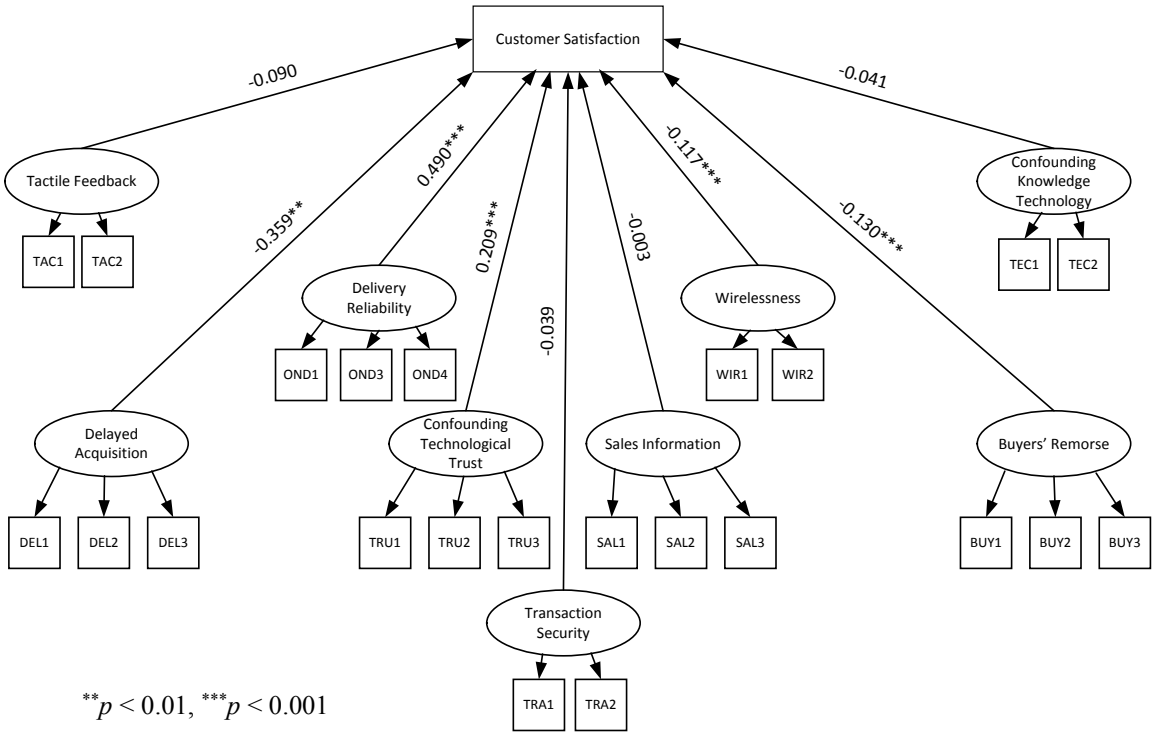


Figure 33: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Male Online Shoppers

The results indicate that Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with the satisfaction for male online shoppers. Mitigating those quality gaps will increase the satisfaction for male online shoppers.

Delayed Acquisition, Wirelessness, and Buyers' Remorse have a negative association with customer satisfaction for male online shoppers, which means the more that male online shoppers agree on those gap, the less they are satisfied. Meanwhile, Delivery

Reliability and Confounding Technological Trust have a positive association with the satisfaction for male online shoppers. This means that the more important those gaps are to male online shoppers, the more they are satisfied to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in the satisfaction for male online shoppers.

For those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with the satisfaction for male online shoppers, followed by Buyers' Remorse and Wirelessness, respectively. For those quality gaps with a positive path coefficient, we can conclude that Delivery Reliability has the strongest association with customer satisfaction for male online shoppers, followed by Confounding Technological Trust.

Group: Females

Responses from 2,469 females were analyzed using Customer Satisfaction (Q19) as an observed variable for all nine quality gaps:

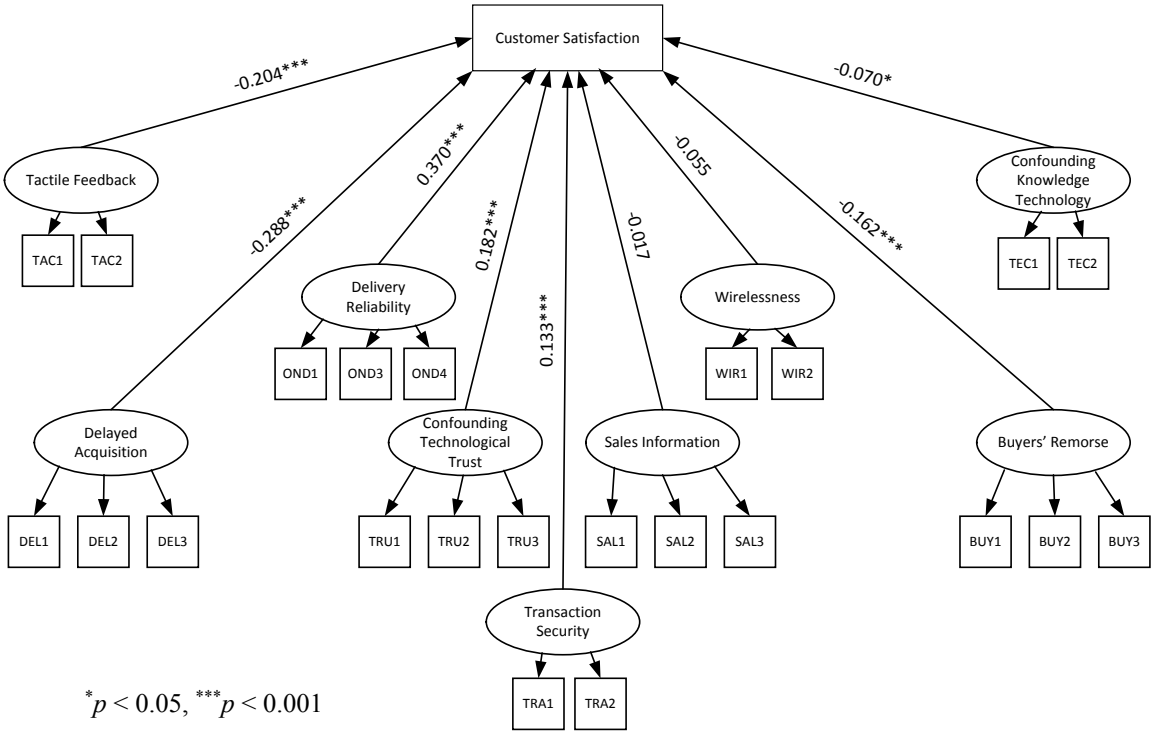


Figure 34: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Female Online Shoppers

The results indicate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with the satisfaction for female online shoppers. Mitigating those quality gaps will increase the satisfaction for female online shoppers.

Tactile Feedback, Delayed Acquisition, Buyers' Remorse, and Confounding Knowledge Technology have a negative association with customer satisfaction for female online shoppers, which means the more that female online shoppers agree on those gaps, the less they are satisfied to shop online. Meanwhile, Delivery Reliability, Confounding

Technological Trust, and Transaction Security have a positive association with the satisfaction for female online shoppers. This means that the more important those gaps are to female online shoppers, the more they are satisfied to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in the satisfaction for female online shoppers.

For those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with the satisfaction for female online shoppers, followed by Tactile Feedback, Buyers' Remorse, and Confounding Knowledge Technology, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with the satisfaction for female online shoppers, followed by Confounding Technological trust, and Transaction Security, respectively.

Table 46 shows the loadings, mean, and Cronbach's alpha of both males and females. It also shows the goodness of fit indexes of the fifth run

Table 46: Output of Fifth Run of Customer Satisfaction Structural Model by Gender Groups

	Male				Female			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.773				0.840
TAC1	1.000	0.821	3.20		1.000	0.877	3.11	
TAC2	1.022	0.839	3.29		1.022	0.895	3.30	
Delayed Acquisition				0.719				0.754
DEL1	1.000	0.642	3.45		1.000	0.697	3.57	
DEL2	1.169	0.750	4.10		1.169	0.790	4.23	
DEL3	1.299	0.834	3.82		1.299	0.855	3.69	
Delivery Reliability				0.719				0.728
OND1	1.000	0.759	3.78		1.000	0.756	3.87	
OND3	1.054	0.800	4.08		1.054	0.823	4.15	
OND4	0.987	0.704	4.07		0.987	0.750	4.18	
Confounding Technological Trust				0.725				0.751
TRU1	1.000	0.710	3.48		1.000	0.733	3.48	
TRU2	1.021	0.725	3.69		1.021	0.754	3.67	
TRU3	1.063	0.755	3.55		1.063	0.790	3.54	
Transaction Security				0.688				0.702
TRA1	1.000	0.841	4.26		1.000	0.839	4.36	
TRA2	0.877	0.738	4.24		0.877	0.773	4.38	
Sales Information				0.741				0.786
SAL1	1.000	0.786	4.12		1.000	0.816	4.25	
SAL2	0.996	0.783	4.21		0.996	0.843	4.26	
SAL3	0.954	0.750	4.08		0.954	0.798	4.19	
Wirelessness				0.689				0.674
WIR1	1.000	0.764	2.68		1.000	0.742	2.48	
WIR2	0.991	0.757	2.74		0.991	0.776	2.47	
Buyers' Remorse				0.826				0.875
BUY1	1.000	0.801	3.38		1.000	0.824	3.50	
BUY2	1.005	0.805	3.35		1.005	0.830	3.42	
BUY3	1.070	0.857	3.50		1.070	0.909	3.58	
Confounding Knowledge Technology				0.726				0.757
TEC1	1.000	0.750	3.31		1.000	0.789	3.44	
TEC2	1.110	0.833	3.46		1.110	0.861	3.60	
Goodness-of-fit Statistics					Model Estimator: WLSM			
χ^2		5157.860*			CFI	0.977		
Scaling Correction Factor		0.5151			TLI	0.974		
df		490			RMSEA	0.064		

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation.

1. Unstandardized loading estimates.
2. Standardized loading estimates.
3. Average response of each item (5-point Likert scale).
4. Cronbach's alpha.

There are difference in values of path coefficients (estimates) of quality gaps on customer satisfaction between males and females. Consequently, the research question would be: Which significant quality gaps have a stronger association with customer satisfaction with male online shoppers than female online shoppers?

To do so, the Chi-square difference test can be used to determine if there is a statistically significant difference on path coefficients of quality gaps' association with customer satisfaction between different groups. In this case, we are studying the significant difference on path coefficients between males and females.

As described in Customers' Willingness Structural Model, from comparing the Chi-square critical value with TRd value, we can conclude if there is a significant difference between path coefficients. Table 47 summarizes the significant hypotheses, values of the unstandardized and standardized estimates (path coefficients), of both males and females, and shows if there is a significant difference in path coefficients between males and females.

Table 47: Results for Customer Satisfaction Structural Model by Gender Groups

Hypothesis	Quality Gap	Males		Females		Chi-Square diff. test[3]
		Unstd.[1]	Std[2]	Unstd[1]	Std.[2]	
H_{21}	Tactile Feedback	-0.176	-0.090	-0.373***	-0.204***	Not Sig.
H_{22}	Delayed Acquisition	-0.899**	-0.359**	-0.685***	-0.288***	Not Sig.
H_{23}	Delivery Reliability	1.036***	0.490***	0.745***	0.370***	Not Sig.
H_{24}	Confounding Technological Trust	0.472***	0.209***	0.394***	0.182***	Not Sig.
H_{25}	Transaction Security	-0.075	-0.039	0.246***	0.133***	Sig.
H_{26}	Sales Information	-0.006	-0.003	-0.033	-0.017	Not Sig.
H_{27}	Wirelessness	-0.246***	-0.117***	-0.110	-0.055	Not Sig.
H_{28}	Buyers' Remorse	-0.260***	-0.130***	-0.294***	-0.162***	Not Sig.
H_{29}	Confounding Knowledge Technology	-0.087	-0.041	-0.14*	-0.070*	Not Sig.

1. Unstandardized path coefficients.
2. Standardized path coefficients.
3. Path coefficients Chi-square difference test.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

Gender group comparison:

1. The Chi-Square difference test between path coefficients for males and females did not show any statistically significant difference on path coefficients of all quality gaps that were significant for both males and females.
2. There is no significant association with the level of satisfaction for male online shoppers by Tactile Feedback, Transaction Security and Confounding Knowledge Technology, while the level of satisfaction for female online shoppers has a significant association with them.
3. There is no significant association with the level of satisfaction for female online shoppers by Wirelessness, while the level of satisfaction male online shoppers has a significant association with Wirelessness.

Consequently, Online Service Retailers should seek to understand the barriers affecting customer satisfaction with online shopping for male and female online shoppers.

5.3.4. Customer Satisfaction Structural Model for Different Levels of Education

Group: Lower-educated (non-college-educated)

Sixth run: running multiple group confirmatory factor analysis of education. Responses from 2,461 lower-educated (non-college-educated) participants were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

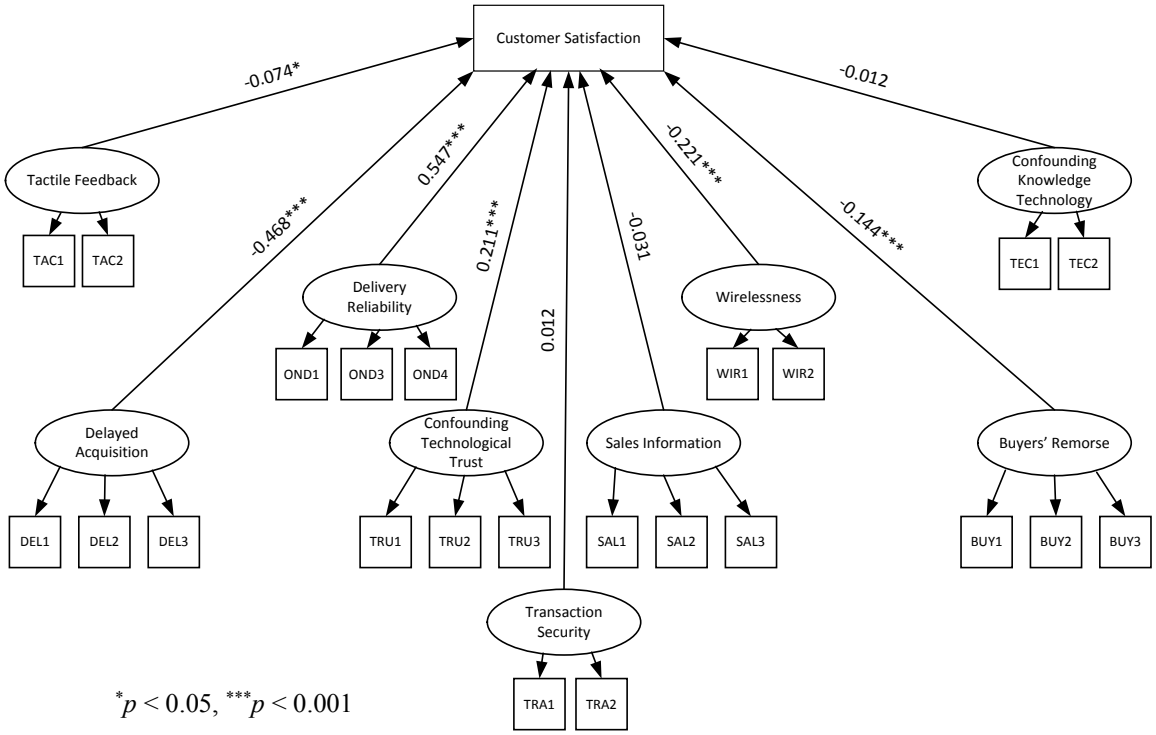


Figure 35: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Respondents with a Low Level of Education (Non-college-educated)

The results illustrate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with the level of satisfaction for online respondents with a low level of education. Mitigating those quality gaps will increase the level of satisfaction for online respondents with a low level of education.

Tactile Feedback, Delayed Acquisition, Wirelessness, and Buyers' Remorse have a negative association with the level of satisfaction for online respondents with a low level

of education. Hence, the more that lower-educated respondents agree on those gaps, the less satisfied they are to purchase online. Meanwhile, Delivery Reliability and Confounding Technological Trust have a positive association with the level of satisfaction for online respondents with a low level of education. This means that the more important those gaps are to lower-educated respondents, the more they are satisfied to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in the satisfaction for respondents with a low level of education to shop online.

For those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with the level of satisfaction for online respondents with a low level of education, followed by Wirelessness, Buyers' Remorse, and Tactile Feedback, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with the level of satisfaction for online respondents with a low level of education, followed by Confounding Technological Trust.

Group: Higher-educated; College-educated (Associate's Degree, Bachelors' Degree or higher)

Responses from 2,476 higher-educated participants using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

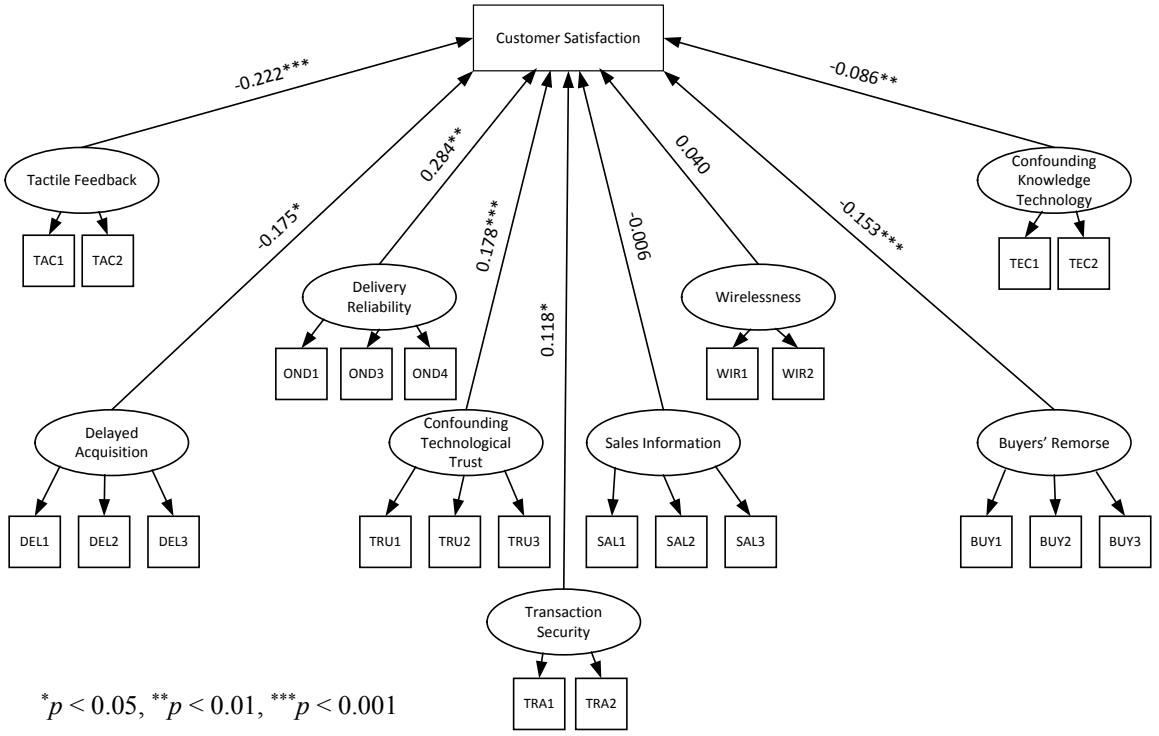


Figure 36: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Respondents with a High Level of Education (College-educated)

The results illustrate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with the level of satisfaction for online shoppers with a high level of education. Mitigating those quality gaps will increase the level of satisfaction for online respondents with a high level of education.

Tactile Feedback, Delayed Acquisition, Buyers' Remorse, and Confounding Knowledge Technology have a negative association with the level of satisfaction for online

respondents with a high level of education. Hence, the more that higher-educated respondents agree on those gaps, the less satisfied they are to purchase online. Meanwhile, Delivery Reliability, Confounding Technological Trust, and Transaction Security have a positive association with the level of satisfaction for online respondents with a high level of education. This means that the more important those gaps are to higher-educated respondents, the more they are satisfied to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in the level of satisfaction for online respondents with a high level of education.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with the level of satisfaction for online respondents with a high level of education, followed by Delayed Acquisition, Buyers' Remorse, and Confounding Knowledge Technology, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with the level of satisfaction for online respondents with a high level of education, followed by Confounding Technological Trust, and Transaction Security, respectively.

Table 48 shows the loadings, mean, and Cronbach's alpha of both lower-educated and higher-educated respondents. It also shows the goodness-of-fit indexes of the sixth run:

Table 48: Output of Sixth Run of the Customer Satisfaction Structural Model for Different Levels of Education

	Lower-educated				Higher-educated			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.809				0.809
TAC1	1.000	0.834	3.15		1.000	0.847	3.16	
TAC2	1.058	0.883	3.23		1.058	0.870	3.35	
Delayed Acquisition				0.738				0.738
DEL1	1.000	0.667	3.44		1.000	0.677	3.53	
DEL2	1.173	0.783	4.14		1.173	0.762	4.16	
DEL3	1.263	0.842	3.83		1.263	0.855	3.91	
Delivery Reliability				0.764				0.768
OND1	1.000	0.762	3.79		1.000	0.753	3.82	
OND3	1.055	0.804	3.70		1.055	0.812	3.72	
OND4	0.974	0.743	4.10		0.974	0.721	4.13	
Confounding Technological Trust				0.721				0.753
TRU1	1.000	0.702	3.39		1.000	0.736	3.52	
TRU2	1.026	0.721	3.63		1.026	0.745	3.70	
TRU3	1.080	0.758	3.46		1.080	0.783	3.61	
Transaction Security				0.697				0.697
TRA1	1.000	0.818	4.30		1.000	0.852	4.30	
TRA2	0.959	0.784	4.32		0.959	0.749	4.29	
Sales Information				0.766				0.764
SAL1	1.000	0.802	4.16		1.000	0.798	4.20	
SAL2	1.007	0.808	4.21		1.007	0.821	4.25	
SAL3	0.957	0.767	4.11		0.957	0.773	4.15	
Wirelessness				0.689				0.682
WIR1	1.000	0.770	2.52		1.000	0.738	2.61	
WIR2	0.989	0.761	2.58		0.989	0.777	2.60	
Buyers' Remorse				0.845				0.841
BUY1	1.000	0.820	3.40		1.000	0.807	3.44	
BUY2	0.994	0.815	3.35		0.994	0.825	3.38	
BUY3	1.088	0.892	3.52		1.088	0.882	3.51	
Confounding Knowledge Technology				0.739				0.749
TEC1	1.000	0.761	3.35		1.000	0.768	3.38	
TEC2	1.118	0.851	3.51		1.110	0.860	3.52	

Goodness-of-fit Statistics		Model Estimator: WLSM	
χ^2	5683.371*	CFI	0.976
Scaling Correction Factor	0.5168	TLI	0.973
df	490	RMSEA	0.066

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation.

1. Unstandardized loading estimates.
2. Standardized loading estimates.
3. Average response of each item (5-point Likert scale).
4. Cronbach's alpha.

As previously explained, the Chi-square difference test can be used to determine if there is statistically significant difference on path coefficients of quality gaps' association with customer satisfaction between different groups. In this case, lower-educated and higher-educated respondents. Consequently, the research question would be: Which significant quality gaps have a stronger association with customer satisfaction with respondents with a low level of education than respondents with a high level of education?

Table 49 summarizes the significant hypotheses, values of the unstandardized and standardized estimates (path coefficients), of both lower-educated and higher-educated respondents, and shows if there is a significant difference on path coefficients between lower-educated and higher-educated respondents.

Table 49: Results for Customer Satisfaction Structural Model for Different Levels of Education

Hypothesis	Quality Gap	Low-educated		Higher-educated		Chi-Square diff. test[3]
		Unstd.[1]	Std[2]	Unstd[1]	Std.[2]	
H_{21}	Tactile Feedback	-0.154*	-0.074*	-0.412***	-0.222***	Sig.
H_{22}	Delayed Acquisition	-1.224***	-0.468***	-0.427*	-0.175*	Sig.
H_{23}	Delivery Reliability	1.254***	0.547***	0.597**	0.284**	Not Sig.
H_{24}	Confounding Technological Trust	0.524***	0.211***	0.375***	0.178***	Not Sig.
H_{25}	Transaction Security	0.026	0.012	0.232*	0.118*	Not Sig.
H_{26}	Sales Information	-0.068	-0.031	-0.013	-0.006	Not Sig.
H_{27}	Wirelessness	-0.502***	-0.221***	0.080	0.040	Sig.
H_{28}	Buyers' Remorse	-0.308***	-0.144***	-0.299***	-0.153***	Not Sig.
H_{29}	Confounding Knowledge Technology	-0.028	-0.012	-0.174**	-0.086**	Not Sig.

1. Unstandardized path coefficients.
2. Standardized path coefficients.
3. Path coefficients Chi-square difference test.

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Using standardized path coefficients, as previously explained, we can distinguish the degree of association of the quality gaps with customer satisfaction, by determining which quality gap has the strongest association with respondents with low and high levels of

education. Using the Chi-square path coefficient different test, by using unstandardized path coefficients, we conclude that Tactile Feedback has a stronger association with customer satisfaction for respondents with a high level of education than respondents with a low level of education, and Delayed Acquisition has a stronger association with customer satisfaction for respondents with a low level of education than respondents with a high level of education.

Comparison of education groups:

1. The level of customer satisfaction for online respondents with low and high level of education has a significant association with Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, and Buyers' Remorse.
2. The level of customer satisfaction for online respondents with a low level of education has a significant association with Wirelessness, while the level of customer satisfaction for online respondents with high level of education do not.
3- The level of customer satisfaction for online respondents with a high level of education has a significant association with Transaction Security and Confounding Knowledge Technology, while the level of customer satisfaction for online respondents with a low level of education do not.

Consequently, Online Service Retailers should seek to understand the barriers affecting customer satisfaction with online shopping for respondents with low and high levels of education.

5.3.5. Customer Satisfaction Structural Model for Different Age Groups

Group: Age Group One (18 – 38 years old)

Seventh run: running multiple group confirmatory factor analysis of age groups. Responses from 1,667 participants from age group one (18 – 38 years old) were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

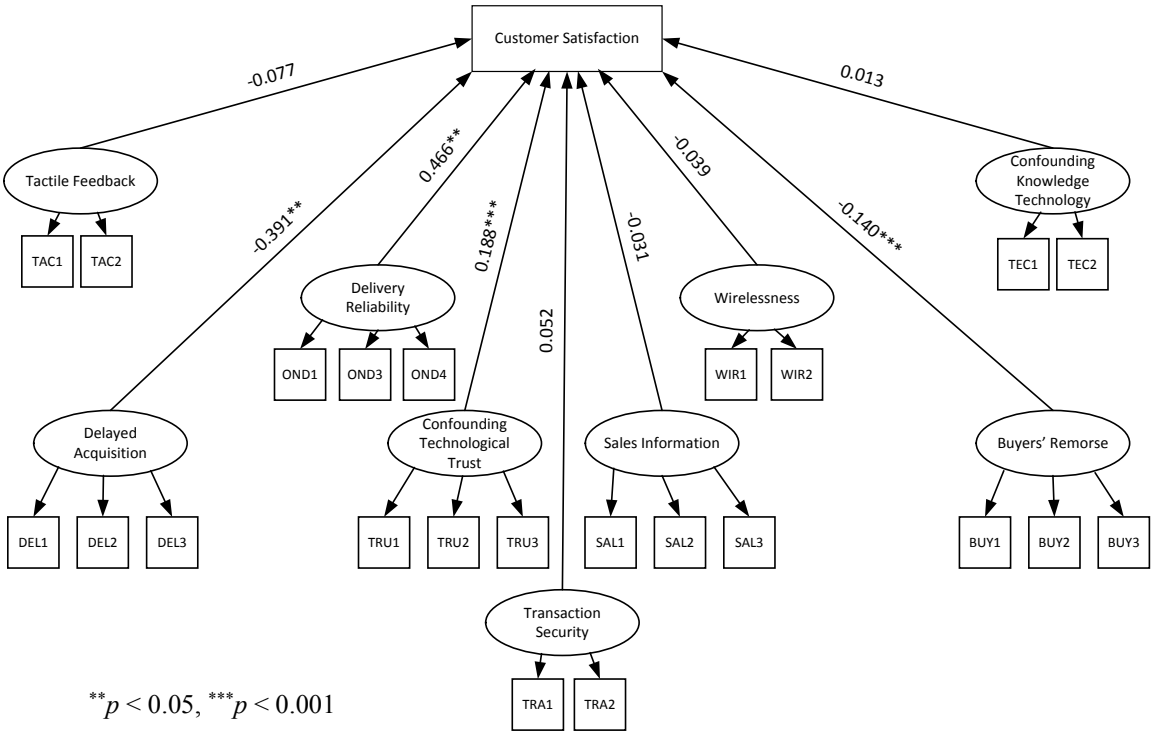


Figure 37: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Online Shoppers in Age Group One (18 – 38 Years Old)

The results illustrate that Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, and Buyers' Remorse have a significant association with customer satisfaction for online shoppers in age group one. Mitigating those quality gaps will increase customer satisfaction for online shoppers in age group one.

Delayed Acquisition and Buyers' Remorse have a negative association with customer satisfaction for online shoppers in age group one. Hence, the more that online shoppers in age group one agree on those gaps, the less satisfied they are to purchase online.

Meanwhile, Delivery Reliability and Confounding Technological Trust have a positive association with customer satisfaction for online shoppers in age group one. This means that the more important those gaps are to online shoppers in age group one, the more they are satisfied to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer satisfaction for online shoppers in age group one to purchase online.

For those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with customer satisfaction for online shoppers in age group one, followed by Buyers' Remorse. For those quality gaps with positive path coefficients, we can conclude that Delivery Reliability has the strongest association with customer satisfaction for online shoppers in age group one, followed by Confounding Technological Trust.

Group: Age Group Two (39 – 59 years old)

Responses from 1,652 participants from age group two (39 – 59 years old) were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

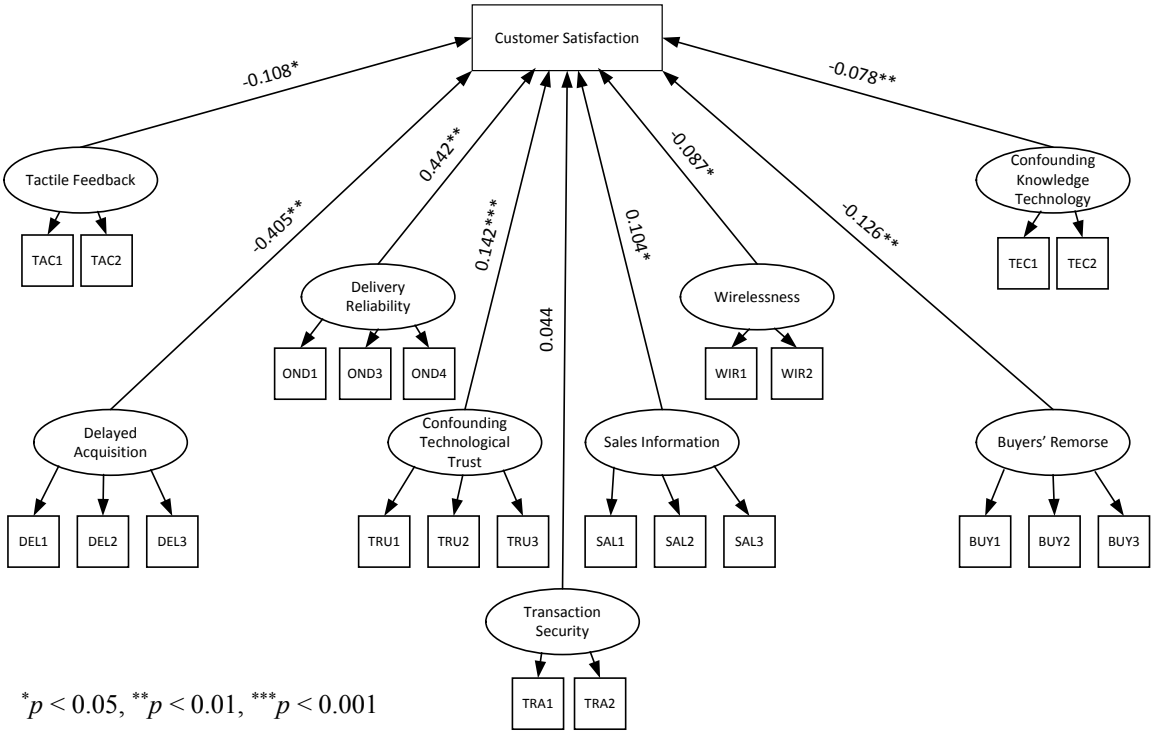


Figure 38: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Online Shoppers in Age Group Two (39 – 59 Years Old)

The results illustrate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Knowledge Trust, Sales Information, Wirelessness, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with customer satisfaction for online shoppers in age group two. Mitigating those quality gaps will increase customer satisfaction for online shoppers in age group two.

Tactile Feedback, Delayed Acquisition, Wirelessness, Buyers' Remorse, and Confounding Knowledge Technology have a negative association with customer satisfaction for online shoppers in age group two. Hence, the more that online shoppers in

age group two agree on those gaps, the less satisfied they are to purchase online. Meanwhile, Delivery Reliability, Sales Information, and Confounding Knowledge Trust have a positive association with customer satisfaction for online shoppers in age group two. This means that the more important those gaps are to online shoppers in age group two, the more satisfied they are to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer satisfaction for online shoppers in age group two to purchase online.

For those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with customer satisfaction for online shoppers in age group two, followed by Buyers' Remorse, Tactile Feedback, Wirelessness, and Confounding Knowledge Technology, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with customer satisfaction for online shoppers in age group two, followed by Confounding Technological Trust, and Sales Information, respectively.

Group: Age Group Three (60 years old and older)

Responses from 1,618 participants from age group three (60 years old and older) were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

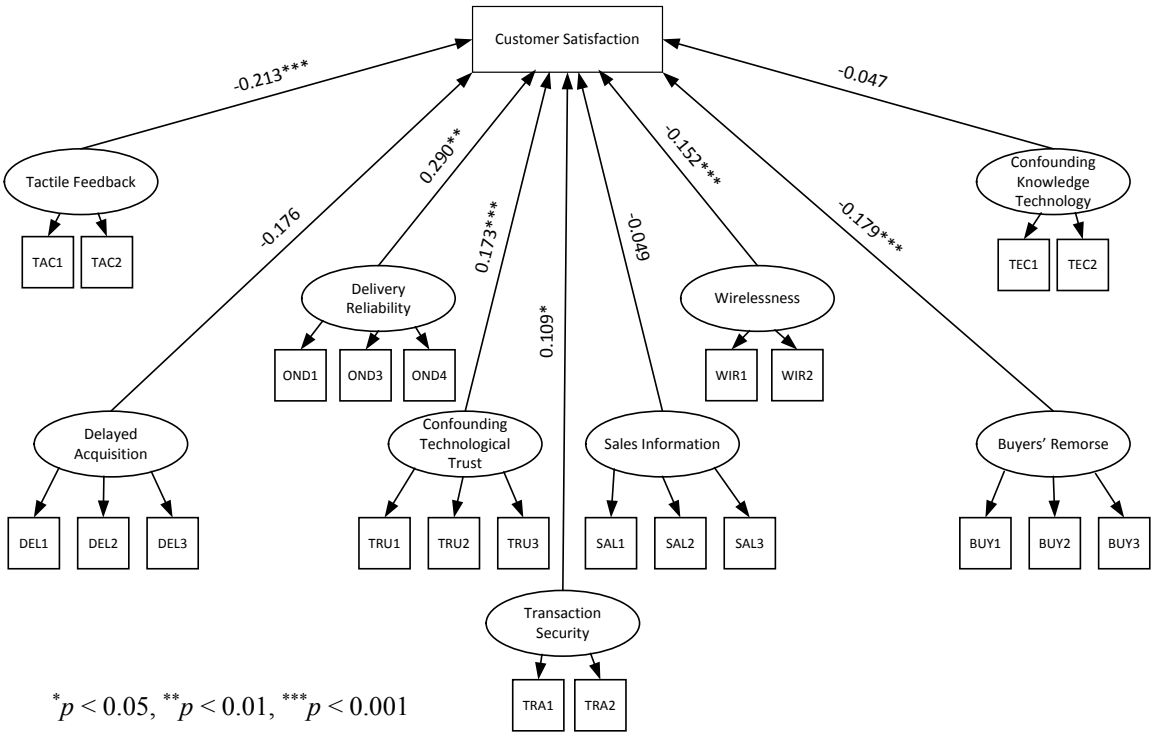


Figure 39: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Online Shoppers in Age Group Three (60 years old and Older)

The results illustrate that Tactile Feedback, Delivery Reliability, Confounding Knowledge Trust, Transaction Security, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction for online shoppers in age group three. Mitigating those quality gaps will increase customer satisfaction for online shoppers in age group three.

Tactile Feedback, Wirelessness, and Buyers' Remorse have a negative association with customer satisfaction for online shoppers in age group three. Hence, the more that online shoppers in age group three agree on those gaps, the less satisfied they are to purchase

online. Meanwhile, Delivery Reliability, Confounding Knowledge Trust, and Transaction Security have a positive association with customer satisfaction for online shoppers in age group three. This means that the more important those gaps are to online shoppers in age group three, the more they are satisfied to shop online. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer satisfaction for age group three online shoppers to purchase online.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customer satisfaction for online shoppers in age group three, followed by Buyers' Remorse, and Wirelessness, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with customer satisfaction for online shoppers in age group three, followed by Confounding Technological Trust, and Transaction Security, respectively.

Table 50 shows the loadings, mean, and Cronbach's alpha of different age groups. It also shows the goodness-of-fit indexes of the seventh run:

Table 50: Output of Seventh Run of Customer Satisfaction Structural Model for Different Age Groups

	Age Group One				Age Group Two			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.754				0.805
TAC1	1.000	0.799	3.23		1.000	0.832	3.12	
TAC2	1.036	0.827	3.41		1.036	0.880	3.26	
Delayed Acquisition				0.721				0.743
DEL1	1.000	0.664	3.76		1.000	0.675	3.46	
DEL2	1.165	0.773	4.30		1.165	0.760	4.15	
DEL3	1.235	0.819	4.03		1.235	0.855	3.84	
Delivery Reliability				0.698				0.737
OND1	1.000	0.725	3.96		1.000	0.779	3.78	
OND3	1.090	0.790	4.26		1.090	0.810	4.10	
OND4	0.986	0.715	4.26		0.986	0.747	4.12	
Confounding Technological Trust				0.710				0.728
TRU1	1.000	0.700	3.72		1.000	0.702	3.44	
TRU2	0.990	0.693	3.86		0.990	0.734	3.63	
TRU3	1.080	0.756	3.75		1.080	0.765	3.51	
Transaction Security				0.720				0.690
TRA1	1.000	0.849	4.36		1.000	0.842	4.33	
TRA2	0.936	0.794	4.33		0.936	0.759	4.31	
Sales Information				0.757				0.769
SAL1	1.000	0.794	4.19		1.000	0.795	4.17	
SAL2	1.004	0.799	4.23		1.004	0.830	4.20	
SAL3	0.950	0.754	4.14		0.950	0.782	4.10	
Wirelessness				0.673				0.694
WIR1	1.000	0.714	2.65		1.000	0.748	2.49	
WIR2	1.118	0.798	2.53		1.118	0.784	2.56	
Buyers' Remorse				0.808				0.857
BUY1	1.000	0.774	3.55		1.000	0.837	3.39	
BUY2	1.004	0.777	3.48		1.004	0.839	3.35	
BUY3	1.119	0.866	3.62		1.119	0.889	3.50	
Confounding Knowledge Technology				0.743				0.719
TEC1	1.000	0.761	3.35		1.000	0.723	3.27	
TEC2	1.118	0.851	3.42		1.118	0.859	3.49	

Table 50 (cont'd): Output of Seventh Run of Customer Satisfaction Structural Model for Different Age Groups

	Age Group Three			
	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]		
Tactile Feedback				0.857
TAC1	1.000	0.886	3.12	
TAC2	1.036	0.911	3.20	
Delayed Acquisition				0.725
DEL1	1.000	0.645	3.23	
DEL2	1.165	0.766	4.00	
DEL3	1.235	0.863	3.73	
Delivery Reliability				0.716
OND1	1.000	0.752	3.67	
OND3	1.090	0.813	3.98	
OND4	0.986	0.709	3.99	
Confounding Technological Trust				0.740
TRU1	1.000	0.726	3.20	
TRU2	0.990	0.750	3.51	
TRU3	1.080	0.762	3.33	
Transaction Security				0.673
TRA1	1.000	0.799	4.21	
TRA2	0.936	0.742	4.26	
Sales Information				0.770
SAL1	1.000	0.804	4.17	
SAL2	1.004	0.828	4.25	
SAL3	0.950	0.786	4.15	
Wirelessness				0.701
WIR1	1.000	0.769	2.55	
WIR2	1.118	0.772	2.68	
Buyers' Remorse				0.858
BUY1	1.000	0.824	3.32	
BUY2	1.004	0.840	3.26	
BUY3	1.119	0.903	3.42	
Confounding Knowledge Technology				0.768
TEC1	1.000	0.801	3.50	
TEC2	1.118	0.870	3.63	
Goodness-of-fit Statistics	Model Estimator: WLSM			
χ^2	6401.860*	CFI	0.974	
Scaling Correction Factor	0.5341	TLI	0.972	
df	772	RMSEA	0.067	

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation.

1. Unstandardized loading estimates.
2. Standardized loading estimates.
3. Average response of each item (5-point Likert scale).
4. Cronbach's alpha.

As previously explained, the Chi-square difference test can be used to determine if there is statistically significant difference on path coefficients of quality gaps association with customer satisfaction between different groups; in this case, online shoppers in age groups one, two, and three. Consequently, the research question would be: Which significant quality gaps have a stronger association with customer satisfaction in different age groups?

Table 51 summarizes the significant hypotheses, values of the unstandardized and standardized estimates (path coefficients) of age groups, and illustrates if there is a significant difference in path coefficients between them.

Table 51: Results for Customer Satisfaction Structural Model for Different Age Groups

Hypo-thesis	Quality Gap	Age Group One		Age Group Two		Age Group Three		Chi-Sqr diff. test[3]
		Unstd.[1]	Std.[2]	Unstd.[1]	Std.[2]	Unstd.[1]	Std.[2]	
H_{11}	Tactile Feedback	-0.149	-0.077	-0.203*	-0.108*	-0.421***	-0.213***	Not Sig.
H_{12}	Delayed Acquisition	-0.909**	-0.391**	-1.010**	-0.405**	-0.572	-0.176	Not Sig.
H_{13}	Delivery Reliability	0.992**	0.466**	0.981**	0.442**	0.822**	0.290**	Not Sig.
H_{14}	Confounding Technological Trust	0.414***	0.188***	0.342***	0.142***	0.495***	0.173***	Not Sig.
H_{15}	Transaction Security	0.095	0.052	0.091	0.044	0.312*	0.109*	Not Sig.
H_{16}	Sales Information	-0.060	-0.031	0.220*	0.104*	-0.135	-0.049	Not Sig.
H_{17}	Wirelessness	-0.085	-0.039	-0.217*	-0.087*	-0.462***	-0.152***	Not Sig.
H_{18}	Buyers' Remorse	-0.280***	-0.140***	-0.248**	-0.126**	-0.436***	-0.179***	Not Sig.
H_{19}	Confounding Knowledge Technology	0.027	0.013	-0.173**	-0.078**	-0.117	-0.047	Not Sig.

1. Unstandardized path coefficients.
2. Standardized path coefficients.
3. Path coefficients Chi-square difference test.

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

As explained previously, using standardized path coefficients, we can distinguish the degree of association of the quality gaps with customer satisfaction by determining which

quality gap has a stronger association with customer satisfaction for different age groups (age groups one, two, and three).

Comparison of age groups:

1. The Chi-Square difference test between path coefficients for different age groups did not show any statistically significant difference on path coefficients.
2. The level of customer satisfaction for online shoppers in age groups one, two, and three has a significant association with Delivery Reliability, Confounding Technological Trust, and Buyer's Remorse.
3. The level of customer satisfaction for online shoppers in age group two has a significant association with Sales Information, Confounding Knowledge Technology, while the level of customer satisfaction for online shoppers in age groups one and three do not.
4. The level of customer satisfaction for online shoppers in age group three toward has a significant association with Transaction Security, while the level of customer satisfaction for online shoppers in age groups one and two do not.
5. The level of customer satisfaction for online shoppers in age groups one and two has a significant association with Delayed Acquisition, while the level of customer satisfaction for online shoppers in age group three do not.
6. The level of customer satisfaction for online shoppers in age groups two and three customer satisfaction has a significant association with Tactile Feedback, and Wirelessness, while the level of customer satisfaction for online shoppers in age group one do not.

Consequently, Online Service Retailers should seek to understand the barriers affecting customer satisfaction for online shoppers in age groups one, two and three.

5.3.6. Customer Satisfaction Structural Model for Different Product Categories

Prodcut Category One (Computer & Consumer Electronics)

Eighth run: running multiple group confirmatory factor analysis for different product categories. Responses from 1,235 participants who purchased from product category one (Computer & Consumer Electronics) were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

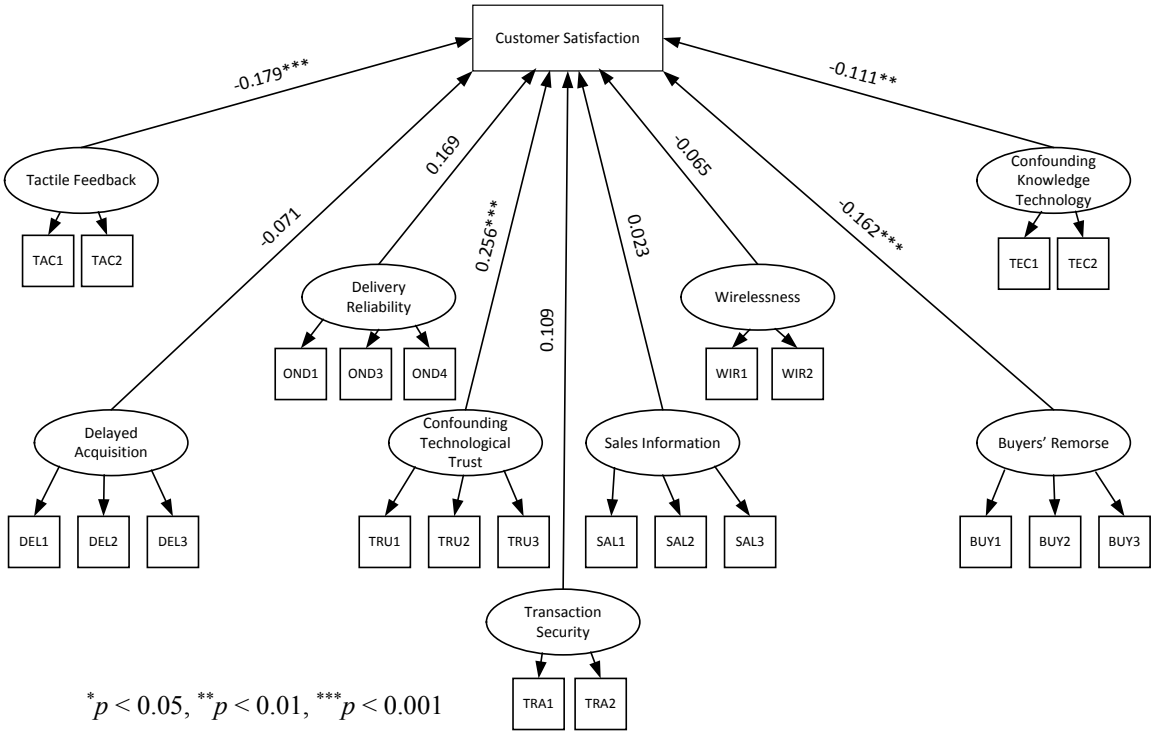


Figure 40: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Online Shoppers who Purchased from Product Category One (Computer & Consumer Electronics)

The results from Figure 40 illustrate that Tactile Feedback, Confounding Technological Trust, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with customer satisfaction for online shoppers who purchased from product

category one. Mitigating those quality gaps will increase customer satisfaction for online shoppers who purchased product category one.

Tactile Feedback, Buyers' Remorse, and Confounding Knowledge Technology have a negative association with customer satisfaction for online shoppers who purchased from product category one. Hence, the more that online shoppers (who purchased from product category one) agree on those gaps, the less satisfied they are with their online purchase. Meanwhile, Confounding Technological Trust has a positive association with customer satisfaction for online shoppers who purchased from product category one. This means that the more important this gap is to online shoppers (who purchased from product category one), the more satisfied they are with their online purchase. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer satisfaction for online shoppers who purchased from product category one.

For those quality gaps with negative path coefficients, we can conclude that Tactile Feedback has the strongest association with customer satisfaction for online shoppers who purchased from product category one, followed by Buyers' Remorse, and Confounding Knowledge Technology, respectively.

Prodcut Category Two (Apparel & Accessories)

Responses from 1,248 participants who purchased from product category two (Apparel & Accessories) were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

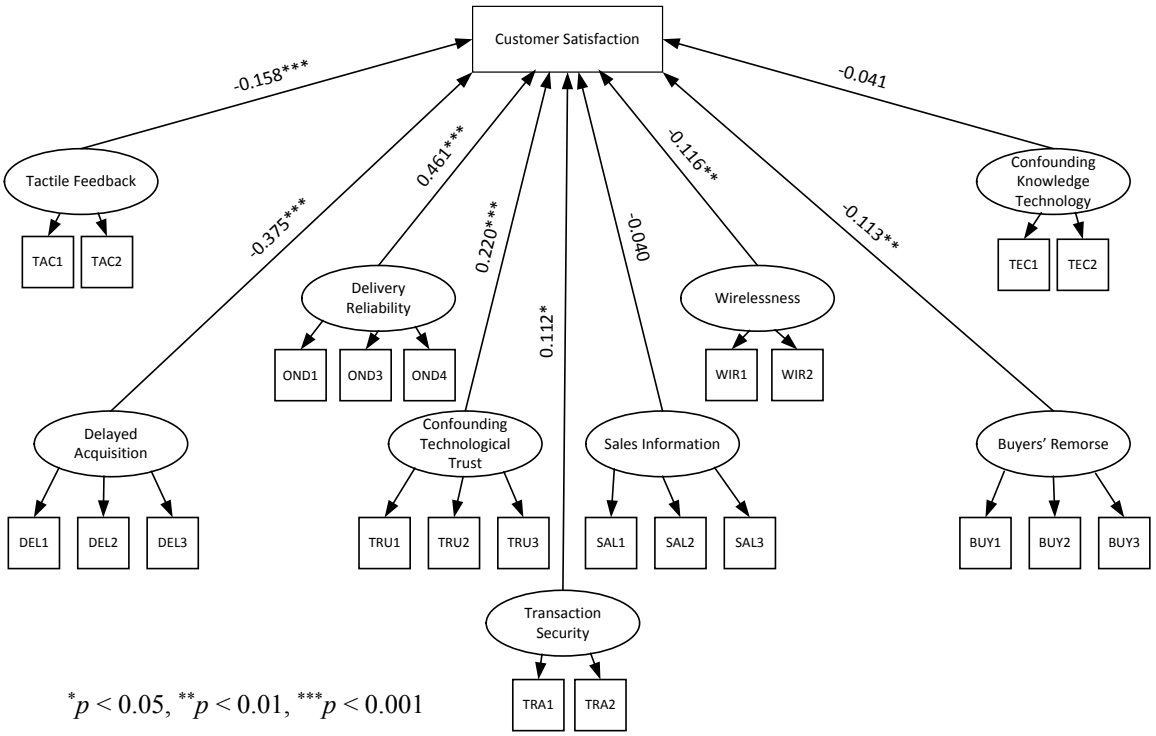


Figure 41: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Online Shoppers who Purchased from Product Category Two (Apparel & Accessories)

The results from Figure 41 illustrate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction for online shoppers who purchased from product category two. Mitigating those quality gaps will increase customer satisfaction for online shoppers who purchased from product category two.

Tactile Feedback, Delayed Acquisition, Wirelessness, and Buyers' Remorse have a negative association with customer satisfaction for online shoppers who purchased from

product category two. Hence, the more that online shoppers (who purchased from product category two) agree on those gaps, the less satisfied they are with their online purchase. Meanwhile, Delivery Reliability, Confounding Technological Trust, and Transaction Security have a positive association with customer satisfaction for online shoppers who purchased from product category two. This means that the more important those gaps are to online shoppers (who purchased from product category two), the more satisfied they are with their online purchase. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer satisfaction for online shoppers who purchased from product category two.

For those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with customer satisfaction for online shoppers who purchased from product category two, followed by Tactile Feedback, Wirelessness, and Buyers' Remorse, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with customer satisfaction for online shoppers who purchased from product category two, followed by Confounding Technological Trust, and Transaction Security, respectively.

Group: Prodcut Category Three (Books/ Music/ Video)

Responses from 1,229 participants who purchased from product category three (Books/ Music/ Video) were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

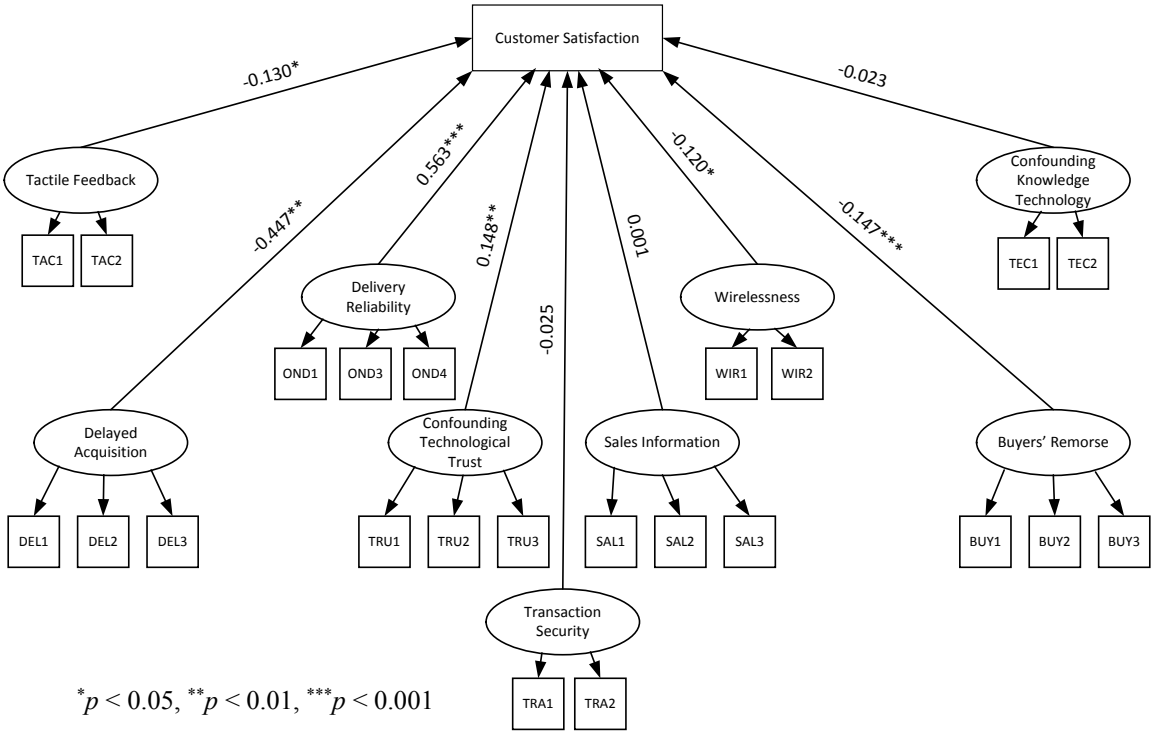


Figure 42: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Online Shoppers who Purchased from Product Category Three (Books/ Music/ Video)

The results from Figure 42 illustrate that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction for online shoppers who purchased from product category three. Mitigating those quality gaps will increase customer satisfaction for online shoppers who purchased from product category three.

Tactile Feedback, Delayed Acquisition, Wirelessness, and Buyers' Remorse have a negative association with customer satisfaction for online shoppers who purchased from product category three. Hence, the more that online shoppers (who purchased from product

category three) agree on those gaps, the less satisfied they are with their online purchase. Meanwhile, Delivery Reliability and Confounding Technological Trust have a positive association with customer satisfaction for online shoppers who purchased from product category three. This means that the more important those gaps are to online shoppers (who purchased from product category three), the more satisfied they are with their online purchase. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer satisfaction for online shoppers who purchased from product category three.

For those quality gaps with negative path coefficients, we can conclude that Delayed Acquisition has the strongest association with customer satisfaction for online shoppers who purchased from product category three, followed by Buyers' Remorse, Tactile Feedback, and Wirelessness, respectively. For those quality gaps with positive path coefficients, Delivery Reliability has the strongest association with customer satisfaction for online shoppers who purchased from product category three, followed by Confounding Technological Trust.

Group: Prodcut Category Four (Health & Personal Care)

Reponses from 1,225 participants who purchased from product category four (Health & Personal Care) were analyzed using Customer Satisfaction (Q20) as an observed variable for all nine quality gaps:

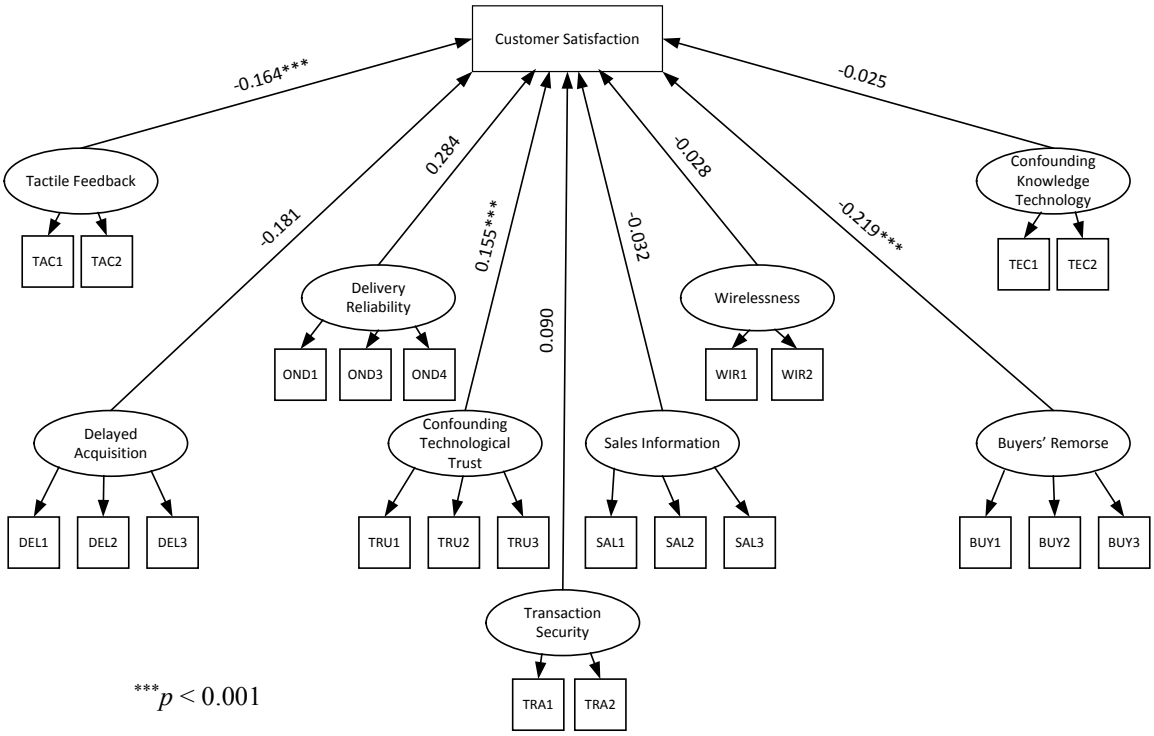


Figure 43: Standardized Path Diagram Results for Customer Satisfaction Structural Model for Online Shoppers who Purchased from Product Category Four (Health & Personal Care)

The results from Figure 43 illustrate that Tactile Feedback, Confounding Technological Trust, and Buyers' Remorse have a significant association with customer satisfaction for online shoppers who purchased from product category four. Mitigating those quality gaps will increase customer satisfaction for online shoppers who purchased from product category four.

Tactile Feedback and Buyers' Remorse have a negative association with customer satisfaction for online shoppers who purchased from product category four. Hence, the more that online shoppers (who purchased from product category four) agree on those gaps,

the less satisfied they are with their online purchase. Meanwhile, Confounding Technological Trust has a positive association with customer satisfaction for online shoppers who purchased from product category four. This means that the more important this gap is to online shoppers (who purchased from product category four), the more satisfied they are with their online purchase. Mitigating quality gaps with a negative path coefficient or a positive path coefficient will result in an increase in customer satisfaction for online shoppers who purchased from product category four.

For those quality gaps with negative path coefficients, we can conclude that Buyers' Remorse has the strongest association with customer satisfaction for online shoppers who purchased from product category four followed by Tactile Feedback. This is intuitive, as related to the Buyers' Remorse gap; cumbersomeness of refund and return of health and personal care products seems to have a large influence on customer satisfaction.

Table 52 shows the loadings, mean, and Cronbach's alpha of different product categories. It also shows the goodness-of-fit indexes of the eighth run:

Table 52: Output of Eighth Run of Customer Satisfaction Structural Model for Different Product Categories

	Product Category One				Product Category Two			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.807				0.830
TAC1	1.000	0.859	3.09		1.000	0.863	3.17	
TAC2	1.002	0.861	3.23		1.002	0.889	3.28	
Delayed Acquisition				0.742				0.750
DEL1	1.000	0.684	3.51		1.000	0.667	3.43	
DEL2	1.105	0.755	4.14		1.105	0.779	4.11	
DEL3	1.229	0.841	3.88		1.229	0.848	3.80	
Delivery Reliability				0.713				0.750
OND1	1.000	0.746	3.78		1.000	0.776	3.75	
OND3	1.092	0.815	4.15		1.092	0.831	4.09	
OND4	0.965	0.720	4.15		0.965	0.775	4.09	
Confounding Technological Trust				0.758				0.741
TRU1	1.000	0.725	3.47		1.000	0.754	3.45	
TRU2	1.057	0.767	3.68		1.057	0.728	3.65	
TRU3	1.096	0.795	3.50		1.096	0.782	3.51	
Transaction Security				0.716				0.720
TRA1	1.000	0.870	4.31		1.000	0.873	4.29	
TRA2	0.878	0.764	4.31		0.878	0.766	4.28	
Sales Information				0.757				0.789
SAL1	1.000	0.783	4.18		1.000	0.826	4.14	
SAL2	1.049	0.821	4.23		1.049	0.821	4.19	
SAL3	1.010	0.791	4.17		1.010	0.884	4.09	
Wirelessness				0.691				0.689
WIR1	1.000	0.754	2.58		1.000	0.780	2.52	
WIR2	1.019	0.769	2.63		1.019	0.760	2.56	
Buyers' Remorse				0.827				0.843
BUY1	1.000	0.792	3.35		1.000	0.828	3.40	
BUY2	1.019	0.807	3.36		1.019	0.821	3.30	
BUY3	1.110	0.879	3.46		1.110	0.884	3.47	
Confounding Knowledge Technology				0.764				0.709
TEC1	1.000	0.773	3.30		1.000	0.759	3.33	
TEC2	1.118	0.864	3.48		1.118	0.805	3.49	

Table 52 (cont'd): Output of Eighth Run of Customer Satisfaction Structural Model for Different Product Categories

	Product Category Three				Product Category Four			
	CFA Loadings		Mean[3]	α[4]	CFA Loadings		Mean[3]	α[4]
Factor	Unstd[1]	Std[2]			Unstd[1]	Std[2]		
Tactile Feedback				0.801				0.793
TAC1	1.000	0.831	3.19		1.000	0.839	3.18	
TAC2	1.010	0.875	3.34		1.010	0.859	3.32	
Delayed Acquisition				0.742				0.714
DEL1	1.000	0.666	3.46		1.000	0.659	3.55	
DEL2	1.061	0.784	4.15		1.061	0.775	4.20	
DEL3	1.243	0.860	3.87		1.243	0.842	3.91	
Delivery Reliability				0.709				0.724
OND1	1.000	0.755	3.83		1.000	0.745	3.86	
OND3	1.059	0.805	4.12		1.059	0.808	4.09	
OND4	0.973	0.692	4.09		0.973	0.735	4.17	
Confounding Technological Trust				0.723				0.731
TRU1	1.000	0.691	3.39		1.000	0.727	3.51	
TRU2	1.041	0.702	3.65		1.041	0.746	3.69	
TRU3	1.085	0.781	3.53		1.085	0.730	3.58	
Transaction Security				0.688				0.659
TRA1	1.000	0.808	4.30		1.000	0.804	4.29	
TRA2	0.879	0.760	4.31		0.879	0.755	4.32	
Sales Information				0.761				0.748
SAL1	1.000	0.831	4.17		1.000	0.772	4.22	
SAL2	1.056	0.819	4.24		1.056	0.793	4.26	
SAL3	1.022	0.758	4.14		1.022	0.762	4.12	
Wirelessness				0.697				0.663
WIR1	1.000	0.769	2.59		1.000	0.721	2.55	
WIR2	1.011	0.7777	2.59		1.011	0.766	2.57	
Buyers' Remorse				0.859				0.842
BUY1	1.000	0.830	3.41		1.000	0.807	3.53	
BUY2	1.022	0.832	3.36		1.022	0.820	3.44	
BUY3	1.112	0.900	3.52		1.112	0.879	3.61	
Confounding Knowledge Technology				0.738				0.762
TEC1	1.000	0.768	3.41		1.000	0.797	3.41	
TEC2	1.110	0.856	3.53		1.110	0.857	3.56	
Goodness-of-fit Statistics					Model Estimator: WLSM			
χ^2		6078.304*			CFI	0.976		
Scaling Correction Factor		0.5304			TLI	0.975		
df		1054			RMSEA	0.064		

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation

1. Unstandardized loading estimates.
2. Standardized loading estimates.
3. Average response of each item (5-point Likert scale).
4. Cronbach's alpha.

Table 53 summarizes the significant hypotheses, values of the unstandardized and standardized estimates (path coefficients) of product categories, and shows if there is a significant difference in path coefficients between them using Chi-square difference test.

Table 53: Results for Customer Satisfaction Structural Model for Different Product Categories

Hypothesis	Quality Gap	Product Category One		Product Category Two	
		Unstd.[1]	Std[2]	Unstd[1]	Std.[2]
H_{11}	Tactile Feedback	-0.343***	-0.179***	-0.313***	-0.158***
H_{12}	Delayed Acquisition	-0.17	-0.071	-0.945***	-0.375***
H_{13}	Delivery Reliability	0.373	0.169	0.998***	0.461***
H_{14}	Confounding Technological Trust	0.582***	0.256***	0.528***	0.220***
H_{15}	Transaction Security	0.206	0.109	0.233*	0.112*
H_{16}	Sales Information	0.048	0.023	-0.088	-0.040
H_{17}	Wirelessness	-0.142	-0.065	-0.258**	-0.116**
H_{18}	Buyers' Remorse	-0.337***	-0.162***	-0.237**	-0.113**
H_{19}	Confounding Knowledge Technology	-0.237***	-0.111***	-0.099	-0.041

1. Unstandardized path coefficients.
2. Standardized path coefficients.

Table 53 (cont'd): Results for Customer Satisfaction Structural Model for Different Product Categories

Hypothesis	Quality Gap	Product Category Three		Product Category Four		Chi-Square diff. test[3]
		Unstd.[1]	Std[2]	Unstd[1]	Std.[2]	
H_{11}	Tactile Feedback	-0.242*	-0.130*	-0.312***	-0.164***	Not Sig.
H_{12}	Delayed Acquisition	-1.089**	-0.447**	-0.459	-0.181	Not Sig.
H_{13}	Delivery Reliability	1.328***	0.563***	0.643	0.284	Not Sig.
H_{14}	Confounding Technological Trust	0.363**	0.148**	0.389***	0.155***	Not Sig.
H_{15}	Transaction Security	-0.052	-0.025	0.196	0.090	Not Sig.
H_{16}	Sales Information	0.002	0.001	-0.075	-0.032	Not Sig.
H_{17}	Wirelessness	-0.260*	-0.120*	-0.064	-0.028	Not Sig.
H_{18}	Buyers' Remorse	-0.308***	-0.147***	-0.462***	-0.219***	Not Sig.
H_{19}	Confounding Knowledge Technology	-0.053	-0.023	-0.056	-0.025	Not Sig.

1. Unstandardized path coefficients.
2. Standardized path coefficients.
3. Path coefficients Chi-square difference test.

$^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

As previously explained, by using standardized path coefficients, we can distinguish the degree of association of the quality gaps with customer satisfaction, to determine which quality gaps have a stronger association with customer satisfaction for online shoppers who purchased from different product categories. The Chi-square difference test can be used to examine whether there is a statistically significant difference on path coefficients of quality gaps' association with customer satisfaction between different groups. In this case, online shoppers who purchased from different product categories. Consequently, the research question would be: Which significant quality gaps have more impact on customer satisfaction in different product categories?

Comparison of four Product Categories:

1. The Chi-Square difference test between path coefficients for different product categories did not show any statistically significant difference on path coefficients.
2. The level of customer satisfaction for online shoppers who purchased from product categories one, two, three, and four has a significant association with Tactile Feedback, Confounding Technological Trust, and Buyer's Remorse.
3. The level of customer satisfaction for online shoppers who purchased from product category one has a significant association with Confounding Knowledge Technology, while level of customer satisfaction for online shoppers who purchased from product categories two, three, and four do not.
4. The level of customer satisfaction for online shoppers who purchased from product categories two and three has a significant association with Wirelessness and Delivery Reliability, while level of customer satisfaction for online shoppers who purchased from product categories one and four do not.

5. The level of customer satisfaction for online shoppers who purchased from product category two has a significant association with Transaction Security, while level of customer satisfaction for online shoppers who purchased from product categories one, three, and four do not.

Consequently, Online Service Retailers should seek to understand the barriers affecting customer satisfaction for online shoppers who purchased from product categories one, two, three, and four.

5.3.7. Customer Satisfaction Structural Model Summary

Table 54 summarizes goodness-of-fit indexes and the significant hypotheses of all models used on analyzing the association of the quality gaps with customer satisfaction with online shopping:

Table 54: Summary of Customer Satisfaction Structural Model (1)

No	Model	CFI	TLI	RMSEA	Significant Hypotheses	
1	Customer Satisfaction on Quality Gaps	0.976	0.968	0.071	H_{21}, H_{22}, H_{23}, H_{24}, H_{25}, H_{27}, H_{28}, H_{29}	
2	Customer Satisfaction on Quality Gaps Using Different Demographic and Product Categories as Predictors	0.968	0.962	0.061	H_{21}, H_{22}, H_{23}, H_{24}, H_{25}, H_{27}, H_{28}, H_{202}, H_{205}, H_{206}, H_{207}	Reference groups: Age (3), and Product Category (4)
		0.975	0.970	0.054	H_{21}, H_{22}, H_{23}, H_{24}, H_{25}, H_{27}, H_{28}, H_{202}, H_{208}, H_{209}, H_{205}, H_{207}	Reference groups: Age (2), and Product Category (3)
		0.974	0.969	0.055	H_{21}, H_{22}, H_{23}, H_{24}, H_{25}, H_{27}, H_{28}, H_{202}, H_{209}, H_{207}	Reference groups: Age (2), and Product Category (2)
3	Customer Satisfaction on Quality Gaps, Grouping for Gender	0.977	0.974	0.064	Males: H_{22}, H_{23}, H_{24}, H_{27}, H_{28}	
					Females: H_{21}, H_{22}, H_{23}, H_{24}, H_{25}, H_{28}, H_{29}	
4	Customer Satisfaction on Quality Gaps, Grouping for Education	0.976	0.973	0.066	Lower-Educated: H_{21}, H_{22}, H_{23}, H_{24}, H_{27}, H_{28}	
					Higher-Educated: H_{21}, H_{22}, H_{23}, H_{24}, H_{25}, H_{28}, H_{29}	
5	Customer Satisfaction on Quality Gaps, Grouping for Age	0.974	0.972	0.067	Age (1): H_{22}, H_{23}, H_{24}, H_{28}	
					Age (2): H_{21}, H_{22}, H_{23}, H_{24}, H_{26}, H_{27}, H_{28}, H_{29}	
					Age (3): H_{21}, H_{23}, H_{24}, H_{25}, H_{27}, H_{28}	
6	Customer Satisfaction on Quality Gaps, Grouping for Product Category	0.976	0.975	0.064	PC (1): H_{21}, H_{24}, H_{28}, H_{29}	
					PC (2): H_{21}, H_{22}, H_{23}, H_{24}, H_{25}, H_{27}, H_{28}	
					PC (3): H_{21}, H_{22}, H_{23}, H_{24}, H_{27}, H_{28}	
					PC (4): H_{21}, H_{24}, H_{28}	

Table 55 summarizes the significant quality gaps based on different demographics and product categories:

	Significant Quality Gaps on Customer Satisfaction										
	Gender		Level of Education		Age Group			Product Category			
Quality Gap	Males	Females	Low	High	(1)	(2)	(3)	(1)	(2)	(3)	(4)
Tactile Feedback		√	√	√		√	√	√	√	√	√
Delayed Acquisition	√	√	√	√	√	√			√	√	
Delivery Reliability	√	√	√	√	√	√	√		√	√	
Confounding Knowledge Trust	√	√	√	√	√	√	√	√	√	√	√
Transaction Security		√		√			√		√		
Sales Information						√					
Wirelessness	√		√			√	√		√	√	
Buyers' Remorse	√	√	√	√	√	√	√	√	√	√	√
Confounding Knowledge Technology		√		√		√		√			

Table 55: Summary of Customer Satisfaction Structural Model (2)

5.4. The Mitigation Strategy-Customers' Willingness (MSCW) Structural Model Results

In this model, data were tested to measure the significant association of the nine quality gaps mitigation strategies with customers' willingness to shop online. Each quality gap mitigation strategies was considered as a latent variable and has two to three observed variables. Refer to Appendix B, Q18, in the comprehensive study survey instrument, for the multiple observed variables of each quality gap mitigation strategies. Those mitigation strategies were measured against Q19 (Customers' Willingness) on the comprehensive survey instrument.

Responses from 4,937 participants were analyzed using Customers' Willingness (Q19) as an observed variable for all nine quality gaps mitigation strategies:

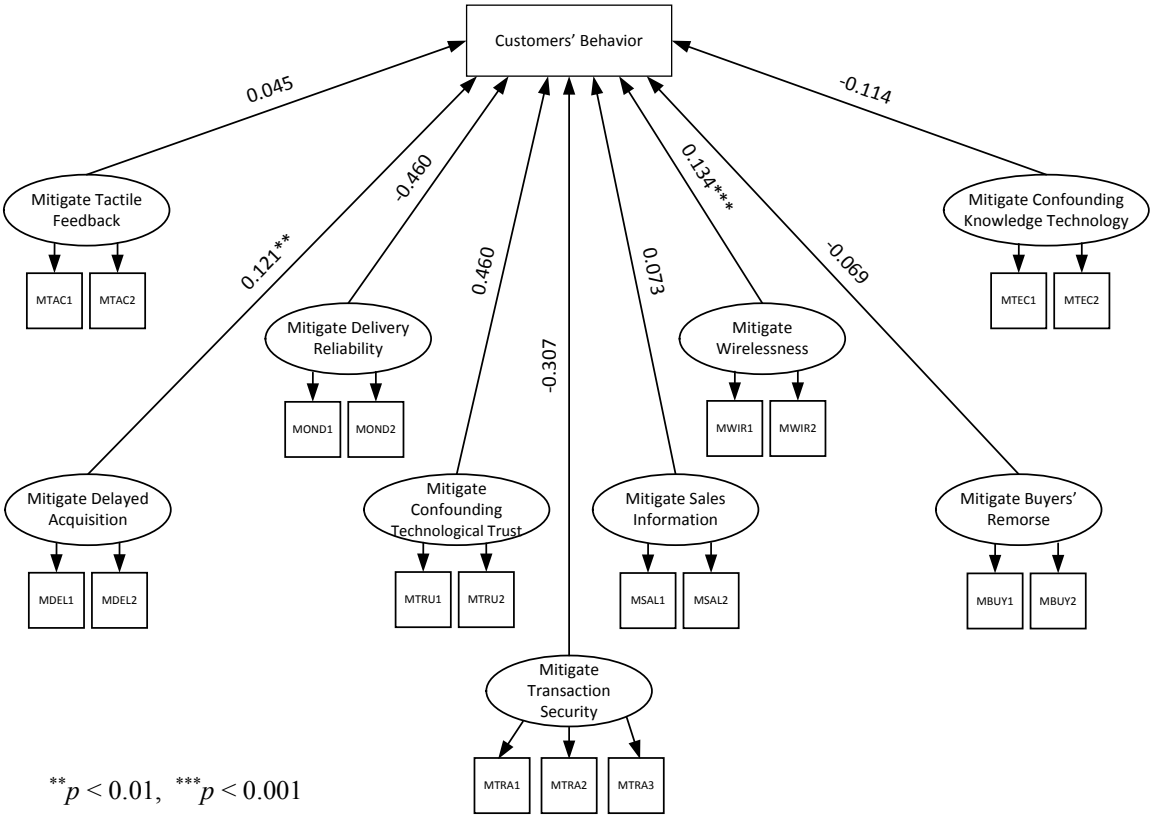


Figure 44: Standardized Path Diagram Results for Mitigation Strategy-Customers' Willingness (MSCW) Structural Model

Figure 44 shows the standardized path coefficients. The results illustrate that mitigation strategies for Delayed Acquisition and Wirelessness have a significant association with customers' willingness to shop online. Utilizing the mitigation strategies that have significant association with customers' willingness may result in an increase in customers' willingness to shop online. Mitigation strategies for Wirelessness has the strongest association with customers' willingness to shop online.

Table 56 summarizes the significant hypotheses, and values of the standardized estimates (path coefficients):

Table 56: Results for Mitigation Strategy-Customers' Willingness (MSCW) Structural Model

Hypothesis	Quality Gap Mitigation Strategy	Standardized Estimate
H_{31}	Tactile Feedback	0.045
H_{32}	Delayed Acquisition	0.121^{**}
H_{33}	Delivery Reliability	0.019
H_{34}	Confounding Technological Trust	0.460
H_{35}	Transaction Security	-0.307
H_{36}	Sales Information	0.073
H_{37}	Wirelessness	0.134^{***}
H_{38}	Buyers' Remorse	-0.150^{***}
H_{39}	Confounding Knowledge Technology	-0.051^{*}

Table 57 shows the loadings, and mean of each observed variable. It also shows the Cronbach's alpha of the observed variables of each mitigation strategy.

Table 57: Output of the Mitigation Strategy-Customers' Willingness Structural Model

	CFA Loadings		
Factor	Loadings[1]	Mean[2]	Cronbach's alpha
Tactile Feedback			0.797
MTAC1	0.848	4.31	
MTAC2	0.925	4.38	
Delayed Acquisition			0.760
MDEL1	0.884	4.01	
MDEL2	0.790	3.93	
Delivery Reliability			0.703
MOND1	0.811	4.17	
MOND2	0.801	4.18	
Confounding Technological Trust			0.699
MTRU1	0.797	3.90	
MTRU3	0.774	3.94	
Transaction Security			0.700
MTRA1	0.736	3.75	
MTRA2	0.607	3.81	
MTRA3	0.825	4.00	
Sales Information			0.541
MSAL1	0.558	3.26	
MSAL3	0.775	3.74	
Wirelessness			0.801
MWIR1	0.834	3.23	
MWIR2	0.868	3.19	
Buyers' Remorse			0.800
MBUY1	0.867	4.53	
MBUY2	0.913	4.42	
Confounding Knowledge Technology			0.727
MTEC1	0.851	4.38	
MTEC2	0.805	4.26	
Goodness-of-fit Statistics	Model Estimator: WLSM		
χ^2	3126.082	CFI	0.994
df	369	TLI	0.991
		RMSEA	0.048

CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation;

1. These are standardized loading estimates from CFA.
2. Average response of each item (5-point Likert scale).

Chapter 6: Conclusion

This research was conducted to enhance the service quality of Online Service Retailers (OSRs). We executed this study in three phases. In Phase I, we developed a conceptual framework of OSRs based on an extensive literature review. Phase I then proceeded with an identification and analysis of OSRs' nine quality gaps and influential mitigation strategies of each quality gap. The quality gaps are Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Sales Information, Buyers' Remorse, and Confounding Knowledge Technology.

In Phase II of this study, we developed a model testing survey instrument to test the conceptual framework of OSRs. Phase II of this study used linear regression to analyze a model testing survey instrument by measuring the significance of the nine quality gaps on customers' willingness. In Phase II, the collected sample size was 239 completed usable survey response. One of the objectives of Phase II was to verify the existence of the identified quality gaps by using RAQ and RDQ. In addition to that, lessons learned from the results of Phase II allowed us to initiate Phase III by refining the model testing survey instrument to develop a comprehensive study survey instrument using a nationwide respondents group.

In Phase III, the comprehensive study survey instrument was used to test three structural models using structural equation modeling (SEM). In Phase III of this study three structural models were developed. Customers' Willingness Structural Model was used to measure the significant association of the nine quality gaps with customers' willingness to shop online. The Customer Satisfaction Structural Model was used to measure the significant association of the nine quality gaps with customer satisfaction with

online shopping. The MSCW Structural Model was used to measure the significant association between the mitigation strategies (for each of the quality gaps) with customers' willingness to shop online.

Our study took into consideration various demographic and product categories (as presented in Chapter 4). Demographic categories were gender, levels of education, and age groups. Gender groups were male and female. Levels of education were non-college-educated and college-educated (Associate's Degree, Bachelor's Degree or higher). Age group one was defined as18 to 38 years old, age group two was defined as 39 to 59 years old, and age group three was defined as 60 years old and older. Computers & Consumer Electronics was defined as product category one, Apparel & Accessories was defined as product category two, Books/ Music/ Video was defined as product category three, and Health & Personal Care was defined as product category four. The collected sample size of the comprehensive study survey instrument was 4,937, with at least 100 respondents in each demographic and product categories. Qualtrics was responsible for collecting the survey data in order to meet the criteria of the required sample size.

Different demographic and product categories were used to address and derive recommendations and conclusions using different structural models. The breadth of the three structural models would allow OSRs to provide customers with an enhanced quality of service. OSRs should focus on those quality gaps that have significant association with customers' willingness and customer satisfaction. The results of Customers' Willingness and Customer Satisfaction Structural Models verified the theoretical and conceptual framework of the quality gaps for OSRs presented in Chapter 3.

Additionally, the MSCW Structural Model can be utilized using different mitigation strategies to enhance customer service quality. Proposed mitigation strategies of Delayed Acquisition and Wirelessness were significantly associated with customers' willingness to shop online. Hence, utilizing those mitigation strategies may result in an increase in customers' willingness to shop online.

Customers' Willingness Structural Model

The Customers' Willingness Structural Model was tested six times with a total of eight runs. The following summarizes the findings of each test:

- Testing the model using the aggregate data, the results showed that Tactile Feedback, Delivery Reliability, Confounding Technological Trust, Transaction Security, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness to shop online.
- Testing the model using different demographic and product categories as covariates, three different runs showed that:
    1. Females are significantly more willing to shop online than males.
    2. There is no significant difference between respondents with a low level of education and respondents with a high level of education with regard to willingness to shop online.
    3. Online shoppers in age group one are significantly more willing to shop online than online shoppers in age groups two and three, while online shoppers in age group two are significantly more willing to shop online than online shoppers in age group three.

4. Online shoppers who purchased from product category three are significantly less willing to shop online than online shoppers who purchased from product categories one, two, and four.
5. There is no significant difference in customers' willingness between online shoppers who purchased from product category one and online shoppers who purchased from product category two.
6. There is no significant difference in customers' willingness between online shoppers who purchased from product categories one and two and online shoppers who purchased for product category four.

- Testing the model by gender groups, the results showed that Tactile Feedback, Confounding Technological Trust, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for male online shoppers. The results also showed that Tactile Feedback, Confounding Technological Trust, Transaction Security, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for female online shoppers.
- Testing the model using different levels of education, the results showed that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for respondents with a low level of education. The results also showed that Tactile Feedback, Confounding Technological Trust, Transaction Security, Sales Information, and Buyers' Remorse have a significant association with customers' willingness for respondents with a high level of education.

- Testing the model using different age groups, the results also showed that Tactile Feedback, Confounding Technological Trust, and Confounding Knowledge Technology have a significant association with customers' willingness for online shoppers in age group one. The results also showed that Tactile Feedback, Confounding Knowledge Trust, Transaction Security, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for online shoppers in age group two. The results also showed that Tactile Feedback, Confounding Knowledge Trust, Sales Information, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for online shoppers in age group three.
- Testing the model using different product categories. The results showed that Tactile Feedback, Confounding Technological Trust, Transaction Security, and Buyers' Remorse have a significant association with customers' willingness for respondents who purchased from product category one. The results also showed that Tactile Feedback, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for respondents who purchased from product category two. The results also showed that Tactile Feedback, Delivery Reliability, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with customers' willingness for respondents who purchased from product category three. The results also showed that Tactile Feedback, Confounding Technological Trust, Sales Information, and Buyers' Remorse have a significant association with customers' willingness for respondents who purchased from product category four

Customer Satisfaction Structural Model

The Customer Satisfaction Structural Model was tested six times with a total of eight runs. The following summarizes the findings of each test:

- Testing the model using the aggregate data, the results showed that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Wirelessness, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with customer satisfaction with online shopping.
- Testing the model using different demographic and product categories as covariates, the three different runs showed that:
    1. The level of customer satisfaction for female online shopper is significantly more than for male online shoppers.
    2. There is no significant difference effect on the level of customer satisfaction between respondents with a low level of education and respondents with a high level of education.
    3. The level of customer satisfaction for online shoppers in age group one is significantly more than for online shoppers in age group three.
    4. The level of customer satisfaction for online shoppers in age group two is significantly more than for online shoppers in age group three.
    5. The level of customer satisfaction for online shoppers who purchased from product category three is significantly less than for online shoppers who purchased from product categories one, two, and four.

6. There is no significant difference on the level of customer satisfaction between online shoppers who purchased from product categories one and two than for online shoppers who purchased from product category four.
7. There is no significant difference on the level of customer satisfaction between online shoppers who purchased from product category one than for online shoppers who purchased from product category two.

- Testing the model by gender groups, the results showed that Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction for male online shoppers. The results also showed that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with customer satisfaction for female online shoppers.
- Testing the model using different levels of education, the results showed that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction for respondents with a low level of education. The results also showed that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with customer satisfaction for respondents with a high level of education.
- Testing the model using different age groups, the results also showed that Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, and Buyers'

Remorse have a significant association with customer satisfaction for online shoppers in age group one. The results also showed that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Knowledge Trust, Sales Information, Wirelessness, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with customer satisfaction for online shoppers in age group two. The results also showed that Tactile Feedback, Delivery Reliability, Confounding Knowledge Trust, Transaction Security, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction for online shoppers in age group three.

- Testing the model using different product categories, the results showed that Tactile Feedback, Confounding Technological Trust, Buyers' Remorse, and Confounding Knowledge Technology have a significant association with customer satisfaction for respondents who purchased from product category one. The results also showed that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Transaction Security, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction for respondents who purchased from product category two. The results also showed that Tactile Feedback, Delayed Acquisition, Delivery Reliability, Confounding Technological Trust, Wirelessness, and Buyers' Remorse have a significant association with customer satisfaction for respondents who purchased from product category three. The results also showed that Tactile Feedback, Confounding Technological Trust, and Buyers' Remorse have a significant association with customer satisfaction for respondents who purchased from product category four.

For both Customers' Willingness and Customer Satisfaction Structural Models, Chapter 5 illustrated the degree of association of each of the quality gaps with customers' willingness and customer satisfaction by using the standardized path coefficient for each of the six tests conducted. Chapter 5 also described the interpretation of those significant quality gaps with positive or negative path coefficients for each of the six tests conducted. The Chi-square difference test was used to determine if there was a statistically significant difference in path coefficients of quality gaps' on both models, Customers' Willingness Structural Model and Customer Satisfaction Structural Model, between different groups of each demographic and product category. The comparison of associations between categories was explained in Chapter 5 using the unstandardized path coefficients.

6.1. Implications for Policy

The robust nature of this study and the large sample size make the results of the study quite significant. Prior to this study, OSRs allocated marketing dollars and resources without the benefit of some of the insights provided by this research. For example, OSRs have always understood the significance of website design, and several research studies have focused on the quality of the retailers' website design and overall website functionality (prepurchase phase) (Allard et al., 2001; Barnes & Vidgen, 2002; Liu & Arnett, 2000; O'Neill, Wright, & Fitz, 2001), but have not given equal attention to the quality of the services delivered by the online retailers (purchase phase and postpurchase phase). What this study has made clear is the impact of OSRs on customers' willingness and customer satisfaction, and the specific elements of the customers' experience that are affected. Similarly, the results of this research provide a roadmap for OSRs pm how to enhance the customers' overall experience.

The conclusions reached in this comprehensive study are specific and diverse. They uncover several barriers to customers' willingness and customer satisfaction for Online Service Retailers. The conclusions reveal differences in customers' willingness and customer satisfaction by gender, level of education, age, and product categories.

Online Service Retailers can utilize these conclusions in the redesign and management of their service structure.

Success lies in the ability of OSRs to address the barriers highlighted in this study, and to develop marketing and business strategies to remove the barriers.

6.2. Limitations of this Research and Opportunities for Future Studies

Although the study sample is large, the study was limited to four product categories (Computers & Consumer Electronics, Apparel & Accessories, Books/ Music/ Video, and Health & Personal Care). Another limitation of this research was the categories of age groups this study used in. The three age groups were each 20 or more years in range. Age group one was defined as 18 to 38 years old, age group two was defined as 39 to 59 years old, and age group three was defined as 60 years old and older. The decision to use groups that spanned 20 years or more was a deliberate decision in order to have a cost effective and manageable data collection process. We acknowledge that within these groups, online consumer behaviors, attitudes, and perceptions are likely to differ. Hence, future studies could measure the association of other product categories and/or different age group intervals with customers' willingness and customer satisfaction.

In addition to the data analyzed in this research, we also collected other information from the survey respondents. We have data for income, ethnicity, and different product attributes for each of the 4,937 respondents. This data can be utilized in the future to

generate more analysis and results for the three structural models (Customers' Willingness, Customer Satisfaction, and MSCW). However, such analysis has been excluded in order to keep the scope of the research manageable.

In marketing research, the effect of consumers' product perception during shopping online (based on different product attributes) has been examined. Prior researchers have classified online products into different categories, such as Search, Experience, and Credence, which is referred to as SEC classification (Klein, 1998; Norton & Norton, 1988). However, the SEC model is considered subjective depending on age and gender (Mityko, 2012). Meanwhile, others have classified products into different dimensions, cost (low/high), frequency of purchase (frequent/infrequent), and value proposition (tangible products/ intangible products "service oriented") (Kiang & Chi, 2001; Peterson, 1997; Phau & Poon, 2000). Since this study focused on product-related items (tangible items), the comprehensive study survey instrument (Appendix B) utilized two dimensions, namely, price and frequency of purchase. The survey questioned respondents (based on their selection of one of the four product categories in Q8) about the price of the most recent item purchased, and if the recent item purchased was frequently purchased or not. Hence, future studies could use the SEC paradigm as a classification for different product categories purchased via the Internet in order to study the association of those classifications with customers' willingness and customer satisfaction. In addition to that, the data that was collected for different product categories, which have the classification of the item purchased (price and frequency), was not used in the analysis of this research. Therefore, this data can be used to derive conclusions and recommendations of all structural models.

The MSCW Structural Model developed in this study used only the aggregate data. The data collected from the comprehensive study survey instrument for different demographic and product categories was not used for the MSCW Structural Model. In fact, this data did not examine the mitigation strategies for males, females, different levels of education, the three age groups, and for different product categories. In addition, the association between the quality gaps mitigation strategies and customer satisfaction with online shopping was not tested in this study. Therefore, this data can be used to derive conclusions regarding the association between the quality gaps' mitigation strategies and customer satisfaction for different demographic and product categories.

Additionally, this study did not address the use and effect of mobile applications of OSRs on customers' willingness and customer satisfaction. Hence, future studies could research the importance of this feature on customers' overall experience.

In the future, the generated SEM from the Customers' Willingness Structural Model or from the Customer Satisfaction Structural Model can be refined by eliminating some/all of those quality gaps that were not significant to be able to generate a better model fit and loadings. Similarly in the MSCW Structural Model, many of the latent variables were not significant. Hence, it can be terminated/modified from the model to produce more specific conclusions.

References

Aladwani, A. M., & Palvia, P. C. (2002). Developing and validating an instrument for measuring user-perceived web quality. *Information & Management, 39*(6), 467–476.

Azam, A., Qiang, F., & Abdullah, M. I. (2012). E-satisfaction in business-to-consumer electronic commerce. *The Business & Management Review, 3*(1), 18.

Bartels, A. (2000, October 30). The difference between e-business and e-commerce. *Computerworld*. Retrieved from: http://www.computerworld.com/article/2588708/e-commerce/e-commerce-the-difference-between-e-business-and-e-commerce.html

Baker, J., Levy, M., & Grewal, D. (1992). An experimental approach to making retail store environmental decisions. *Journal of Retailing, 68(4)*, 445.

Barnes, S. J., & Vidgen, R. T. (2002). An integrative approach to the assessment of e-commerce quality. *Journal of Electronic Commerce Research, 3*(3), 114–127.

Bauer, H. H., Falk, T., & Hammerschmidt, M. (2006). eTransQual: A transaction process-based approach for capturing service quality in online shopping. *Journal of Business Research, 59*(7), 866–875.

Bell, D., Gallino, S., & Moreno, A. (2015). Showrooms and information provision in omni-channel retail. *Production and Operations Management, 24*(3), 360–362. doi:10.1111/poms.12258_2

Bellman, S., Lohse, G. L., & Johnson, E. J. (1999). Predictors of online buying behavior. *Communications of the ACM*, *42*(12), 32–38.

Bitner, M. J., Booms, B. H., & Tetreault, M. S. (1990). The service encounter: Diagnosing favorable and unfavorable. *Journal of Marketing, 54*(1), 71–84.

Blakney, V. L., & Sekely, W. (1994). Retail attributes: Influence on shopping mode choice behavior. *Journal of Managerial Issues*, 101–118.

Bower, A. B., & Maxham, J. B., III. (2012). Return shipping policies of online retailers: Normative assumptions and the long-term consequences of fee and free returns. *Journal of Marketing, 76*(5), 110–124.

Butler, S. (2014, February 18). Marks & Spencer takes control of its online store from Amazon. *The Guardian* Retrieved from: https://www.theguardian.com/business/2014/feb/18/marks-spencer-control-online-shopping-website-amazon

Byrne, B. M. (2013). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. Routledge.

Cai, S., & Jun, M. (2003). Internet users' perceptions of online service quality: A comparison of online buyers and information searchers. *Managing Service Quality, 13*(6), 504–519.

Chang, M. K., Cheung, W., & Tang, M. (2013). Building trust online: Interactions among trust building mechanisms. *Information & Management, 50*(7), 439–445.

Chiu, Y. B., Lin, C. P., & Tang, L. L. (2005). Gender differs: Assessing a model of online purchase intentions in e-tail service. *International Journal of Service Industry Management*, *16*(5), 416–435.

Cho, Y. C., & Sagynov, E. (2015). Exploring factors that affect usefulness, ease of use, trust, and purchase intention in the online environment. *International Journal of Management & Information Systems, 19*(1), 21–36.

Choi, J., Lee, H. J., & Kim, Y. C. (2011). The influence of social presence on customer intention to reuse online recommender systems: The roles of personalization and product type. *International Journal of Electronic Commerce, 16*(1), 129–154.

Collier, J. E., & Bienstock, C. C. (2006). Measuring service quality in e-retailing. *Journal of Service Research, 8*(3), 260–275.

Cox, J., & Dale, B. G. (2001). Service quality and e-commerce: An exploratory analysis. *Managing Service Quality, 11*(2), 121–131.

Cristobal, E., Flavián, C., & Guinalíu, M. (2007). Perceived e-service quality (PeSQ). *Managing Service Quality, 17*(3), 317–340.

Cronbach L. J. (1951). Coefficient alpha and the internal structure of tests. *psychometrika, 16*(3), 297-334.

Culnan, M. J., & Armstrong, P. K. (1999). Information privacy concerns, procedural fairness, and impersonal trust: An empirical investigation. *Organization Science, 10*(1), 104–115.

Esper, T. L., Jensen, T. D., Turnipseed, F. L., & Burton, S. (2003). The last mile: An examination of effects of online retail delivery strategies on consumers. *Journal of Business Logistics, 24*(2), 177–203.

eMarketer (2015). *Worldwide Retail Ecommerce Sales: eMarketer's Updated Estimates and Forecast Through 2019.* Retrieved from: http://www.emarketer.com/public_media/docs/eMarketer_eTailWest2016_Worldwide_ECommerce_Report.pdf

eMarketer (2016, June 14). China Embraces Cross-Border Ecommerce. Retrieved from http://www.emarketer.com/Article/China-Embraces-Cross-Border-Ecommerce/1014078

Farag, S., Schwanen, T., Dijst, M., & Faber, J. (2007). Shopping online and/or in-store? A structural equation model of the relationships between e-shopping and in-store shopping. *Transportation Research, Part A: Policy and Practice, 41*(2), 125–141.

Fiore, A. M., & Hyun-Jeong, J. (2003). Influence of image interactivity on approach responses towards an online retailer. *Internet Research, 13*(1), 38–48.

Fiore, A. M., Hyun-Jeong, J., & Kim, J. (2005). For fun and profit: Hedonic value from image interactivity and responses toward an online store. *Psychology & Marketing, 22*(8), 669–694.

Fiore, A. M., Kim, J., & Hyun-Hwa, L. (2005). Effect of image interactivity technology on consumer responses toward the online retailer. *Journal of Interactive Marketing, 19*(3), 38–53.

Flavián, C., Guinalíu, M., & Gurrea, R. (2006). The role played by perceived usability, satisfaction and consumer trust on website loyalty. *Information & Management, 43*(1), 1–14.

Francis, J. E. (2009). Category-specific RECIPEs for internet retailing quality. *The Journal of Services Marketing, 23*(7), 450–461.

Francis, J. E., & White, L. (2002). Pirqual: A scale for measuring customer expectations and perceptions of quality in Internet retailing. *Conference Proceedings of the American Marketing Association, 13*, 263–270.

Grau, J. (2013). *US retail Ecommerce 2013 forecast and comparative estimates.* Retrieved from: http://www.emarketer.com/Article/Retail-Ecommerce-Set-Keep-Strong-Pace-Through-2017/1009836

Ha, S., & Stoel, L. (2009). Consumer e-shopping acceptance: Antecedents in a technology acceptance model. *Journal of Business Research, 62*(5), 565–571.

Ha, S., & Stoel, L. (2012). Online apparel retailing: Roles of e-shopping quality and experiential e-shopping motives. *Journal of Service Management, 23*(2), 197–215.

Harrison McKnight, D., Choudhury, V., & Kacmar, C. (2002). The impact of initial consumer trust on intentions to transact with a web site: A trust building model. *The Journal of Strategic Information Systems, 11*(3–4), 297–323.

Hassanein, K., & Head, M. (2007). Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping. *International Journal of Human-Computer Studies, 65*(8), 689–708.

Ho, S. Y., & Tam, K. Y. (2005). An empirical examination of the effects of web personalization at different stages of decision making. *International Journal of Human-Computer Interaction, 19*(1), 95–112.

Hong, I. B., & Cho, H. (2011). The impact of consumer trust on attitudinal loyalty and purchase intentions in B2C e-marketplaces: Intermediary trust vs. seller trust. *International Journal of Information Management, 31*(5), 469–479.

Horrigan, J. B. (2008). *Internet users like the convenience but worry about the security of their financial information.* Retrieved from: http://www.pewinternet.org/files/old-media//Files/Reports/2008/PIP_Online Shopping.pdf

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: A multidisciplinary journal*, 6(1), 1–55.

Janda, S., Trocchia, P. J., & Gwinner, K. P. (2002). Consumer perceptions of Internet retail service quality. *International Journal of Service Industry Management, 13*(5), 412–431.

Jarvenpaa, S. L., & Todd, P. A. (1996). Consumer reactions to electronic shopping on the world wide web. *International Journal of electronic commerce, 1*(2), 59–88.

Jiang, P., Jones, D. B., & Javie, S. (2008). How third-party certification programs relate to consumer trust in online transactions: An exploratory study. *Psychology & Marketing, 25*(9), 839–858.

Jiang, Z., & Benbasat, I. (2004). Virtual product experience: Effects of visual and functional control of products on perceived diagnosticity and flow in electronic shopping. *Journal of Management Information Systems, 21*(3), 111–147.

Jifeng, L., Sulin, B., & Han, Z. (2012). The effectiveness of online shopping characteristics and well-designed websites on satisfaction. *MIS Quarterly, 36*(4), 1131–1139.

Jin, B., Jin Yong, P., & Kim, J. (2008). Cross-cultural examination of the relationships among firm reputation, e-satisfaction, e-trust, and e-loyalty. *International Marketing Review, 25*(3), 324–337.

Jun, M., Yang, Z., & Kim, D. (2004). Customers' perceptions of online retailing service quality and their satisfaction. *The International Journal of Quality & Reliability Management, 21*(8), 817–840.

Kamoun, F., & Halaweh, M. (2012). User interface design and e-commerce security perception: An empirical study. *International Journal of E-Business Research, 8*(2), 15–32.

Keeney, R. L. (1999). The value of Internet commerce to the customer. *Management Science, 45*(4), 533–542.

Kiang, M. Y., & Chi, R. T. (2001). A Framework for Analyzing the Potential Benefits of Internet Marketing. *J. Electron. Commerce Res., 2*(4), 157–163.

Kim, D. J., Ferrin, D. L., & Rao, H. R. (2008). A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. *Decision Support Systems, 44*(2), 544–564.

Kim, J., Fiore, A. M., & Lee, H.-H. (2007). Influences of online store perception, shopping enjoyment, and shopping involvement on consumer patronage behavior towards an online retailer. *Journal of Retailing and Consumer Services, 14*(2), 95–107.

Kim, J., & Lennon, S. J. (2013). Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention. *Journal of Research in Interactive Marketing, 7*(1), 33–56.

Kim, S., & Stoel, L. (2004). Apparel retailers: Website quality dimensions and satisfaction. *Journal of Retailing and Consumer Services, 11*(2), 109–117.

Klein, L. R. (1998). Evaluating the potential of interactive media through a new lens: Search versus experience goods. *Journal of business research, 41(3),* 195–203.

Koufaris, M., & Hampton-Sosa, W. (2004). The development of initial trust in an online company by new customers. *Information & Management, 41*(3), 377–397.

Koyuncu, C., & Bhattacharya, G. (2004). The impacts of quickness, price, payment risk, and delivery issues on on-line shopping. *The Journal of Socio-Economics, 33*(2), 241–251.

Lee, G.-G., & Lin, H.-F. (2005). Customer perceptions of e-service quality in online shopping. *International Journal of Retail & Distribution Management, 33*(2/3), 161–176.

Lee, M. K. O., Wang, C., & Wang, H. (1998). Consumer privacy concerns about Internet marketing. *Communications of the ACM, 41,* 63–70.

Lei-da, C., Gillenson, M. L., & Sherrell, D. L. (2004). Consumer acceptance of virtual stores: A theoretical model and critical success factors for virtual stores. *Database for Advances in Information Systems, 35*(2), 8–31.

Lepkowska-White, E. (2004). Online store perceptions: How to turn browsers into buyers? *Journal of Marketing Theory and Practice*, 36–47.

Li, H., Daugherty, T., & Biocca, F. (2003). The role of virtual experience in consumer learning. *Journal of Consumer Psychology, 13*(4), 395–407.

Li, H., Kuo, C., & Rusell, M. G. (1999). The impact of perceived channel utilities, shopping orientations, and demographics on the consumer's online buying behavior. *Journal of Computer-Mediated Communication, 5*(2)

Liang, T.-P., Lai, H.-J., & Ku, Y.-C. (2006). Personalized content recommendation and user satisfaction: Theoretical synthesis and empirical findings. *Journal of Management Information Systems, 23*(3), 45–70.

Liu, C., & Arnett, K. P. (2000). Exploring the factors associated with Web site success in the context of electronic commerce. *Information & Management, 38*(1), 23–33.

Lohse, G. L., & Spiller, P. (1998). Electronic shopping. *Communications of the ACM, 41*(7), 81–87.

Loiacono, E. T. (2000). *WebQual(TM): A Web site quality instrument* (Unpublished doctoral dissertation), University of Georgia, Athens, GA.

Long, M., & McMellon, C. (2004). Exploring the determinants of retail service quality on the Internet. *The Journal of Services Marketing, 18*(1), 78–90.

Lynch, J. G., & Ariely, D. (2000). Wine online: Search costs affect competition on price, quality, and distribution. *Marketing Science, 19*(1), 83–103.

Machlis, S. (1999). Online shoppers want on-time delivery. *Computerworld, 33*(10), 43.

Marsh, H. W., Hau, K. T., Balla, J. R., & Grayson, D. (1998). Is more ever too much? The number of indicators per factor in confirmatory factor analysis. *Multivariate Behavioral Research*, *33*(2), 181–220.

McKnight, D. H., Choudhury, V., & Kacmar, C. (2002). The impact of initial consumer trust on intentions to transact with a web site: A trust building model. *The Journal of Strategic Information Systems, 11*(3), 297–323.

Montoya-Weiss, M. M., Voss, G. B., & Grewal, D. (2003). Determinants of online channel use and overall satisfaction with a relational, multichannel service provider. *Journal of the Academy of Marketing Science, 31*(4), 448–458.

Mulpuru, S., Johnson, C., & Wright, S. (2007). Which personalization tools work for ecommerce—and why. *eBusiness, Channel & Product Management Professionals, Forrester Research*.

Muthén, L. K., & Muthén, B. O. (2002). How to use a Monte Carlo study to decide on sample size and determine power. *Structural Equation Modeling*,*9*(4), 599–620.

Múthen, L. K. & Múthen, B. O. *Mplus User's Guide (1998-2015).* Los Angeles, CA: Múthen & Múthen.

Nasser, F., & Wisenbaker, J. (2003). A Monte Carlo study investigating the impact of item parceling on measures of fit in confirmatory factor analysis. *Educational and Psychological Measurement*, *63*(5), 729–757.

Norton, S. W., & Norton Jr, W. (1988). An economic perspective on the information content of magazine advertisements. *International Journal of Advertising,* 7(2), 138–148.

Numally J. C. (1978). *Psychometric theory*. *New York: McGraw-Hill*.

Ofek, E., Katona, Z., & Sarvary, M. (2011). "Bricks and clicks": The impact of product returns on the strategies of multichannel retailers. *Marketing Science, 30*(1), 42–60.

O'Neill, M., Wright, C., & Fitz, F. (2001). Quality evaluation in on-line service environments: An application of the importance-performance measurement technique. *Managing Service Quality, 11*(6), 402–417.

Ong, B. S. (2011). Online shopper reviews: Ramifications for promotion and website utility. *Journal of Promotion Management, 17*(3), 327–344.

Palvia, P. (2009). The role of trust in e-commerce relational exchange: A unified model. *Information & Management, 46*(4), 213–220.

Pan, Y., & Zinkhan, G. M. (2006). Exploring the impact of online privacy disclosures on consumer trust. *Journal of Retailing, 82*(4), 331–338.

Parasuraman, A., Berry, L. L., & Zeithaml, V. A. (1991). Refinement and reassessment of the SERVQUAL scale. *Journal of Retailing, 67*(4), 420.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing, 49*(4), 41–50.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing, 64*(1), 12–40.

Parasuraman, A., Zeithaml, V. A., & Malhotra, A. (2005). E-S-QUAL: A multiple-item scale for assessing electronic service quality. *Journal of Service Research, 7*(3), 213–233.

Pavlou, P. A., & Fygenson, M. (2006). Understanding and predicting electronic commerce adoption: An extension of the theory of planned behavior. *MIS quarterly,* 115–143.

Pelet, J. É., & Papadopoulou, P. (2012). The effect of E-commerce websites' colors on customer trust. *Mobile Applications and Knowledge Advancements in E-Business*, 167.

Peterson, R. A., Balasubramanian, S., & Bronnenberg, B. J. (1997). Exploring the implications of the Internet for consumer marketing. *Journal of the Academy of Marketing science,* 25(4), 329-346.

Peterson, R. A., & Jolibert, A. J. P. (1995). A meta-analysis of country-of-origin effects. *Journal of International Business Studies, 26*(4), 883–900.

Phau, I., & Meng Poon, S. (2000). Factors influencing the types of products and services purchased over the Internet. *Internet Research,* 10(2), 102–113.

Pintro, N. L. (2013). Understanding the barriers to online shopping among Indian consumers. *International Journal of Research in Humanities, Arts and Literature, 1*(3), 35–44.

Ponte, E. B., Carvajal-Trujillo, E., & Escobar-Rodríguez, T. (2015). Influence of trust and perceived value on the intention to purchase travel online: Integrating the effects of assurance on trust antecedents. *Tourism Management, 47*, 286–302.

Pynnönen, K., Törmäkangas, T., Heikkinen, R.-L., Rantanen, T., & Lyyra, T.-M. (2012). Does social activity decrease risk for institutionalization and mortality in older people? *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, gbs076.

Raphel, M. (2004). And many happy returns. *Art Business News, 31*(1), 46.

Rigby, C. (2015, July 07). Marks & Spencer's online sales rise by more than a third. *Internet Retailing*
Retrieved from https://internetretailing.net/2015/07/marks-spencer-reports-online-sales-up-by-more-than-a-third/

Rodgers, S., & Harris, M. A. (2003). Gender and e-commerce: an exploratory study. *Journal of advertising research*, *43*(3), 322-329.

Rogers, D. S., & Tibben-Lembke, R. S. (1999). *Going backwards: Reverse logistics trends and practices* (Vol. 2). Pittsburgh, PA: Reverse Logistics Executive Council.

Roy, M. C., Dewit, O., & Aubert, B. A. (2001). The impact of interface usability on trust in Web retailers. *Internet Research, 11*(5), 388–398.

Sorce, P., Perotti, V., & Widrick, S. (2005). Attitude and age differences in online buying. *International Journal of Retail & Distribution Management*, *33*(2), 122–132.

Solomon, M. R., Surprenant, C., Czepiel, J. A., & Gutman, E. G. (1985). A role theory perspective on dyadic interactions: The service encounter. *The Journal of Marketing*, 99–111.

Song, J., Baker, J., Lee, S., & Wetherbe, J. C. (2012). Examining online consumers' behavior: A service-oriented view. *International Journal of Information Management, 32*(3), 221–231.

Song, J., & Zahedi, F. M. (2005). A theoretical approach to web design in e-commerce: A belief reinforcement model. *Management Science, 51*(8), 1219–1235.

Spiller, P., & Lohse, G. L. (1997). A classification of Internet retail stores. *International Journal of Electronic Commerce*, 29–56.

Straub DW. (1989). Validating instruments in MIS research. *MIS Quarterly*, 147-169.

Suki, N. M., & Suki, N. M. (2013). Consumer online shopping behavior: The effect of internet marketing environment, product characteristics, familiarity and confidence, and promotional offer. *International Journal of Social, Education, Economics and Management Engineering, 7*, 412–418.

Tam, K. Y., & Ho, S. Y. (2006). Understanding the impact of web personalization on user information processing and decision outcomes. *MIS Quarterly*, 865–890.

Trager, I. (2000). Not so many happy returns. *Interactive Week, 7*(11), 44–45.

Tsai, J. Y., Egelman, S., Cranor, L., & Acquisti, A. (2011). The effect of online privacy information on purchasing behavior: An experimental study. *Information Systems Research, 22*(2), 254–268.

Utz, S., Kerkhof, P., & van den Bos, J. (2012). Consumers rule: How consumer reviews influence perceived trustworthiness of online stores. *Electronic Commerce Research and Applications, 11*(1), 49–58.

Van Riel, A. C., Liljander, V., & Jurriens, P. (2001). Exploring consumer evaluations of e-services: A portal site. *International Journal of Service Industry Management, 12*(4), 359–377.

Van Slyke, C., Comunale, C. L., & Belanger, F. (2002). Gender differences in perceptions of web-based shopping. *Communications of the ACM*, *45*(8), 82–86.

Wahba, P. (2016a, August 18). Here's how walmart is reigniting its E-commerce growth, *Fortune Magazine.*
Retrieved from http://fortune.com/2016/08/18/walmart-ecommerce-2/

Wahba, P. (2016b, March 21). Why online retailers are flocking to Nordstrom, *Fortune Magazine*
Retrieved from http://fortune.com/2016/03/21/nordstrom-ecommerce-2/

Wolf, E. J., Harrington, K. M., Clark, S. L., & Miller, M. W. (2013). Sample size requirements for structural equation models: An evaluation of power, bias, and solution propriety. *Educational and Psychological Measurement*, *73*(6), 913–934.

Wolfinbarger, M., & Gilly, M. C. (2001). Shopping online for freedom, control, and fun. *California Management Review, 43*(2), 34–55.

Wolfinbarger, M., & Gilly, M. C. (2003). eTailQ: Dimensionalizing, measuring and predicting etail quality. *Journal of Retailing, 79*(3), 183–198.

Wurmser, Y. (2014). *US retail ecommerce: 2014 trends and forecast.* Retrieved from http://www.emarketer.com/Article/US-Retail-Ecommerce-Sales-Highest-Computers-Consumer-Electronics/1010759.

Xiling, Z., & Xiangchun, L. (2005). *Effective user interface design for consumer trust: Two case studies* (Unpublished master's thesis). Luleå University of Technology, Sweden.

Yen, H. (2005). An attribute-based model of quality satisfaction for Internet self-service technology. *The Service Industries Journal, 25*(5), 641–659.

Yoo, B., & Donthu, N. (2001). Developing a scale to measure the perceived quality of an internet shopping site (SITEQUAL). *Quarterly Journal of Electronic Commerce, 2*(1), 31–47.

Zeithaml, V. A., & Gilly, M. C. (1987). Characteristics affecting the acceptance of retailing technologies: A comparison of elderly and nonelderly consumers. *Journal of Retailing.*

Zeithaml, V. A., Parasuraman, A., & Berry, L. L. (1990). *Delivering quality service: Balancing customer perceptions and expectations*. New York: Simon and Schuster.

Zeithaml, V. A., Parasuraman, A., & Malhotra, A. (2002). Service quality delivery through Web sites: A critical review of extant knowledge. *Academy of Marketing Science. Journal, 30*(4), 362–375.

Zellweger, P. (1997). Web-based sales: Defining the cognitive buyer. *Electronic Markets, 7*(3), 10–16.

Appendix A: Model-Testing Survey Instrument

Q1 Thank you for participating in this survey. This study tracks trends in Internet usage and shopping. The survey will take no more than 10 minutes. All information is strictly confidential and will not be shared.

❍ Start

Q2 In the past six months, have you purchased products through the Online Service Retailers?

❍ Yes

❍ No

If No is Selected, then skip to end of survey

Q3 Please check the product(s) category from which you purchased during the past twelve months through the Online Service Retailers. (Check all that apply.)

❑ Computer & consumer electronics

❑ Apparel & accessories e.g. Clothes, Shoes, etc.

❑ Auto & parts

❑ Books/ Music/ Video

❑ Furniture & home furnishings

❑ Health & personal care

❑ Toy & hobby

❑ Office equipment & supplies

❑ Food & beverage

❑ Other (please specify)

Q4 Thinking back to the Online Service Retailers you've purchased from, have you ever:		
	Yes	No
Provided a customer review/feedback on the products you purchased?	❍	❍
Completed a survey for Online Service Retailers?	❍	❍
Returned merchandise after you received it?	❍	❍
Contacted the customer service department using the phone, chat or email?	❍	❍

Q5 Thinking about purchasing from Online Service Retailers, how much do you usually spend for a single item?

❍ Less than $100

❍ $100-$300

❍ $301-$500

❍ $501-$700

❍ $701-$1000

❍ More than $1,000

Q6 How much would you estimate you have spent through Online Service Retailers in the past twelve months?

- ❍ Less than $500
- ❍ $500-$1,000
- ❍ $1,001-$1,500
- ❍ $1,501-$2,000
- ❍ $2,001-$2,500
- ❍ More than $2,500

Q7 How often have you conducted transactions through Online Service Retailers in the past twelve months?

- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6 or more

Q8 Thinking back to your experience with Online Service Retailers, to what extent do you agree or disagree with the following:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Not Applicable
Online Service Retailers do not just sell products; they entertain me compared to basic in-store shopping.	❍	❍	❍	❍	❍	❍
I consider Online Service Retailers my first choice to purchase consumer goods. **(Dependent Variable)**	❍	❍	❍	❍	❍	❍
I find Customer Service options, such as chat, email, or call that are available in with Online Service Retailers useful.	❍	❍	❍	❍	❍	❍

Q9 Recalling your experience with Online Service Retailers, to what extent do you agree or disagree with the following:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	Not Applicable
In some cases, I prefer not to buy online because of my inability to touch, feel, smell, try, and pull the item, e.g., clothes, shoes, jewelry, perfumes.	❍	❍	❍	❍	❍	❍
In some cases, shopping online is not preferable since I cannot own the item immediately. I have to wait for the item to be shipped.	❍	❍	❍	❍	❍	❍
In some cases, Online Service Retailers' failure (in general) to deliver some products on time makes me prefer to shop in-store.	❍	❍	❍	❍	❍	❍
Ineffective search engines and inferior website design affect my trust.	❍	❍	❍	❍	❍	❍
Inability to pay by using different secure transaction methods, such as PayPal, affects my decision to buy online.	❍	❍	❍	❍	❍	❍
In some cases, the information provided by the shopping website provided is not accurate.	❍	❍	❍	❍	❍	❍
The inability to interact with a customer service representatives inperson makes me prefer shopping in-store rather than shopping online	❍	❍	❍	❍	❍	❍
In some cases, an inconvenient refund policy makes me prefer shopping in-store rather than shopping online.	❍	❍	❍	❍	❍	❍
In some cases, customers' lack of technology experience may hinder their ability to shop online.	❍	❍	❍	❍	❍	❍

Q10 What do you consider your ethnic group to be?

- ❍ White/Caucasian
- ❍ African-American
- ❍ Hispanic
- ❍ Asian
- ❍ Native American
- ❍ Pacific Islander
- ❍ Other

Q11 Please check your highest level of education.

- ❍ High School or equivalent
- ❍ Vocational/Technical School (2 year)
- ❍ Bachelor's Degree
- ❍ Master's Degree
- ❍ Doctoral Degree (PhD)
- ❍ Professional Degree (MD, JD, etc.)
- ❍ Other

Q12 What is your gender?

- ❍ Female
- ❍ Male

Q13 How old are you?

- ❍ Under 17
- ❍ 17-25
- ❍ 26-34
- ❍ 35-54
- ❍ 55-64
- ❍ 65 or over

Q14 What is your annual income range?

- ❍ Below $20,000
- ❍ $20,000 - $29,999
- ❍ $30,000 - $39,999
- ❍ $40,000 - $49,999
- ❍ $50,000 - $59,999
- ❍ $60,000 - $69,999
- ❍ $70,000 - $79,999
- ❍ $80,000 - $89,999
- ❍ $90,000 or more

Appendix B: Comprehensive Study Survey Instrument

Q1 Thank you for participating in this survey. The purpose of this survey is to track trends in online shopping. The survey will take no more than 10 minutes. All information is strictly confidential and will not be shared.

Q2 How old are you?

- ❍ 18 - 38
- ❍ 39 - 59
- ❍ 60 and above
- ❍ None of the above

If None of the above is selected, then skip to end of survey

Q3 What is your race?

- ❍ White
- ❍ Black or African American
- ❍ Hispanic or Latino
- ❍ Asian
- ❍ American Indian
- ❍ Alaska Native
- ❍ Native Hawaiian or Pacific Islander

Q4 Please check your level of education.

- ❍ Non-college-educated
- ❍ College-educated (Associate Degree, Bachelor Degree or higher)

Q5 What is your gender?

- ❍ Male
- ❍ Female

Q6 What is your annual income range?

- ❍ Below $20,000
- ❍ $20,000 - $39,999
- ❍ $40,000 - $59,999
- ❍ $60,000 - $79,999
- ❍ $80,000 or more

Q7 In the past six months, have you purchased any product(s) online?

- ❍ Yes
- ❍ No

If No is selected, then skip to end of survey

Q8 Thinking about the most recent product you purchased online, which ONE of the following categories represents your purchase in the last six months? (Select ONLY ONE)

- ❍ Computer & Consumer Electronics
- ❍ Apparel & Accessories e.g. Clothes, Shoes, etc.
- ❍ Books/ Music/ Video
- ❍ Health & Personal Care
- ❍ None of the above

If None of the above is selected, then skip to end of survey

If Computer & Consumer Electronics is selected, please check ONE of the following product categories:

Q9 Thinking about the most recent product(s) you purchased online (Computer & Consumer Electronics), approximately how much did you spend?

- ❍ $100 or less
- ❍ $101 - $200
- ❍ $201 - $300
- ❍ More than $300

If Computer & Consumer Electronics is selected, please check ONE of the following product categories:

Q10 Thinking about the most recent product(s) you purchased online (Computer & Consumer Electronics), have you purchased this (or similar) product(s) previously during the last 12 months?

- ❍ Yes
- ❍ No

If Apparel & Accessories is selected, please check ONE of the following:

Q11 Thinking about the most recent product(s) you purchased online (Apparel & Accessories), approximately how much did you spend?

- ❍ $100 or less
- ❍ $101-$200
- ❍ $201 - $300
- ❍ More than $300

If Apparel & Accessories is selected, please check ONE of the following:

Q12 Thinking about the most recent product(s) you purchased online (Apparel & Accessories), have you purchased this (or similar) product(s) previously during the last 12 months?

- ❍ Yes
- ❍ No

If Books/ Music/ Video Is selected, please check ONE of the following:

Q13 Thinking about the recent product(s) you purchased online (Books/ Music/ Video), approximately how much did you spend?

- ❍ $100 or less
- ❍ $101 - $200
- ❍ $201 - $300
- ❍ More than $300

Based on your previous choice, please check ONE of the following:

Q14 Thinking about the most recent product(s) you purchased online (Books/ Music/ Video), have you purchased this (or similar) product(s) previously during the last 12 months?

- ❍ Yes
- ❍ No

If Health & Personal Care is selected, please check ONE of the following product categories:

Q15 Thinking about the most recent product(s) you purchased online (Health & Personal Care), approximately how much did you spend?

- ❍ $100 or less
- ❍ $101 - $200
- ❍ $201 - $300
- ❍ More than $300

Based on your previous choice, please check ONE of the following:

Q16 Thinking about the most recent product(s) you purchased online (Health & Personal Care), have you purchased this (or similar) product(s) previously during the last 12 months?

- ❍ Yes
- ❍ No

Q17 Based on your answers to the previous questions, recalling your experience with recent online purchases, to what extent do you agree or disagree with the following:

		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A
TAC1	I always prefer to see the item I am buying in front of me.	❍	❍	❍	❍	❍	❍
TAC2	I prefer to touch and feel different styles and colors of the item(s) I am buying.	❍	❍	❍	❍	❍	❍
DEL1	The length of the delivery time affects my decision to purchase online.	❍	❍	❍	❍	❍	❍
DEL2	How quickly I need the merchandise could affect my decision to purchase online.	❍	❍	❍	❍	❍	❍
DEL3	Inconvenient estimated time frame to deliver the item could affect my decision while shopping online.	❍	❍	❍	❍	❍	❍
OND1	Shipping reliability affects my decision to shop online.	❍	❍	❍	❍	❍	❍
OND2	Uncertainty of delivering the item on time affects my decision to purchase online.	❍	❍	❍	❍	❍	❍
OND3	I am more likely to shop online when I can be certain that the purchased item(s) can be delivered by the promised date.	❍	❍	❍	❍	❍	❍
OND4	I prefer to shop online when the item(s) can be delivered on time.	❍	❍	❍	❍	❍	❍
TRU1	Website design quality affects my degree of trust in the Online Service Retailer.	❍	❍	❍	❍	❍	❍
TRU2	I trust websites with better search engine capabilities.	❍	❍	❍	❍	❍	❍
TRU3	Higher website usability affects my degree of trust.	❍	❍	❍	❍	❍	❍

		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A
TRA1	I am more likely to shop online if the website seems secure.	❍	❍	❍	❍	❍	❍
TRA2	I am more willing to shop online if my purchasing behavior information is kept confidential.	❍	❍	❍	❍	❍	❍
SAL1	Accuracy of product(s) descriptions and details affect my intention to purchase online.	❍	❍	❍	❍	❍	❍
SAL2	Product information that is seemingly false or artificial affects my intention to purchase online.	❍	❍	❍	❍	❍	❍
SAL3	Prices that are seemingly factitious (either exaggerated or seemingly underquoted) affect my decision to purchase online.	❍	❍	❍	❍	❍	❍
WIR1	The lack of human interaction affects my decision to shop online.	❍	❍	❍	❍	❍	❍
WIR2	I prefer to speak personally with a customer service representative when purchasing an item.	❍	❍	❍	❍	❍	❍
BUY1	Return processes can be difficult for me when I shop online.	❍	❍	❍	❍	❍	❍
BUY2	I have doubts that I will be fully refunded by some websites for returned items.	❍	❍	❍	❍	❍	❍
BUY3	Refund processes could be prolonged and difficult when I shop online.	❍	❍	❍	❍	❍	❍
TEC1	Complex and challenging website designs confuse me.	❍	❍	❍	❍	❍	❍
TEC2	The level of technological complexity used in some websites could hinder my ability to shop online.	❍	❍	❍	❍	❍	❍

Q18 Based on your answers to the previous questions, recalling your experience with recent online purchases, to what extent do you agree or disagree with the following:

		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A
MTAC1	The ability to expand the image (zoom in) for better viewing of the item helps me to understand the item I am buying.	❍	❍	❍	❍	❍	❍
MTAC2	More details, illustrations, and descriptions about all aspects of the product help me to better understand what I am buying.	❍	❍	❍	❍	❍	❍
MDEL1	The faster an item is delivered to me, the more likely I am to shop online.	❍	❍	❍	❍	❍	❍
MDEL2	I would like to have shorter shipping time options.	❍	❍	❍	❍	❍	❍
MOND1	I always like to have a specific reliable delivery date and time.	❍	❍	❍	❍	❍	❍
MOND2	I would like to be frequently updated with the products' processing and shipping status.	❍	❍	❍	❍	❍	❍
MTRU1	Enhanced website interface quality and usability increase my degree of trust in Online Service Retailers.	❍	❍	❍	❍	❍	❍
MTRU2	Satisfactory experience of the website interface quality will increase my willingness to purchase more frequently.	❍	❍	❍	❍	❍	❍

		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree	N/A
MTRA1	An enhanced website's interface quality and usability affect my sense of security.	❍	❍	❍	❍	❍	❍
MTRA2	I feel more secure when I see third party assurance seals, such as BBBonline or Truste.	❍	❍	❍	❍	❍	❍
MTRA3	Satisfactory experience of the website interface security will increase my willingness to purchase more frequently	❍	❍	❍	❍	❍	❍
MSAL1	I chat or email customer service for inquiries and concerns about product details.	❍	❍	❍	❍	❍	❍
MSAL2	The ability to ask questions addressed to previous users of the product about certain inquiries and concerns helps me to acquire more information on the item I am buying.	❍	❍	❍	❍	❍	❍
MWIR1	Personalized recommender systems compensate for the lack of human interaction.	❍	❍	❍	❍	❍	❍
MWIR2	I would prefer buying from websites using personalized recommender systems.	❍	❍	❍	❍	❍	❍
MBUY1	I would prefer a return policy with free shipping.	❍	❍	❍	❍	❍	❍
MBUY2	Providing me the ability to return products with free shipping would positively affect my future purchase behavior.	❍	❍	❍	❍	❍	❍
MTEC1	I prefer ease-of-use and user-friendly websites.	❍	❍	❍	❍	❍	❍
MTEC2	The level of technology used on websites should be adequate for all users.	❍	❍	❍	❍	❍	❍

Q19 On a scale of 1 to 10, how would you rate your level of preference for online shopping (as opposed to in-store shopping)? (Where 1 = least preferred; and 10 = highest preferred)

- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 9
- ❍ 10

Q20 On a scale of 1 to 10, how satisfied are you with your preference to shop online? (Where 1 = strongly dissatisfied; and 10 = strongly satisfied)

- ❍ 1
- ❍ 2
- ❍ 3
- ❍ 4
- ❍ 5
- ❍ 6
- ❍ 7
- ❍ 8
- ❍ 9
- ❍ 10

Appendix C: Examples of Mplus Syntax

Customers' Willingness Structural Model: customers' willingness on quality gaps.

```
data: file is C:\Users\Asem\Desktop\Results\data.dat;
        listwise=on;

variable:

 names are Q2  Q3      Q4      Q5      Q6      Q7      Q8      Q9      Q10     Q11     Q12
       Q13     Q14     Q15     Q16
   TAC1        TAC2    DEL1    DEL2    DEL3    OND1    OND2    OND3    TRU1    TRU2    TRU3
   TRA1        TRA2    SAL1    SAL2    SAL3    WIR1    WIR2    BUY1    BUY2    BUY3
   TEC1        TEC2    Q19;

   usevariables=
   TAC1        TAC2    DEL1    DEL2    DEL3    OND1    OND2    OND3    TRU1    TRU2    TRU3
   TRA1        TRA2    SAL1    SAL2    SAL3    WIR1    WIR2    BUY1    BUY2    BUY3
   TEC1        TEC2    Q19;

categorical are  TAC1   TAC2    DEL1    DEL2    DEL3    OND1    OND2    OND3    TRU1    TRU2
        TRU3    TRA1    TRA2    SAL1    SAL2    SAL3    WIR1    WIR2    BUY1    BUY2    BUY3
        TEC1    TEC2;

   MISSING ARE ALL (999);

Analysis:
Estimator = WLSM;

   Model:
   G1 by   TAC1        TAC2;
   G2 by   DEL1        DEL2    DEL3;
   G3 by  TRU1         TRU2    TRU3;
   G4 by  TRU1         TRU2    TRU3;
   G5 by  TRA1         TRA2;
   G6 by  SAL1         SAL2    SAL3;
   G7 by  WIR1         WIR2;
   G8 by BUY1          BUY2    BUY3;
   G9 by  TEC1         TEC2;
   Q19 on G1 G2 G3 G4 G5 G6 G7 G8 G9;

   Output: Standardized Modindices;
```

The first structural model: customers' willingness on quality gaps with gender, Education, Age, and Product Categories as predictors, Reference groups: Age (3) Product Category (4).

```
data: file is C:\Users\Asem\Desktop\Results\data_dummy.dat;
            listwise=on;

variable:

    names are Q2 Q3      Q4      Q5      Q6      Q7      Q8      Q9      Q10     Q11     Q12
          Q13     Q14     Q15     Q16
     TAC1       TAC2    DEL1    DEL2    DEL3    OND1    OND2    OND3    TRU1    TRU2    TRU3
     TRA1       TRA2    SAL1    SAL2    SAL3    WIR1    WIR2    BUY1    BUY2    BUY3
     TEC1       TEC2    Q19     gender  age1    age2    age3    edu
pc1     pc2     pc3     pc4;

     usevariables=
     TAC1       TAC2    DEL1    DEL2    DEL3    OND1    OND2    OND3    TRU1    TRU2    TRU3
     TRA1       TRA2    SAL1    SAL2    SAL3    WIR1    WIR2    BUY1    BUY2    BUY3
     TEC1       TEC2    Q19     gender  age1    age2    edu     pc1     pc2     pc3;

 categorical are   TAC1    TAC2    DEL1    DEL2    DEL3    OND1    OND2    OND3    TRU1    TRU2
          TRU3    TRA1    TRA2    SAL1    SAL2    SAL3    WIR1    WIR2    BUY1    BUY2    BUY3
          TEC1    TEC2;

    MISSING ARE ALL (999);

 Analysis:
 Estimator = WLSM;

    Model:
    G1 by   TAC1        TAC2;
    G2 by   DEL1        DEL2    DEL3;
    G3 by  TRU1         TRU2    TRU3;
    G4 by  TRU1         TRU2    TRU3;
    G5 by  TRA1         TRA2;
    G6 by  SAL1         SAL2    SAL3;
    G7 by  WIR1         WIR2;
    G8 by BUY1          BUY2    BUY3;
    G9 by  TEC1         TEC2;
    Q19 on G1 G2 G3 G4 G5 G6 G7 G8 G9 gender age1 age2 edu pc1  pc2 pc3;;

    Output: Standardized Modindices;
```

The first structural model: customers' willingness on quality gaps grouping Gender

```
  data: file is C:\Users\Asem\Desktop\Results\data.dat;
        listwise=on;

  variable:

   names are Q2  Q3     Q4     Q5     Q6     Q7     Q8     Q9     Q10    Q11    Q12
         Q13    Q14    Q15    Q16
     TAC1       TAC2   DEL1   DEL2   DEL3   OND1   OND2   OND3   TRU1   TRU2   TRU3
     TRA1       TRA2   SAL1   SAL2   SAL3   WIR1   WIR2   BUY1   BUY2   BUY3
     TEC1       TEC2   Q19;

     usevariables=
     TAC1       TAC2   DEL1   DEL2   DEL3   OND1   OND2   OND3   TRU1   TRU2   TRU3
     TRA1       TRA2   SAL1   SAL2   SAL3   WIR1   WIR2   BUY1   BUY2   BUY3
     TEC1       TEC2   Q19    Q5;

 categorical are  TAC1   TAC2   DEL1   DEL2   DEL3   OND1   OND2   OND3   TRU1   TRU2
         TRU3   TRA1   TRA2   SAL1   SAL2   SAL3   WIR1   WIR2   BUY1   BUY2   BUY3
         TEC1   TEC2;

    MISSING ARE ALL (999);

grouping= Q5 (1=males, 2=females);

Analysis:
  Estimator = WLSM;

     Model:
     G1 by   TAC1        TAC2;
     G2 by   DEL1        DEL2   DEL3;
     G3 by  TRU1         TRU2   TRU3;
     G4 by  TRU1         TRU2   TRU3;
     G5 by  TRA1         TRA2;
     G6 by  SAL1         SAL2   SAL3;
     G7 by  WIR1         WIR2;
     G8 by BUY1          BUY2   BUY3;
     G9 by  TEC1 TEC2;
     Q19 on G1 G2 G3 G4 G5 G6 G7 G8 G9;

     Output: Standardized Modindices;

   Model males:
    Q19 on G1 G2 G3 G4 G5 G6 G7 G8 G9;

    Model females:
    Q19 on G1 G2 G3 G4 G5 G6 G7 G8 G9;
```