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Two studies exploring the effects of ageing cohorts and channel usage on the antecedents and consequence of customer satisfaction

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TWO STUDIES EXPLORING THE EFFECTS OF AGEING COHORTS AND CHANNEL USAGE ON THE ANTECEDENTS AND CONSEQUENCE OF CUSTOMER SATISFACTION

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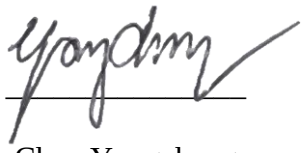
I hereby declare that this PhD dissertation is my original work and it has been written by me in its entirety. I have duly acknowledged all the sources of information which have been used in this dissertation.

This PhD dissertation has also not been submitted for any degree in any university previously.



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ABSTRACT

A rapidly ageing customer base, and an acceleration in the adoption of self-service technologies (SST) are two major trends which are set to have an increasing impact on how companies manage and satisfy customers. While there has been a rich body of work studying the effects of ageing and SST usage on customers, research on how they might affect cumulative satisfaction appears to be limited. The ageing literature tends to focus on cognition and decision-making processes, while SST research tends to be narrowly focused on SST evaluation and adoption. Our understanding on how ageing affects how satisfied customers are with service providers, and how SST usage within a complex multichannel environments affects cumulative satisfaction appears to be limited. To bridge this gap, we conducted two studies using data from the Customer Satisfaction Index of Singapore.

Study 1 looked at how ageing cohorts affects the established antecedents of customer satisfaction, namely customer expectations, perceived quality, and perceived value. The study also looked at how the inflation experience of ageing cohorts affects perceived value. Contrary to data from the American Customer Satisfaction Index which found an older-more-satisfied phenomena, our study found ageing cohorts to be less satisfied, with a consistently negative effect on all three antecedents. The velocity and magnitude of inflation was also found to have a negative effect on perceived value, with ageing cohorts positively moderating the effects of inflation velocity on perceived value. The findings highlight the potential neglect of senior customers and provides guidance on how cohort experiences may be an

important factor for managers to think about when considering how best to manage an increasingly ageing customer base.

Study 2 looked at how different channel user types moderated the established relationships between perceived quality and customer satisfaction, and customer satisfaction and loyalty. Previous research tends to focus on the retail sector, and only on digital SST and offline customers. Studies on the effects of different channel user types within more complex multichannel service environments was surprising limited. Using survey data from the banking and telecommunications industry, the study compared the moderating effects of digital SST customers, multichannel customers, and offline customers, on the two established relationships. Across both industries, when compared to offline customers, the quality-satisfaction and satisfaction-loyalty relationships were found to be weaker for digital SST customers. Both established relationships were also found to be strongest among multichannel banking customers when compared with the other two channel user types. As more companies embark on a multichannel strategy by digitally transforming how they serve customers, the differentiated effects found in Study 2 provides managers guidance on how best to manage their channel mix.

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Dissertation Overview

This dissertation will consist of two studies focusing on the impact of (1) ageing cohorts and (2) digital self-service technologies usage, on the antecedents and outcomes of customer satisfaction. Ageing customers are set to see a significant increase of 1.5 billion by 2050, while the deployment of self-service technologies (SST) as a channel has been on the rise and is set to be worth US$77.7 billion by 2027 (United Nations, 2020; Acumen Research and Consulting, 2021; Neslin et al., 2006). As customers age, and companies increasingly replace social interactions with SST driven service encounters, especially with the onset of the 2020 COVID-19 pandemic (Laberge et al., 2020), both of these trends are likely to result in significant changes to customer experience. Yet despite their implications for the future of marketing, research into their impact on customer satisfaction tends to be limited. For ageing customers, past research have shown that marketers tend to ignore ageing customers (Thompson & Thompson, 2009), while research on the area is typically narrowly focused on customers' decision-making processes and responses (Yoon et al., 2009a; Zniva & Weitzl, 2016). Few have studied how ageing customers impact customer satisfaction despite its importance in predicting financial performance (Morgan & Rego, 2006a).

On SST, previous studies tend to revolve around technology adoption and SST satisfaction (Robertson et al., 2016). Research on how different channel user types can affect customer satisfaction and loyalty have been limited (Hult et al., 2019). How ageing customers and SSTs affect evaluative outcomes of customer experience (Becker & Jaakkola, 2020), and in particular customer satisfaction and its outcomes at the overall relationship level (Gronroos, 2007) appears to be limited.

Given the importance of both trends, and to bridge the research gap, through two studies, this dissertation would explore the impact of ageing cohorts and channel user types

on the antecedents and outcome of customer satisfaction. The studies will draw on extensive cross-industry data from the Customer Satisfaction Index of Singapore (CSISG), an annual industry wide survey of customers in Singapore. The dissertation will be organised into two parts. The first part will focus on the study of how ageing cohorts affect the antecedents of customer satisfaction (Study 1). The second part of the dissertation will focus on how the different types of channel users moderate the established relationships between the antecedent and outcome of customer satisfaction (Study 2).

Study 1: *Are older customers happier? Exploring cohort effects on the antecedents of customer satisfaction*

CHAPTER 1.1: INTRODUCTION

Are older customers happier? Exploring cohort effects on customer satisfaction

Focusing on individual characteristics of customers, this study aims to understand how older customer cohorts impact customer satisfaction across industries based on the established antecedents of customer satisfaction. Drawing on research on expectations-disconfirmation model or EDM (Fornell et al., 1996; Parasuraman et al., 1988), reference prices (Mazumdar et al., 2005), and memory and biases (Yoon et al., 2009a), the study will explore how ageing cohorts impact customer satisfaction levels and the established antecedents of (1) customer expectations, (2) perceived quality, and (3) perceived value (Fornell et al., 1996). Contrary to the older-more-satisfied observation in Western centric studies (Yoon et al., 2010), the study found a negative relationship between older cohorts and customer satisfaction and its antecedents.

The study will focus on two ageing cohorts, namely the (1) pioneer generation, that is citizens and permanent residents born prior to Singapore's independence, and (2) the generation born post-independence, dubbed the Merdeka generation. The study will argue that firstly, with regards to customer expectations, ageing cohorts should have a negative impact on the variable due to their past experiences with older and presumably inferior quality of goods and services. Secondly, with regards to perceived quality, we consider two potentially opposite effects as (1) recent advancements may have resulted in products and services being better able to meet the needs of older cohorts than their previous experiences, while at the same time (2) the needs of ageing customers tend to be underserved due to a

general neglect by marketers. Lastly, with regards to perceived value, we propose that the velocity and magnitude of inflation should have a negative impact on the construct.

Studying the data using various multiple regression and moderated regression models, we found ageing cohorts to have a negative effect on satisfaction as well as all three established antecedents. Inflation velocity and magnitude were found to have a negative effect on perceived value, with ageing cohorts found to strengthen the negative effect between inflation velocity and perceived value.

Theoretical Contributions

In terms of theoretical contributions, this study contributes in three ways. Firstly, while ageing and customer satisfaction are individually well established research fields, surprisingly there has been limited research studying the relationship between the two variables (Zniva & Weitzl, 2016). While, the most extensive study on the topic by Yoon et al (2010) had proposed that (1) cohort effects, (2) socioemotional selectivity, (3) changes in decision-making processes, and (4) difference in survey response by ageing customers, could be potential reasons for the positive relationship, these hypotheses were not formally tested. Moreover, there does not appear to be much work done to look at the effects through the above stated antecedents of customer satisfaction (Fornell et al., 1996; Morgeson, 2013). Therefore, this paper contributes to theory by proposing and testing the effects of ageing cohorts on these established antecedents.

Secondly, this paper aims to make an empirical contribution by using cohort and Asian data to study the phenomena. Past studies tend to be limited, Western centric, and cross-sectional (Zniva & Weitzl, 2016). By focusing on cohorts, this study can more adequately untangle the effects of cohort, ageing, and time (Yoon et al., 2009a) on

satisfaction. The use of an extensive cross-industry Asian dataset also provides an empirical means to validate previous Western-centric research.

Thirdly, to our knowledge, there has thus far been no studies on the effects of long-term inflation on perceived value or customer satisfaction. While the reference price literature have looked at the effects of a shift in prices, these tend to be based on experiments and focusing on short-term price movements (Mazumdar et al., 2005). Therefore, the study contributes to our understanding on how long-term price movements affects customers, by providing evidence of a significant negative effect on customers perception of value.

Managerial Implications

In terms of managerial implications, the study aims to contribute to practice in three ways. Firstly, by focusing on seniors, the study aims to provide managers an understanding of an overlooked but increasingly important customer segment (Thompson & Thompson, 2009).

Secondly, with ageing cohorts having a negative effect on customer satisfaction and its antecedents, the study underscores the potential neglect of seniors by marketers and highlights a potentially underserved customer segment.

Finally, by providing cohort level insights into the reasons for potential differences in customer expectations, perceived quality, and perceived value, the study provides managers guidance on how they could target seniors more effectively. Presumably, managers should be more mindful of not just age-related differences when segmenting their customers, but even the cohort experience of their older customers.

CHAPTER 1.2: LITERATURE REVIEW

In this chapter we review the relevant literature for the study. This section is organised into two parts. The first section will focus on the customer satisfaction literature. The second section will review the existing research on the impact of ageing on customers.

Research On Customer Satisfaction

Over the years, companies have increasingly identified satisfaction as key part of their marketing strategies (Otto et al., 2020) given its purported link to driving firm performance (Morgan & Rego, 2006a). Research wise, studies on customer satisfaction has been extremely rich and prolific since its conceptualisation in the 1960s (Oliver, 1980; Szymanski & Henard, 2001; Otto et al., 2020). Defined as a post consumption response to the extent by which a product or service has fulfilled a customer's expectations (Oliver, 1980, 1996), much work has been done over the years to study its antecedents, outcomes, and moderators. While there have been different conceptualisation of the construct, the most established measurement has been the model developed by Fornell et al (1996) for the American Customer Satisfaction Index (ACSI). We structure our review of the literature by first focusing on the (1) types of satisfaction, followed by the (2) antecedent and outcomes, before (3) ending the section with the well-established ACSI model.

Transactional & Cumulative Satisfaction

Research on customer satisfaction generally makes a distinction between transaction-specific satisfaction and cumulative satisfaction. While both types of satisfaction refer to a customer's post-consumption evaluation of a product or service, transaction-specific satisfaction focuses on a specific transaction, episode, or encounter. Cumulative satisfaction on the other hand, revolves around evaluations of the product or service provider to date

(Johnson et al., 1995; Olsen & Johnson, 2003; Homburg et al., 2005). Hence, cumulative satisfaction differs from transactional satisfaction as it focuses on a customer's relationship with the providers as opposed to any specific exchange (Palmatier et al., 2006). Satisfaction at the relational level is based on cumulative satisfaction arising from prior experiences. Research in this area suggest that past satisfaction tends to weigh more heavily than evaluations of more recent transactions and encounters (Bolton, 1998).

Given the distinction, the insights gained from the two conceptualisation of customer satisfaction differs greatly. Transactional satisfaction tends only provide short-run information about how customer feel about specific encounters. Cumulative satisfaction, given its relational focus, can provide insights on the long-run performance of a firm. Indeed, previous research have shown cumulative satisfaction to be strongly linked to loyalty, willingness to pay and performance (Bolton, 1998; Olsen & Johnson, 2003; Homburg et al., 2005; Anderson et al., 1994).

Antecedents, and Outcomes of Satisfaction

We next turn our attention to the antecedents and outcomes of satisfaction. Firstly in terms of antecedents, seminal work on the area was based on the Expectations Disconfirmation Model (EDM) developed by Oliver (1980). The model has been used extensively in both research on customer as well as citizen satisfaction (Anderson et al., 1994; Fornell et al., 1996; Morgeson, 2013; Van Ryzin, 2006; Zhang et al., 2021). EDM essentially states that satisfaction is driven by an evaluation of performance based on prior expectations. The antecedents in the model include (1) expectations, (2) performance, and (3) disconfirmation. Disconfirmation is typically operationalised either through direct measurement, or through subtractive disconfirmation, where the variable is constructed through the deduction of expectations from performance. Research suggest that direct

measurement of disconfirmation should be preferred as subtractive disconfirmation tends to result in a statistical bias that can overstate the importance of expectations (Van Ryzin, 2006; Morgeson, 2013; Zhang et al., 2021).

Apart from the EDM, an early meta-analysis by Szymanski and Henard (2001) found that apart from (1) expectations, (2) performance, and (3) disconfirmation, (4) affect, and (5) equity, were also found as significant antecedents of the construct. A more recent meta-analysis by Otto et al (2020) focusing on the relationship between satisfaction and performance, found firm-level attributes such as (6) advertising, (7) R&D, and (8) scope of market served, were also key drivers of satisfaction.

Next, on outcomes of satisfaction, apart from the relationship between customer satisfaction and (1) firm performance, research have also looked at other consequences of satisfaction such as (2) complaints, (3) word-of-mouth, (4) customer loyalty, and (5) repurchase intentions (Morgan & Rego, 2006b; Otto et al., 2020; Szymanski & Henard, 2001). Among these outcomes, a major focus of recent literature has been on the satisfaction-performance relationship. Performance in this field has been operationalised using various accounting metrics including profit, market share, and stock prices. The general finding has been that satisfaction tends to have a positive relationship with firm performance. The theories presented for this relationship include (1) contagion reasons, where satisfied customers motivate others to purchase, (2) affective reasons, where satisfied customers develop positive affinities that improve loyalty, (3) risk-reduction reasons, where satisfying experiences provide a guarantee of future experiences which in turn drive up repurchases, (4) market-force reasons, where satisfaction forms a barrier to entry for new entrants, and (5) market-signalling reasons, whereby satisfaction forms a signal to the firm's customer-centric culture (Otto et al., 2020; Fornell et al., 2006; Tuli & Bharadwaj, 2009; Morgan & Rego, 2006b; Morgan et al., 2005; Anderson et al., 1994; Fornell et al., 2016).

The ACSI Model

As can be seen from our above review, work on customer satisfaction has been rich and extensive. As a metric, the construct has been measured in many different way including through different Likert scales as well as the use of top-box as a key measurement (Morgan & Rego, 2006b). Within the academic literature, the most mature model that has been used to conceptualise and measure the construct has been the ACSI model (Hult et al., 2019; Morgeson et al., 2015; Otto et al., 2020). We briefly outline its key elements in this section.

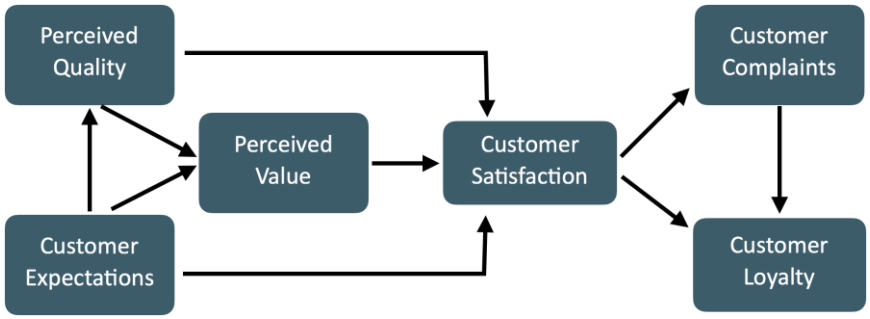


Figure 1: ACSI Model (Fornell et al, 1996)

Figure 1 presents the model as first conceptualised by Fornell et al (1996). The antecedents of customer satisfaction consist of (1) customer expectations, (2) perceived quality and (3) perceived value. The first two antecedents were drawn from EDM. According to the authors, customer expectation measures the performance customers expect based on both previous consumption experiences and other non-experiential based information sources such as word-of-mouth and advertising. Perceived quality is akin to the performance measurement from EDM and measures the quality of the product and service experienced by customers. The third antecedent, perceived value, introduces the element of price which the EDM model excludes. While pricing generally has an impact on customer satisfaction (Jiang & Rosenbloom, 2005), rather than focus on price alone, the Fornell et al (1996) used perceived value to include price information into the model, as it allowed for a more general cross-industry measurement. Defined as the level of quality relative to the price paid, this

conceptualisation is similar to the concept of equity and fairness which has been found to have a positive relationship with customer satisfaction (Oliver, 1996; Szymanski & Henard, 2001).

In terms of the outcomes of satisfaction, Fornell et al (1996) drew upon previous research on customer loyalty and exit-voice theory, and postulated that customer satisfaction would have a negative relationship with customer complaints, and a positive relationship with customer loyalty (Fornell & Wernerfelt, 1988; Hirschman, 1970).

Szymanski and Henard's (2001) meta-analysis further validates the relationships postulated by the model. According to the authors, the mean correlation with satisfaction for the three antecedents, namely expectations, perceived quality (conceptualised broadly as performance), and perceived value (conceptualised as equity), were all positive at 0.27, 0.34, and 0.50 respectively. With regards to the consequences of satisfaction, the satisfaction-loyalty correlation (conceptualised as repeat purchases) was 0.53, while that of complaints was -0.34. While subsequent research studied various moderators of the relationships postulated by the model, including country, category type (products and services) type, and customer type (online and offline customers); the theoretical relationships postulated by the model have generally been validated by later studies (Anderson, 1994; Hult et al., 2019; Morgeson et al., 2015, 2020).

Given the established nature of these relationships, this paper would focus on how ageing cohorts may have affected the established antecedents of customer satisfaction. By doing so, we aim to contribute to existing research through a more nuanced understanding of the relationship between ageing and customer satisfaction. In the next section, we review some of the literature on ageing and its impact on customers.

Ageing And Its Impact On Customers

A significant amount of research has been done on the effects of ageing in the medical literature. Meta-analysis on ageing covers a broad range of topics that include not just the physiological effects of ageing, but even its impact on caregivers (Daskalopoulou et al., 2017; Peng & Chan, 2019; Sörensen et al., 2002). Concerns about the social and economic problems of an ageing society have also been highlighted by studies by the United Nations (2020). Focusing on the effects of ageing on customers, the research can be delineated in terms of (1) the response of marketers, or more specifically the lack of it, to ageing customers, and (2) the effects of ageing on customers themselves. In this review, we would point out that despite the rich literature, research on the impact of ageing on evaluative outcomes of customer experience such as customer satisfaction appear to be limited.

The Neglect of Senior Customers By Marketers

The senior segment is set to account for an increasingly larger share of the consumer market. According to a study by the United Nations (2020), customers aged 65 years and older is set to double from 703 million in 2019, to 1.5 billion by 2050, with the top 2 countries with the largest expected percentage increase coming from South Korea at 23%, and Singapore at 20.9%. However, despite its growing significance, research on marketers' response to older customers show that the segment tends to be predominantly ignored. This can be seen firstly at the product development phase where the requirements of older customers tend to be overlooked. Thompson and Thompson (2009) points out that marketing tends to be youth-centric with the needs of older customers typically ignored at the product design stage. Major companies themselves typically do not have programmes that target and attract older customers even when they are acknowledged to be potentially attractive as a segment (Ahmad, 2002).

Secondly, moving downstream, even marketing communications tends not to be in favour of older customers. Research by Hsu (2019) points out that marketing images tend to be ageist and youth-centric. It is thus little wonder that a research on German customers show that older customers themselves believe that the economy does not necessarily cater to their needs (Leyhausen & Vossen, 2011). Therefore, we note that marketing activities appear to have traditionally neglected and ignored older customers despite their growing importance.

According to Thompson and Thompson (2009), the reasons for this seemingly ageist response to the segment can be traced to the (1) the origins of modern marketing, and (2) the profile of the marketing profession itself. In terms of the former, the authors point out that marketing as a profession was historically developed to serve the needs of the post-war needs of the youth. At that time, youth formed a significant customer segment due to their growing affluence and market size after the war. Hence, the focus on youth was a rational response to how markets were in that era. Companies would routinely focus on "fun, sex, novelty and conformity with peers", which in turn would appeal to the youth (Thompson & Thompson, 2009, p. 1281). Thus, despite the gradual shift in demographics in the post-baby boomer era, the focus of modern marketing appears to have not caught up with the times. Instead, modern marketing appears to be taking a path dependent approach in its development, with youth centricity remaining at its core.

Apart from the historical underpins of the profession, the characteristic of marketers themselves also appear to contribute to the neglect of this segment. There tends to be an age gap between marketers themselves and older customers. This has resulted in a limited ability and willingness to understand their needs. Additionally, given the relative ease of acquiring younger customers through promotional activities, marketers pressured to produce short-term results, are typically incentivised to focus their attention on youth rather than older customers (Thompson & Thompson, 2009). This is further compounded by a perception that older

customers tend to have poorer spending power. This in turn fosters a stereotype of the senior segment as unattractive and potentially not as profitable (Hare, 2003).

Consequently, there appears to be a strategic neglect of ageing customers. The impact of which are likely to result in ageing customers experiencing products and services that tend not to be fully catered to their personal requirements. While there are likely to be exceptions to this, given that certain industries, such as healthcare where customer tend to be older, our review of the literature suggests a general lack of attention to seniors. This is likely to be exacerbated by the fact that as customers age, apart from health and motor-functional issues, they tend to experience more changes to their cognition, affect, and behaviour. This in turn presents additional challenges for marketers to understand their needs, and in turn design products and services that can satisfy them. To better understand the challenges marketers face when catering to seniors, in the next section we focus our attention on studies that look at the impact of ageing on customer behaviour.

Impact of Ageing on Consumers

Most research on ageing customers can be broadly categorised in terms of (1) consumer responses and (2) decision making processes (Yoon et al., 2009a, 2010; Zniva & Weitzl, 2016). Research focusing on satisfaction tends to be surprisingly limited, fraught with methodological issues, and lacking a robust framework to explain the effects. While the most robust study from the US suggests a potentially positive relationship, other studies seem to suggest a negative relationship. We explore each of these issues in turn.

Meta-analysis on Ageing & Consumer Response

Firstly, in terms the effects of ageing on consumer behaviour, Zniva and Weitzl (2016) helpfully conducted an extensive meta-analysis on the area, and provided a broad

framework on the literature. In their review of 128 papers, the authors showed that studies on the effects of ageing looked at how ageing affects customers' (1) affective and individual responses, (2) cognitive responses, and (3) behavioural responses. Table 1 summarises some of the key effects of ageing on consumers.

Table 1: Study 1 Meta-Analysis on the Effects of Ageing on Consumers

Summary of Meta-Analysis on the Effects of Ageing on Consumer Behaviour Adapted from Zniva & Weitzl (2016)		
Affective & Individual Responses	**Cognitive Responses**	**Behavioural Responses**
• Ads with emotional and affective appeals are preferred. • Ads with negative emotional message less effective. • Trust in brand more affected by partner quality (i.e., feeling wanted, listened, and cared for) for older elderly than a connection to their self-concept. • Increasing enjoyment for food shopping. • Motivated by recreation and personal relationship with grocery retailer. • Prefer closer locations, senior discounts for food shopping and financial services. • More positive attitude towards older retail sales personnel. • More risk adverse towards financial services. • More positive attitude towards appeals that avoid negative emotions when under time pressure. • More positive attitude to appeals that achieves positive emotions when faced with expansive time horizons.	• Information source use inconsistent across studies. • Use newspapers for information but less active in search. • Interact less with media ads. • Pay more attention to online ads. • Received less information from word-of-mouth. • Staff knowledge and store reputation important for apparel shopping and financial services. • Durability, quality, after sales service, environmental friendliness less important for older elderly when shopping. • Multi-purchase promotion, convenience, nutritional awareness, less important for food shopping. • Good service, location, convenience important for pharmacies. • Physicians more important for nursing homes. • Decision on fashion based on pleasures, need, fit and comfort. • Perceive senior discounts as stigmatization and self-devaluating. • View product harm crisis as less severe. • Information processing decline. Lower working memory capacity, less accurate selection decisions, lower optimal processing in evening when relying on schema processing. • Better recall of emotional ads especially when communicated with expansive time horizons.	• Higher intention and willingness to recommend product involved in product harm crisis. • Positively framed healthy lifestyle message leads to higher intentions to adopt the lifestyle. • Higher intention to purchase online later in the day. • Department and specialty stores preferred. • Purchase from less retailers. • Prefer supermarkets and hypermarkets due to one-stop shopping trip. • Shopping habits localised and limited. • Increase in senior discount usage. • Prefer shopping earlier in the day. • Prefer long established brands and consider fewer brands. • Prefer electronic fund transfer. • Use less long-distance calls. • Buy less beer and bottled tea. • Spend less on recreation, entertainment, and cultural services. • Spend more on medical and health. • Exercise less.

According to Zniva and Weitzl (2016), research on affective and individual responses have encompassed customers' emotions, motives and motivation, attitude, and values. Research on cognitive responses on the other hand have looked at how ageing customers handle information, and this includes their information source, and how information is perceived and processed. Lastly in terms of behavioural responses, the authors highlight that this refers to how ageing affects customer actions. Research in this area includes customer intentions, usage, satisfaction, and loyalty.

Research Overly Western Centric

From the above, research into the effects of ageing on consumer behaviour appears to be a rich stream of research with multiple studies done across the years. However, a closer look at the review reveals at least two key limitations in terms of research scope. Firstly, most of the research appears to be Western centric, with close to 70% of the articles reviewed based on data from US and UK. Asian studies were limited to only 8 papers, or about 6% of the articles. While the extent to which biological or cultural differences impact the effect of ageing on consumers remains an empirical question, the fact that the top countries projected to have the largest increase in elderly customers by 2050 has been understudied presents an odd gap in the field. Apart from context limitations, studies on the impact of ageing on customer satisfaction appears to be rather limited. Zniva and Weitzl (2016) found only 5 papers which touched on the topic of satisfaction, with an assessment of these papers revealing various limitations in their scope and methodology. We further explore these issues in a later section.

Antecedents of Satisfactory Decision-Making Among Seniors

Next, we consider specifically the topic of ageing and its effects on consumer decision-making processes given its potential impact on customer satisfaction. A substantial amount of research has been done focusing on this area (Carpenter & Yoon, 2015; Strough et al., 2015; Yoon et al., 2009a). Apart from framing the literature through the broad lens of consumer response, in their work Yoon et al (2009a) proposed a framework to explain what would drive satisfactory decision-making outcomes for ageing customers. The authors argue that satisfactory decision-making outcomes are a function of the of degree of fit between (1) individual characteristics of ageing customer, and (2) the task and contextual environment by which customers interact with the company. Individual characteristics refer to the (1) age, (2) cohort, (3) health, (4) goals and motivation, as well as the (5) memory and knowledge of customers. Task and contextual environment on the other hand, refers to factors such as (1) familiarity, (2) meaningfulness, (3) time pressure, (4) time of day, and (5) stereotypes. Accordingly, a high degree of fit between individual characteristics and the task or contextual environment from which older customers make a consumer-based decision, would result in outcomes which would be satisfactory to the customer. A low degree of fit however would likely lead to unsatisfactory customer outcomes, unless mitigated by (1) consumer adaptation, (2) marketing accommodation, or (3) public policy interventions.

While the framework provides a useful means to understand what might drive satisfactory consumer decisions among ageing customers, several limitations were highlighted in the paper. We point out two areas which are of interest for our research. Firstly, with regards to the issue of "fit", Yoon et al (2009a) suggest a need for more research to determine and measure the quality and effectiveness of decision making, as well as the extent of satisfaction with the outcome. Customer satisfaction as a construct is typically conceptualised and operationalised on a spectrum (Fornell et al., 1996; Szymanski & Henard,

2001). Within the framework, the degree of optimal decision-making and its effect on the level of satisfaction as an outcome of the decision, remains a theoretical and empirical question that requires further conceptualisation. Secondly, while the authors point to task and context as areas that impact decision making for ageing customers, from a practical managerial perspective, how this relationship might differ across industries is not immediately clear.

Methodological Considerations in Ageing Research

Next, we consider some of the methodological issues that arise from the study of ageing consumers. There are broadly two methodologically issues in the study of ageing, namely (1) the definition of ageing, and (2) the tendency to use cross-sectional surveys as opposed to cohort-based studies.

Firstly, there appears to be no clear consensus on the age a person is considered a mature customer. How old a person needs to be, to be considered "old", tends to vary across studies. In their review of the literature, Zniva and Weitzl (2016) found the two most commonly used definition were customers aged (1) 55 years old and older, and (2) 65 years and older, with 32% and 24% of the papers using these cut-offs respectively. The main reasons for their use appear to stem from (1) prior relevant studies, (2) cut-offs used in census data, and (3) retirement age.

This lack of consensus on the chronological age needed to categorise a person as "old", is further complicated by additional research which suggest that functional and cognitive age should also be considered (Yoon et al., 2009a). In their review, Zniva and Weitzl (2016) further outlined additional factors which can contribute to the ageing process apart from chronological age. This includes (1) biological ageing, which refer to changes in functional capacity, (2) psychological ageing, which refers to changes in cognition and

personality, and (3) social ageing, which refers to changes in roles. While these alternative operationalisation of ageing are not as commonly used in ageing research, they do contribute to are significant proportion of the research (Zniva & Weitzl, 2016).

Additionally, apart from defining who should be considered an "old" customer, research on ageing have also found significant variations in behaviour within customers classified as "old". Various authors have also pointed to differences within the elderly segment, which could stem from variances in health, mobility, cognition, and even cohort experiences (Jahn et al., 2012; Yoon et al., 2009a, 2010). Despite these differences, Moschis (2003) notes that marketers seem to treat mature customers above 55 years old as a homogenous group. Therefore, from the above, the definition of ageing seems to require a more nuanced operationalisation as opposed to a simple singular aged-based cut-off.

Secondly, we consider methodological issues arising in the study of ageing. While a variety of methods have been used including (1) surveys, (2) experiments, (3) interviews, and (4) focus-groups, surveys tend to be the most commonly used research method (Zniva & Weitzl, 2016). Their extensive use however presents potential issues. Firstly, as noted by Yoon et al (2009a), these are typically cross-sectional studies. This tends to limit the ability of researchers to untangle the effects of cohort, ageing, and time. Secondly, the process of ageing itself could also have an impact on how older respondents respond to surveys. Declining cognition can affect memory search, and result in older respondents providing satisfactory instead of optimal answers in surveys (Knäuper et al., 2016). Lastly, in discussing the reasons for higher satisfaction scores among older customers in their data, Yoon et al (2010) point to potential scale usage issues among older respondents. These include the older respondents being (1) more susceptible to social desirability and self-presentation effects when participating in interviewer administered surveys, (2) answering rating scales in a less-granular way than younger respondents, and (3) a positive self-selection

bias since happy people tend to outlive less happy people. Nevertheless, it should be noted that after reviewing their data, Yoon et al (2010) did not think that these issue might have a large impact on their older-more-satisfied observation as similar phenomena have been observed in other studies using different methodologies.

From the above, we therefore note that while there have been many studies into the impact of ageing on consumer behaviour. For a more robust analysis, future research into the area would need to consider (1) various age-based cut-off, (2) sub-segments within the elderly, (3) cohort-based studies, and (4) a potential positive bias in scale usage.

Studies on Ageing and Customer Satisfaction

In this section we review the limited research and the relationship between ageing and customer satisfaction. Despite the importance of metrics like customer satisfaction in predicting future business performance (Morgan & Rego, 2006a) and the growing importance of the senior consumers, previous meta-analysis on the topic of satisfaction and ageing show the research to be surprisingly limited (Zniva & Weitzl, 2016). We organise the discussion by firstly conducting a detailed review of work done by Yoon et al (2010), who based their research on the most extensive data from the ACSI. This would then be followed by a review of other less robust studies. From our review, we would argue that work on this area tends to be limited by (1) methodological issues, (2) Western centric, and (3) lacking a more robust framework to explain the observed relationships.

Older More Satisfied Finding from the ACSI Data

The most extensive study done on the area was by Yoon et al (2010). Using a 15 years of cross-sectional survey data from the American Customer Satisfaction Index (ACSI), the authors found a generally positive relationship between ageing customers and customer

satisfaction. Methodologically, the authors used a multiple regression analysis with customer satisfaction as the dependent variable, age as the independent variable, and (1) education, (2) income, and (3) gender, as control variables. The authors conducted the analysis for every year of data for each industry. In drawing their conclusions, the authors noted that among most of the industries, a significant relationship (p-value < .100) between ageing and customer satisfaction was found for two thirds of the years measured. Examples of these industries include airlines, banks, apparel, department stores, e-business, electronic retail services, healthcare insurance, life insurance, hotels, limited-service restaurants, supermarkets, and telecommunications.

Postulated Reasons: Cohort & Ageing Based Explanations

The reasons postulated by Yoon et al (2010) can be broadly characterised as a (1) cohort-based explanation, and (2) an ageing based explanation. In the cohort-based explanation, the authors point to external historical events that may have an impact on cohorts of customers over the course of their life. In this explanation, long term improvements in quality and variety as compared to what the cohorts have been exposed to when growing up, may have resulted in higher satisfaction levels as current products and services are now more effective in meeting their needs.

On the other hand, in the ageing-based explanation, the authors point to a few potential explanations relating to how ageing changes how seniors choose and evaluate products and services. Firstly, Yoon et al (2010) point to how greater self-knowledge from experience, and higher cost of information search due to declining cognition, may have resulted in older customers being more likely to make choices that they already know would satisfy them. Secondly, the authors suggest that older customers also tend to have smaller consideration sets, and limited knowledge of current offerings. This in turn potentially results

in higher satisfaction levels as their reference product and service may be dated, and of lower quality as compared to more recent superior offerings which younger customers are more likely to be aware of. Lastly, the authors draw upon socioemotional selectivity theory, and suggest that as customer age, and their time horizons shrink, seniors tend to focus more on emotionally meaningful activities which may in turn result in higher satisfaction. Indeed ageing research have shown seniors tend to exhibit more emotionally gratifying memory distortion for their past choices, and better emotion regulation as compared to youths (Mather & Carstensen, 2005).

Methodological Problems

The authors were unable to conclusively point to an ageing or cohort-based explanation for the older-more-satisfied observation. Attempts to test this hypothesis by studying the average satisfaction scores of customers born between 1938 and 1944, showed the cohort rated satisfaction higher in 2008 as compared to 1994. At the same time, customers younger than this cohort gave lower satisfaction scores in 2008. Customers older than this cohort also gave higher scores in 1994. Given that the satisfaction scores of the older group always appears to be higher, the authors suggest that there was more likely an ageing rather than a cohort effect at play.

However, a review of the paper reveals a lack of methodological rigour in the analysis. A simple comparison of the mean satisfaction scores was utilised with a lack of controls for potential confounders such as income, gender, and industry. It should also be pointed out the cohort's higher satisfaction scores at the 2008 mark could very well be due to further advancements to products and services between 1994 and 2008. Moreover, it could be argued that the higher satisfaction scores for this cohort when compared to a younger cohort in 2008, may be attributable to a greater sensitivity to current improvements due to exposure

to lower reference quality. Hence, a possible cohort effect explanation remains. The authors concede that the finding remains inconclusive due to limitations in the dataset. Nevertheless, the study does suggest that using a cohort-based analysis is necessary and useful when conducting further research. The study also suggests a potentially strong positive relationship between age and satisfaction.

Other Limited Studies on Ageing and Customer Satisfaction

Apart from Yoon et al (2010), other studies on the relationship between the two variables were less rigorous. Firstly, we consider a UK study on restaurant services by Lee et al (2012). The authors found seniors aged 55 years and above to be less satisfied than younger customers. Older customers also rated service quality dimensions such as reliability, responsiveness, assurance, and empathy higher than younger customers, but cleanliness, food, price, and atmosphere lower. Despite the scope, the study had a limited sample size of only 140 participants. The findings also lacked methodological rigor as the typical demographical variables such as income and gender were not controlled for. Instead, the authors used only a bivariate T-test to determine their findings.

Secondly, we look at Hare's (2003) study of Scottish seniors aged 60 years and above. While seniors were specifically surveyed in the study, Hare (2003) oddly did not include younger customers in their survey to serve as a contrast. Statistical analysis to control for any potential confounders were also not used. Instead, the conclusion that aged customers were "generally satisfied" was drawn based simply on the proportion of respondents who rated 4 and 5 on a 5-point Likert scale.

Thirdly, we consider Simcock et al (2006). The study looked at the impact of perceived risk and satisfaction when purchasing a car. However, despite the inclusion of seniors, the study had insufficient samples for a more detailed analysis of the segment.

Lastly, we review a US study on baby boomers (Reisenwitz & Iyer, 2007). The study surveyed a convenience sample of 295 respondents, aged 40 to 58 years old, to determine if there were differences between older baby boomers born during the Vietnam War era from 1946 to 1965, and those born later from 1956 to 1965. The study was however limited, focusing only on satisfaction and loyalty with the internet. Notably the authors did not find any significant differences between the two groups.

Thus, from the above, we note that the literature on ageing and satisfaction tends to be limited in scope and lacking in statistical rigour. While there is some evidence of an older-more-satisfied phenomena from the ACSI data, the study was limited by various methodological issues.

Wrapping up: Research on Ageing & Customer Satisfaction Extremely Limited

In the final analysis, our review of the ageing literature has revealed firstly a surprising lack of attention by marketers to address the needs of older customers despite the growing importance of the segment. Secondly, ageing has a broad-based impact on consumer behaviour, including their cognition, affect, behaviour response, and decision making. Thirdly, despite an extensive number of papers published, research into the effects of ageing on customer satisfaction has been surprisingly limited in scope and lacking in statistical rigour. Given the predominant use of cross-sectional surveys, the ability to tease out cohort and ageing based effects appear to be limited. Fourthly, geographically, studies in the area tend to be based on Western datasets, and it is not immediately clear if Asian customers are potentially more or less satisfied as their age. This point is particular pertinent if a cohort-based effect is used to explain a potential older-more-satisfied phenomena in the Asian context. Indeed, the pace of development in non-Western countries differs from West countries. Southeast Asian countries as an example, have developed economically at a much

faster pace than Western countries in recent years. This may potentially result in greater differences in ageing customers' reference quality, variety, and even prices as compared to the Western experience.

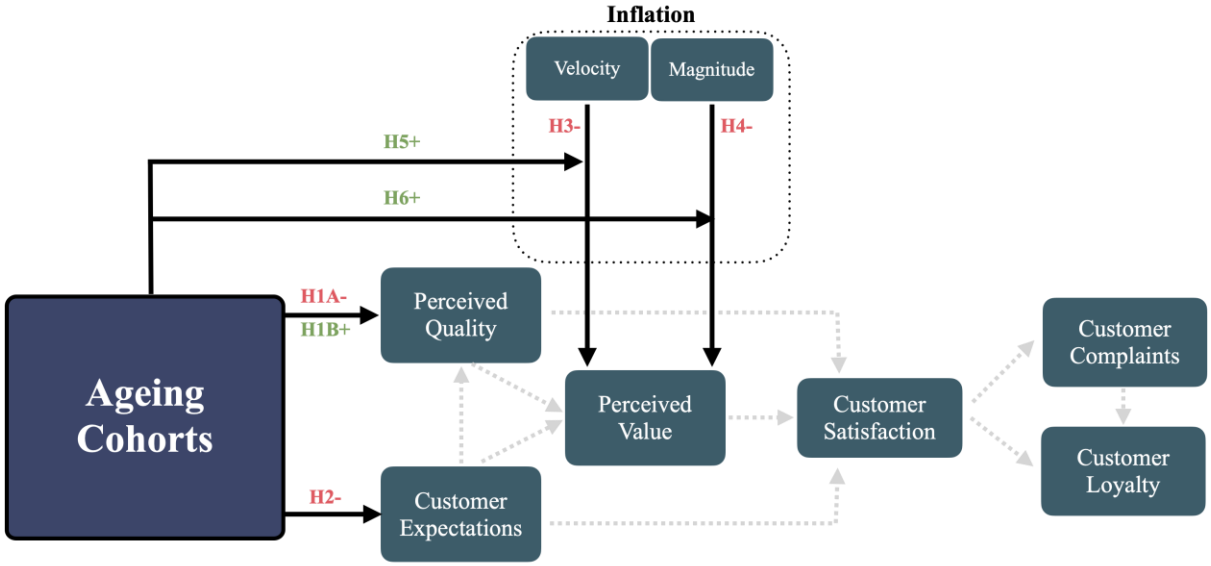
CHAPTER 1.3: RESEARCH HYPOTHESES

Are older customers generally more satisfied and why? Our review of the above literature reveals significant gaps in the study of ageing and customer satisfaction. While Yoon et al (2010) may have postulated several ideas on their observation of an older-more-satisfied finding, a proper framework to explain these theories remains lacking. Moreover, other limited studies seem to present conflicting findings, lacked a theoretical basis for the different observations. While Yoon et al (2009a) presented a framework that includes satisfactory decision making outcomes, a link between satisfactory outcomes and satisfaction was not established. Therefore, a framework to ground our understanding of the relationship between the two variables remain lacking.

To address this gap, we propose to develop our theory based on the established antecedents of customer satisfaction from the ACSI model (Fornell et al., 1996). As discussed above, the model is based on a "rich theoretical foundation and voluminous subsequent empirical validation" (Hult et al., 2019, p. 12). While the model has been used in numerous studies, to our knowledge, none have been used to study the effect of ageing on customer satisfaction. Therefore, by extending the established model based on ageing related theories, we aim to provide a more robust foundation to explain the relationship, and contribute to existing theories on customer satisfaction.

Theoretical Model

The model in Figure 2 presents our proposed framework. As our research interest is in explaining the relationship between ageing and customer satisfaction, this study would focus on the effects of ageing on the three primary antecedents, namely perceived quality, customer expectations and perceived value.



Note: Solid arrows represent relationships focused on in this study

Figure 2: Theoretical Model for Study 1

Ageing Cohorts → Perceived Quality

Strategic Neglect of Seniors By Marketers

Perceived quality focuses on the performance of a product and service. The literature on quality typically conceptualise this in terms of (1) how well the products and service meets customers' needs, and (2) their reliability (Fornell et al., 1996; Parasuraman et al., 1988). Therefore, the evaluation of products and services are tied to how well the needs of seniors are reliably met. Our review of the literature suggests, potentially two competing effects. Firstly, there appears to be an overall strategic neglect of older customers stemming from (1) perceived lower profitability of serving seniors, (2) the perceived ease of acquiring younger customers, (3) the inability of younger marketers to relate to the needs of seniors, and (4) the historical post-war youth-centric development of marketing practice (Moschis, 2003; Thompson & Thompson, 2009). Hence, as products and services tend to be developed more for younger customer segments, when compared to younger cohorts, ageing cohorts are likely to evaluate perceived quality poorer.

General Improvement in Quality Over the Years

Secondly, despite the poorer ability of marketers to meet customers' needs, the overall quality of products and services has generally improved over the years as technology improves. Service wise, the introduction of various self-service technologies has greatly improved areas such as accessibility and efficiency. Banks for example have introduced many more channels including websites, mobile applications, and phone banking, since the introduction of automated teller machines in 1969 (NCR, 2021). The product quality has also improved over the years as technology advances. The development of smart phones in the late 2000s is a far cry from analogue based wired phones of old. Even motor vehicles now include onboard global position systems. Yoon et al (2010) argued that as technology and the economy develops, things are generally better now as compared to what older cohorts had experienced before. This in turn may explain the older-more-satisfied phenomena in the US centric ACSI dataset.

Consequently, the hypothesized poorer ability of marketers to meet the needs of older cohorts, may be outweighed by general advances in products and services. As such, older cohorts may feel that contemporary products and services are better able to meet their needs now as compared to later cohorts simply because of the relatively inferior experiences they had previously.

Given these competing effects, we hypothesize both a positive and negative relationship between ageing cohorts and perceived quality. Formally:

H1A: Perceived quality is lower for ageing cohorts as compared to younger cohorts.

H1B: Perceived quality is higher for ageing cohorts as compared to younger cohorts.

Ageing Cohort → Customer Expectations

Next, we consider the effects of ageing cohorts on customer expectations. As highlighted above, the construct refers to the predicted quality of the products and services customers expect to receive and can be shaped by past consumption experiences.

Anchors Based on Historically Inferior Quality

Drawing again on Yoon et al (2009a, 2010), unlike younger cohorts with more contemporary experiences, the past consumption experiences of older cohorts includes a time when products and services were less developed and mature. The phenomena of a slow and insufficient adjustment from previous anchors has been well established in the judgement and decision-marking literature (Tversky & Kahneman, 1974). As such, we argue that the long series of experiences with relatively inferior products and services of the past, are likely to result in a lower predicted quality for senior cohorts as compared to younger cohorts. Older customers should have longer exposure to relatively inferior products and services, and due to the anchoring effect, the accumulated poorer experiences would in turn weigh more heavily in their prediction of future experiences. In line with this argument, even when faced with more recent exposures to higher quality, seniors are likely to adjust insufficiently to update their expectations. In contrast, younger cohorts who have fewer exposures to such historically lower product and service quality, are likely to anchor their expectations on more recent advancements in quality.

Youth-Centric Marketing

Apart from historical anchors, customer expectations can also be affected by the marketing communication efforts of marketers (Fornell et al., 1996). Our review showed that marketer tend to be youth centric and even sometimes ageist (Ahmad, 2002; Hsu, 2019;

Thompson & Thompson, 2009). As such, the effect of marketing activities on customer expectations will likely resonate more with younger customers as opposed to seniors. In fact, given the potentially ageist slant, seniors may feel that recent products and services are not catered for their needs, and therefore predict a poorer experience with them as compared to younger customers.

Therefore, taken together, customer expectations for ageing cohorts are likely to be lower as compared to younger cohorts. Formally:

H2: Customer expectations is lower for ageing cohorts as compared to younger cohorts.

Ageing Cohorts → Perceived Value

Inflation, typically refers to a continuous general increase in prices (Federal Reserve Bank of Cleveland, 2014; Frisch, 1977). The media from time to time makes reference to the effects of inflation by highlighting how expensive things are now as compared to decades ago (Bloom, 2017; Lubin & De la Cruz, 2012). Anecdotally, seniors recounting the "good old days", would recall how much cheaper things used to be. Indeed, things used to be cheaper. Data from the World Bank (2021) show global inflation rates averaging about 5.4% between 1981 to 2020, and have ranged between 1.4% to 12.5%.

Given our interest in cohort-based effects, we will focus our attention on the effects of long-term general price movements on perceptions of value. Within the literature, the effects of short-term price changes on perceived value has been well-established (Boksberger & Melsen, 2011; Sánchez-Fernández & Iniesta-Bonillo, 2007). However, to our knowledge the effects of long-term price movements in the form of inflation on ageing customers has received limited attention. Drawing upon past research on reference prices and inflation, we propose that inflation velocity and magnitude would have a negative effect on perceived

value. Moreover, as senior cohorts would have experienced a longer series of shifts in prices as they age, in conjunction with the effects of ageing on decision marking processes, the velocity and magnitude of inflation is likely to have a stronger negative effect on perceived value when compared to younger cohorts.

Current Prices Judged Based on Exposure to Previous Prices

How do prices affect perceived value? Perceived value is typically defined as the net utility derived through the ratio of benefits received and cost incurred[1] (Yang & Peterson, 2004), the construct relates to the perceived equity and fairness of prices, relative to what customers receive (Oliver, 1996; Szymanski & Henard, 2001). According to the reference price literature, memories of past prices are stored in an amalgamated form, with new prices judged based on a weighted average of prices a person has been exposed to over time (Danziger & Segev, 2006; Mazumdar et al., 2005; Monroe, 1973). Therefore, memories of past prices influence how current prices are judged, and by extension customers' perception of value. However, as the research on reference prices tends to be based on experiments and store-based panel data, the effects of longer-term general price changes over time, and how the services (as opposed to products) are affected is not immediately clear from this stream of research (Mazumdar et al., 2005).

[1] This utility based definition is in-line with most of the research on perceived value. While price and the trade-off with benefits remains key in the conceptualisation of the construct, recent research have argued that it remains insufficient (Boksberger & Melsen, 2011). Using broader utilitarian and hedonic concepts of value, researchers have developed multi-dimensional conceptualization of the construct to include dimensions like (1) emotional value, (2) social value, and (3) functional value (Boksberger & Melsen, 2011; Sánchez-Fernández & Iniesta-Bonillo, 2007; Sweeney & Soutar, 2001). However as systematic reviews of the research show a lack of consensus on these new definitions (Boksberger & Melsen, 2011; Sánchez-Fernández & Iniesta-Bonillo, 2007), we focus our research on the generally agreed conceptualization based on the price and quality trade-off.

Inflation & Perceived Value

From the above we note that perceived value tends to be affected by historical prices. To formulate our theory on how long-term general price movements affects perceived value, we turn to research on inflation and judgment and decision-making. Firstly, on inflation, the work of Tversky and Kahneman (1974) suggests that people are more likely to notice the effects of inflation based on its (1) direction, (2) size, and (3) frequency of change (Ranyard et al., 2008). In line with this, research on inflation perceptions show people are generally aware of and sensitive to changes in inflation, and their perception of the level of inflation is generally in-line with official figures (Ranyard et al., 2008). As such there should be a link between perceived value and inflation. As there are no current research on how inflation may affect perceived value, we propose the following general hypotheses first, before developing our theory on ageing cohorts. Accordingly:

H3: Inflation velocity has negative effect on perceived value.

H4: The magnitude of inflation has a negative effect on perceived value.

Anchoring & Ageing Effects on Inflation Perceptions

Focusing now on ageing cohorts, we note that various experimental research on the anchoring effects have shown the enduring effects of initial prices on customers' reference prices. For example, in their seminal work, Doob et al (1969) found initial discounting resulted in poorer sales when regular prices were introduced. Lowe and Alpert (2010) found the prices of pioneering brands had an enduring effect on customers' price perceptions. Baucells et al (2011) in their experiment on stock prices, found their subjects giving more weight to the first and last prices as compared to price information in the middle. Therefore, given their longer exposure to lower prices relative to younger cohorts, seniors are likely to be more affected by historically lower prices.

Additionally, apart from exposure to lower prices, research into ageing and decision-making suggests that seniors are likely to be more sensitive to shifts in inflation due to changes in their decision-making processes. Accordingly, while research on the effects of ageing on price perceptions has been limited, research on decision-making by seniors shows that they depend more on heuristics and crystallised intelligence stemming from long-term memory and experience as opposed to the use of more recent working memory. Seniors also tend to have smaller consideration sets, and have less fluid mental abilities to process complex and novel information (Carpenter & Yoon, 2015). Thus, while the general reference price literature tends to show current prices having a heavier weight when individuals evaluate new price information (Mazumdar et al., 2005), given that lower propensity of seniors to draw upon more recent information to their decision-making process, we hypothesize that this effect is likely to be less pronounced for seniors, with earlier prices being relative more important. Thus, seniors are likely to be more influenced by historical price movements when making judgements on perceived value as compared to younger cohorts.

Consequently, from the above, we propose that the perception of value is likely to be more sensitive to inflation for senior cohorts due to their greater exposure to lower prices and changes to their decision-making processes as they age. Specifically, based on availability heuristics (Tversky & Kahneman, 1974), the larger the magnitude and velocity of inflation, the larger the negative effect on perceived value, due to the increased salience of a shift in prices for senior cohorts. Formally:

H5: The effect of inflation velocity on perceived value would be stronger for ageing cohorts as compared to younger cohorts.

H6: The effect of inflation magnitude on perceived value would be stronger for ageing cohorts as compared to younger cohorts.

CHAPTER 1.4: METHODOLOGY

Data

To test the hypotheses, we used data extracted from the CSISG database. The CSISG is a cross-industry annual nation-wide survey of Singapore customers. Based on face-to-face interviews with Singaporean and permanents residents, the survey has been conducted since 2007. The core customer satisfaction questions used by the CSISG are based on the ACSI. Like the ACSI, companies with significant market share tend to be included on the index. As such the data mainly comprises of customers from the largest product and services companies in Singapore (Fornell et al., 1996; Morgeson et al., 2020). The use of an Asian dataset, allows us to address the issue of overly western centric research, as well as to validate the older-more-satisfied observation from the US based ACSI data from Yoon et al (2010).

Table 2: Industry Sectors for Study 1

Sector	Sample Size	Years Measured
Retail	41,741	12
Food & Beverage	26,859	12
Tourism	10,127	13
Land Transport	15,459	12
Air Transport	9,431	12
Water Transport	1,929	5
Logistics	7,868	9
Healthcare	32,647	13
Banking	19,184	13
Insurance	27,333	12
Total	192,578	13

The data for our analysis was extracted from 13 years of the CSISG data, from 2007 to 2019[2]. As our research focuses on long-term cohort effects, industry sectors which have

[2] While there was some data available post 2019, they have been excluded from our analysis due to the potential noise that might have been created by the socio-economic structural shifts from the global 2020 COVID-19 pandemic. Indeed, data from the CSISG data showed pandemic era restrictions on social interaction having a structural impact on customer satisfaction and its antecedents for several industries such as retail, food and beverage, and transport just to name a few. As such we have restricted our analysis to data prior to the pandemic.

been developed more recently such as e-commerce, transport booking mobile apps, online travel agencies, internet service providers, and mobile telecommunications have been excluded from the data. Non-citizens such as tourist and permanent residents who may not have experienced the long-term effects of inflation in Singapore have been excluded. Missing or incomplete survey responses have also been excluded. As the CSISG has undergone changes in sectorial coverage over the years, not every sector would be measured over the entire 13-year period. Table 2 above provides an overview of the final dataset and the industry sectors included for the analysis, and the number of years the sector has been measured. The final dataset comprises of 192,578 survey responses and 10 industry sectors. Apart from the CSISG database, data on inflation for H3, H4, H5 and H6, have been extracted from the Singapore Department of Statistic's Consumer Price Index database (Singapore Department of Statistics, 2021). The data provides Consumer Price Index (CPI) figures from 1961 to 2020, with 2019 as the base year.

Measures

Table 3 provides an overview of the core variables, moderators, and control variables used in the analysis. The table also shows how they are operationalised and the data source.

Customer Satisfaction & Antecedents

In line with Fornell et al (1996), the core ACSI based constructs of customer expectations, perceived value and customer satisfaction are operationalised using 3 items. For perceived overall quality, the construct comprises of either 3 or 6 items depending on the industry. The items measure the 3 areas, overall quality, ability to meet customers' requirements, and reliability. For some sectors such as the retail and food and beverage, the same 3 areas are asked specifically on product quality and service quality, resulting in 6 items

being measured instead of just 3. The ACSI variables are calculated based on the average rating of their respective items.

Table 3: Summary of Variables Used for Study 1

Variable	Operationalisation		Data Source
Customer Expectations	Overall expectation of quality (prepurchase):	How would you rate the overall quality you were expecting to experience, where 1 means "expecting very low quality" and 10 means "expecting very high quality"?	CSISG database
	Expectations on meeting personal requirements (prepurchase):	How well were you expecting them to meet your personal requirements, where 1 means "not very well" and 10 means "very well"?	CSISG database
	Expectations on reliability (prepurchase):	How often were you expecting things to go wrong where, 1 means "very often" and 10 means "not very often"?	CSISG database
Perceived Quality*	Overall quality experienced (post purchase):	How would you rate the overall product/service quality you experienced, where 1 means "very low" and 10 means "very high"?	CSISG database
	Evaluation of how well personal requirements were met (post purchase):	How well your product/service personal requirements were met, where 1 means "not very well" and 10 means "very well"?	CSISG database
	Evaluation of reliability (post purchase):	How often things have gone wrong with their product/service, where 1 means "very often" and 10 means "not very often"?	CSISG database
Perceived Value	Rating of price given the quality:	Given that 1 means "very poor" and 10 means "very good", how would you rate the prices they charge, given the quality of their products and services?	CSISG database
	Rating of the quality given the price:	Given that 1 means "very poor" and 10 means "very good", how would you rate the quality of the products and services, given the prices they charge?	CSISG database
Customer Satisfaction	Overall satisfaction:	How would you rate your overall satisfaction with (Company), where 1 is "very dissatisfied" and 10 is "very satisfied"?	CSISG database
	Expectations disconfirmation:	How would you rate the overall ability of (Company) to meet your expectations, where 1 means "falls short of your expectations" and 10 means "exceeds your expectations"?	CSISG database
	Performance relative to ideal product/service in the category:	How does (Company) compare with your ideal (Sub-sector), where 1 means "not very close to your ideal" and 10 means "very close to your ideal"?	CSISG database
Inflation Velocity	Mean inflation rate from when customer was aged 21 up to the survey year.		Singapore Department of Statistics
Inflation Magnitude	Difference in consumer price index between when customer was aged 21, and the survey year.		Singapore Department of Statistics
Cohort	Pioneer Generation Indicator for customers born before 1950		Derived for each sample year
	Merdeka Generation Indicator for customers born between 1950 to 1959		Derived for each sample year
Age	Age categories (1 = Below 45, 2 = 45 - 49, 3 = 50 - 54, 4 = 55 - 59, 5 = 60 - 64, 6 = 65 - 69, 7 = 70+)		Derived from CSISG database
Education	Education level (1 = None, 2 = PSLE & below, 3 = GCE N Level, 4 = GCE O Level, 5 = GCE A Level / Post-Secondary, 6 = ITE / Vocational Institute, 7 = Polytechnic Diploma / Professional Cert, 8 = University Degree, 9 = University Post-Graduate Degree)		CSISG database
Gender	Female (1 = Male, 2 = Female)		CSISG database
Household Income	Monthly Household Income (1 = Under SGD 2K, 2 = SGD 2K - Under SGD 3K, 3 = SGD 3K - Under SGD 4K, 4 = SGD 4K - Under SGD 6K, 5 = SGD 6K - Under SGD 8K, 6 = SGD 8K - Under SGD 10K, 7 = SGD 10K - Under SGD 15K, 8 = SGD 15K - Under SGD 20K, 9 = SGD 20K or over)		CSISG database
Marital Status	Married (1 = Married, 0 = Not Married)		CSISG database
Work Status	Working (1 = Working, 0 = Not working)		CSISG database
Sector	Sector dummies indicators		CSISG database

**Some sectors such as the Retail, Food and Beverage, and Tourism sectors measured perceived quality based on 6 items instead of the above 3. Changes in the questionnaire over time, had also resulted in some sub-sectors such as the Supermarkets, Mobile Telecommunications, and Internet Service Providers to change from using 3 items to 6 items to measure perceived quality. In these cases, the same 3 items were measured for both service quality, and product quality. Regardless of the number of items used, as we are only interested in the overall measure of perceived quality, for the purpose of our analysis, we used the average of the available items to measure the construct.*

Ageing Cohorts

Yoon et al (2009b) proposed studying the US baby boomer cohort (born between1946 and 1964) when studying the effects of ageing and consumer decision-making. The authors proposed that given differences life experiences, the cohort can be further broken down into sub-cohorts such the youngest baby boomers, younger post-war boomers, and older boomers who had experienced in the second world war. Given our Singapore centric dataset, we operationalise ageing cohorts using two key cohorts, namely the Pioneer generation, and the Merdeka generation. The two cohorts were recognised by the Singapore government in 2014 and 2018 as key cohorts with unique historical experiences and contributions to the nation's development. In recognition of their contributions, the government developed various benefits, primarily in the form of healthcare subsidies, for the cohorts (H. L. Lee, 2014, 2018). Specifically, the Pioneer generation refers to Singapore citizens born before 1950, and generally constitutes the cohort that grew up prior to Singapore's independence in 1965. The generation would have experienced the post-war events leading up to the independence of Singapore, and would have pioneered the development of various key institutions of modern post-independence Singapore (H. L. Lee, 2014). The Merdeka generation on the other hand consist of Singaporeans who were born between 1950 to 1959. This cohort would have grown up in post-independent Singapore, and would have experienced many of the changes as Singapore developed into the modern metropolis that it is today (H. L. Lee, 2018). Based on these criteria, the final dataset consists of 9,077 and 29,444 samples from the Pioneer and Merdeka generation respectively.

Inflation

Inflation, generally refers to a continuous general increase in prices, typically measured using an economic indicator such as the CPI. In economics, the index is typically

constructed using a weighted average of prices from a basket of goods and services typically purchased by consumers (Federal Reserve Bank of Cleveland, 2014; Frisch, 1977). For our analysis we use the overall CPI which includes all items measured by the Singapore Department of Statistics.

As we had developed our theory on inflation based on cohort memory, the question arises at which point would an individual start to become sensitive to inflation. To our knowledge no specific research has been done on this area. As such we would conservatively place this at the age of 21 years old, which is the age by which most countries would consider an individual to no longer be a minor. Being legally considered an adult, individuals by this age should be actively participating in the economy as consumers, or even as workers. They should therefore by this age be aware of and forming memories of the price of goods and services.

Based on this cut off, inflation magnitude is therefore calculated as the difference between the CPI for the corresponding survey year, and the CPI when the survey participant was 21 years old. For inflation velocity, this was calculated as the average inflation rate from when the survey participant was aged 21 years old and the survey year. Given that the CPI data extends only to 1961, and 21 years old was used as the age cut-off to determine sensitivity to inflation, a smaller dataset of 181,513 samples was available for analysis. Of this, 36,907 consist of survey participants from the Pioneer and Merdeka generation cohorts[3].

Control Variables

We include a range of demographic variables as control variables due the effects they may have on the dependent variables as well as their potential effects on ageing cohorts.

[3] While the price index was available in 1961, inflation rate was not available in 1961 since no price index was available for the prior year (i.e., 1960). Given the missing data, for this earliest cohort who were in born in 1940, inflation velocity was calculated from 1962 when they were aged 22 years old.

Firstly, with regards to income, we note that social-economic status tends to have a general impact on consumption choice. The variable has also been found to have an impact on reference price formation and inflation expectations (Mazumdar et al., 2005; Ranyard et al., 2008). Therefore in line with Yoon et al (2010), we include monthly household income as a control variable.

Secondly, to control for the effects of ageing, we included a variable for chronological age. In line with Yoon et al (2010), the variable is set at 5 year intervals starting from below 45 years old, to more than 70 years old. The variable would allow for the control of difference in the effects of ageing within the cohorts.

Thirdly, with regards to gender and education, these were found to have an impact on how services are evaluated by seniors, as well as the onset of cognitive impairment among seniors (Jedrziewski et al., 2014; T. J. Lee et al., 2012; Yoon et al., 2010). Thus, these were included in line with prior research on ageing.

Fourth, we include working status and marital status to control for the effects of lifestyle and social activities on cognitive decline. Various research on ageing have found engagement in mentally stimulating activities and social relationships to have a positive effect on areas such as working memory, processing, reasoning and attention (Deary et al., 2009; Kelly et al., 2017; Soubelet, 2013). These effects can generally be found within the context of work and familial relations. Given their effects on the decision-making processes of seniors and consequently customer satisfaction and its antecedents, we include both variables to control for their effects.

Lastly, in line with Yoon et al (2010) who used a similar large scale cross-industry dataset, sectorial dummies were included. This allows for the controlling of industry level variances arising from differences in sectorial evaluations and sampling.

Descriptive Statistics

In this section we outline some of the descriptive statistics of the dataset. Table 4 provides the demographic profile of the dataset. The Pioneer generation consists of 4.7% of the sample, while the Merdeka generation consists of 15.3% of the sample.

Table 4: Demographics for Study 1

Demographic Variable	Counts	Percentage (%)
Cohort		
Pioneer Generation	9,077	4.7%
Merdeka Generation	29,444	15.3%
Other Cohorts	154,057	80.0%
Age (Years)		
Below 45	115,038	59.7%
45 - 49	22,664	11.8%
50 - 54	23,239	12.1%
55 - 59	15,676	8.1%
60 - 64	9,285	4.8%
65 - 69	4,114	2.1%
70+	2,562	1.3%
Education		
None	2,664	1.4%
PSLE & below	15,391	8.0%
GCE N Level	9,427	4.9%
GCE O Level	33,910	17.6%
GCE A Level / Post-Secondary	12,014	6.2%
ITE / Vocational Institute	13,214	6.9%
Polytechnic Diploma / Professional Cert	45,922	23.9%
University Degree	50,550	26.3%
University Post-Graduate Degree	9,486	4.9%
Gender		
Male	97,456	50.6%
Female	95,122	49.4%
Monthly Household Income (SGD)		
Under SGD 2K	9,352	4.9%
SGD 2K - Under SGD 3K	15,701	8.2%
SGD 3K - Under SGD 4K	26,540	13.8%
SGD 4K - Under SGD 6K	39,063	20.3%
SGD 6K - Under SGD 8K	29,412	15.3%
SGD 8K - Under SGD 10K	19,980	10.4%
SGD 10K - Under SGD 15K	20,289	10.5%
SGD 15K - Under SGD 20K	18,494	9.6%
SGD 20K or over	13,747	7.1%
Married		
No	51,075	26.5%
Yes	141,503	73.5%
Working		
No	48537	25.2%
Yes	144,041	74.8%

Demographic Variable	Counts	Percentage (%)
Sector		
Retail	41,741	21.7%
Food & Beverage	26,859	14.0%
Tourism	10,127	5.3%
Land Transport	15,459	8.0%
Air Transport	9,431	4.9%
Water Transport	1,929	1.0%
Logistics	7,868	4.1%
Healthcare	32647	16.95%
Banking	19184	9.96%
Insurance	27333	14.19%

With regards to the reliability of the ACSI constructs, Table 5 below provides the Cronbach alpha statistics. In line with what is to be expected of an established model, the Cronbach alpha statistics were all above the usual acceptable cut-off of 0.700 (Cortina, 1993).

Table 5 Reliability Statistics for ACSI Constructs in Study 1

Construct	N	Items	Cronbach's Alpha
Customer Expectations	192,578	3	0.800
Perceived Quality (3 items)	111,822	3	0.825
Perceived Quality (6 items)	80,756	6	0.876
Perceived Value	192,578	2	0.745
Customer Satisfaction	192,578	3	0.820

Table 6 further provides the mean and standard deviation of the data used in Study 1, as well as the Pearson correlation statistic between the variables.

Table 6: Descriptive Statistics and Correlations for Study 1

	Variable	1	2	3	4	5	6	7	8	9	10	11	12
1	Customer Expectations	1											
2	Perceived Quality	.628**	1										
3	Perceived Value	.562**	.766**	1									
4	Customer Satisfaction	.590**	.804**	.748**	1								
5	Inflation Velocity	-.021**	-.031**	-.046**	-.021**	1							
6	Inflation Magnitude	.006*	-0.001	-.008**	.009**	.287**	1						
7	Pioneer Generation	-.030**	-.021**	-.020**	-.011**	.280**	.436**	1					
8	Merdeka Generation	-.009**	-.011**	-.013**	-.016**	.264**	.560**	-.094**	1				
9	Age	-.010**	-.006*	-.006**	0.002	.316**	.887**	.583**	.561**	1			
10	Education	.093**	.086**	.087**	.089**	-.154**	-.381**	-.253**	-.252**	-.402**	1		
11	Gender	0.004	-0.001	-0.001	0.001	-.005*	.005*	-.021**	-0.002	-.014**	-.098**	1	
12	Household Income	.097**	.101**	.102**	.104**	-.099**	-.050**	-.117**	-.053**	-.084**	.577**	-.014**	1
13	Married	.028**	.022**	.024**	.015**	-.104**	.493**	.083**	.208**	.308**	-.060**	.064**	.070**
14	Working	.043**	.032**	.034**	.022**	-.165**	-.160**	-.223**	-.062**	-.207**	.349**	-.213**	.202**
15	Sector=Retail	-.025**	0.001	.017**	-0.002	-.005*	-.008**	.007**	.007**	-0.003	0.000	-.012**	.006**
16	Sector=Food & Beverage	0.002	-.022**	-.037**	-.039**	.015**	-.034**	-.013**	-.013**	-.026**	-.006**	-0.002	-.059**
17	Sector=Tourism	.027**	.018**	0.002	0.003	-.011**	-.036**	-.008**	-.010**	-.028**	.012**	.005*	-0.003
18	Sector=Land Transport	-.081**	-.105**	-.104**	-.107**	-.012**	-.021**	.017**	-.018**	-0.003	-.099**	.026**	-.105**
19	Sector=Air Transport	.009**	.009**	.011**	.018**	-.019**	-.021**	-.014**	-.009**	-.018**	.031**	-.005*	.018**
20	Sector=Water Transport	-.023**	-.025**	-.025**	-.024**	.011**	-.025**	.007**	.009**	-.013**	-.029**	-0.003	-.010**
21	Sector=Logistics	0.001	-.016**	-.019**	-.015**	.023**	-.036**	-.014**	-.016**	-.045**	-0.002	-.006**	-.020**
22	Sector=Healthcare	.024**	.021**	.020**	.031**	.042**	.096**	.057**	.060**	.104**	-.067**	.059**	-.034**
23	Sector=Banking	.025**	.048**	.051**	.058**	-.033**	.011**	-.019**	-.011**	0.000	.096**	-.019**	.127**
24	Sector=Insurance	.026**	.037**	.041**	.043**	-.013**	.007**	-.034**	-.018**	-.022**	.055**	-.047**	.066**
	Mean	7.448	7.428	7.388	7.175	1.996	29.365	0.047	0.153	1.980	5.960	1.490	4.970
	SD	1.108	1.155	1.235	1.171	0.658	16.305	0.212	0.360	1.467	2.136	0.500	2.190
	N	192,578	192,578	192,578	192,578	181,513	181,513	192,578	192,578	192,578	192,578	192,578	192,578

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 6: Descriptive Statistics and Correlations for Study 1(Cont'd)

	Variable	13	14	15	16	17	18	19	20	21	22	23	24
1	Customer Expectations												
2	Perceived Quality												
3	Perceived Value												
4	Customer Satisfaction												
5	Inflation Velocity												
6	Inflation Magnitude												
7	Pioneer Generation												
8	Merdeka Generation												
9	Age												
10	Education												
11	Gender												
12	Monthly Household Income												
13	Married	1											
14	Working	.141**	1										
15	Sector=Retail	.009**	.036**	1									
16	Sector=Food & Beverage	-.041**	-.014**	-.212**	1								
17	Sector=Tourism	-.032**	-.018**	-.124**	-.095**	1							
18	Sector=Land Transport	-.078**	-.094**	-.155**	-.119**	-.070**	1						
19	Sector=Air Transport	-.036**	-.005*	-.119**	-.091**	-.053**	-.067**	1					
20	Sector=Water Transport	-.032**	-.033**	-.053**	-.040**	-.024**	-.030**	-.023**	1				
21	Sector=Logistics	-.035**	-.005*	-.109**	-.083**	-.049**	-.061**	-.047**	-.021**	1			
22	Sector=Healthcare	.066**	-.067**	-.238**	-.182**	-.106**	-.133**	-.103**	-.045**	-.093**	1		
23	Sector=Banking	.043**	.078**	-.175**	-.134**	-.078**	-.098**	-.075**	-.033**	-.069**	-.150**	1	
24	Sector=Insurance	.055**	.076**	-.214**	-.164**	-.096**	-.120**	-.092**	-.041**	-.084**	-.184**	-.135**	1
	Mean	0.735	0.748	0.217	0.140	0.053	0.080	0.049	0.010	0.041	0.170	0.100	0.142
	SD	0.441	0.434	0.412	0.346	0.223	0.272	0.216	0.100	0.198	0.375	0.299	0.349
	N	192,578	192,578	192,578	192,578	192,578	192,578	192,578	192,578	192,578	192,578	192,578	192,578

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Models

We used OLS (Ordinary Least Squared) regression models to test for the direct relationships proposed for H1 to H4. As for H5 and H6 where moderation effects were hypothesized, we conducted a moderation analysis using the PROCESS macro by Hayes (2017). As the study also sought to understand the relationship between ageing and customer satisfaction, an OLS regression model was also used to analyse the direct effects of ageing cohorts on customer satisfaction itself. We outline the regression models used below.

Exploring the Effects of Ageing on Customer Satisfaction

To explore the effects of ageing on customer satisfaction, we develop an OLS model with customer satisfaction (*satisfaction*) as the dependent variable, and the Pioneer generation (*pgen*) and Merdeka generation (*mgen*) as cohort dummies. Control variables added to the model includes age (*age*), education (*edu*), gender (*gender*), household income (*hincome*), marital status (married), work status (*work*), and 9 industry sector dummies, with the logistic sector as the reference sector ($sectordum_j$). Additionally, in line with the ACSI model, we controlled for customer expectations (*expect*), perceived quality (*quality*), and perceived value (*value*) given their established effects on customer satisfaction (Fornell et al., 1996). Lastly the typical constant (α_0) and error term (e_i) were also included in the model. Equation (1) below depicts the model used:

$$(1)\ satisfaction_i = \alpha_0 + \beta_1 pgen_i + \beta_2 mgen_i + \beta_3 age_i + \beta_4 edu + \beta_5 gender_i + \beta_6 hincome_i + \beta_7 married_i + \beta_8 work_i + \beta_9 expect + \beta_{10} quality + \beta_{11} value + \beta_{ij} sectordum + e_i$$

To further tease out the effects at the cohort level, apart from (1) which would utilise a pooled sample of all cohorts in the dataset, we also analysed the data at the cohort level, with the same analysis done for the Pioneer generation, Merdeka generation, and the remaining cohorts separately. As expected, cohort dummies were excluded for the cohort level analysis.

Model for Perceived Quality (H1A & H1B)

To examine the effects of ageing cohorts on perceived quality (*quality*), we developed an OLS model with *quality* as the dependent variable, and Pioneer generation (*pgen*) and Merdeka generation (*mgen*) as cohort dummies. The same control variables from (1) were included. Additionally, in line with the ACSI model, we control for customer expectations (*expect*) given its effects on customer's perception of quality (Fornell et al., 1996). Equation (2) below depicts the model used:

$$(2)\ quality_i = \alpha_0 + \beta_1 pgen_i + \beta_2 mgen_i + \beta_3 age_i + \beta_4 edu + \beta_5 gender_i + \beta_6 hincome_i + \beta_7 married_i + \beta_8 work_i + \beta_9 expect + \beta_{ij} sectordum + e_i$$

Model for Customer Expectations (H2)

To examine the effects of ageing cohorts on customer expectations, a model like equation (2) was used. As customer expectations is considered exogenous in the ACSI structural model (Fornell et al., 1996), no other antecedents of customer satisfaction were included as control variables. Equation (3) below depicts the model used:

$$(3)\ expect_i = \alpha_0 + \beta_1 pgen_i + \beta_2 mgen_i + \beta_3 age_i + \beta_4 edu + \beta_5 gender_i + \beta_6 hincome_i + \beta_7 married_i + \beta_8 work_i + \beta_{ji} sectordum_{ij} + e_i$$

Models for Perceived Value (H3, H4, H5, H6)

To examine the general effects of inflation on perceived value (*value*), we include inflation velocity (*infv*) and inflation magnitude (*infm*) as independent variables for the model. Apart from the demographic and sectorial control variables introduced in the previous models, in line with the relationships established in the ACSI model (Fornell et al., 1996), we controlled for the effects of customer expectations and perceived quality in this model. As there is a strong correlation between age and inflation magnitude (Pearson correlation coefficient 0.887, p-value <0.010), we excluded age (*age*) from the list of control variables to prevent multicollinearity issues in our model estimation. However, we retained the cohort dummies *pgen* and *mgen* to control for some of the effects of ageing on the perceived value. Equation (4) below depicts the model used to test the general effects of inflation velocity and magnitude on perceived value:

$$(4)\ value_i = \alpha_0 + \beta_1 infv_i + \beta_2 infm_i + \beta_3 edu + \beta_4 gender_i + \beta_5 hincome_i + \beta_6 married_i + \beta_7 work_i + \beta_8 expect + \beta_9 quality + \beta_{10} pgen_i + \beta_{11} mgen_i + \beta_{ij} sectordum + e_i$$

To test for the moderating effects of ageing cohorts we constructed a cohort dummy that consists of both Pioneer and Merdeka generation survey participants (*oldgen*). By combining both ageing cohorts into one indicator variable, the model can test for the overall moderating effects of ageing cohorts on inflation velocity (*infv*) by contrasting the effects against the younger post-Merdeka cohorts. As with equation (4), apart from the general control variables in our above equations, we included *pgen* as a control variable to control for the effects of cohort and ageing. Equation (5) depicts the model used:

$$(5)\ value_i = \alpha_0 + \beta_1 oldgen_i \times infv_i + \beta_2 infv_i + \beta_3 infm_i + \beta_4 edu + \beta_5 gender_i + \beta_6 hincome_i + \beta_7 married_i + \beta_8 work_i + \beta_9 expect + \beta_{10} qual + \beta_{11} pgen_i + \beta_{ij} sectordum + e_i$$

Like (5), to test for the moderating effect of ageing cohorts on the effect of inflation magnitude on perceived value, we included a similar interaction term using *oldgen* and *infm*. Similar controls from equation (5) were used. Equation (6) below depicts the model:

$$(6)\ value_i = \alpha_0 + \beta_1 oldgen_i \times infm_i + \beta_2 infv_i + \beta_3 infm_i + \beta_4 edu + \beta_5 gender_i + \beta_6 hincome_i + \beta_7 married_i + \beta_8 work_i + \beta_9 expect + \beta_{10} qual + \beta_{11} pgen_i + \beta_{ij} sectordum + e_i$$

CHAPTER 1.5: RESULTS

In this section we present the results from our regression analysis. Given the limitations of previous studies on the relationship between satisfaction and ageing, we will first examine the effects of ageing cohorts on customer satisfaction. While no specific hypothesis was proposed on this, this was done to validate some of findings from previous research using our dataset. Thereafter, we would examine the findings on the impact of ageing cohorts on the three antecedents of satisfaction, before looking at the effects of inflation on perceived value.

Ageing Cohorts & Customer Satisfaction

As outlined above, to explore this relationship, we conducted four separate OLS regressions. Apart from using the entire pooled dataset (Model 1), we conducted the analysis using only data from the Pioneer generation (Model 2), the Merdeka generation (Model 3), and the remaining samples (Model 4). Table 7 presents the findings from the analysis. All four models were found to be statistically significant (p-value <0.001). In line with the established ACSI model, all three antecedents of customer satisfaction, namely customer expectations, perceived quality, and perceived value were found to have a statistically significant positive effects on customer satisfaction (p-value <0.001).

Focusing firstly on the pooled sample, we found the Pioneer and Merdeka generation to have a negative effect on customer satisfaction. While the effect was statistically significant for the Merdeka generation with its unstandardized beta coefficient at -0.046 ($t(192,557) = -7.164$, $p < 0.001$), the effect for Pioneer generation was negative but not statistically significant at -0.018 ($t(192,557) = -1.623$, $p = 0.105$).

With regards to our variable of interest, the ageing variable was found to have a statistically significant positive effect on customer satisfaction but to varying degrees. For the

pooled sample, the unstandardized beta coefficient was a positive 0.018 ($t(192,557) = 8.890$, $p<0.01$). Looking specifically at the two cohorts, the unstandardized beta coefficient for both Pioneer generation and Merdeka generation was 0.044 ($t(9,058) = 7.038$, $p<0.001$) and 0.034 ($t(29,425) = 5.121$, $p<0.001$) respectively. Of note, these coefficients were positive and higher than the coefficient for other younger cohorts in Model 4 at a mere 0.009 ($t(154,038) = 3.662$, $p<0.001$). Applying Cumming and Finch's (2005) method for using the 95% confidence interval (CI) to test for a statistically significant differences between regression coefficients, both regression coefficients for the age variable for both Pioneer and Merdeka generation were statistically larger than that of the younger cohorts. While the differences between Pioneer generation and Merdeka generation was not statistically significant. Specifically, CI for the age variable for Pioneer generation was [0.027, 0.060], Merdeka generation was [0.024, 0.043], and Other cohorts was [0.004, 0.014].

Therefore, while there appears to be an older-more-satisfied phenomena, the positive relationship between ageing and customer satisfaction does not appear to be homogenous across cohorts, with the younger cohorts seeing a statistically significant smaller effect as compared to both our ageing cohorts. In addition, contrary to previous studies, despite the positive relationship with ageing (Yoon et al., 2010), controlling for this relationship, ageing cohorts were actually still manifestly less satisfied as compared to younger cohorts. We discuss this important difference in our discussion section.

Table 7: OLS Regressions for Customer Satisfaction

	Model 1: Pooled Sample					Model 2: Pioneer Generation					Model 3: Merdeka Generation				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	0.018	0.002	0.020	0.000	**	0.044	0.009	0.032	0.000	**	0.034	0.005	0.025	0.000	**
Education	0.007	0.001	0.010	0.000	**	0.027	0.004	0.050	0.000	**	0.020	0.002	0.039	0.000	**
Gender	0.005	0.003	0.000	0.090		0.008	0.014	0.003	0.566		0.044	0.009	0.019	0.000	**
Household Income	0.003	0.001	0.010	0.000	**	-0.015	0.004	-0.030	0.000	**	-0.002	0.002	-0.005	0.303	
Married	-0.030	0.004	0.000	0.000	**	-0.056	0.024	-0.013	0.018	*	-0.062	0.019	-0.011	0.001	**
Working	-0.031	0.004	0.000	0.000	**	0.001	0.017	0.000	0.968		-0.052	0.010	-0.020	0.000	**
Sector=Retail	-0.004	0.008	0.000	0.600		-0.008	0.044	-0.003	0.863		-0.018	0.023	-0.006	0.432	
Sector=Food & Beverage	-0.044	0.008	0.000	0.000	**	-0.088	0.046	-0.023	0.056		-0.125	0.024	-0.035	0.000	**
Sector=Tourism	-0.043	0.010	0.000	0.000	**	-0.052	0.053	-0.009	0.329		-0.039	0.028	-0.007	0.168	
Sector=Land Transport	-0.056	0.009	0.000	0.000	**	-0.027	0.047	-0.007	0.563		-0.092	0.027	-0.020	0.001	**
Sector=Air Transport	0.052	0.010	0.010	0.000	**	0.153	0.056	0.023	0.006	**	0.089	0.029	0.015	0.002	**
Sector=Water Transport	-0.012	0.016	0.000	0.460		0.118	0.073	0.011	0.106		0.027	0.042	0.002	0.518	
Sector=Healthcare	0.037	0.008	0.010	0.000	**	0.054	0.044	0.019	0.217		0.006	0.023	0.002	0.787	
Sector=Banking	0.061	0.009	0.020	0.000	**	0.103	0.049	0.022	0.034	*	0.023	0.026	0.006	0.367	
Sector=Insurance	0.034	0.008	0.010	0.000	**	0.058	0.048	0.013	0.219		-0.004	0.024	-0.001	0.871	
ACSI Constructs					**										
Customer Expectations	0.106	0.002	0.100	0.000	**	0.108	0.008	0.103	0.000	**	0.094	0.005	0.087	0.000	**
Perceived Quality	0.516	0.002	0.510	0.000	**	0.528	0.010	0.515	0.000	**	0.516	0.006	0.498	0.000	**
Perceived Value	0.282	0.002	0.300	0.000	**	0.279	0.009	0.289	0.000	**	0.292	0.005	0.300	0.000	**
Cohort					**										
Pioneer Generation	-0.018	0.011	0.000	0.110											
Merdeka Generation	-0.046	0.006	0.000	0.000	**										
Adjusted R^2	0.697					0.716					0.675				
F	22128.297	**				1270.900	**				3403.090	**			
N	192,578					9,077					29,444				

** $p < 0.01$

* $p < 0.05$

Table 7: OLS Regressions for Customer Satisfaction Cont'd

	Model 4: Other Cohorts				
	B	SE	Beta	P-Value	
Age	0.009	0.002	0.006	0.000	**
Education	0.002	0.001	0.003	0.120	
Gender	-0.002	0.003	-0.001	0.512	
Household Income	0.005	0.001	0.009	0.000	**
Married	-0.024	0.004	-0.010	0.000	**
Working	-0.025	0.004	-0.009	0.000	**
Sector=Retail	-0.004	0.009	-0.001	0.663	
Sector=Food & Beverage	-0.029	0.009	-0.009	0.001	**
Sector=Tourism	-0.044	0.010	-0.009	0.000	**
Sector=Land Transport	-0.054	0.010	-0.013	0.000	**
Sector=Air Transport	0.042	0.011	0.008	0.000	**
Sector=Water Transport	-0.034	0.018	-0.003	0.064	
Sector=Healthcare	0.040	0.009	0.013	0.000	**
Sector=Banking	0.063	0.009	0.017	0.000	**
Sector=Insurance	0.039	0.009	0.012	0.000	**
ACSI Constructs					
Customer Expectations	0.109	0.002	0.103	0.000	**
Perceived Quality	0.515	0.002	0.511	0.000	**
Perceived Value	0.280	0.002	0.297	0.000	**
Cohort					
Pioneer Generation					
Merdeka Generation					
Adjusted R^2	0.700				
F	19982.387	**			
N	154,057				

** p < 0.01

* p < 0.05

Ageing Cohorts & Perceived Quality

We turn our attention next to the effects of ageing cohorts on perceived quality. Model 5 in Table 8 outlines the OLS regression for our hypotheses on perceived quality. Model 5 was found to be statistically significant ($p<0.001$) with an adjusted R^2 of 0.400. Both ageing cohorts had a negative statistically significant effect on perceived quality. Specifically, the beta coefficient for both Pioneer and Merdeka generation were -0.051 ($t(192,559) = -3.307$, $p=0.001$) and -0.042 ($t(192,559) = -4.786$, $p<0.001$) respectively. Thus H1A, where we proposed a negative relationship between ageing cohorts and perceived quality was supported.

Ageing Cohorts & Customer Expectations

Model 6 in Table 8 provides our regression analysis for customer expectations. Similar to the findings from Model 5, Model 6 was statistically significant ($p<0.001$) with both ageing cohorts having a statistically significant negative effect ($p<0.001$). The beta coefficients for both Pioneer and Merdeka generation were -0.233 ($t(192,560) = -12.276$, $p<0.001$) and -0.098 ($t(192,560) = -8.998$, $p<0.001$) respectively. Thus H2, where we proposed a negative relationship between ageing cohorts and customer expectations was supported.

Table 8: OLS Regressions for Direct Effects on Perceived Quality & Customer Expectations

	Model 5: Perceived Quality					Model 6: Customer Expectations				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	0.013	0.003	0.017	0.000	**	0.045	0.003	0.059	0.000	**
Education	0.005	0.001	0.009	0.000	**	0.031	0.002	0.06	0.000	**
Gender	-0.007	0.004	-0.003	0.123		0.028	0.005	0.012	0.000	**
Household Income	0.014	0.001	0.026	0.000	**	0.026	0.001	0.051	0.000	**
Married	-0.01	0.005	-0.004	0.046	*	0.028	0.006	0.011	0.000	**
Working	-0.029	0.005	-0.011	0.000	**	0.018	0.007	0.007	0.005	**
Sector=Retail	0.127	0.011	0.045	0.000	**	-0.074	0.014	-0.028	0.000	**
Sector=Food & Beverage	0.026	0.011	0.008	0.023	*	-0.003	0.014	-0.001	0.834	
Sector=Tourism	0.096	0.013	0.019	0.000	**	0.109	0.016	0.022	0.000	**
Sector=Land Transport	-0.116	0.012	-0.027	0.000	**	-0.276	0.015	-0.068	0.000	**
Sector=Air Transport	0.100	0.014	0.019	0.000	**	0.013	0.017	0.003	0.428	
Sector=Water Transport	-0.036	0.023	-0.003	0.115		-0.222	0.028	-0.02	0.000	**
Sector=Healthcare	0.105	0.011	0.034	0.000	**	0.044	0.014	0.015	0.001	**
Sector=Banking	0.186	0.012	0.048	0.000	**	0.016	0.015	0.004	0.292	
Sector=Insurance	0.143	0.011	0.043	0.000	**	0.028	0.014	0.009	0.045	*
ACSI Constructs										
Customer Expectations	0.646	0.002	0.62	0.000	**					
Cohort										
Pioneer Generation	-0.051	0.015	-0.009	0.001	**	-0.233	0.019	-0.045	0.000	**
Merdeka Generation	-0.042	0.009	-0.013	0.000	**	-0.098	0.011	-0.032	0.000	**
Adjusted R^2	0.400					0.020				
F	7147.587	**				233.693	**			
N	192,578					192,578				

** p < 0.01

* p < 0.05

Inflation & Perceived Value

In this section, we discuss the effects of ageing cohorts on perceived value. We first explore the direct effects, before investigating further into the moderating effects of ageing cohorts on the relationship between inflation and perceived value. Table 9 and 10 presents results of the regression analysis. We discuss them in turn.

Direct Effect Of Inflation On Perceived Value

For the direct effects, we first conducted a baseline regression analysis to check the effects of ageing cohorts on perceived value in Model 7, before analysing the effects of inflation velocity and magnitude on perceived value in Model 8 and 9.

Firstly, while no hypothesis was proposed for the effect of ageing cohorts on perceived value, in line with the findings on customer expectations and perceived quality, both ageing cohorts were found to have negative effect on perceived value in Model 7. Accordingly, Model 7 was found to be statistically significant ($p<0.001$). The beta coefficient for both Pioneer and Merdeka generation were -0.011 ($t(181,493) = -0.775$, $p= 0.438$) and -0.016 ($t(181,493) = -2.088$, $p=0.037$) respectively. While the negative effect for Merdeka generation was statistically significant, the negative effect for the Pioneer generation was not. Nevertheless, it should be noted that directionally, the effect for Pioneer generation was in the same direction as the Merdeka generation.

Next in Models 8 and 9, the two inflation terms were included into the base model. As discussed in our chapter on the models used, Model 9 excluded the age variable due to multicollinearity effects arising from the high correlation between the inflation magnitude and age. In Model 8, we retained the age variable just to check the robustness of the findings in Model 9. Regardless of the model specification, both inflation velocity and inflation magnitude were found to have a statistically significant negative effect on perceived value (p-

value <0.001). The beta coefficients for both models were also similar. In particular Model 9 found the effects of inflation velocity and inflation magnitude to be -0.042 (t(181,492) = -13.469, p< 0.001) and -0.001 (t(181,492) = -5.594, p<0.001). The beta coefficients in Model 8, where age was retained as a control variable, were similar. Given these negative effects, both H3 and H4 was supported.

Interestingly, the addition of both inflation terms also resulted in a change in the direction of the effect of ageing cohorts on perceived value. The statistically significant negative effect of ageing cohorts on perceived value in the base model (Model 7) had turned positive in both Model 8 and Model 9. Specifically, the beta coefficients for both ageing cohorts had turned positive. For the Pioneer generation in particular, the effects were statistically significant both models. Focusing on Model 9, which excludes the age variable, the beta coefficients for both ageing cohorts were both positive and statistically significant (p-value < 0.001). This finding lends support to our theory that the negative effects of ageing cohorts on perceived value appears to stem at least partially from inflationary effects.

Moderation Effect Of Ageing Cohorts

We turn next to testing for moderation effects. Table 10 outlines the findings of our moderation analysis. Model 10 provides the base model before the addition of the inflation variables. Model 11 and Model 12 tests for the moderating effect of ageing cohorts on inflation velocity and perceived value, and inflation magnitude on perceived value respectively. All three models were found to be statistically significant (p<0.001) with a similar adjusted R^2 value of 0.600.

In terms of moderation effects, in Model 11, while the inclusion of the interaction term for inflation velocity and older cohorts accounted for a small increase in R^2, the increase was statistically significant $\Delta F(1, 181,491)= 3.937$, p=0.047, indicating the interaction term

contributed to Model 10. The interaction term was found to be negative and statistically significant, -0.025 (t(181,491) = -1.984, p=0.047). These results are evidence in support for the presence of a moderation effect. Looking further at the interaction plot in Chart 1, we find that as inflation velocity increases, the decline in perceived value was more pronounced for ageing cohorts as compared to younger cohorts. Based on the model, for every point increase in inflation velocity, perceived value declines by an additional 0.025 for ageing cohorts as compared to younger cohorts. Given the stronger negative effect observed, H5 was found to be supported.

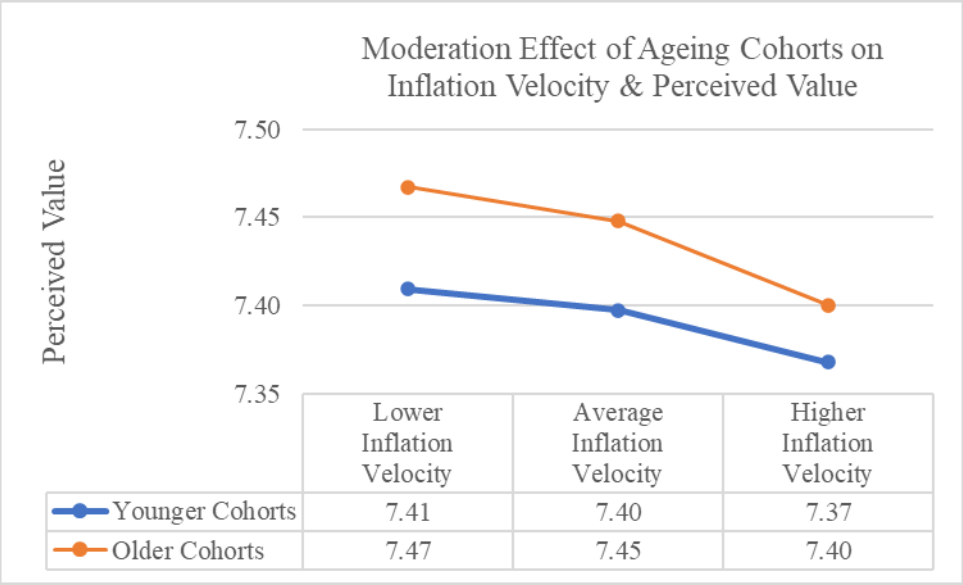


Chart 1: Moderating Effect of Ageing Cohorts On Inflation Velocity & Perceived Value

Focusing next on the inflation magnitude and perceived value relationship in Model 12, we note that the inclusion of the interaction term of older cohorts and inflation magnitude did not contribute to the base model. The change in variance explained was not statistically significant at ΔF(1, 181,491)= 0.362, p= 0.547). The interaction term was also not statistically significant at 0.000 (t(181,491) = -0.602, p=0.547). Therefore, H6, where we postulated a stronger effect of inflation magnitude on perceived value for ageing cohorts, was not supported.

Sensitivity Analysis On Age of Inflation Sensitivity

Given the lack of studies on the age of inflation sensitivity, we further conducted a sensitivity analysis to assess how robust our findings might be to changes to the age of inflation sensitivity. Given the limited range of historical inflation data, setting the age at 30 years old instead of 21 years old, resulted in the sample size dropping from 181,513 to 150,700. However, the proportion of older cohort samples increased from 20.3% to 25.4% as earlier cohorts could now be included, while younger cohorts were now excluded. Running the same analysis on perceived value for H3 to H6, all models were found to be statistically significant ($p<0.001$) with the findings remaining generally consistent with our early analysis where 21 years old was used as the age cut-off. We outline the findings next.

Firstly, in terms of H3 and H4 the direct effects of inflation velocity and magnitude on perceived value was consistently negative and statistically significant with beta coefficients at -0.031 ($t(150,679) = -12.096$, $p<0.001$) and -0.001 ($t(150,679) = -4.120$, $p<0.001$) respectively. Therefore, H3 and H4 remained supported.

Secondly, running the analysis for H5, older cohorts continued to have a moderating effect on inflation velocity. In fact the beta coefficient of the interaction term of inflation velocity and ageing cohorts was larger at -0.049 ($t(150,678) = -2.883$, $p=0.004$) when compared to -0.025 ($t(181,491) = -1.984$, $p=0.047$) from Model 11. Looking at the interaction plot (Chart 2), it should be noted that at higher inflation velocity levels, perceived value was in fact lower for older cohorts as compared to younger cohorts when this new model specification was used. Thus, H5 remained supported[4].

[4] As inflation velocity for the earliest cohort was calculated based on the average inflation from when they were 31 or 22 years old due to the lack of inflation rate data for 1961, the same sensitivity analysis was done with the earliest cohort excluded. For the analysis based on 30 years old as the age of inflation sensitivity, findings remain consistent with H3, H4, and H5 remain supported. However, for the analysis based on 21 years old as the age of inflation sensitivity, while H3 and H4 remained supported, for H5, the interaction term while still negative, only approached statistical significance at -0.024 ($t(181,155) = -1.926$, $p=0.054$). This is likely attributed to the substantial loss of 336 samples from the earliest cohort, which would have been most sensitive to the effects of inflation given their age.

As for H6, the interaction term for older cohorts and inflation magnitude remain statistically insignificant at 0.000 (t(150,678) = -0.845, p=0.398). Hence, H6 remained unsupported.

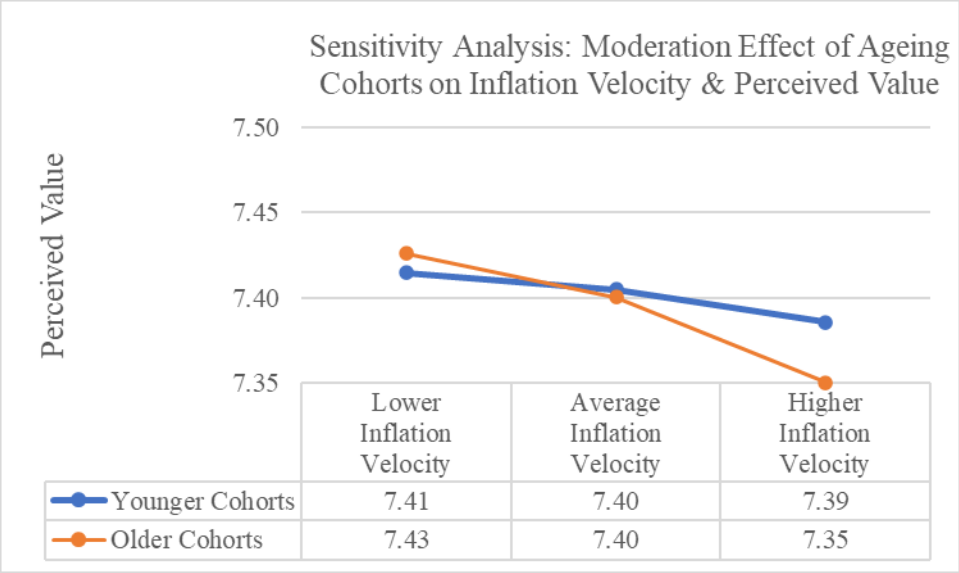


Chart 2: Sensitivity Analysis on Moderating Effect (30 years old as Age of Inflation Sensitivity)

Therefore, taken together, our sensitivity analysis provides suggests that our findings on the negative direct effects of inflation velocity and magnitude on perceived value remain consistently supported. The moderating effect of older cohorts on the negative effect of inflation velocity on perceived value also remained supported.

Table 9: OLS Regressions for Direct Effects on Perceived Value

	Model 7: Base Model					Model 8: Model with Inflation					Model 9: Model with Inflation Age Excluded				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	0.003	0.003	0.003	0.252		0.028	0.004	0.032	0.000	**					
Education	0.004	0.001	0.007	0.001	**	0.004	0.001	0.007	0.001	**	0.003	0.001	0.005	0.023	*
Gender	0.000	0.004	0.000	0.984		0.000	0.004	0.000	0.909		-0.001	0.004	0.000	0.768	
Household Income	0.007	0.001	0.012	0.000	**	0.007	0.001	0.012	0.000	**	0.007	0.001	0.013	0.000	**
Married	0.001	0.005	0.000	0.828		0.017	0.006	0.006	0.002	**	0.005	0.005	0.002	0.342	
Working	-0.011	0.005	-0.004	0.021	*	-0.010	0.005	-0.003	0.039	*	-0.016	0.005	-0.005	0.002	**
Sector=Retail	0.096	0.010	0.032	0.000	**	0.093	0.010	0.031	0.000	**	0.094	0.010	0.031	0.000	**
Sector=Food & Beverage	-0.016	0.011	-0.005	0.124		-0.019	0.011	-0.005	0.076		-0.017	0.011	-0.005	0.103	
Sector=Tourism	-0.024	0.012	-0.004	0.055		-0.031	0.012	-0.005	0.013	*	-0.029	0.012	-0.005	0.020	*
Sector=Land Transport	-0.039	0.012	-0.008	0.001	**	-0.047	0.012	-0.010	0.000	**	-0.044	0.012	-0.009	0.000	**
Sector=Air Transport	0.066	0.013	0.011	0.000	**	0.060	0.013	0.010	0.000	**	0.062	0.013	0.011	0.000	**
Sector=Water Transport	-0.005	0.022	0.000	0.818		-0.017	0.022	-0.001	0.431		-0.015	0.022	-0.001	0.496	
Sector=Healthcare	0.060	0.010	0.018	0.000	**	0.058	0.010	0.018	0.000	**	0.060	0.010	0.018	0.000	**
Sector=Banking	0.102	0.011	0.025	0.000	**	0.099	0.011	0.024	0.000	**	0.101	0.011	0.025	0.000	**
Sector=Insurance	0.086	0.010	0.025	0.000	**	0.086	0.010	0.025	0.000	**	0.086	0.010	0.025	0.000	**
ACSI Constructs															
Customer Expectations	0.151	0.002	0.135	0.000	**	0.152	0.002	0.136	0.000	**	0.152	0.002	0.135	0.000	**
Perceived Quality	0.724	0.002	0.676	0.000	**	0.722	0.002	0.675	0.000	**	0.723	0.002	0.676	0.000	**
Inflation															
Inflation Velocity						-0.040	0.003	-0.021	0.000	**	-0.042	0.003	-0.023	0.000	**
Inflation Magnitude						-0.003	0.000	-0.037	0.000	**	-0.001	0.000	-0.015	0.000	**
Cohort															
Pioneer Generation	-0.011	0.014	-0.002	0.438		0.034	0.014	0.006	0.014	*	0.085	0.012	0.014	0.000	**
Merdeka Generation	-0.016	0.008	-0.005	0.037	*	0.012	0.008	0.004	0.123		0.040	0.007	0.012	0.000	**
Adjusted R^2	0.600					0.600					0.600				
F	14318.594	**				12989.499	**				13631.593	**			
N	181,513					181,513					181,513				

** p < 0.01

* p < 0.05

Table 10: Moderation Regressions for Perceived Value

	Model 10: Base Model					Model 11: Moderation of Inflation Velocity					Model 12: Moderation of Inflation Magnitude				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Education	0.003	0.001	0.005	0.023	*	0.003	0.001	0.005	0.022	*	0.003	0.001	0.005	0.021	*
Gender	-0.001	0.004	0.000	0.768		-0.001	0.004	-0.001	0.737		-0.001	0.004	0.000	0.752	
Household Income	0.007	0.001	0.013	0.000	**	0.007	0.001	0.013	0.000	**	0.007	0.001	0.013	0.000	**
Married	0.005	0.005	0.002	0.342		0.004	0.005	0.002	0.411		0.004	0.006	0.002	0.422	
Working	-0.016	0.005	-0.005	0.002	**	-0.016	0.005	-0.005	0.001	**	-0.016	0.005	-0.005	0.001	**
Sector=Retail	0.094	0.010	0.031	0.000	**	0.094	0.010	0.031	0.000	**	0.094	0.010	0.031	0.000	**
Sector=Food & Beverage	-0.017	0.011	-0.005	0.103		-0.017	0.011	-0.005	0.102		-0.017	0.011	-0.005	0.107	
Sector=Tourism	-0.029	0.012	-0.005	0.020	*	-0.028	0.012	-0.005	0.021	*	-0.028	0.012	-0.005	0.021	*
Sector=Land Transport	-0.044	0.012	-0.009	0.000	**	-0.044	0.012	-0.009	0.000	**	-0.044	0.012	-0.009	0.000	**
Sector=Air Transport	0.062	0.013	0.011	0.000	**	0.062	0.013	0.011	0.000	**	0.063	0.013	0.011	0.000	**
Sector=Water Transport	-0.015	0.022	-0.001	0.496		-0.014	0.022	-0.001	0.507		-0.015	0.022	-0.001	0.492	
Sector=Healthcare	0.060	0.010	0.018	0.000	**	0.060	0.010	0.018	0.000	**	0.061	0.010	0.019	0.000	**
Sector=Banking	0.101	0.011	0.025	0.000	**	0.101	0.011	0.025	0.000	**	0.101	0.011	0.025	0.000	**
Sector=Insurance	0.086	0.010	0.025	0.000	**	0.086	0.010	0.025	0.000	**	0.086	0.010	0.025	0.000	**
ACSI Constructs															
Customer Expectations	0.152	0.002	0.135	0.000	**	0.152	0.002	0.135	0.000	**	0.152	0.002	0.135	0.000	**
Perceived Quality	0.723	0.002	0.676	0.000	**	0.723	0.002	0.676	0.000	**	0.723	0.002	0.676	0.000	**
Cohort															
Pioneer Generation	0.045	0.011	0.007	0.000	**	0.055	0.012	0.009	0.000	**	0.048	0.012	0.008	0.000	**
Older Cohorts	0.040	0.007	0.013	0.000	**	0.097	0.030	0.032	0.001	**	0.054	0.025	0.018	0.031	*
Inflation															
Inflation Velocity	-0.042	0.003	-0.023	0.000	**	-0.041	0.003	-0.022	0.000	**	-0.042	0.003	-0.022	0.000	**
Inflation Magnitude	-0.001	0.000	-0.015	0.000	**	-0.001	0.000	-0.014	0.000	**	-0.001	0.000	-0.014	0.000	**
Moderation															
Inflation Velocity x Older Cohorts						-0.025	0.013	-0.021	0.047	*					
Inflation Magnitude x Older Cohorts											0.000	0.001	-0.006	0.547	
Adjusted R^2	0.600					0.600					0.600				
F	13631.593	**				12982.867	**				12982.441	**			
ΔF						3.937	*				0.362				
ΔR^2						0.000					0.000				
N	181,513					181,513					181,513				

** p < 0.01
* p < 0.05

CHAPTER 1.6: DISCUSSION

Table 11 below summarises the findings from our analysis. Most of the hypotheses were supported, with only H6 unsupported from the data. We discuss the key findings next.

Table 11: Study 1 Summary of Findings

No.	Proposed Effect	Hypothesis	Finding
H1A	-	Perceived quality is lower for ageing cohorts as compared to younger cohorts.	S
H1B	+	Perceived quality is higher for ageing cohorts as compared to younger cohorts.	NS
H2	-	Customer expectations is lower for ageing cohorts as compared to younger cohorts.	S
H3	-	Inflation velocity has negative effect on perceived value.	S
H4	-	The magnitude of inflation has a negative effect on perceived value.	S
H5	+	The effect of inflation velocity on perceived value would be stronger for ageing cohorts as compared to younger cohorts.	S
H6	+	The effect of inflation magnitude on perceived value would be stronger for ageing cohorts as compared to younger cohorts.	NS

Note: S - Supported, NS - Not Supported

Negative Relationship Between Satisfaction & Ageing Cohorts

Contrary to the older-more-satisfied finding in the limited ageing and satisfaction (Yoon et al., 2009b, 2010), our study which introduced more robust controls, found cohort level difference in satisfaction levels. While the age variable was positively related to the customer satisfaction, the cohort variables were found to have a negative effect on customer satisfaction. Both Pioneer and Merdeka generation had a negative effect on customer satisfaction. Even though the negative effect for the Pioneer generation was not statistically significant, the p-value at 0.110 does suggests a weak negative effect. Interestingly when analysed at the group level, the age variable continues to have a positive effect on customer satisfaction. Therefore, while the study supports the older-more-satisfied observation in previous studies, older cohorts were not more satisfied than younger cohorts. On the contrary,

our Asian data shows older cohorts were less satisfied after controlling for the effects of ageing.

In consideration of these effect, in line with Yoon et al's (2009b) suggestion that cohort based studies would be more effective in teasing out the effects of ageing, our study provides evidence for a more nuanced view on the older-more-satisfied phenomena. While Yoon et al (2010) acknowledged that cohort and ageing effects could potentially be distinct, they were theorised to both have a positive relationship with customer satisfaction. We contribute to theory by postulating and showing that while these effects are indeed distinct, they may not necessarily move in the same direction. Our study shows that while there is indeed a positive ageing effect on customer satisfaction, cohort effects are not necessarily positive but can be negative, and in fact are so for our Asian dataset. This could also potentially explain some of the mixed findings seen in some of research we highlighted above. Thus, future research in the area should take these findings into consideration. As to the reasons for such differences could stem from the negative effect of ageing cohorts on the antecedents of satisfaction which we discuss next.

Lower Predicted and Perceived Quality

In terms of antecedents of customer satisfaction, the study found evidence of lower customer expectations and perceived quality regardless of the ageing cohort. While past studies found evidence for the neglect of seniors by marketers (Thompson & Thompson, 2009), the study provides evidence for how the neglect affects customers. Ageing customers were found to be less satisfied, with the antecedents of satisfaction found to be lower than younger cohorts. Specifically, the data supports the proposition that ageing cohorts expect poorer quality of products and services due to potentially ageist marketing communications and past experiences with inferior products and services.

As for the perceived quality, the lower perception of quality among ageing cohorts, is in contrast to previous research that argue that the older-more-satisfied phenomena could be due to general improvements in the quality of products and services over time (Yoon et al., 2009b). Rather, the separation of the two effects provides evidence to show that the older-more-satisfied effect stems more from ageing related factors, as opposed to improvements over time. Evidence for a negative cohort effect on the other hand suggests that the purported improvements in quality over time may not necessarily have resonated with seniors. Or at the very least not for Asian seniors.

Enduring Effects of Inflation

In terms of the effects of perceived value, we find that inflation velocity and magnitude have a negative effect on customers' perception of value. Interestingly, when the inflation variables were included into the model, the negative effects of ageing cohorts on perceived value turned from negative to positive (p-value <0.001). An inspection of the interaction plots in Chart 1 furthers shows older cohorts having a higher perception of value once inflation has been accounted. This appears to suggest that some of the negative variance can be explained by inflation. Thus, apart from short-term price shifts, our study contributes to theory by showing that long term general price movements, in the form of inflation, could also affect how customers conceptualise the value they receive from products and services.

Lastly, apart from the general effects, ageing cohorts were also found to have strengthen the negative relationship between inflation velocity and perceived value. However, there was no evidence for a moderation effect for the relationship between inflation magnitude and perceived value. This seems to suggest that it may not necessarily be how large prices have changed, but the saliency of how fast those prices have changed (Tversky & Kahneman, 1974) that results in a poorer perception of value among seniors. A potential

reason for the lack of evidence for a moderating influence on inflation magnitude and perceived value could be due to a memory effect, whereby the long passage of time may have made it more difficult for older cohorts to recall specific price differences. Another possible reason could be due to the lack of specificity in our inflation variable to capture price changes at the industry level. The effect of price shifts on perceived value at the industry level may be more influenced by ageing cohorts as opposed to general price differences.

Guidance for Managers on Ageing Customers

Managerially the findings provide several interesting implications on how to manage, measure, and target ageing customers. Firstly, in terms of managing ageing customers, the generally negative effect of ageing cohorts on customer satisfaction and its antecedents paints a picture of an underserved and neglected customer segment. The study shows that these seniors expect and perceived products and services to be less able to meet their needs than younger customers. Apart from suggesting that managers could improve on the way they serve seniors, the findings also point to a gap in the underserved senior market which managers could potentially leverage on.

Secondly, in terms of the measurement of customer satisfaction, the positive relationship between the ageing and satisfaction and its antecedents may result in managers to think erroneously that they are improving the way they serve their older customers. However, as seen in the data, ageing related factors may be driving these movements. Therefore, when measuring satisfaction levels for older customers, managers may need to consider cohort level customer segments to accurately understand how well they are really performing.

Thirdly, managers should consider cohort effects when developing their segmentation strategies. Traditional segmentation strategies usually include behavioural, attitudinal, and demographical variables. Given that ageing cohorts were found to have a significant impact

on customer satisfaction and its antecedents, managers should also consider looking at cohorts when attempting to identify and target different customer segments.

Lastly, as inflation was found to negatively affect perceived the value, with ageing cohorts moderating the effects, we propose that managers should also be mindful of inflation experiences of different cohorts when deriving their pricing strategies. Managers may wish to not only consider past and competitor prices, but also how their target segments may have been affected by inflation when making pricing decisions.

CHAPTER 1.7: LIMITATIONS & FUTURE RESEARCH

Despite the generally supported findings, Study 1 suffers from several limitations which presents opportunities for future research. Firstly, we consider the limitations of using chronological age as a measurement of ageing. More recent research on ageing focuses on the use of customers' time horizon perspective to measure ageing. This was done due to the mixed results from the use of chronological age (Kuppelwieser & Klaus, 2021; Kuppelwieser & Sarstedt, 2014). These studies argue that that chronological age "does not sufficiently discriminate between age group's behaviour and perception" (Kuppelwieser & Klaus, 2021, p. 372). Consequently, future research may be needed to consider other measurements of ageing in order to see if the findings remain robust.

Secondly, the argument for a negative relationship between ageing cohorts and perceived quality have been based on a potentially poorer ability to meet the needs of more senior customers due to marketers' focus on younger customers. However, in certain industries seniors may be served by senior themselves. How such service encounters affect customer satisfaction may differ. Unfortunately, the dataset is unable to further tease out these effects and more research would be needed to address this question.

Thirdly, our conceptualisation of inflation velocity and magnitude was predicated on seniors' working age at 21 years old. The conservative assumption made was that 21 years old is the age whereby a person is typically no longer considered a minor and is likely to be more financially aware of the price of products and services. This assumption may not necessarily hold as older cohorts may have started working even earlier in the past. This may therefore have introduced noise into the findings. While our sensitivity analysis with 30 years old as the age of inflation sensitivity lends further support for our findings, future research could potentially adjust further the age criterion to test the robustness of the findings, especially for research using data from other countries.

Fourthly, the use of a general inflation index while useful in capturing customers' general sense of how prices have shifted over time, may not be as effective in capturing industry level price movements. The use of industry specific inflation indices is likely to be more effective in teasing out more specific effects. The moderating effect of inflation magnitude may also be potentially detectable with more specific CPI data as seniors may be more able to recall price differences for specific categories. However, the use of industry specific analysis would have drastically reduced the sample sizes for our dataset, and as such prevented us from further analysing at this level. Future research may wish to conduct a more fine-grained analysis by using industry specific inflation data.

Lastly, in terms of generalisability, we note that after controlling for an ageing effect, contrary to data from the US by Yoon et al (2010) which suggests a positive cohort effect, we found negative cohort effect. These two contrasting effects presents a new avenue for further research to understand cohort effects on customer satisfaction and its antecedents. We propose that future research in other countries may be needed to further validate our Asian based findings, or even extend the theory.

CHAPTER 1.8: CONCLUSION

Are older customers happier? In study 1, we sought to better understand the under-researched area of ageing and customer satisfaction. The study contributes to research on the effects of ageing on customer satisfaction by teasing out cohort and ageing effects, and in so doing uncovered a more nuanced perspective than previously observed. While customers do appear to be more satisfied as they age, contrary to other US studies, we found older cohorts to be less satisfied than younger cohorts, and this was driven by poorer customer expectations, perceived quality, and perceived value. Additionally, in line with our interest in long-term cohort effects, we provide, to our knowledge, the first study to look at the effects of inflation on perceived value. We found a negative relationship between the magnitude and velocity of inflation on perceived value, with negative effects of inflation velocity stronger for older cohorts. The findings from our study should serve as an impetus for managers to better understand and serve this underserved but growing customer segment.

STUDY 2: IS DIGITAL BETTER IN A MULTICHANNEL SETTING? EXPLORING THE MODERATING EFFECTS OF CHANNEL USAGE ON THE ANTECEDENT AND CONSEQUENCE OF RELATIONAL LEVEL SATISFACTION

CHAPTER 2.1: INTRODUCTION

Self-service technologies such as mobile application, websites, and self-service kiosk have grown increasingly ubiquitous (Ailawadi & Farris, 2017; Hsieh et al., 2012; van Birgelen et al., 2006), with the COVID-19 pandemic accelerating its adoption (Laberge et al., 2020). According to some estimates, the market for self-service technologies (SST) is set to rise to US$77.7 billion by 2027 (Acumen Research and Consulting, 2021). SST are increasingly provided on top of existing traditional channels such as brick-and-mortar outlets and call centres. As such, the service experience of customers has progressively become a multichannel one. Strategically, managers are increasingly challenged to determine how best to manage and integrate their offline and online channel mix (Verhoef et al., 2015).

Despite the rising importance of multichannel service environments, research into how different channel users affect relational level satisfaction and loyalty within more complex non-retail settings appear to be limited. To bridge this gap, this study will focus on how the multichannel usage can affect the relationship between quality, cumulative satisfaction, and loyalty. Specifically, the study aims to understand how (1) multi-channel customers, defined as customers who use both digital SST and offline channels, (2) digital SST customers, and (3) offline customers, moderate the relationship between (1) perceived quality and cumulative customer satisfaction, and (2) cumulative satisfaction and customer loyalty. Drawing upon research in multichannel customer management, SST, e-service quality, and customer satisfaction (Anderson et al., 1994; Bitner et al., 2000; Blut et al., 2015; Hult et al., 2019; Neslin et al., 2006; Verhoef et al., 2015), we would propose that the

relationship between (1) perceived quality and customer satisfaction and (2) customer satisfaction and customer loyalty, would be strongest for multichannel customers when compared with digital SST customers and offline customers, as the variety of channels used would complement the strengths of the different channel types. We would also explore how digital SST customers moderates the two relationships, given that benefits such as accessibility may not necessarily outweigh the negative effects from a lack of human interactions.

Use the CSISG data from two industries, we found that multichannel customers indeed had the strongest quality-satisfaction and satisfaction-loyalty relationships only for the banking industry. As for digital SST, we found that digital SST customers had a weaker quality-satisfaction relationship than offline customers for both industries.

On the question of which channel user type performs better and under what circumstances, our study found mixed results. For both industries, digital SST customers were found to be more satisfied than offline customers when perceived quality was lower, with the pattern reversing as perceived quality increases. However when it comes to multichannel customers, contrary to previous retail-centric research which points to higher satisfaction and loyalty for multichannel customers (Neslin et al., 2006), our research based on more complex service environments, found more nuanced and heterogenous results. For the banking industry, multichannel customers were more satisfied and loyal than other channel users only when perceived quality and customer satisfaction were higher respectively. However, for the telecommunications industry, multichannel customers outperformed offline customers in satisfaction and quality, only when perceived quality and satisfaction was lower, respectively. The comparisons between multichannel customers and digital SST customer were not statistically significant.

Theoretical Contributions

By examining the moderating effects of different channel users on the antecedents and outcomes of customer satisfaction within the banking and telecommunications industry, Study 2 contributes to research on (1) customer satisfaction, (2) SST and (3) multichannel customers.

With regards to the field of customer satisfaction, while the topic has been extremely prolific, research on how customer types moderate the well-established relationships between quality and satisfaction, and satisfaction and loyalty has been limited (Fornell et al., 1996; Hult et al., 2019). Therefore, we contribute to the limited research on customer satisfaction moderators, by establishing the moderating effects of the three different channel user types and by examining the conditions by which they outperform each other.

As for SST research, the literature currently tends to be highly SST centric with a narrow focus on SST quality, satisfaction and adoption (Blut et al., 2016; Curran & Meuter, 2005; Meuter et al., 2000). Our research expands the field beyond SST centric outcomes to broader firm level outcomes in the form of cumulative satisfaction and loyalty.

Lastly, on multichannel research, most multichannel studies focused on the retail sector. Our understanding of the effects of multichannel environments (1) where service interactions can be characterised by a high degree of complexity, and (2) where customers can often switch between channel alternatives (Hsieh et al., 2012; Waite & Harrison, 2002), appears to be limited. In contrast to retail settings where interactions tend to be relatively less complex and predominantly transactional, the existence of routine and non-routine service requirements (van Birgelen et al., 2006), and the ability to switch between a variety of digital and offline channels, can have different effects on relational level outcomes such as cumulative customer satisfaction and loyalty. By identifying common patterns as well as differences in the moderating effects of different channel user types across the two industries,

we add to multichannel research by providing a more nuanced and contrasting view on the current research, which points to a generally positive direct effect of multichannel deployment on customer satisfaction and loyalty (Neslin et al., 2006).

Managerial Implications

As companies increasingly adopt digital SST, our study serves to provide managers insights on the different channel user types on customer satisfaction and loyalty. This would provide them guidance on the resourcing need to achieve an optimal channel mix. This is particularly pertinent given that companies are increasingly embarking on digital transformation, but are yet often concerned about how the reduction in social interactions with SST may have a negative impact on customer experience (Laberge et al., 2020; Zaki, 2019).

CHAPTER 2.2: LITERATURE REVIEW

To develop our theories on the effects of digital SST on customer satisfactions and loyalty within a multichannel environment, we draw upon research on (1) multichannel, (2) customer satisfaction, and (3) SST. In this section, we will review some of the relevant literature, and point out that despite the prolific research on these three topics, there has been limited research on (1) our understanding of how SST usage affects relational level outcomes, (2) how different customer types moderate the relationship between the antecedents and outcomes of customer satisfaction, and (3) the effects of digital SST usage within the context of complex multichannel service industries.

Multichannel Customers

The literature typically refers to channels as a "customer contact point, or a medium through which the firm and the customer interact." (Neslin et al., 2006, p. 92). Channels can thus encompass both digital SST such as websites and mobile apps, as well as non-digital channels such as call centres, stores, and agents. Over the years, companies have increasingly adopted a multichannel strategy with the assumption that this would improve customer experience and drive customer satisfaction and loyalty (Bitner et al., 2000; van Birgelen et al., 2006; Hsieh et al., 2012; Ailawadi & Farris, 2017). In this section we would review the theorised effects of a multichannel strategy and highlight some of the empirical work.

Impact of Multichannel Services on Customers

Conceptually, multichannel research offers two competing effects on customers. In terms of positive effects, researchers have argued that services offered across multiple channels should enhance customer satisfaction and loyalty due to (1) greater accessibility to existing services, (2) greater customization and flexibility available for customers to interact

with the company, (3) better service recovery due to the ease of providing feedback and complaints, (4) greater synergies across channels (Bitner et al., 2000; Neslin et al., 2006).

On the other hand, authors have also argued that having multiple channels may also negatively affect customers. Neslin et al (2006) suggests that multichannel offerings may negatively impact customer loyalty as it allows for more extensive search of alternatives. A lack of integration and coordination of strategy, activities, communication, and data across channels may also lead to a poor customer experience (Ailawadi & Farris, 2017; Neslin et al., 2006; Verhoef et al., 2015). Indeed, some research suggests that the effects of online satisfaction can spill over into offline loyalty, as customers view the online channel as an extension of an offline store, with positive impressions online transferring to the offline channel (Wang & Zhang, 2018). Despite the competing theories, research that has predominantly focused on the retail sector suggests that the effects of offering multiple channels usually has a positive effect on satisfaction and loyalty, although this appears to be weaker for the banking industry (Neslin et al., 2006).

Recent Research Focusing on Channel Integration

More recent research on channels have shifted away from a multichannel focus, to an omnichannel focus (Verhoef et al., 2015). Rather than study the effects of different channels on customers, recent studies now focus on measuring the quality of channel integration and its corresponding impact on customers. Instruments to measure different conceptualisation of channel integration have been developed, with researchers studying their impact on outcomes such as customer satisfaction, customer experience, and loyalty (Gao et al., 2021; Hamouda, 2019; Hsieh et al., 2012; Madaleno et al., 2007; Quach et al., 2020; Shuqing Yang et al., 2017). While efforts in this space expands our understanding of multichannel customers, how

these customers compare with other customer types, such as those who only use offline channels, or customers who only use digital SST remains limited.

Most Research Limited to Retail Environments

Apart from a lack of research in comparing multichannel customers against other customer types, multichannel research also tends to be predominantly focused on the retail industry (Bolton et al., 2022; Gao et al., 2021; Hult et al., 2019; Jiang & Rosenbloom, 2005; Quach et al., 2020; Shuqing Yang et al., 2017). While insightful, research on how multichannel services affect customers within more complex service environments tends to be lacking (Hsieh et al., 2012). Transactions and customer relationships in industries such as banks tend to be more complex and for longer durations. Services encounters can range from the routine where service responses can be simple and standardised, to non-routine, where service responses can be complex, knowledge intensive, and require extensive customisation (Hsieh et al., 2012; van Birgelen et al., 2006). In contrast, retail service encounters may tend to be more fleeting and transactional. Thus, the lack of research in non-retail settings presents a gap in our understanding of the impact of multichannel strategies.

Consequently, from the above, the effect of multichannel service offerings on customers may not always be positive. Research contrasting multichannel customers with other customer types appears to be lacking. The research has also been predominantly focused on the retail environment. The effect of multichannel usage within more complex service environments may differ, and the limited research in the area may warrant further theorising.

Customer Satisfaction Moderators

In Study 1, we reviewed literature on customer satisfaction and highlighted its origins in the EDM theory (Oliver, 1980). Of relevance to Study 2, is how the relationships between perceived quality and satisfaction, and satisfaction and loyalty, has been found to be well established in the literature (Fornell et al., 1996; Szymanski & Henard, 2001). Additionally, the Study 1 review found cumulative satisfaction, as opposed to transactional satisfaction having a stronger link with firm performance (Bolton, 1998; Johnson et al., 1995; Palmatier et al., 2006). Despite the rich literature, not much work has been done on customer level moderators, and how different channel users can affect the established relationships within the ACSI model.

Moderator Research Focused on Satisfaction-Performance Link

Firstly, with regards to moderators, we note that much of the work in this area has focused on how customer satisfaction moderates its impact on business performance. As previously noted in Study 1, these moderators generally revolve around the type of (1) satisfaction measurement used, (2) category types, such as services as opposed to goods, and retail and non-retail industries, and (3) country (Anderson, 1994; Szymanski & Henard, 2001; Morgeson et al., 2015, 2020; Otto et al., 2020). Surprisingly, there has been few studies on how the ACSI relationships can be moderated. Despite the limited research, there has been one noteworthy study focusing on the retail sector. We review this research next.

Channel User Type & ACSI Relationships

Hult et al (2019) studied how the relationship between the ACSI antecedents and outcomes of satisfaction would be moderated by online and offline purchases for the electronic goods industry. Focusing only on customers from the retail sector, the authors

found that the quality-satisfaction relationship was weaker for online purchases. The effect of satisfaction on loyalty however was interestingly stronger among online customers. The authors argued that the weaker quality-satisfaction relationship was due to (1) a lack of socialization, (2) the absence of an agent who could have potentially provided personalised and trustworthy information, (3) higher shopping risk due to the inability to physically judge the quality and reliability of a product, and (4) perceived online security and privacy risks. The authors point out that these detriments would outweigh any convenience-related benefits.

As for the stronger relationship between satisfaction and loyalty, the authors argued that this stems from the lower search costs associated with online purchases. Hult et al (2019) point out that in an online retail setting, customers are able to save, review, and customise their previous search and purchase histories. This would therefore result in an increase in customer stickiness.

Therefore, while research on customer satisfaction has grown and matured over the years, research on how channel user types moderate established relationships with customer satisfaction appear to be lacking (Hult et al., 2019). Previous research appears to be predominantly focused on methodological and industry level variables. Evidence of customer level moderators by Hult et al (2019) suggests that research in this field could branch further to cover not only the relationship between satisfaction and performance, but the relationships between customer satisfaction and its antecedents and outcomes.

Research on SST Usage & Outcomes

Multichannel research typically involves SST as part of the channel mix. Research specifically on SST on the other hand has been prolific, with a number of meta-analysis done to review the growing body of work (Blut et al., 2015, 2016; Lionello et al., 2020). Typically defined as "technology interfaces that enable customers to produce a service independent of direct service employee involvement" (Meuter et al., 2000, p. 50), studies have generally identified technologies such as ATMs, internet banking, websites, mobile applications, and self-check-out kiosks as SST. With the rise of artificial intelligence, more recent studies have looked at a new generation of SST which include technologies such as service robots and chatbots (Blut et al., 2021; van Doorn et al., 2017; Wirtz et al., 2018). In our review of the research, we would first look at the two primary research streams, namely (1) SST adoption, and (2) e-service quality. Thereafter, we would focus our attention on the limited research on (3) SST and its impact on relational level outcomes. Through the review, we would point out that the research has predominately focused on the use and evaluation of the SST itself, but surprisingly limited research has been done on its impact on firm level relational outcomes.

Research on SST Acceptance & Adoption

Most of the early research on SST were aimed at understanding customer adoption issues. This was unsurprising as managerially, companies were increasingly deploying these technologies to raise productivity by replacing employee-based service (Meuter et al., 2000; Blut et al., 2016; Weijters et al., 2007; Leng & Wee, 2017). Indeed when implemented well, SST theoretically should improve firm outcomes through (1) standardizing of service delivery, (2) lowering labor costs, and (3) expansion of service options (Curran & Meuter, 2005). According to Blut et al's (2016), the theoretical foundations for SST research were based on the technology acceptance model (Davis, 1989) and the unified theory of acceptance

and use of technology (Venkatesh et al., 2012). Their meta-analysis of 96 papers went on to show that intention to use SST was driven by factors such as (1) subjective norms, (2) experience, (3) need for interaction, (4) self-efficacy, (5) external control, (6) anxiety, and (7) computer playfulness. The relationship between these drivers and intention to use SST was in turn found to be generally mediated by (1) usefulness, (2) ease of use, and (3) attitude towards using SST (Blut et al., 2016).

Research on SST Quality

Apart from adoption related research, an adjacent stream of research focuses on the quality of customers' experience with e-services. Branching out from service quality research, (Parasuraman et al., 1988), this research stream adapted and extended the concepts into the digital domain, with different scales developed to measure the construct for digital SST such as websites (Parasuraman et al., 2005). In various meta-analysis, e-service quality dimensions include factors such as (1) web (2) design, (3) fulfilment, (4) customer service, (5) security, (6) efficiency, (7) fulfilment, (8) system availability, (9) privacy, (10) responsiveness, and (11) contact. The effect of these dimensions on e-service quality were found to be moderated by country culture, regulatory environment, and industry (Blut et al., 2015; Lionello et al., 2020). Rather than adoption as an outcome, research on e-service quality generally focuses on customer satisfaction and repurchase intentions with the e-service itself (Blut et al., 2015).

Outcomes of SST Usage

Focusing on outcomes other than SST adoption, the research on SST has considered its impact on (1) customer satisfaction, and (2) customer loyalty. However, our review would show that the research on customer satisfaction tends to be SST centric. Research on its impact on customer loyalty also tends to be limited.

SST and Customer Satisfaction

While researchers acknowledge the importance of studying its effects (Robertson et al., 2016; Chen et al., 2009; Weijters et al., 2007), most of the research tends to be predominately SST centric. For example, while Chen et al (2009) noted the importance of understanding customer satisfaction, their study of Taiwanese students perception of SST such as kiosks, ATM, internet banking and mobile applications, focused only on satisfaction and continuance intention to use the SST itself. Robertson et al's (2016) study of interactive voice response and digital SST usage, focused only on satisfaction and continued usage with the SST. Bolton et al's (2022) study of a global home décor and furnishing retailer considered only satisfaction with service encounters and how it differs between online and offline channels. Pooya et al's (2020) study of private banking customers only looked at the impact of SST service quality on e-satisfaction despite also studying its impact on broader relational outcomes such as trust. Thus, these examples of SST research reveal that much of the work on SST usage and customer satisfaction tends to focus on satisfaction with the SST itself.

SST Kiosks & Overall Satisfaction

An exception to the over focus on SST satisfaction is the research on self-service kiosks. This stream of SST research looks specifically at the impact of self-service kiosk usage and quality, and their effects on overall store level satisfaction. The research has covered a broad range of service settings including supermarkets, grocers, airports, hospitals, and banks. Arguments for a positive relationship between self-service kiosks and overall satisfaction include (1) improved in waiting times, (2) increased accessibility to services, (3) flexibility in schedules, and (4) convenience (Cambra-Fierro et al., 2020; Demirci Orel & Kara, 2014; Djelassi et al., 2018; Kokkinou & Cranage, 2013; Meuter et al., 2000; Weijters et al., 2007; Yoon & Choi, 2020).

SST & Customer Loyalty

Moving on to SST and its impact on customer loyalty, as highlighted previously, while research on customers willingness to continue to use SST has been highly prolific, research on how SST affects customer loyalty tends to be limited. Research in this area appears to focus on comparing online and offline channel usage and its impact on loyalty. Research based on non-complex service environments such as retail and lodging found the customer satisfaction-loyalty relationship to be positively moderated by digital SST when compared with an offline channel usage.

Specifically, Shanker et al's (2003) study of the lodging industry looked at one set of data with customers who used both online and offline channels, and another set of data where customers used either online or offline channel exclusively. In both instances they found the use of a website for reservation tends to result in a stronger relationship with customer loyalty. Hult et al's (2019) study of the electronic goods industry, also found the satisfaction-loyalty relationship to be stronger. Arguments for this relationship stem from the online medium allowing for (1) greater ease of access resulting in a reduction in willingness to consider alternatives, (2) reduced search costs due to the ease of reviewing past search history and past choices. While these limited findings are helpful, the effect of digital SST usage within a more complex multichannel service environment may not necessarily hold.

With regards to more complex service settings, evidence from van Birgelen et al's (2006) study of the banking industry suggests that the effect of different channel usage on behavioral intentions, which includes customer loyalty attributes such as repurchase intentions, can differ by the type of service customers are utilising. Specifically, non-routine service which cannot be resolved based on standardized procedures and simple decision making, was more impacted by service employee satisfaction. Moreover, there appears to be a positive interaction effect between website and service staff satisfaction, and behavioral

intentions. The authors argue that the use of both digital and non-digital channels may have resulted in a complementary effect on behavior intentions, with website usage reducing information asymmetry and sharpening expectations when interacting with a service staff. However, as the data relied on customers who were already using multiple channels, including the internet banking, branch, and service employees, the study is essentially studying only a within groups effect. The effect of SST usage among customers who only use one type of channel remains uncertain.

Consequently, while the limited research on SST usage and customer loyalty seem to point to digital SST having a positive moderating effect, it remains unclear if this relationship would hold within a more complex service environment.

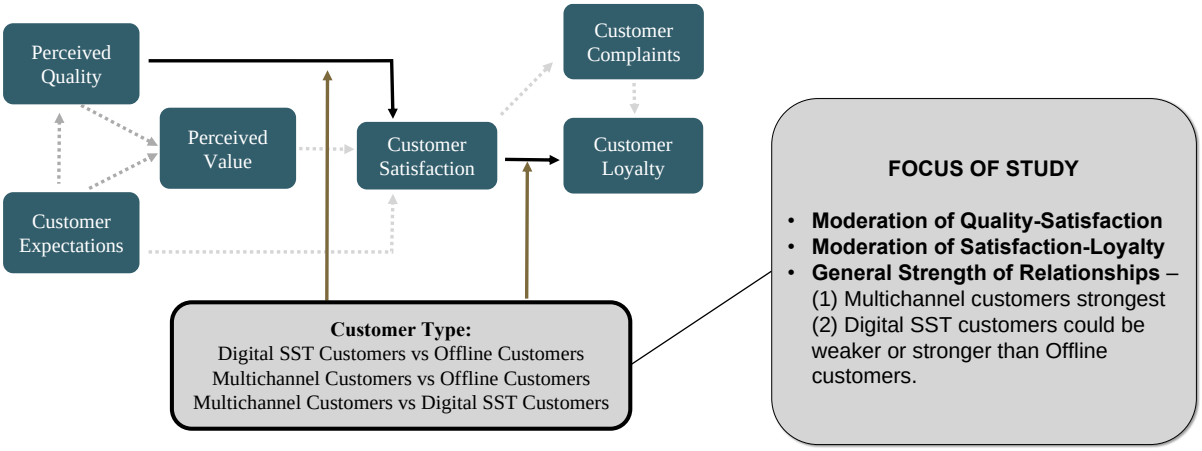
Gaps in Understanding How SST Users Affect Customer Satisfaction

From the above, we note that while research on multichannel and SST has been rather extensive, the research has been focused on the effects of channel integration, SST quality, SST encounter satisfaction, and SST adoption. Limited research has been done on the broader relational level outcomes of cumulative customer satisfaction and loyalty. Research that does look at these outcomes, generally either do not consider the effects within the context of a more complex service environment, or suffer from methodological limitations in comparing these effects. Therefore, there remains a gap in our understanding of how different channel user types moderates the quality-satisfaction and satisfaction-loyalty relationships.

CHAPTER 2.3: RESEARCH HYPOTHESES

As stated above, how different channel user types affect the relationship between customer satisfaction and its antecedents and consequences, and how they might differ from each other remains a gap in our knowledge. This is particular pertinent for complex multichannel service environments where the types of service needs can range from the routine to non-routine (van Birgelen et al., 2006). In this section we will first develop our theoretical model before providing our proposed hypotheses.

Theoretical Model



Note: Solid arrows represent relationships focused on in this study

Figure 3: Theoretical Model for Study 2

In line with work by Hult et al (2019), we situate our theory development within the context of the well-researched ACSI model (Fornell et al., 1996). Figure 3 highlights the focus of our proposed hypotheses. Our research will focus primarily on how the different channel user types would moderate the relationships between (1) perceived quality and customer satisfaction, and (2) customer satisfaction and customer loyalty. These relationships tend to form the most critical components of the ACSI model and from our experience consulting with companies using the ACSI model, perceived quality is often the most metric which managers tend to be more fixed on.

To gain a better understanding on the moderating effects, we would theorise a hierarchy of effects between channel user types. We do this by proposing how the moderating effects of each of the three channel user types would compare with each other. The limited research in this field tends to focus on a comparison between a digital SST customer and an offline customer (Chen et al., 2009; Hult et al., 2019; Shankar et al., 2003). By theorising based on a hierarchy of effects, we aim to provide a more fine-grained view on how the different channel user types differ from each other. Therefore, we propose that that two ACSI relationships tend to be the strongest for multichannel customers when compared with the other channel user types. As for digital SST customers, we would explore two competing theories on how its moderating effects compares with offline customers. We discuss them in detail next.

Moderation Effects on Quality-Satisfaction Relationship

Digital SST vs Offline Customers

The moderating effects of customers who only use digital SST when compared to customers who have only used offline channels depends on how the benefits of online services such as (1) greater accessibility with 24/7 access, (2) convenience, and (3) ease of viewing information for decision making (Shankar et al., 2003), would outweigh the detriments arising from the lack of human-based interactions. Specifically this would include the lack of socialisation and the ability to gain more personalised information from service staff (Hult et al., 2019). Moreover, website interactions tend to be less satisfying and weigh more heavily on cognitive and behavioural qualities, as opposed to stores where emotional and sensorial qualities weigh more heavily (Bolton et al., 2022). These effects are likely to be more pronounced in a complex service environment given the potential for non-routine service interactions (van Birgelen et al., 2006). The limited research set within the context of

less complex service environments, do not reveal any conclusive effects. Hult et al's (2019) research on the retail industry found a negative moderating effect. Research on kiosks on the other hand suggests a potentially positive moderating effect given the general convenience and accessibility of SST. Given the uncertainty, we propose two competing hypotheses:

H1A: The effect of perceived quality on cumulative satisfaction is stronger for digital SST customers when compared to offline customers

H1B: The effect of perceived quality on cumulative satisfaction is weaker for digital SST customers as compared when offline customers

Multichannel Customers

Research from the multichannel literature generally suggests that providing customers with multiple channels should ultimately strengthen customer satisfaction and loyalty due to the synergies and ability for customers to use channels that best fit their requirements (Bitner et al., 2000; Hsieh et al., 2012; Neslin et al., 2006). The ability to use both digital SST and offline channels can potentially result in both types of channels complementing each other and substituting against their weaknesses. Empirically, van Birgelen et al's (2006) study of banking customers found a positive moderating effect of website and service staff satisfaction on behaviour intentions. The authors argued that both channel types complemented each other as website interaction reduced information asymmetry and sharpened customer expectations when interacting with service staff. Moreover, a lack of immediate feedback from online interactions can be circumvented by face-to-face interactions with service staff, resulting in a complementary effect. Channels with poorer service levels or longer waiting times could also be avoided. This effect is likely to be most pronounced for complex non-

routine interactions which required customization and greater service staff knowledge to effectively meet customers' needs.

In contrast, customers who use only offline channels or digital SST would require the strengths of their respective channel types to outweigh any shortcomings. However, as highlighted above, digital SST suffers from less satisfying experiences (Bolton et al., 2022), while offline channels may not be as accessible and convenient as digital SST. Thus, as multichannel customers are likely to benefit from the strengths of both channel types, while circumventing their weaknesses, the effect of perceived quality on customer satisfaction should be the strongest when compared with other channel user types. Formally:

H2: The effect of perceived quality on cumulative satisfaction is stronger for multichannel customers when compared to offline customers

H3: The effect of perceived quality on cumulative satisfaction is stronger for multichannel customers when compared to digital SST customers

Moderation Effect on Satisfaction-Loyalty Relationship

Digital SST vs Offline Customers

Like H1A and H1B, the moderating effect of digital SST customers on the satisfaction-loyalty relationship could potential be positive or negative. In terms of positive effects, digital SST allows for (1) greater accessibility, (2) greater convenience, and (3) ease of tracking historical transactions and search history (Hult et al., 2019; Shankar et al., 2003). In more recent times, digital SST usage would also (4) allow for more targeted offerings by using data derived from their customers' behaviour on their digital platforms. When

compared to offline channels, these benefits would increase customer stickiness and strengthen the satisfaction-loyalty relationship.

In terms of a potentially negative moderating effect, the ease of comparing with alternatives online and the resultant ability to widen a customers' consideration set could serve to weaken the relationship between satisfaction and loyalty (Neslin et al., 2006; Shankar et al., 2003). Additionally, digital SST usage tends to weigh less on emotional and sensory qualities, which when compared to offline channel usage, would result in a poorer ability of companies to build rapport and form socio-emotional ties with their customers (Bolton et al., 2022; Giebelhausen et al., 2014). All these effects would result in a lower level of loyalty regardless of how satisfied a customer may be.

While the data from the retail and lodging industry suggests a positive moderating effect for digital SST customers (Hult et al., 2019; Shankar et al., 2003), it remains unclear which of the above effects would take precedence in a complex service environment. Therefore, as before we form hypotheses for both effects. Formally:

H4A: The effect of cumulative satisfaction on loyalty is stronger for digital SST customers when compared to offline customers

H4B: The effect of cumulative satisfaction on loyalty is weaker for digital SST customers when compared to offline customers

Multichannel Customers

Like H2 and H3, we would argue that the relationship between customer satisfaction and loyalty should likewise be the strongest for multichannel customers. As pointed out previously, the use of multiple channels can result in a complementary effect across the

different channel types. The use of multiple channels can allow for quicker identification and response to service failures due to the increased level of engagement, which in turn would translate to higher customer loyalty (Bitner et al., 2000). Evidence from multichannel research also tends to suggest that the ability to choose between preferred channel options can improve customer loyalty (Neslin et al., 2006).

Thus, as with H2 and H3, the moderating effect should be stronger when compared to digital SST customers and offline customers, which must substitute for the shortcomings of their respective channel types. Therefore, we propose that the moderating effect of multichannel customers on the satisfaction-loyalty relationship should be the strongest across channel user types. Formally:

H5: The effect of cumulative satisfaction on loyalty is stronger for multichannel customers when compared to offline customers

H6: The effect of cumulative satisfaction on loyalty is stronger for multichannel customers when compared to digital SST customers

CHAPTER 2.4: METHODOLOGY

Data

To test our hypotheses, we used surveys data of banking and telecommunication customers from the CSISG database. In line with previous research on multichannel services, both these industries have well-established multichannel services which customers are familiar with (Hsieh et al., 2012). For banking, customers' relationship with a bank tends to be deeper than with retailers given the presence of financial risks. Services offered by banks can range from the simple and routine, to the complex and non-routine (van Birgelen et al., 2006). Banks also typically offer a host of channels for customers including ATMs, branches, internet banking, mobile banking, call centres, and relationship managers.

Similarly, telecommunication customers tend to also have deeper and longer relationships with their provider due to contractual obligations. Most telecommunication customers in Singapore have post-paid contracts with their provider. Telecommunication providers also tend to provide a range of channels from which customer can use. These include stores, website, mobile applications, and call centres. Like banks, services at these various channels can range from the simple purchase of equipment and SIM-cards to the complex, such as resolving network connectivity issues.

Therefore, the depth of customer relationships and complexity of service offerings make both these industries ideal candidates to test our theories. By using two industries, we would also be able to ascertain the generalizability of our theories.

The banking dataset was extracted from the period 2014 to 2019, while the dataset for telecommunications was from 2016 to 2019. These periods were chosen as they were the period from which the data on multiple channels was available. The data was further cleaned to remove any missing data. In addition, for banking, we excluded customers who had interacted only with ATM machines, to focus our analysis on digital SST as opposed to

kiosk-based SST. The final dataset consists of 7,950 banking customers, and 5,839 telecommunication customers.

Measures

Table 11 provides the list of variables used for our analysis as well as their data source. The variables include customer satisfaction related variables, channel-related variables, and a range of demographic control variables.

Table 12: Summary of Variables Used for Study 2

Variable	**Operationalisation**		**Data Source**
Customer Expectations	Overall expectation of quality (prepurchase):	How would you rate the overall quality you were expecting to experience, where 1 means "expecting very low quality" and 10 means "expecting very high quality"?	CSISG database
	Expectations on meeting personal requirements (prepurchase):	How well were you expecting them to meet your personal requirements, where 1 means "not very well" and 10 means "very well"?	CSISG database
	Expectations on reliability (prepurchase):	How often were you expecting things to go wrong where, 1 means "very often" and 10 means "not very often"?	CSISG database
Perceived Quality*	Overall quality experienced (post purchase):	How would you rate the overall (product/service) quality you experienced, where 1 means "very low" and 10 means "very high"?	CSISG database
	Evaluation of how well personal requirements were met (post purchase):	How well your (product/service) personal requirements were met, where 1 means "not very well" and 10 means "very well"?	CSISG database
	Evaluation of reliability (post purchase):	How often things have gone wrong (with their product/service), where 1 means "very often" and 10 means "not very often"?	CSISG database
Perceived Value	Rating of price given the quality:	Given that 1 means "very poor" and 10 means "very good", how would you rate the prices they charge, given the quality of their products and services?	CSISG database
	Rating of the quality given the price:	Given that 1 means "very poor" and 10 means "very good", how would you rate the quality of the products and services, given the prices they charge?	CSISG database
Customer Satisfaction	Overall satisfaction:	How would you rate your overall satisfaction with (Company), where 1 is "very dissatisfied" and 10 is "very satisfied"?	CSISG database
	Expectations disconfirmation:	How would you rate the overall ability of (Company) to meet your expectations, where 1 means "falls short of your expectations" and 10 means "exceeds your expectations"?	CSISG database
	Performance relative to ideal product/service in the category:	How does (Company) compare with your ideal (Sub-sector), where 1 means "not very close to your ideal" and 10 means "very close to your ideal"?	CSISG database
Customer Loyalty	Repurchase likelihood:	The next time you are choosing a (Sector), how likely will it be (Company) again, where 1 means "very unlikely" and 10 means "very likely"?	CSISG database
Complaints	Complaints Behaviour	Have you complained to your family members or friends about (Company) in the last 3 months?	CSISG database

Variable	Operationalisation		Data Source
Channel Usage Dummies	Indicators based on channels used. For both sectors this include Call Centre, Store, Website and App. For Banking, Relationship Manager (RM) and ATM was also included.		CSISG database
Average Call Centre Rating Average Store Rating Average Website Rating Average App Rating Average RM Rating** Average ATM Rating**	Average channel satisfaction rating for each company for each survey year	Considering your recent experience with (Company), how satisfied are you with their (Channel) on a scale of 1 to 10, where 1 means "very dissatisfied" and 10 means "very satisfied"?	Derived from CSISG database
Education	Education level (1 = None, 2 = PSLE & below, 3 = GCE N Level, 4 = GCE O Level, 5 = GCE A Level / Post-Secondary, 6 = ITE / Vocational Institute, 7 = Polytechnic Diploma / Professional Cert, 8 = University Degree, 9 = University Post-Graduate Degree)		CSISG database
Gender	Female (1 = Male, 2 = Female)		CSISG database
Household Income	Monthly Household Income (1 = Under SGD 2K, 2 = SGD 2K - Under SGD 3K, 3 = SGD 3K - Under SGD 4K, 4 = SGD 4K - Under SGD 6K, 5 = SGD 6K - Under SGD 8K, 6 = SGD 8K - Under SGD 10K, 7 = SGD 10K - Under SGD 15K, 8 = SGD 15K - Under SGD 20K, 9 = SGD 20K or over)		CSISG database
Marital Status	Married (1 = Married, 0 = Not married,)		CSISG database
Age	Age of respondents		CSISG database
Work Status	Not Working (1 = Working, 0 = Not working)		CSISG database
Relationship Length (For Telecommunications Sector only)***	Length of relationship	Please tell me how long you have been a customer of (Company)? (1 = Less than 1 year, 2 = 1 to less than 2 years, 3 = 2 to less than 3 years, 4 = 3 to less than 4 years, 5 = 4 to less than 5 years, 6 = 5 or more years)	CSISG database
Telco Sub-Sector (Telecommunications Only)***	Indicators based on telecommunication sub-sector (i.e., Mobile, Broadband, PayTV)		CSISG database
Telco Company (Telecommunications Only)***	Indicators based on the 3 telecommunication companies in Singapore (i.e., Singtel, Starhub, M1)		CSISG database
Bank (Banking Only)**	Indicators based on the top consumer banks in Singapore (i.e., DBS, UOB, OCBC, Citi, HSBC, SCB, Maybank)		CSISG database

**The telecommunication sector measures perceived quality based on 6 items instead of the above 3. In this case, the same 3 items were measured for both service quality, and product quality. Regardless of the number of items used, as we are only interested in the overall measure of perceived quality, for the purpose of our analysis, we used the average of the available items to measure the construct.*
*** Variable available for Banking only.*
**** Variable available for Telecommunications only.*

Customer Satisfaction Related Variables

Similar to Study 1, we use ACSI based constructs for the customer satisfaction related variables (Fornell et al., 1996). This includes our variables of interest namely (1) customer satisfaction, (2) customer loyalty, and (3) perceived quality. Additionally, we added (4)

customer expectations, (5) perceived value, and (6) complaints as additional control variables.

As with Study 1, customer expectations, perceived value and customer satisfaction were operationalised using 3 items. Perceived quality comprises of either 3 or 6 items depending on the industry. For the banking the 3-item measure of perceived quality was used with overall quality, ability to meet customers' requirements, and reliability as the component variables. For telecommunications, the same 3 areas were asked but on product quality and service quality, resulting in 6 items being measured instead of just 3. As with Study 1, an average of the component variables was used to operationalise the constructs.

Apart from the above, Study 2 also included customer loyalty and complaints. Customer loyalty was operationalised based on the repurchase intention question, while complaints was based on customers' recent complaint behaviour.

Channels & Channel User Type

Channel usage was operationalised based on a customers' recent usage of the respective channels. For both industries, the channels included in the study were (1) call centres, (2) stores/branch (labelled as store), (3) website, and (4) mobile application. For banking, apart from these channels, we include ATMs and relationship managers.

The channel user type variable was derived based on the above channel usage data. For digital SST customers, this consists of customers who had only used either the website, the mobile application, or both. For offline customers, this differs across datasets. For banking, this would consist of customers who had only used the offline channels, namely call centre, branch, relationship manager, or any combination of these channels. For telecommunications, this would consist of customers who had only interacted with either the call centres and stores, or both. Finally for multichannel customers, this would comprise of customers who had interacted with at least one digital SST and offline channel.

Control Variables

We included a range of control variables for our analysis. This includes the typical demographic variables, and average channel satisfaction rating. For the telecommunications industry we also included sub-sector dummies, company dummies, and length of customer relationship. For the banking industry we added company dummies for the top consumer banks in Singapore. We outline them below.

Demographics

Firstly in terms of demographics, we use education, age, gender which were the typical control variables used in SST research (Blut et al., 2016; Hult et al., 2019; Meuter et al., 2005; Weijters et al., 2007). We also include work status and marital status given the positive effect of socialization on curbing the negative effects of ageing, which can affect technology interactions (Jedrziewski et al., 2014; Mayhorn et al., 2004; Soubelet, 2013). Given that banking and telecommunication companies tend to segment their customers based on financial assets and spending, we also included household income to control for any potential effects arising from socio-economic status.

Average Channel Satisfaction Rating

Customers may ignore the use of one channel over another due to poorer level of service. To measure service levels, past research has focused on customer-level satisfaction with the channel. This creates a methodological bias as only customers who had interacted with a particular channel can provide a satisfaction rating for it (van Birgelen et al., 2006). Research on multichannel integration and omnichannel quality attempted to overcome this issue by simply having customers who had interacted with at least a number of channels to rate their overall perception (Hamouda, 2019; Hsieh et al., 2012). This tends to result in

studies either comparing between only two different channel user types, typically online and offline customers (Hult et al., 2019; Shankar et al., 2003), or studies that only looked at the effects of channel usage within the context of a multichannel customer. To overcome these issues, we constructed a proxy for channel interaction quality by creating variables to measure the average channel satisfaction rating for each channel. This is done by averaging the satisfaction ratings of a particular channel, for each respective company, for each corresponding survey year. This is possible as the CSISG database measures cross-industry customer satisfaction for different companies. Consequently, this allows for a control variable for channel quality, without having to resort to a dataset that consist of only customers who had interacted with all the channels. Conceptually, customers within a multichannel environment may already be somewhat aware of the quality of channel interactions across the available channels. Thus, customers should generally have gravitated toward using channels that they feel would best meet their needs based on these perceptions. Therefore, using a firm-level measurement of channel satisfaction should be adequate to control for some of these perceptions among channel user types.

Sub-Sector & Company (Telecommunications Only)

The telecommunications industry consists of three sub-sectors, namely mobile, broadband and pay tv. In addition, during the survey period, the industry was also highly concentrated with only three major companies, namely Singtel, Starhub, and M1. As sub-sectorial and company level differences may introduce noise into our dataset, we include them as dummy variables to control for any potential confounding effects.

Length of Relationship (Telecommunications Only)

Given our focus on relational level outcomes, a measure of how long a customer has been with a company would be needed. Longer term customers may already be more loyal

and satisfied. As this data was available in the telecommunications dataset, and we have included it as part of the control variables.

Bank (Banking Only)

Like the telecommunications industry the banking industry was also highly concentrated with the top three local banks, namely DBS, UOB, and OCBC accounting for a significant majority of the market share. As such, dummy variables for the top seven banks in Singapore were included as control variables.

Descriptive Statistics

We used data from the CSISG database, as well as several constructed variables based on the dataset. Table 13 provides a summary of the data used for the analysis.

Table 13: Demographics for Study 2

	Banking		Telecommunications	
Demographic Variable	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
Channel User Type				
Offline Customer	1750	22.0%	2681	45.9%
Digital SST Customer	1488	18.7%	927	15.9%
Multichannel Customer	4712	59.3%	2231	38.2%
Call Centre Usage				
No	4651	58.5%	2456	42.1%
Yes	3299	41.5%	3383	57.9%
Store Usage				
No	3220	40.5%	2762	47.3%
Yes	4730	59.5%	3077	52.7%
Website Usage				
No	2701	34.0%	3451	59.1%
Yes	5249	66.0%	2388	40.9%
Mobile App Usage				
No	3769	47.4%	4420	75.7%
Yes	4181	52.6%	1419	24.3%
Interacted with Relationship Manager (Banking Only)				
No	6282	79.0%	NA	NA
Yes	1668	21.0%	NA	NA
ATM Usage (Banking Only)				
No	471	5.9%	NA	NA
Yes	7479	94.1%	NA	NA
Gender				
Male	4142	52.1%	3523	60.3%
Female	3808	47.9%	2316	39.7%
Education				
None	30	0.4%	16	0.3%
PSLE & below	107	1.4%	150	2.6%
GCE N Level	156	2.0%	76	1.3%
GCE O Level	405	5.1%	656	11.2%
GCE A Level / Post-Secondary	268	3.4%	231	4.0%
ITE / Vocational Institute	430	5.4%	453	7.8%
Polytechnic Diploma / Professional Cert	1793	22.6%	1663	28.5%
University Degree	3917	49.3%	2059	35.3%
University Post-Graduate Degree	844	10.6%	535	9.2%
Monthly Household Income (SGD)				
Under SGD 2K	95	1.2%	44	0.8%
SGD 2K - Under SGD 3K	178	2.2%	253	4.3%
SGD 3K - Under SGD 4K	299	3.8%	440	7.5%
SGD 4K - Under SGD 6K	648	8.2%	819	14.0%

	Banking		Telecommunications	
Demographic Variable	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
SGD 6K - Under SGD 8K	1079	13.6%	1227	21.0%
SGD 8K - Under SGD 10K	1291	16.2%	902	15.4%
SGD 10K - Under SGD 15K	1218	15.3%	927	15.9%
SGD 15K - Under SGD 20K	1718	21.6%	717	12.3%
SGD 20K or over	1424	17.9%	510	8.7%
Married				
No	1434	18.0%	1434	24.6%
Yes	6516	82.0%	4405	75.4%
Working				
No	885	11.1%	733	12.6%
Yes	7065	88.9%	5106	87.4%
Age				
Less than 30	995	12.5%	1003	17.2%
30 - 39	2334	29.4%	1665	28.5%
40 - 49	2515	31.6%	1762	30.2%
50 - 59	1592	20.0%	1029	17.6%
60 - 69	484	6.1%	357	6.1%
70+	30	0.4%	23	0.4%
Length of Relationship (Telecommunications Only)				
Less than 1 year	NA	NA	519	8.9%
1 to less than 2 years	NA	NA	642	11.0%
2 to less than 3 years	NA	NA	736	12.6%
3 to less than 4 years	NA	NA	845	14.5%
4 to less than 5 years	NA	NA	735	12.6%
5 or more years	NA	NA	2362	40.5%
Telco Sub-Sector (Telecommunications Only)				
Mobile	NA	NA	2132	36.5%
Broadband	NA	NA	2254	38.6%
PayTV	NA	NA	1453	24.9%
Telco Company (Telecommunications Only)				
Singtel	NA	NA	2172	37.2%
Starhub	NA	NA	2187	37.5%
M1	NA	NA	1480	25.3%
Bank (Banking Only)				
DBS	969	12.2%	NA	NA
UOB	999	12.6%	NA	NA
OCBC	1038	13.1%	NA	NA
Citi	1063	13.4%	NA	NA
HSBC	1056	13.3%	NA	NA
SCB	1024	12.9%	NA	NA
Maybank	923	11.6%	NA	NA
Other Banks	878	11.0%	NA	NA

Focusing next on the reliability statistics of the ACSI constructs, Table 14 below provides the Cronbach alpha statistics. While most of the statistics were above the generally

accepted value of 0.700 (Cortina, 1993), we note that Perceived Value had a value of only 0.652. The lower value could stem from the use of only two items to measure the construct. Nevertheless, while not as ideal, values of 0.600 have been cited by other studies as an acceptable indicator of reliability (Taber, 2018). Moreover, as the construct only serves as a control variable in our study, the slightly lower reliability statistics is not expected to have any meaningful impact on our findings.

Table 14: Reliability Statistics for ACSI Constructs in Study 2

Construct	N	Items	Cronbach's Alpha
Banking			
Customer Expectations	7,950	3	0.744
Perceived Quality	7,950	3	0.725
Perceived Value	7,950	2	0.652
Customer Satisfaction	7,950	3	0.729
Telecommunications			
Customer Expectations	5,839	3	0.827
Perceived Quality	5,839	6	0.895
Perceived Value	5,839	2	0.701
Customer Satisfaction	5,839	3	0.845

Next, we turn our attention to descriptive statistics and correlations of the variables used in our study. Table 15 and Table 16 provides the mean, standard deviation, and Pearson correlation statistics, for the Banking and Telecommunication sectors respectively.

Table 15: Banking Dataset Descriptive Statistics and Correlations for Study 2

	Variable	1	2	3	4	5	6	7	8	9	10	11	12
1	Customer Expectations	1											
2	Perceived Quality	.451**	1										
3	Perceived Value	.443**	.689**	1									
4	Customer Satisfaction	.492**	.740**	.688**	1								
5	Customer Loyalty	.454**	.495**	.473**	.536**	1							
6	Complaints	-.133**	-.197**	-.190**	-.215**	-.183**	1						
7	Call Centre Usage	-.059**	-.047**	-.038**	-.045**	-.065**	.037**	1					
8	Store Usage	-.093**	0.003	-0.003	0.002	-.104**	-0.022	.029**	1				
9	Website Usage	.049**	0.006	0.02	0.013	.048**	0.006	.062**	-.281**	1			
10	App Usage	.051**	.047**	.051**	.058**	.047**	-0.007	.028*	-.162**	.250**	1		
11	RM Usage	.077**	.032**	.033**	.052**	.067**	0.005	-.058**	0.018	.096**	.056**	1	
12	ATM Usage	0.001	.030**	.025*	0.01	.039**	0	-.033**	-.080**	0.004	.097**	.026*	1
13	Average Call Centre Rating	-.111**	.064**	.080**	.079**	-.031**	-.042**	.080**	.132**	0.002	.093**	-0.016	-.058**
14	Average Store Rating	-.114**	.069**	.078**	.065**	-.052**	-.058**	.025*	.200**	-.059**	.076**	-.031**	-.067**
15	Average Website Rating	.028*	0.013	-0.001	0.018	.050**	0.019	-0.017	-.053**	-0.004	.024*	0.011	0
16	Average App Rating	.029*	-0.008	-0.022	-0.002	.054**	.040**	-.046**	-.082**	0.005	.031**	.048**	0.016
17	Average RM Rating	0.01	-0.018	-.041**	-.037**	.025*	0.018	-.038**	-0.015	-0.013	-.034**	.053**	-0.012
18	Average ATM Rating	.031**	0.002	-.025*	-0.014	.062**	0.003	-.080**	-.023*	-.089**	-0.022	-.030**	.052**
19	Education	.050**	0.004	0.003	-0.006	.027*	0.014	.134**	-.144**	.332**	.250**	.179**	-0.011
20	Gender	0.007	0.009	0.012	0.011	-0.007	0.002	-0.004	0.004	-.041**	-0.014	-.062**	-0.007
21	Household Income	.085**	0.02	.027*	0.001	0.016	0.016	.062**	-.057**	.191**	.116**	.245**	-.060**
22	Married	0.017	-.024*	-0.021	-0.012	0.004	0.011	-.033**	.105**	-.101**	-.085**	.141**	-0.01
23	Age	0.016	-.025*	-0.007	-.025*	-0.005	-0.001	-.141**	.230**	-.288**	-.279**	.145**	-.055**
24	Working	.030**	-.030**	-.034**	-.034**	-0.01	.030**	.070**	-.114**	.181**	.115**	.091**	.028*
25	DBS	0.003	.044**	.050**	.066**	0.02	-0.018	-0.013	.030**	-.075**	-0.02	-.069**	.023*
26	UOB	-0.013	0.001	0.002	-.022*	-0.014	-0.013	-.029**	0.021	-.057**	-0.012	-.055**	.040**
27	Citi	.045**	.052**	.049**	.053**	0.013	0.01	0.013	-0.008	.026*	.030**	.060**	-0.008
28	HSBC	.034**	-.026*	-.022*	-.033**	0.017	0.009	-0.001	-0.012	.052**	.049**	.072**	-0.01
29	SCB	.033**	0.005	0.002	-0.011	0.000	0.011	0.006	-0.018	.055**	.040**	.050**	0.011
30	Maybank	-.038**	-.032**	-0.02	-0.012	0.002	0.003	-0.007	-.029**	0.008	.036**	-0.017	.026*
31	Digital SST Customer	.062**	0.013	.025*	0.007	.078**	-0.004	-.404**	-.582**	.217**	.183**	-.247**	.079**
32	Multichannel Customer	-0.006	0.003	0.005	0.017	-.025*	0.003	.356**	.199**	.452**	.327**	.288**	-.046**
33	Offline Customer	-.052**	-0.016	-.029**	-.027*	-.045**	0.001	-.042**	.311**	-.741**	-.560**	-.109**	-0.02
	Mean	7.686	7.737	7.727	7.515	7.710	0.030	0.410	0.590	0.660	0.530	0.210	0.940
	Standard Deviation	0.970	1.037	1.109	0.982	1.198	0.164	0.493	0.491	0.474	0.499	0.407	0.236
	N	7950	7950	7950	7950	7950	7950	7950	7950	7950	7950	7950	7950

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 15: Banking Dataset Descriptive Statistics and Correlations for Study 2 (Cont'd)

	Variable	13	14	15	16	17	18	19	20	21	22	23	24
1	Customer Expectations												
2	Perceived Quality												
3	Perceived Value												
4	Customer Satisfaction												
5	Customer Loyalty												
6	Complaints												
7	Call Centre Usage												
8	Store Usage												
9	Website Usage												
10	App Usage												
11	RM Usage												
12	ATM Usage												
13	Average Call Centre Rating	1											
14	Average Store Rating	.650**	1										
15	Average Website Rating	.035**	.118**	1									
16	Average App Rating	0.006	.065**	.566**	1								
17	Average RM Rating	-.063**	.164**	.357**	.595**	1							
18	Average ATM Rating	-.133**	.179**	.509**	.538**	.519**	1						
19	Education	.110**	.101**	0.009	.059**	.103**	-.065**	1					
20	Gender	0.003	-0.008	-.031**	-0.02	-.060**	-0.003	-.093**	1				
21	Household Income	.087**	.101**	-.022*	0.02	.114**	-.089**	.597**	0.016	1			
22	Married	.030**	.025*	0.016	.044**	.046**	-0.006	0.001	.077**	.077**	1		
23	Age	-0.004	0.021	.023*	.043**	.071**	.042**	-.255**	-.035**	.074**	.536**	1	
24	Working	0.009	-0.017	-.032**	-0.016	0.014	-.104**	.326**	-.195**	.240**	-0.009	-.125**	1
25	DBS	.131**	-.089**	.072**	.050**	-.117**	-0.005	-.225**	0.006	-.225**	-.113**	-.069**	-.147**
26	UOB	-.260**	-.141**	-.022*	-.145**	-.144**	.067**	-.171**	0.009	-.156**	-.054**	-0.014	-.105**
27	Citi	.119**	.061**	.160**	.274**	.179**	.160**	.124**	-0.021	.140**	.053**	.056**	.086**
28	HSBC	-0.02	.152**	.064**	.093**	.239**	-0.003	.136**	-.075**	.180**	.081**	.095**	.097**
29	SCB	.042**	-0.014	-.037**	.070**	.065**	-.087**	.137**	-0.019	.135**	-0.004	-0.009	.068**
30	Maybank	.061**	.146**	-.153**	-.127**	-.175**	-.127**	0.017	.123**	-.036**	.039**	-0.01	-0.02
31	Digital SST Customer	-.101**	-.090**	.027*	.062**	.030**	.080**	.042**	0.014	-0.012	-.125**	-.177**	.047**
32	Multichannel Customer	.169**	.101**	-.032**	-.065**	-.070**	-.166**	.321**	-.042**	.211**	0.002	-.165**	.138**
33	Offline Customer	-.105**	-.035**	0.012	0.019	.055**	.122**	-.420**	.036**	-.238**	.115**	.363**	-.208**
	Mean	7.539	7.704	7.823	7.871	8.115	7.602	7.260	1.480	6.560	0.820	42.410	0.889
	Standard Deviation	0.245	0.234	0.111	0.162	0.210	0.152	1.511	0.500	1.942	0.385	10.758	0.315
	N	7950	7950	7950	7950	7950	7950	7950	7950	7950	7950	7950	7950

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 15: Banking Dataset Descriptive Statistics and Correlations for Study 2 (Cont'd)

	Variable	25	26	27	28	29	30	31	32	33
1	Customer Expectations									
2	Perceived Quality									
3	Perceived Value									
4	Customer Satisfaction									
5	Customer Loyalty									
6	Complaints									
7	Call Centre Usage									
8	Store Usage									
9	Website Usage									
10	App Usage									
11	RM Usage									
12	ATM Usage									
13	Average Call Centre Rating									
14	Average Store Rating									
15	Average Website Rating									
16	Average App Rating									
17	Average RM Rating									
18	Average ATM Rating									
19	Education									
20	Gender									
21	Household Income									
22	Married									
23	Age									
24	Working									
25	DBS	1								
26	UOB	-.141**	1							
27	Citi	-.146**	-.149**	1						
28	HSBC	-.146**	-.148**	-.154**	1					
29	SCB	-.143**	-.146**	-.151**	-.150**	1				
30	Maybank	-.135**	-.137**	-.142**	-.142**	-.139**	1			
31	Digital SST Customer	-0.004	0.014	-0.001	-0.001	-0.004	0.017	1		
32	Multichannel Customer	-.062**	-.055**	.023*	.047**	.049**	0.011	-.579**	1	
33	Offline Customer	.078**	.052**	-.027*	-.055**	-.055**	-.030**	-.255**	-.641**	1
	Mean	0.122	0.126	0.134	0.133	0.129	0.116	0.187	0.593	0.220
	Standard Deviation	0.327	0.331	0.340	0.339	0.335	0.320	0.390	0.491	0.414
	N	7950	7950	7950	7950	7950	7950	7950	7950	7950

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 16: Telecommunications Dataset Descriptive Statistics and Correlations for Study 2

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Customer Expectations	1														
2	Perceived Quality	.699**	1													
3	Perceived Value	.613**	.813**	1												
4	Customer Satisfaction	.652**	.848**	.763**	1											
5	Customer Loyalty	.541**	.707**	.627**	.656**	1										
6	Complaints	-.276**	-.322**	-.283**	-.312**	-.277**	1									
7	Call Centre Usage	-.117**	-.111**	-.093**	-.124**	-.103**	.166**	1								
8	Store Usage	.078**	.092**	.076**	.062**	.042**	-0.009	-.163**	1							
9	Website Usage	.117**	.133**	.105**	.110**	.099**	-.101**	-.343**	-.040**	1						
10	App Usage	.041**	.070**	.065**	.049**	.035**	-.041**	-.037**	-.119**	.056**	1					
11	Average Call Centre Rating	.084**	.179**	.170**	.124**	.113**	-.070**	0.005	.070**	-.051**	.110**	1				
12	Average Store Rating	.051**	.109**	.081**	.080**	.087**	-.042**	0.005	.076**	-0.003	.040**	.590**	1			
13	Average Website Rating	.087**	.126**	.105**	.091**	.047**	-.041**	.050**	.070**	0.002	.064**	.442**	.535**	1		
14	Average App Rating	.078**	.132**	.120**	.091**	.060**	-.053**	.048**	-0.023	-0.014	.167**	.577**	.365**	.543**	1	
15	Education	.083**	.097**	.082**	.068**	.061**	-.145**	-.118**	-.054**	.265**	.116**	.063**	0.016	.084**	.060**	1
16	Gender	-0.003	-0.013	-0.016	-.028*	-0.004	0.021	0.014	0.019	-.039**	-.036**	-0.021	0.006	-.034**	-.041**	-.089**
17	Household Income	.107**	.080**	.070**	.052**	.064**	-.089**	-.123**	.029*	.178**	0.024	.060**	0.018	.108**	.052**	.509**
18	Married	0.004	-.026*	-.037**	-0.02	0.004	-0.004	-0.013	-.078**	-.085**	-.081**	0.003	-0.018	0.014	.035**	-.079**
19	Age	-0.017	-.031*	-.037**	-.036**	-0.001	.030*	.029*	.032*	-.204**	-.148**	-0.023	-0.012	-.032*	-0.019	-.328**
20	Working	.047**	.029*	.027*	.030*	0.022	-.106**	-.097**	-.043**	.128**	.075**	.045**	-0.008	.081**	.069**	.321**
21	Relationship Length	.037**	.065**	.037**	.078**	.058**	0.004	-0.018	-.100**	-.168**	0.001	.113**	.054**	-0.014	.037**	-.176**
22	Digital SST Customer	0.01	-0.001	0.002	0.025	0.021	-.077**	-.510**	-.459**	.370**	.214**	-.027*	-.035**	-.027*	0.01	.084**
23	Multichannel Customer	.133**	.163**	.138**	.120**	.096**	-.064**	.064**	.244**	.508**	.375**	.055**	.053**	.081**	.074**	.258**
24	Offline Customer	-.137**	-.158**	-.136**	-.135**	-.109**	.119**	.312**	.099**	-.766**	-.522**	-.034**	-.026*	-.059**	-.080**	-.313**
25	Sub-sector: Mobile	.060**	.063**	.060**	.064**	.030*	-0.006	-.071**	.221**	-.033*	-.070**	.147**	.163**	-.196**	-.201**	-.091**
26	Sub-sector: Broadband	-0.014	-0.024	-0.003	-0.018	-.035**	0.005	.027*	-.103**	0.014	-.028*	-.206**	-.387**	.180**	-.083**	.098**
27	Sub-sector: PayTV	-.050**	-.042**	-.064**	-.050**	0.005	0.001	.048**	-.131**	0.022	.109**	.068**	.254**	0.016	.317**	-0.008
28	Telco Company: Singtel	-0.016	-0.022	-.037**	.047**	-0.015	0.005	0.012	-0.019	-0.003	0.011	-.098**	-.091**	-.128**	0.004	-.041**
29	Telco Company: Starhub	0.007	.032*	.026*	-0.009	0.012	0.006	0.004	-0.011	0.017	.033*	.108**	.150**	.177**	.185**	0.000
30	Telco Company: M1	0.01	-0.01	0.013	-.041**	0.003	-0.012	-0.018	.033*	-0.015	-.048**	-0.011	-.066**	-.054**	-.210**	.045**
	Mean	7.444	7.554	7.560	7.198	7.500	0.060	0.580	0.530	0.410	0.240	7.509	7.734	7.811	7.761	6.850
	Standard Deviation	1.056	1.085	1.161	1.058	1.267	0.233	0.494	0.499	0.492	0.429	0.325	0.161	0.185	0.210	1.701
	N	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 16: Telecommunications Dataset Descriptive Statistics and Correlations for Study 2 (Cont'd)

	Variable	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	Customer Expectations															
2	Perceived Quality															
3	Perceived Value															
4	Customer Satisfaction															
5	Customer Loyalty															
6	Complaints															
7	Call Centre Usage															
8	Store Usage															
9	Website Usage															
10	App Usage															
11	Average Call Centre Rating															
12	Average Store Rating															
13	Average Website Rating															
14	Average App Rating															
15	Education															
16	Gender	1														
17	Household Income	.028*	1													
18	Married	.096**	.069**	1												
19	Age	0.019	0.023	.528**	1											
20	Working	-.287**	.184**	-0.025	-.106**	1										
21	Relationship Length	.036**	-.100**	.285**	.377**	-.044**	1									
22	Digital SST Customer	-0.017	0.025	0.015	-.087**	.073**	.057**	1								
23	Multichannel Customer	-.042**	.187**	-.120**	-.179**	.120**	-.177**	-.342**	1							
24	Offline Customer	.053**	-.201**	.106**	.239**	-.171**	.131**	-.400**	-.725**	1						
25	Sub-sector: Mobile	.061**	-.038**	-.078**	-.028*	-.122**	.139**	-.136**	.035**	.066**	1					
26	Sub-sector: Broadband	-.052**	.063**	0.009	-0.015	.105**	-.154**	.070**	-.036**	-0.017	-.601**	1				
27	Sub-sector: PayTV	-0.01	-.029*	.076**	.049**	0.017	0.018	.072**	0.001	-.054**	-.436**	-.456**	1			
28	Telco Company: Singtel	0.005	-0.021	0.018	.029*	-0.012	.053**	0.014	-0.014	0.003	-.071**	-.069**	.156**	1		
29	Telco Company: Starhub	-0.008	-0.011	-0.009	-0.012	-0.022	0.007	0.01	0.022	-.029*	-.060**	-.070**	.145**	-.596**	1	
30	Telco Company: M1	0.004	.036**	-0.01	-0.019	.038**	-.067**	-.027*	-0.009	.029*	.145**	.154**	-.335**	-.448**	-.451**	1
	Mean	1.400	5.740	0.754	41.370	0.875	4.320	0.159	0.382	0.459	0.365	0.386	0.249	0.372	0.375	0.254
	Standard Deviation	0.489	1.923	0.430	11.277	0.331	1.734	0.365	0.486	0.498	0.482	0.487	0.432	0.483	0.484	0.435
	N	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839	5839

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Models

As our research is concerned with moderation effects, moderation regression models using the PROCESS macro by Hayes (2017) was used. A pairwise comparison of the different user types was done to examine the different effects. We outline the models next.

Moderating Quality-Satisfaction Relationship: Digital SST vs Offline (H1A & H1B)

To examine the moderating effects of digital SST customers on the quality-satisfaction relationship we used a moderated regression OLS model with customer satisfaction (*satisfaction*) as the dependent variable, digital SST customers (*digicust*), perceived quality (*quality*), and an interaction term consisting of *digicust* and *quality*, as the independent variables. The data consist of a subset of the full dataset, with only digital SST customers and offline customers. This allows offline customers to be used as the reference in the model, thereby allowing us to make a direct comparison between the two channel user types.

Control variables added to the model include gender (*gender*), education (*edu*), household income (*hincome*), marital status (married), work status (*work*), age (*age*). The model also includes other antecedents of customer satisfaction from the ACSI model (Fornell et al., 1996), namely customer expectations (*expect*) and perceived value (*value*). Channel wise, the relevant channel indicators (*channeldum*) were included together with the respective average channel satisfaction ratings (*channelsatis*). In terms of industry control variables, company indicators (*coydum*) were included. For the telecommunications dataset, we further included the length of the relationship (*relationship*) and sub-sector (*subsec*) as control variables. Lastly the typical constant (α_0) and error term (e_i) was included. Equation (1) below depicts the model:

$$(1)\ satisfaction_i = \alpha_0 + \beta_1 digicust_i \times quality_i + \beta_2 digicust_i + \beta_3 gender + \beta_4 edu_i + \beta_5 hincome_i + \beta_6 married_i + \beta_7 work_i + \beta_8 age_i + \beta_9 expect + \beta_{10} quality + \beta_{11} value_i + \beta_{ij} channeldum + \beta_{ij} channelsatis + \beta_{12} relationship_i + \beta_{ij} subsec + \beta_{ij} coydum + e_i$$

Moderating Quality-Satisfaction Relationship: Multichannel vs Offline/Digital SST (H2 & H3)

To compare the moderating effects between multichannel customer and offline customers, and multichannel customers and digital SST customers, a similar model from equation (1) was used. For the comparison between multichannel customers and offline customers, the dataset consisted of these customer types with offline customer as the reference group. The comparison between multichannel customers and digital SST customers consisted of multichannel customers and digital SST customers, with digital SST customers as the reference group. An indicator variable for multichannel customers (*multicust*) and an interaction term with ***multicust*** and *quality* was added to test for the moderation effects. Equation (2) below depicts the model:

$$(2)\ satisfaction_i = \alpha_0 + \beta_1 multicust_i \times quality_i + \beta_2 multicust_i + \beta_3 gender + \beta_4 edu_i + \beta_5 hincome_i + \beta_6 married_i + \beta_7 work_i + \beta_8 age_i + \beta_9 expect + \beta_{10} quality + \beta_{11} value_i + \beta_{ij} channeldum + \beta_{ij} channelsatis + \beta_{12} relationship_i + \beta_{ij} subsec + \beta_{ij} coydum + e_i$$

Moderating Satisfaction-Loyalty Relationship: Digital SST vs Offline (H4A & H4B)

To test for how digital SST customers moderates the satisfaction-loyalty relationship, we used the same dataset from equation (1). The model used would be like equation (1), but with customer loyalty (*loyalty*) as the dependent variable, and *satisfaction* as an independent

variable. Additionally, an interaction term with *digitcust* and *satisfaction* was be used to measure the moderation effects.

Based on the ACSI model, *satisfaction* and complaints behaviour (*complaints*) have a direct effect on customer loyalty (Fornell et al., 1996). As such both would be included in the model as control variable. Other control variables in equation (1) were retained as well. Equation (3) below depicts the model:

$$(3)\ loyalty_i = \alpha_0 + \beta_1 digicust_i \times satisfaction_i + \beta_2 digicust_i + \beta_3 gender + \beta_4 edu_i + \beta_5 hincome_i + \beta_6 married_i + \beta_7 work_i + \beta_8 age_i + \beta_9 satisfaction + \beta_{10} complaints + \beta_{ij} channeldum + \beta_{ij} channelsatis + \beta_{11} relationship_i + \beta_{ij} subsec + \beta_{ij} coydum + e_i$$

Moderating Satisfaction-Loyalty Relationship: Multichannel vs Offline/Digital SST (H5 & H6)

The same datasets used to test H3 and H4 were used to test H5 and H6. Model wise we replaced *digicust* from equation (3) with *multicust*. The other variables were retained from equation (3). Therefore, to test for H5 and H6, equation (4) below was used:

$$(4)\ loyalty_i = \alpha_0 + \beta_1 multicust_i \times satisfaction_i + \beta_2 multicust_i + \beta_3 gender + \beta_4 edu_i + \beta_5 hincome_i + \beta_6 married_i + \beta_7 work_i + \beta_8 age_i + \beta_9 satisfaction + \beta_{10} complaints + \beta_{ij} channeldum + \beta_{ij} channelsatis + \beta_{11} relationship_i + \beta_{ij} subsec + \beta_{ij} coydum + e_i$$

Chapter 2.5: Results

Based on our moderation regression models, we found all our hypotheses supported for the banking dataset. However, for the telecommunications dataset, only H1B and H4B was supported. We outline the findings for both industries in turn before discussing their implications.

Moderation Effect on Quality & Satisfaction Relationship (Banking)

To study moderation effects on the relationship between perceived quality and customer satisfaction, we first conducted a base model with only the customer type of interest as the independent variable, before including the interaction term to ascertain its effects. Table 17 outlines our analysis. Models 13, 15 and 17, were the base models for this analysis. While Models 14, 16, 18, were the moderated regressions. All six models were statistically significant ($p<0.001$) with adjusted R^2 above 0.580. We discuss the moderation effects in turn.

Digital SST vs Offline Customers

Model 13 and 14 was conducted using offline customers as the reference group and digital SST customers as the focal group. Looking at Model 14, we note that the increase in in variance explained from the base model (Model 13) once the perceived quality and digital SST interaction term was included was statistically significant ($\Delta F(1, 3{,}207)= 9.492$, $p=0.002$). The beta coefficient for the interaction term was also found to be negative and statistically significant at -0.070 ($t(3{,}207) = -3.081$, $p=0.002$), thus indicating the presence of a negative moderation effect. An inspection of the interaction plot (Chart 3) reveals that at lower levels of quality, customer satisfaction was higher for digital SST customers as opposed to offline customers. However, as quality improves, at higher levels of quality,

customer satisfaction was lower for digital SST customers as compared to offline customers. Therefore, H1B was supported for the banking industry.

Multichannel vs Offline Customers

Model 15 and 16 was conducted using offline customers as the reference group and multichannel customers as the focal group. For Model 16, we note that the increase in variance explained from the base model (Model 15) once the perceived quality and multichannel interaction term was included, while small (ΔR^2=0.0003), was statistically significant ($\Delta F(1, 6{,}431) = 5.297$, $p = 0.021$). The beta coefficient for the interaction term was also found to be positive and statistically significant at 0.036 ($t(6{,}431)=2.302$, $p=0.021$), thus indicating the presence of a positive moderation effect for multichannel customer when compared to offline customers. The interaction plot (Chart 4) further reveals that while multichannel customers had lower satisfaction levels than offline customers at lower levels of quality, as quality increases, customer satisfaction levels improve more for multichannel customers as compared to offline customers. From the plot we see that at high levels of quality, customer satisfaction levels were higher for multichannel customers than offline customers. Therefore, H2 for the banking industry was supported.

Multichannel vs Digital SST Customers

To compare the effects between multichannel and digital SST customers, Model 17 and 18 used digital SST customers as the reference group and multichannel customers as the focal group. For Model 18, we note that the increase in in variance explained from the base model (Model 17) once the perceived quality and multichannel interaction term was included, was statistically significant ($\Delta F(1,6{,}169) = 29.664$, $p<0.001$). The beta coefficient for the interaction term was also found to be positive and statistically significant at 0.108 ($t(6{,}169) =$

5.446, $p<0.001$), thus indicating the presence of a positive moderation effect for multichannel customers when compared to digital SST customers. Looking at the interaction plot (Chart 5), we note that while at lower levels of quality, digital SST customers were more satisfied as compared to multichannel customers. However, as quality improves, the pattern changes with customer satisfaction levels for multichannel customers rising higher than digital SST customers. Therefore, for the banking industry, H3 was supported.

Table 17: Quality-Satisfaction Moderated Regression for Banking

	Digital SST vs Offline (Reference)									Multichannel vs Offline (Reference)								
	Model 13: Base Model					Model 14: Moderated Regression					Model 15: Base Model					Model 16: Moderated Regression				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	-0.002	0.001	-0.031	0.072		-0.002	0.001	-0.032	0.061		-0.002	0.001	-0.019	0.072		-0.002	0.001	-0.018	0.077	
Education	-0.008	0.009	-0.016	0.393		-0.007	0.009	-0.015	0.412		-0.003	0.007	-0.004	0.727		-0.003	0.007	-0.004	0.720	
Gender	-0.010	0.022	-0.006	0.641		-0.007	0.022	-0.004	0.749		0.005	0.016	0.002	0.755		0.003	0.016	0.002	0.843	
Household Income	-0.011	0.007	-0.026	0.113		-0.012	0.007	-0.027	0.107		-0.016	0.005	-0.031	0.003	**	-0.015	0.005	-0.030	0.004	**
Married	0.047	0.034	0.020	0.172		0.047	0.034	0.020	0.168		0.036	0.025	0.013	0.146		0.036	0.025	0.013	0.145	
Working	-0.071	0.032	-0.028	0.029	*	-0.067	0.032	-0.027	0.038	*	-0.009	0.026	-0.003	0.718		-0.012	0.026	-0.004	0.643	
Bank																				
DBS	0.033	0.050	0.013	0.504		0.041	0.050	0.016	0.408		0.076	0.035	0.025	0.029	*	0.075	0.035	0.024	0.031	*
UOB	-0.074	0.051	-0.028	0.148		-0.067	0.051	-0.026	0.188		0.009	0.035	0.003	0.796		0.008	0.035	0.003	0.820	
OCBC	0.048	0.050	0.018	0.334		0.053	0.050	0.020	0.289		0.070	0.034	0.023	0.041	*	0.070	0.034	0.023	0.041	*
Citi	0.035	0.048	0.012	0.470		0.041	0.048	0.015	0.389		0.031	0.032	0.010	0.331		0.032	0.032	0.011	0.326	
HSBC	-0.059	0.049	-0.020	0.226		-0.061	0.049	-0.021	0.208		-0.023	0.032	-0.008	0.470		-0.021	0.032	-0.007	0.506	
SCB	-0.068	0.048	-0.023	0.158		-0.066	0.048	-0.022	0.170		-0.029	0.031	-0.010	0.354		-0.028	0.031	-0.009	0.379	
Maybank	0.052	0.050	0.018	0.299		0.052	0.050	0.018	0.295		0.030	0.034	0.009	0.374		0.031	0.034	0.010	0.363	
Channel Usage																				
Call Centre Usage	-0.041	0.033	-0.018	0.220		-0.039	0.033	-0.017	0.240		-0.017	0.017	-0.009	0.298		-0.017	0.017	-0.008	0.306	
Store Usage	0.002	0.049	0.001	0.973		0.002	0.049	0.001	0.972		0.004	0.019	0.002	0.830		0.004	0.019	0.002	0.822	
Website Usage	-0.005	0.049	-0.003	0.917		-0.001	0.049	0.000	0.986		0.018	0.025	0.009	0.477		0.018	0.025	0.009	0.482	
App Usage	-0.014	0.036	-0.007	0.700		-0.009	0.036	-0.004	0.808		0.040	0.020	0.020	0.049	*	0.039	0.020	0.019	0.054	
RM Usage	-0.014	0.046	-0.004	0.767		-0.015	0.046	-0.004	0.743		0.061	0.019	0.026	0.002	**	0.060	0.019	0.026	0.002	**
ATM Usage	-0.132	0.052	-0.030	0.011	*	-0.131	0.052	-0.030	0.012	*	-0.064	0.030	-0.016	0.035	*	-0.065	0.030	-0.016	0.033	*
Average Channel Rating																				
Average Call Centre Rating	0.180	0.065	0.050	0.006	**	0.178	0.065	0.049	0.007	**	0.082	0.049	0.019	0.093		0.083	0.049	0.020	0.089	
Average Store Rating	-0.052	0.074	-0.013	0.482		-0.048	0.074	-0.012	0.519		0.121	0.053	0.028	0.021	*	0.117	0.053	0.027	0.026	*
Average Website Rating	0.206	0.122	0.025	0.091		0.207	0.122	0.025	0.089		0.031	0.086	0.003	0.722		0.032	0.086	0.004	0.712	
Average App Rating	0.059	0.098	0.011	0.546		0.062	0.098	0.011	0.528		0.071	0.072	0.011	0.327		0.072	0.072	0.011	0.320	
Average RM Rating	-0.002	0.077	0.000	0.979		-0.002	0.077	-0.001	0.975		-0.023	0.052	-0.005	0.655		-0.025	0.052	-0.005	0.629	
Average ATM Rating	-0.144	0.097	-0.025	0.138		-0.150	0.097	-0.026	0.121		-0.141	0.074	-0.021	0.058		-0.140	0.074	-0.021	0.059	
ACSI Constructs																				
Customer Expectations	0.165	0.013	0.175	0.000	**	0.164	0.013	0.173	0.000	**	0.160	0.009	0.154	0.000	**	0.161	0.009	0.155	0.000	**
Perceived Quality	0.407	0.015	0.433	0.000	**	0.434	0.017	0.462	0.000	**	0.446	0.010	0.470	0.000	**	0.419	0.015	0.442	0.000	**
Perceived Value	0.244	0.014	0.281	0.000	**	0.240	0.014	0.276	0.000	**	0.263	0.010	0.296	0.000	**	0.263	0.010	0.296	0.000	**
Customer Type																				
Digital SST	-0.011	0.078	-0.006	0.892		0.524	0.190	0.283	0.006	**										

	Digital SST vs Offline (Reference)									Multichannel vs Offline (Reference)								
	Model 13: Base Model					Model 14: Moderated Regression				Model 15: Base Model					Model 16: Moderated Regression				
	B	**SE**	**Beta**	**P-Value**		**B**	**SE**	**Beta**	**P-Value**	**B**	**SE**	**Beta**	**P-Value**		**B**	**SE**	**Beta**	**P-Value**	
Multichannel										-0.029	0.034	-0.013	0.391		-0.308	0.126	-0.134	0.014	*
Moderation																			
Perceived Quality x Digital SST						-0.070	0.023	-0.297	0.002	**									
Perceived Quality x Multichannel															0.036	0.016	0.127	0.021	*
Adjusted R^2	0.583					0.584					0.651				0.652				
F	157.068	**				152.55	**				417.452	**			403.984	**			
⊿F						9.492	**								5.297	*			
⊿R2						0.001									0.000				
N	3,238					3,238					6,462				6,462				

** p < 0.01
* p < 0.05

Table 17: Quality-Satisfaction Moderated Regression for Banking (Cont'd)

	Multichannel vs Digital SST (Reference)									
	Model 23: Base Model					Model 24: Moderated Regression				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	-0.003	0.001	-0.033	0.002	**	-0.003	0.001	-0.034	0.001	**
Education	0.002	0.009	0.002	0.842		0.002	0.009	0.002	0.803	
Gender	-0.009	0.016	-0.004	0.588		-0.008	0.016	-0.004	0.601	
Household Income	-0.009	0.005	-0.016	0.097		-0.009	0.005	-0.016	0.107	
Married	0.037	0.024	0.015	0.117		0.037	0.024	0.016	0.111	
Working	0.015	0.030	0.004	0.625		0.015	0.030	0.004	0.622	
Bank										
DBS	0.067	0.036	0.021	0.063		0.074	0.036	0.023	0.040	*
UOB	-0.023	0.035	-0.007	0.517		-0.018	0.035	-0.006	0.603	
OCBC	0.069	0.034	0.024	0.044	*	0.073	0.034	0.025	0.033	*
Citi	0.025	0.033	0.009	0.444		0.032	0.033	0.011	0.330	
HSBC	-0.038	0.032	-0.013	0.240		-0.036	0.032	-0.013	0.261	
SCB	-0.034	0.032	-0.012	0.290		-0.029	0.032	-0.010	0.352	
Maybank	0.032	0.034	0.011	0.346		0.033	0.034	0.011	0.329	
Channel Usage										
Call Centre Usage	-0.011	0.019	-0.005	0.572		-0.009	0.019	-0.005	0.616	
Store Usage	0.020	0.020	0.010	0.317		0.020	0.020	0.010	0.308	
Website Usage	0.003	0.022	0.001	0.890		0.004	0.022	0.001	0.867	
App Usage	0.016	0.017	0.008	0.346		0.017	0.017	0.008	0.341	
RM Usage	0.075	0.021	0.032	0.000	**	0.073	0.020	0.032	0.000	**
ATM Usage	0.008	0.033	0.002	0.819		0.006	0.033	0.001	0.853	
Average Channel Rating										
Average Call Centre Rating	0.050	0.049	0.012	0.310		0.048	0.049	0.012	0.326	
Average Store Rating	0.137	0.051	0.034	0.007	**	0.134	0.051	0.033	0.008	**
Average Website Rating	0.106	0.088	0.012	0.228		0.112	0.088	0.013	0.204	
Average App Rating	0.164	0.072	0.027	0.023	*	0.165	0.072	0.027	0.022	*
Average RM Rating	-0.065	0.053	-0.014	0.214		-0.069	0.053	-0.015	0.188	
Average ATM Rating	-0.249	0.079	-0.038	0.002	**	-0.256	0.079	-0.039	0.001	**
ACSI Constructs										
Customer Expectations	0.172	0.009	0.168	0.000	**	0.172	0.009	0.169	0.000	**
Perceived Quality	0.433	0.010	0.456	0.000	**	0.346	0.019	0.364	0.000	**
Perceived Value	0.264	0.010	0.297	0.000	**	0.260	0.010	0.292	0.000	**
Customer Type										
Digital SST										
Multichannel	0.008	0.028	0.003	0.784		-0.828	0.156	-0.364	0.000	**

	Multichannel vs Digital SST (Reference)								
	Model 23: Base Model				Model 24: Moderated Regression				
	B	**SE**	**Beta**	**P-Value**	**B**	**SE**	**Beta**	**P-Value**	
Moderation									
Perceived Quality x Digital SST									
Perceived Quality x Multichannel					0.108	0.020	0.380	0.000	**
Adjusted R^2	0.629				0.631				
F	363.774	**			354.27	**			
⊿F					29.664	**			
⊿R^2					0.002				
N	6,200				6,200				

** p < 0.01
* p < 0.05

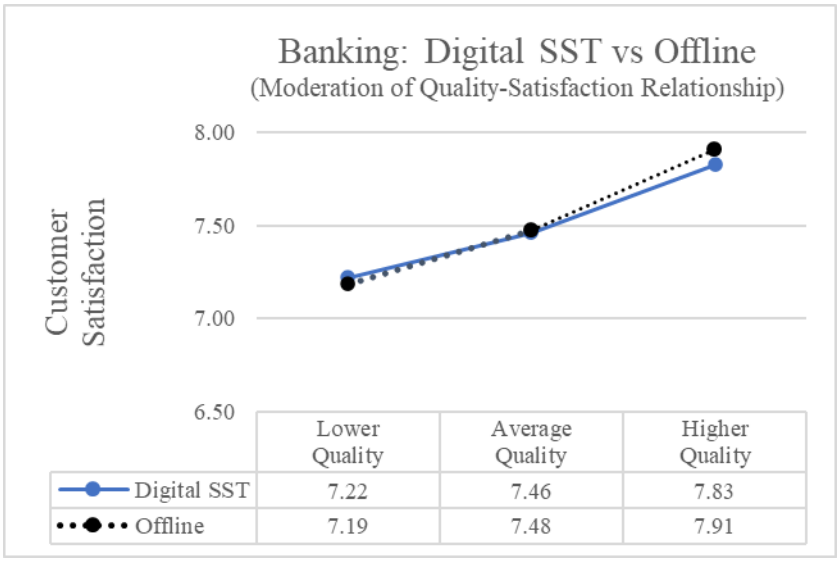


Chart 3: Quality-Satisfaction Moderation By Digital SST vs Offline Customers (Banks)

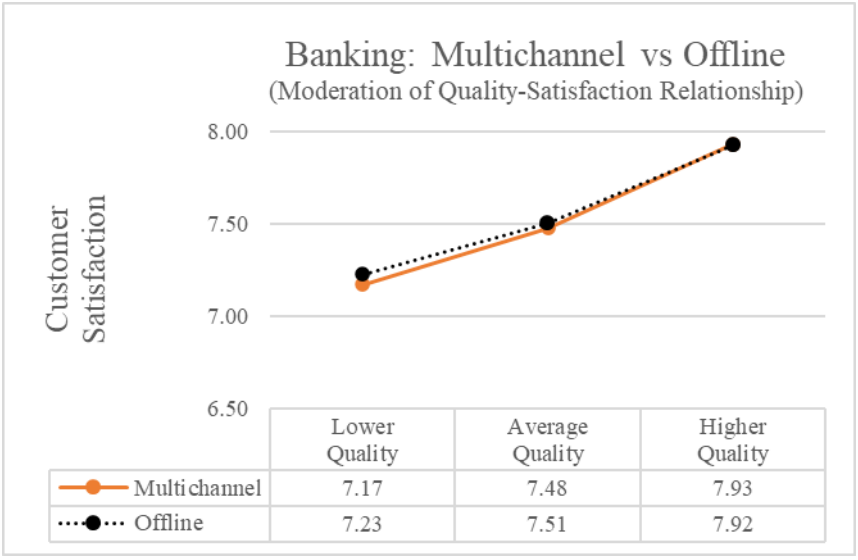


Chart 4: Quality-Satisfaction Moderation By Multichannel vs Offline Customers (Banks)

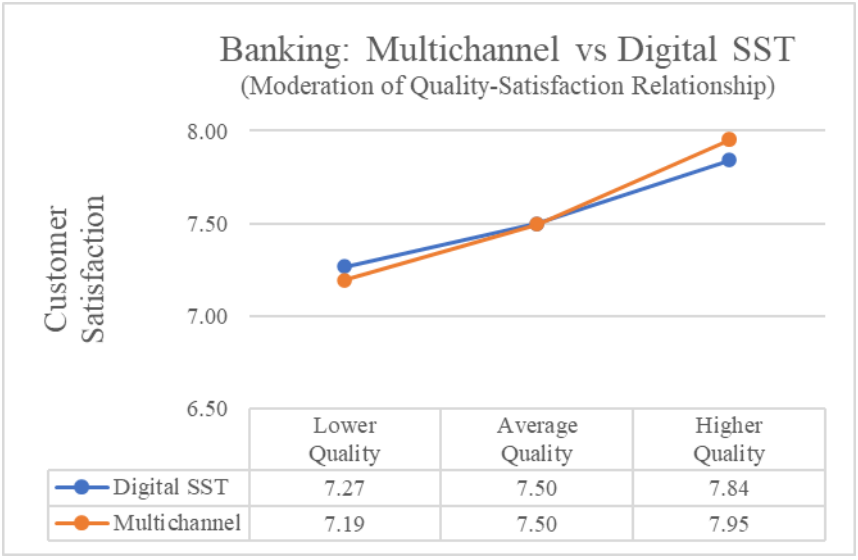


Chart 5: Quality-Satisfaction Moderation By Multichannel vs Digital SST Customers (Banks)

Moderation Effect on Satisfaction & Loyalty Relationship (Banking)

Like the above, Table 18 outlines our analysis of how customer types moderate the relationship between customer satisfaction and customer loyalty. Models 19, 21 and 23, were the base models for this analysis. While Models 20, 22, 24, were the moderated regressions. All six models were statistically significant ($p<0.001$) with adjusted R^2 above 0.260. We discuss the moderation effects in turn.

Digital SST vs Offline Customers

Model 19 and 20 was conducted using offline customers as the reference group and digital SST customers as the focal group. From Model 20, we note that the increase in in variance explained from the base model (Model 19) once the customer satisfaction and digital SST interaction term was included, was statistically significant ($\Delta F(1\ 3{,}208) = 14.660$, $p<0.001$). Similar to findings for the moderation regression for perceived quality and customer satisfaction, the beta coefficient for the interaction term was negative and statistically significant at -0.150($t(3{,}208) = -3.829$, $p<0.001$), thus indicating the presence of a negative moderation effect. The interaction plot (Chart 6) shows digital SST customers to be more loyal at lower satisfaction levels than offline customers. However, as satisfaction increases, offline customers become more loyal, with highly satisfied customers more loyal than digital SST customers. Therefore, for the banking industry, H4B was supported.

Multichannel vs Offline Customers

Model 21 and 22 was conducted using offline customers as the reference group and multichannel customers as the focal group. The increase in variance explained from the base model (Model 21) once the customer satisfaction and multichannel interaction term was included, was statistically significant ($\Delta F(1, 6{,}432) = 6.577$, $p= 0.010$). The beta coefficient

for the interaction term was positive and statistically significant at 0.071 ($t(6,432) = 2.565$, $p= 0.010$), thus indicating the presence of a positive moderation effect for multichannel customers when compared to offline customers. Like the earlier findings, the interaction plot (Chart 7) shows multichannel customers had lower customer loyalty than offline customers at lower levels of customer satisfaction. However, as customer satisfaction increases, customer loyalty rose more for multichannel customers as compared to offline customers, such that at higher levels of customer satisfaction, customer loyalty was higher for multichannel customers than offline customers. Therefore, for the banking industry, H5 was supported.

Multichannel vs Digital SST Customers

Lastly, we compared the effects between multichannel and digital SST customers, in Model 23 and 24 used digital SST customers as the reference group and multichannel customers as the focal group. Again, we found moderation effects similar to the previous analysis. For Model 24, the increase in variance explained from the base model (Model 23) once the customer satisfaction and multichannel interaction term was included, was statistically significant ($\Delta F(1, 6,170)= 42.081$, $p<0.001$). The beta coefficient for the interaction term was also found to be positive and statistically significant at 0.226 ($t(6,170) = 6.487$, $p<0.001$), thus indicating the presence of a positive moderation effect for multichannel customers when compared to digital SST customers. From the interaction plot (Chart 8), we note that while at lower levels of satisfaction, digital SST customers were more satisfied as compared to multichannel customers, as customer satisfaction improves, the pattern reverses with customer loyalty for multichannel customers rising higher than digital SST customers at higher levels of customer satisfaction. Therefore, H6 was supported for the banking industry.

Table 18 Satisfaction-Loyalty Moderated Regression for Banking

	Digital SST vs Offline (Reference)									Multichannel vs Offline (Reference)								
	Model 19: Base Model					Model 20: Moderated Regression					Model 21: Base Model					Model 22: Moderated Regression				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	0.001	0.002	0.015	0.513		0.001	0.002	0.012	0.603		0.002	0.002	0.015	0.282		0.002	0.002	0.016	0.261	
Education	0.021	0.015	0.036	0.142		0.022	0.014	0.037	0.132		0.012	0.012	0.015	0.324		0.011	0.012	0.015	0.350	
Gender	-0.020	0.036	-0.009	0.572		-0.018	0.036	-0.008	0.608		-0.051	0.026	-0.021	0.051		-0.054	0.026	-0.022	0.041	*
Household Income	-0.006	0.012	-0.011	0.609		-0.006	0.012	-0.011	0.610		0.003	0.009	0.004	0.769		0.003	0.009	0.005	0.730	
Married	0.050	0.055	0.017	0.366		0.049	0.055	0.017	0.380		-0.004	0.041	-0.001	0.924		-0.003	0.041	-0.001	0.942	
Working	-0.009	0.052	-0.003	0.856		-0.005	0.052	-0.002	0.925		-0.049	0.043	-0.013	0.260		-0.054	0.043	-0.014	0.210	
Bank																				
DBS	-0.064	0.080	-0.020	0.423		-0.057	0.080	-0.018	0.476		-0.144	0.058	-0.038	0.013	*	-0.146	0.058	-0.039	0.012	*
UOB	-0.122	0.083	-0.038	0.140		-0.120	0.082	-0.038	0.146		-0.100	0.057	-0.027	0.082		-0.103	0.057	-0.028	0.072	
OCBC	-0.111	0.080	-0.035	0.166		-0.106	0.080	-0.033	0.185		-0.166	0.057	-0.045	0.004	**	-0.167	0.057	-0.045	0.003	**
Citi	-0.180	0.078	-0.053	0.021	*	-0.172	0.078	-0.050	0.026	*	-0.120	0.053	-0.033	0.025	*	-0.119	0.053	-0.033	0.025	*
HSBC	0.201	0.079	0.056	0.011	*	0.192	0.079	0.054	0.015	*	0.092	0.052	0.025	0.078		0.095	0.052	0.026	0.071	
SCB	0.063	0.077	0.018	0.411		0.061	0.077	0.017	0.431		-0.035	0.052	-0.010	0.497		-0.034	0.052	-0.009	0.514	
Maybank	0.115	0.081	0.032	0.153		0.114	0.080	0.032	0.156		0.076	0.056	0.019	0.180		0.076	0.056	0.020	0.175	
Channel Usage																				
Call Centre Usage	-0.025	0.054	-0.009	0.642		-0.019	0.054	-0.007	0.720		-0.044	0.028	-0.018	0.114		-0.044	0.028	-0.018	0.111	
Store Usage	-0.086	0.079	-0.038	0.279		-0.080	0.079	-0.035	0.313		-0.161	0.031	-0.058	0.000	**	-0.161	0.031	-0.058	0.000	**
Website Usage	0.043	0.080	0.019	0.592		0.049	0.080	0.021	0.540		0.031	0.042	0.012	0.458		0.031	0.042	0.012	0.459	
App Usage	0.063	0.058	0.026	0.272		0.071	0.058	0.030	0.219		-0.007	0.034	-0.003	0.832		-0.009	0.034	-0.004	0.794	
RM Usage	0.012	0.075	0.003	0.873		0.009	0.075	0.002	0.900		0.087	0.032	0.031	0.006	**	0.085	0.032	0.030	0.008	**
ATM Usage	-0.016	0.084	-0.003	0.853		-0.002	0.084	0.000	0.982		0.115	0.050	0.024	0.022	*	0.111	0.050	0.023	0.028	*
Average Channel Rating																				
Average Call Centre Rating	0.075	0.106	0.017	0.480		0.067	0.105	0.015	0.524		0.187	0.081	0.037	0.021	*	0.191	0.081	0.038	0.018	*
Average Store Rating	-0.566	0.119	-0.113	0.000	**	-0.559	0.119	-0.112	0.000	**	-0.703	0.087	-0.132	0.000	**	-0.713	0.087	-0.134	0.000	**
Average Website Rating	0.226	0.197	0.022	0.250		0.248	0.197	0.024	0.208		0.045	0.144	0.004	0.752		0.045	0.144	0.004	0.752	
Average App Rating	0.092	0.158	0.014	0.559		0.105	0.158	0.016	0.508		0.021	0.120	0.003	0.864		0.022	0.120	0.003	0.856	
Average RM Rating	-0.185	0.125	-0.034	0.139		-0.195	0.125	-0.036	0.119		-0.048	0.086	-0.008	0.582		-0.048	0.086	-0.008	0.582	
Average ATM Rating	0.938	0.156	0.134	0.000	**	0.920	0.156	0.132	0.000	**	0.794	0.123	0.097	0.000	**	0.796	0.123	0.097	0.000	**
ACSI Constructs																				
Customer Satisfaction	0.565	0.019	0.462	0.000	**	0.618	0.023	0.505	0.000	**	0.672	0.013	0.554	0.000	**	0.620	0.024	0.512	0.000	**
Complaints	-0.723	0.106	-0.104	0.000	**	-0.682	0.107	-0.098	0.000	**	-0.574	0.078	-0.077	0.000	**	-0.574	0.078	-0.077	0.000	**

	Digital SST vs Offline (Reference)									Multichannel vs Offline (Reference)								
	Model 19: Base Model				Model 20: Moderated Regression					Model 21: Base Model				Model 22: Moderated Regression				
	B	**SE**	**Beta**	**P-Value**	**B**	**SE**	**Beta**	**P-Value**		**B**	**SE**	**Beta**	**P-Value**	**B**	**SE**	**Beta**	**P-Value**	
Customer Type																		
Digital SST	0.068	0.127	0.030	0.589	1.182	0.317	0.522	0.000	**					-0.529	0.214	-0.190	0.014	*
Multichannel										0.000	0.057	0.000	0.995					
Moderation																		
Customer Satisfaction x Digital SST					-0.150	0.039	-0.503	0.000	**									
Customer Satisfaction x Multichannel														0.071	0.028	0.199	0.010	*
Adjusted R^2	0.269				0.272					0.345				0.345				
F	43.465	**			42.650	**				122.446	**			118.553	**			
ΔF					14.660	**								6.577	*			
ΔR^2					0.003									0.001				
N	3,238				3238					6,462				6,462				

** p < 0.01
* p < 0.05

Table 18 Satisfaction-Loyalty Moderated Regression for Banking (Cont'd)

	Multichannel vs Digital SST (Reference)									
	Model 23: Base Model					Model 24: Moderated Regression				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	0.004	0.002	0.030	0.032	*	0.003	0.002	0.028	0.046	*
Education	0.020	0.014	0.017	0.174		0.019	0.014	0.017	0.178	
Gender	-0.009	0.026	-0.004	0.731		-0.011	0.026	-0.005	0.670	
Household Income	-0.004	0.009	-0.006	0.655		-0.003	0.009	-0.004	0.732	
Married	-0.025	0.039	-0.008	0.531		-0.024	0.039	-0.008	0.539	
Working	-0.060	0.049	-0.013	0.226		-0.064	0.049	-0.014	0.190	
Bank										
DBS	-0.161	0.059	-0.042	0.007	**	-0.156	0.059	-0.041	0.009	**
UOB	-0.111	0.058	-0.030	0.055		-0.115	0.058	-0.031	0.046	*
OCBC	-0.203	0.057	-0.056	0.000	**	-0.199	0.057	-0.055	0.000	**
Citi	-0.177	0.054	-0.051	0.001	**	-0.168	0.054	-0.049	0.002	**
HSBC	0.049	0.053	0.014	0.357		0.047	0.053	0.014	0.375	
SCB	-0.069	0.053	-0.020	0.190		-0.068	0.052	-0.020	0.192	
Maybank	0.042	0.056	0.011	0.461		0.041	0.056	0.011	0.463	
Channel Usage										
Call Centre Usage	-0.042	0.031	-0.017	0.178		-0.041	0.031	-0.017	0.188	
Store Usage	-0.178	0.033	-0.075	0.000	**	-0.177	0.033	-0.074	0.000	**
Website Usage	0.032	0.037	0.010	0.388		0.033	0.037	0.010	0.374	
App Usage	0.019	0.029	0.008	0.504		0.019	0.029	0.007	0.515	
RM Usage	0.104	0.034	0.037	0.002	**	0.099	0.034	0.035	0.004	**
ATM Usage	0.081	0.055	0.016	0.144		0.080	0.055	0.015	0.148	
Average Channel Rating										
Average Call Centre Rating	0.127	0.081	0.025	0.117		0.128	0.081	0.026	0.114	
Average Store Rating	-0.679	0.083	-0.136	0.000	**	-0.689	0.083	-0.138	0.000	**
Average Website Rating	-0.070	0.146	-0.006	0.634		-0.052	0.146	-0.005	0.720	
Average App Rating	0.058	0.120	0.008	0.629		0.071	0.119	0.010	0.551	
Average RM Rating	-0.002	0.087	0.000	0.981		-0.010	0.087	-0.002	0.905	
Average ATM Rating	0.885	0.131	0.109	0.000	**	0.864	0.130	0.106	0.000	**
ACSI Constructs										
Customer Satisfaction	0.660	0.013	0.538	0.000	**	0.472	0.032	0.385	0.000	**
Complaints	-0.474	0.078	-0.065	0.000	**	-0.431	0.078	-0.059	0.000	**
Customer Type										
Digital SST						-1.742	0.266	-0.624	0.000	**
Multichannel	-0.044	0.046	-0.016	0.344						

Multichannel vs Digital SST (Reference)

	Model 23: Base Model				Model 24: Moderated Regression				
	B	**SE**	**Beta**	**P-Value**	**B**	**SE**	**Beta**	**P-Value**	
Moderation									
Customer Satisfaction x Digital SST									
Customer Satisfaction x Multichannel					0.226	0.035	0.631	0.000	**
Adjusted R^2	0.324				0.328				
F	106.873	**			105.325	**			
⊿F					42.081	**			
⊿R^2					0.005				
N	6,200				6,200				

** p < 0.01
* p < 0.05

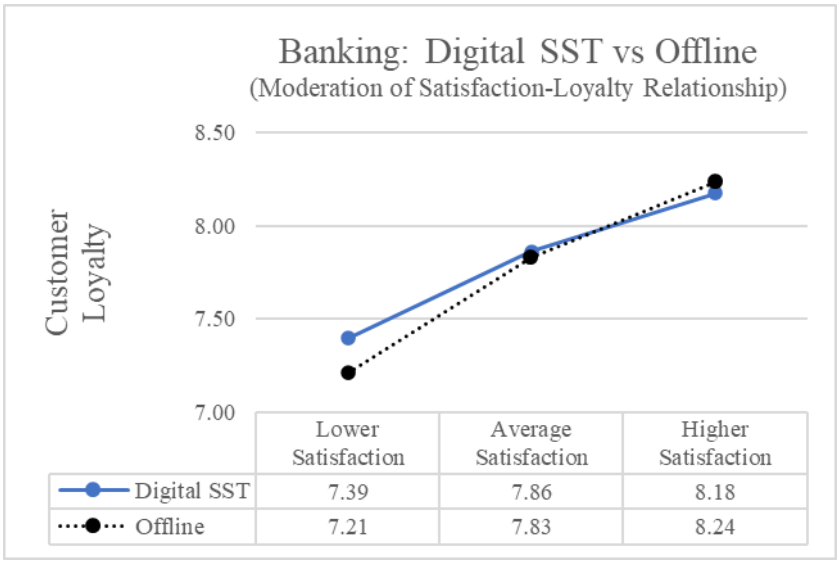


Chart 6: Satisfaction-Loyalty Moderation By Digital SST vs Offline Customers (Banks)

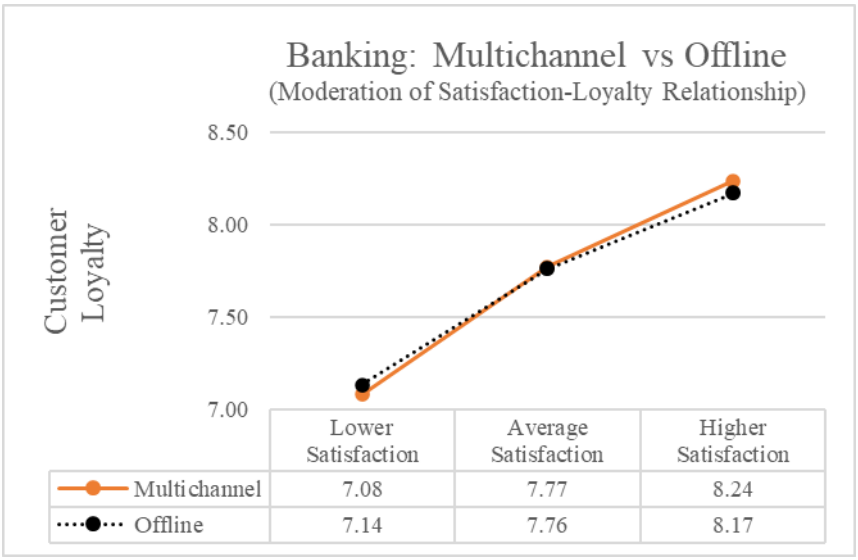


Chart 7: Satisfaction-Loyalty Moderation By Multichannel vs Offline Customers (Banks)

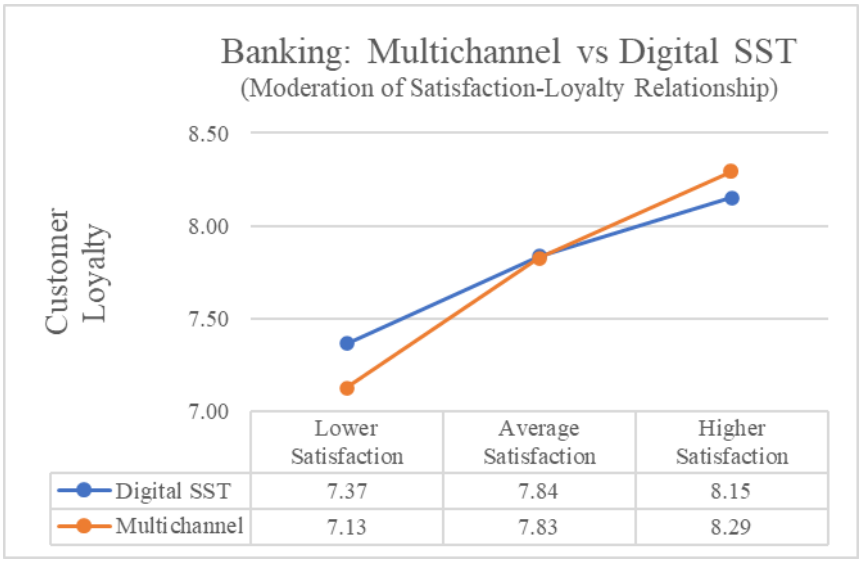


Chart 8: Satisfaction-Loyalty Moderation By Multichannel vs Digital SST Customers (Banks)

Moderation Effect on Quality & Satisfaction Relationship (Telecommunications)

While all the hypotheses were supported for the banking industry, the same was not observed for the telecommunications industry. Table 19 outlines the results of our analysis of moderation effects on the relationship between perceived quality and customer satisfaction for the telecommunications industry. As with above, Models 25, 27 and 29, were the base models, while Models 26, 28, 30, were the moderated regressions. All six models were statistically significant ($p<0.001$) with adjusted R^2 above 0.660. We discuss the moderation effects next.

Digital SST vs Offline Customers

Model 25 and 26 was conducted using offline customers as the reference group and digital SST customers as the focal group. Looking at Model 25, it is interesting to note that the beta coefficient for digital SST customers in the base model was positive and statistically significant 0.180 ($t(3,584) = 2.704$, $p<0.007$), suggesting that digital SST customers were on average more satisfied as compared to offline customers. This finding was not observed in the banking dataset, where digital SST customer did not have any statistically significant direct effect on customer satisfaction in the base model (Model 13).

Focusing back on moderation effects, similar to banking, in Model 26 the increase in variance explained from the base model (Model 25) once the perceived quality and digital SST interaction term was included, was statistically significant ($\Delta F(1, 3,583) =10.883$, $p=0.001$). The beta coefficient for the interaction term was also found to be negative and statistically significant at -0.072 ($t(3,583) = -3.299$, $p=0.001$), indicating the presence of a negative moderation effect. The interaction plot (Chart 9) shows customer satisfaction generally higher for digital SST customers as opposed to offline customers. However, as quality improves, at higher levels of quality, the increase in customer satisfaction was less

than offline customers, suggesting a weaker relationship between the two variables for digital SST customers. Thus, H1B was also supported for the telecommunications industry.

Multichannel vs Offline Customers

Model 27 and 28 was conducted using offline customers as the reference group and multichannel customers as the focal group. For Model 28, we note that the increase in variance explained from the base model (Model 27) once the perceived quality and multichannel interaction term was included, was statistically significant ($\Delta F(1, 4{,}887)=13.118$, $p<0.001$). However, unlike the banking industry, the beta coefficient for the interaction term was negative and statistically significant at -0.053 ($t(4{,}887)=-3.622$, $p<0.001$), thus indicating the presence of a negative moderation effect for multichannel customers when compared to offline customers. The interaction plot (Chart 10) further reveals that while multichannel customers had higher satisfaction levels than offline customers at lower levels of quality, as quality increases, customer satisfaction levels improved less for multichannel customers as compared to offline customers. Contrary to our hypothesis, the results reveal a weaker quality-satisfaction relationship for multichannel telecommunications customers when compared to offline customers. From the plot we see that at higher levels of quality, customer satisfaction levels were in fact lower for multichannel customers than offline customers. Therefore, H2 for the telecommunications industry was not supported.

Multichannel vs Digital SST Customers

Turning next to the comparison between multichannel and digital SST customers, Model 29 and 30 used digital SST customers as the reference group and multichannel customers as the focal group. Unlike the banking industry, for Model 30, we note that the

change in variance explained from the base model (Model 29) once the perceived quality and multichannel interaction term was included, was not statistically significant ($\Delta F(1, 3,133)= 0.906$, $p=0.341$). The beta coefficient for the interaction term was positive but not statistically significant at 0.022 ($t(3,133)=0.952$, $p=0.341$). While the interaction term was in the same hypothesized direction, the lack of statistical significance suggests no evidence of a moderation effect. As such, there was a lack of evidence to suggest that the relationship between perceived quality and customer satisfaction was stronger for the telecommunications industry for multichannel customers when compared to digital SST customers. Thus, in contrast to our data from the banking industry, H3 was not supported for the telecommunications industry.

Table 19 Quality-Satisfaction Moderated Regression for Telecommunications

	Digital SST vs Offline (Reference)										Multichannel vs Offline (Reference)									
	Model 25: Base Model					Model 26: Moderated Regression					Model 27: Base Model					Model 28: Moderated Regression				
	B	**SE**	**Beta**	**P-Value**		**B**	**SE**	**Beta**	**P-Value**		**B**	**SE**	**Beta**	**P-Value**		**B**	**SE**	**Beta**	**P-Value**	
Age	-0.003	0.001	-0.035	0.001	**	-0.003	0.001	-0.035	0.001	**	-0.003	0.001	-0.028	0.003	**	-0.003	0.001	-0.029	0.003	**
Education	-0.013	0.006	-0.023	0.032	*	-0.014	0.006	-0.024	0.022	*	-0.012	0.006	-0.019	0.044	*	-0.012	0.006	-0.020	0.037	*
Gender	-0.053	0.019	-0.024	0.005	**	-0.053	0.019	-0.023	0.006	**	-0.057	0.017	-0.025	0.001	**	-0.058	0.017	-0.026	0.000	**
Household Income	-0.006	0.006	-0.011	0.250		-0.005	0.006	-0.009	0.348		-0.002	0.005	-0.004	0.666		-0.002	0.005	-0.003	0.719	
Married	0.039	0.026	0.014	0.122		0.039	0.025	0.014	0.122		0.017	0.021	0.007	0.432		0.020	0.021	0.008	0.358	
Working	-0.026	0.027	-0.009	0.338		-0.024	0.027	-0.008	0.369		0.007	0.025	0.002	0.793		0.006	0.025	0.002	0.801	
Length of Relationship	0.021	0.006	0.031	0.000	**	0.021	0.006	0.030	0.001	**	0.018	0.005	0.029	0.000	**	0.017	0.005	0.027	0.001	**
Sub-Sector																				
Mobile	0.054	0.027	0.023	0.046	*	0.055	0.027	0.024	0.042	*	0.062	0.023	0.028	0.008	**	0.064	0.023	0.028	0.006	**
Broadband	0.045	0.029	0.020	0.115		0.044	0.029	0.019	0.127		0.064	0.026	0.028	0.014	*	0.065	0.026	0.029	0.012	*
Company																				
Singtel	0.161	0.024	0.071	0.000	**	0.161	0.024	0.070	0.000	**	0.175	0.021	0.078	0.000	**	0.178	0.021	0.079	0.000	**
Starhub	0.009	0.024	0.004	0.696		0.009	0.024	0.004	0.716		0.053	0.021	0.024	0.010	*	0.055	0.021	0.024	0.008	**
Channel Usage																				
Call Centre Usage	-0.033	0.028	-0.015	0.238		-0.031	0.028	-0.014	0.257		-0.065	0.020	-0.028	0.001	**	-0.067	0.020	-0.028	0.001	**
Store Usage	-0.005	0.024	-0.002	0.831		-0.008	0.024	-0.004	0.742		-0.047	0.019	-0.021	0.014	*	-0.049	0.019	-0.022	0.011	*
Website Usage	-0.142	0.053	-0.052	0.008	**	-0.129	0.053	-0.048	0.015	*	-0.041	0.035	-0.018	0.239		-0.040	0.035	-0.017	0.251	
App Usage	-0.077	0.040	-0.022	0.055		-0.071	0.040	-0.020	0.080		-0.045	0.032	-0.017	0.158		-0.047	0.032	-0.017	0.144	
Average Channel Rating																				
Average Call Centre Rating	-0.064	0.042	-0.018	0.127		-0.068	0.042	-0.020	0.103		-0.125	0.035	-0.037	0.000	**	-0.123	0.035	-0.037	0.000	**
Average Store Rating	0.077	0.088	0.011	0.379		0.071	0.088	0.010	0.418		0.178	0.077	0.026	0.021	*	0.178	0.077	0.026	0.021	*
Average Website Rating	0.025	0.075	0.004	0.735		0.042	0.075	0.007	0.576		-0.017	0.066	-0.003	0.793		-0.011	0.066	-0.002	0.867	
Average App Rating	-0.023	0.062	-0.004	0.712		-0.019	0.062	-0.004	0.755		-0.050	0.056	-0.009	0.369		-0.050	0.055	-0.009	0.371	
ACSI Constructs																				
Customer Expectations	0.097	0.012	0.095	0.000	**	0.099	0.012	0.096	0.000	**	0.094	0.010	0.093	0.000	**	0.093	0.010	0.092	0.000	**
Perceived Quality	0.605	0.016	0.620	0.000	**	0.618	0.016	0.633	0.000	**	0.602	0.013	0.619	0.000	**	0.622	0.014	0.639	0.000	**
Perceived Value	0.196	0.013	0.213	0.000	**	0.193	0.013	0.210	0.000	**	0.197	0.011	0.217	0.000	**	0.196	0.011	0.215	0.000	**
Customer Type																				
Digital SST	0.180	0.067	0.071	0.007	**	0.706	0.173	0.278	0.000	**										
Multichannel											0.027	0.040	0.012	0.504		0.430	0.118	0.196	0.000	**
Moderation																				
Perceived Quality x Digital SST						-0.072	0.022	-0.215	0.001	**										
Perceived Quality x Multichannel																-0.053	0.015	-0.190	0.000	**
Adjusted R^2	0.776					0.776					0.762					0.763				
F	543.609	**				522.849	**				684.668	**				658.313	**			
ΔF						10.880	**									13.120	**			
ΔR^2						0.001										0.001				
N	3,608					3,608					4,912					4,912				

** p < 0.01
* p < 0.05

Table 19 Quality-Satisfaction Moderated Regression for Telecommunications (Cont'd)

	Multichannel vs Digital SST (Reference)									
	Model 29: Base Model					Model 30: Moderated Regression				
	B	**SE**	**Beta**	**P-Value**		**B**	**SE**	**Beta**	**P-Value**	
Age	-0.003	0.001	-0.033	0.019	*	-0.003	0.001	-0.033	0.019	*
Education	0.006	0.009	0.009	0.482		0.006	0.009	0.008	0.497	
Gender	-0.007	0.020	-0.004	0.734		-0.006	0.020	-0.003	0.753	
Household Income	-0.012	0.006	-0.025	0.047	*	-0.012	0.006	-0.024	0.053	
Married	0.029	0.026	0.014	0.277		0.028	0.026	0.014	0.293	
Working	0.071	0.039	0.020	0.067		0.073	0.039	0.020	0.062	
Length of Relationship	0.009	0.006	0.017	0.163		0.009	0.006	0.017	0.165	
Sub-Sector										
Mobile	0.063	0.030	0.032	0.034	*	0.062	0.030	0.032	0.035	*
Broadband	0.064	0.032	0.034	0.046	*	0.063	0.032	0.034	0.049	*
Company										
Singtel	0.213	0.027	0.111	0.000	**	0.212	0.027	0.111	0.000	**
Starhub	0.060	0.026	0.031	0.023	*	0.059	0.026	0.031	0.025	*
Channel Usage										
Call Centre Usage	-0.103	0.029	-0.055	0.000	**	-0.102	0.029	-0.055	0.000	**
Store Usage	-0.096	0.030	-0.052	0.001	**	-0.097	0.030	-0.052	0.001	**
Website Usage	-0.071	0.029	-0.033	0.015	*	-0.071	0.029	-0.033	0.017	*
App Usage	-0.054	0.026	-0.029	0.033	*	-0.054	0.026	-0.029	0.036	*
Average Channel Rating										
Average Call Centre Rating	-0.135	0.044	-0.047	0.002	**	-0.136	0.044	-0.048	0.002	**
Average Store Rating	0.229	0.096	0.040	0.017	*	0.226	0.096	0.040	0.019	*
Average Website Rating	-0.010	0.083	-0.002	0.906		-0.006	0.083	-0.001	0.941	
Average App Rating	-0.028	0.069	-0.006	0.688		-0.027	0.069	-0.006	0.699	
ACSI Constructs										
Customer Expectations	0.097	0.013	0.104	0.000	**	0.098	0.013	0.105	0.000	**
Perceived Quality	0.577	0.017	0.584	0.000	**	0.560	0.025	0.568	0.000	**
Perceived Value	0.177	0.015	0.196	0.000	**	0.176	0.015	0.196	0.000	**
Customer Type										
Digital SST										
Multichannel	0.055	0.040	0.027	0.172		-0.116	0.184	-0.057	0.529	
Moderation										
Perceived Quality x Digital SST										
Perceived Quality x Multichannel						0.022	0.024	0.088	0.341	
Adjusted R^2	0.668					0.668				
F	277.500	**				266.000	**			
ΔF						0.906				
ΔR^2						0.000				
N	3,518					3,518				

** p < 0.01
* p < 0.05

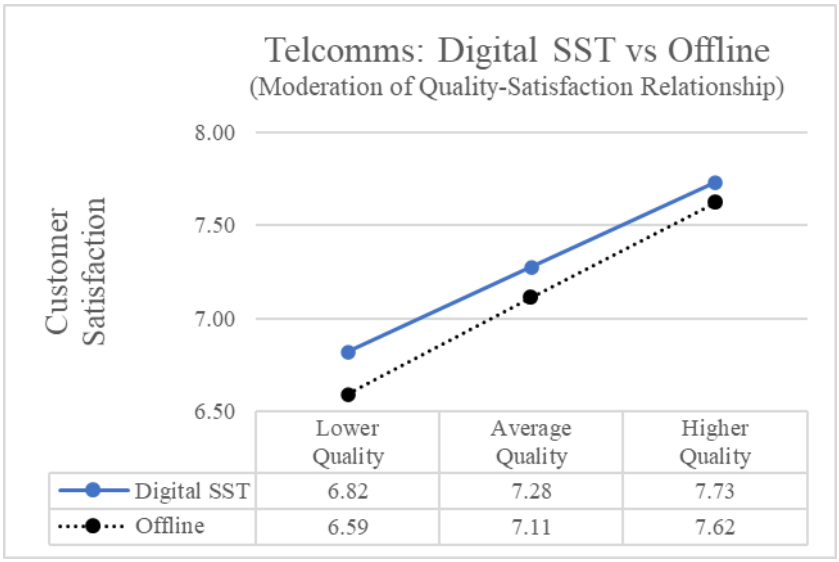


Chart 9: Quality-Satisfaction Moderation By Digital SST vs Offline Customers (Telcos)

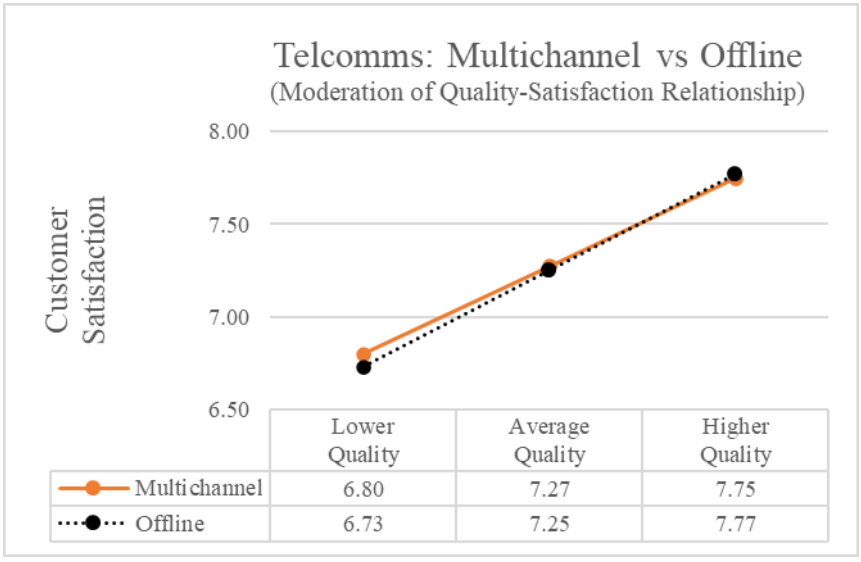


Chart 10: Quality-Satisfaction Moderation By Multichannel vs Offline Customers (Telcos)

Moderation Effect on Satisfaction & Loyalty Relationship (Telecommunications)

Table 20 outlines the results of our analysis of moderation effects on the relationship between customer satisfaction and customer loyalty for the telecommunications industry. As with above, Models 31, 33 and 35, were the base models, while Models 32, 34, 36, were the moderated regressions. All six models were statistically significant ($p<0.001$) with adjusted R^2 above 0.310. We discuss the moderation effects next.

Digital SST vs Offline Customers

As before, Model 31 and 32 was conducted using offline customers as the reference group and digital SST customers as the focal group. Looking at the base model (Model 31), we note that the beta coefficient for digital SST customers in the base model was this time negative and statistically significant -0.283 ($t(3,585)=-2.395$, $p=0.017$), suggesting that digital SST customers were on average less loyal as compared to offline customers. This finding was also not observed in the banking dataset, where digital SST customer did not have any statistically significant direct effect on customer loyalty in the base model (Model 19).

With regards to moderation effects, similar to banking, in Model 32 the increase in variance explained from the base model (Model 31) once the customer satisfaction and digital SST interaction term was included, was statistically significant ($\Delta F(1, 3,584)=6.239$, $p=0.013$). The beta coefficient for the interaction term was also found to be negative and statistically significant at -0.098 ($t(3,584)=-2.498$, $p=0.013$), indicating the presence of a negative moderation effect. The interaction plot (Chart 11) shows customer loyalty generally poorer for digital SST customers as opposed to offline customers. As customer satisfaction improves, at higher levels of satisfaction, the gains in customer loyalty were lower when compared to offline customers, suggesting a weaker relationship between the two variables for digital SST customers. Thus, loyalty for digital SST customers never exceeds that of

offline customers regardless of the satisfaction levels. Thus, H4B was also supported for the telecommunications industry.

Multichannel vs Offline Customers

Like our analysis for the banking industry, Model 33 and 34 was conducted using offline customers as the reference group and multichannel customers as the focal group. For Model 34, we note that increase in variance explained from the base model (Model 33) once the customers satisfaction and multichannel interaction term was included, was statistically significant ($\Delta F(1, 4{,}888) = 35.186$, $p<0.001$). Like the analysis for the quality-satisfaction relationship, and unlike the banking industry, the beta coefficient for the interaction term was negative and statistically significant at -0.159 ($t(4{,}888)=-5.932$, $p<0.001$), which indicates the presence of a negative moderation effect for multichannel customers when compared to offline customers. The interaction plot (Chart 12) shows that while multichannel customers had higher customer loyalty than offline customers at lower levels of satisfaction, as satisfaction increases, the gains in loyalty was lower for multichannel customers as compared to offline customers. At high levels of customer satisfaction, customer loyalty for multichannel customers was actually lower than offline customers. Therefore, H5 for the telecommunications industry was not supported.

Multichannel vs Digital SST Customers

Finally, we turn our attention to the comparison between multichannel and digital SST customers. Model 35 and 36 used digital SST customers as the reference segment and multichannel customers as the focal segment. Again, unlike the banking industry, for Model 36, we note that the change in variance explained from the base model (Model 35) once the customer satisfaction and multichannel interaction term was included, was not statistically

significant ($\Delta F(1, 3,134)=1.277$, $p=0.258$). The beta coefficient for the interaction term was interestingly negative but not statistically significant at -0.047 ($t(3,134)=-1.130$, $p=0.258$). Hence, like the quality-satisfaction analysis, there was a lack of evidence to suggest that the relationship between customer satisfaction and customer loyalty was stronger for the telecommunications industry for multichannel customers when compared to digital SST customers. Therefore, H6 was also not supported for the telecommunications industry.

Table 20: Satisfaction-Loyalty Moderated Regression for Telecommunications

	Digital SST vs Offline (Reference)										Multichannel vs Offline (Reference)									
	Model 31: Base Model					Model 32: Moderated Regression					Model 33: Base Model					Model 34: Moderated Regression				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	0.001	0.002	0.008	0.619		0.001	0.002	0.008	0.625		0.003	0.002	0.025	0.079		0.003	0.002	0.025	0.085	
Education	-0.002	0.011	-0.003	0.858		-0.003	0.011	-0.004	0.822		0.002	0.011	0.002	0.873		0.002	0.011	0.003	0.835	
Gender	0.056	0.034	0.021	0.098		0.059	0.034	0.022	0.080		0.044	0.030	0.017	0.138		0.043	0.030	0.016	0.149	
Household Income	0.029	0.010	0.041	0.003	**	0.030	0.010	0.042	0.002	**	0.012	0.009	0.018	0.172		0.012	0.009	0.018	0.157	
Married	0.010	0.045	0.003	0.827		0.011	0.045	0.003	0.807		-0.006	0.038	-0.002	0.883		0.001	0.038	0.000	0.975	
Working	-0.046	0.048	-0.013	0.333		-0.043	0.048	-0.012	0.370		-0.015	0.045	-0.004	0.732		-0.010	0.044	-0.003	0.830	
Length of Relationship	0.010	0.011	0.012	0.344		0.009	0.011	0.011	0.399		0.006	0.009	0.008	0.503		0.004	0.009	0.005	0.690	
Sub-Sector																				
Mobile	-0.198	0.048	-0.071	0.000	**	-0.197	0.048	-0.071	0.000	**	-0.194	0.042	-0.073	0.000	**	-0.189	0.042	-0.071	0.000	**
Broadband	-0.086	0.051	-0.032	0.090		-0.089	0.051	-0.033	0.082		-0.125	0.047	-0.046	0.007	**	-0.124	0.046	-0.046	0.008	**
Company																				
Singtel	-0.182	0.043	-0.067	0.000	**	-0.181	0.043	-0.066	0.000	**	-0.190	0.037	-0.071	0.000	**	-0.179	0.037	-0.067	0.000	**
Starhub	-0.065	0.043	-0.024	0.126		-0.067	0.043	-0.024	0.118		-0.067	0.037	-0.025	0.074		-0.061	0.037	-0.023	0.102	
Channel Usage																				
Call Centre Usage	-0.093	0.049	-0.035	0.059		-0.092	0.049	-0.035	0.062		-0.035	0.036	-0.013	0.329		-0.046	0.036	-0.016	0.206	
Store Usage	-0.014	0.043	-0.005	0.754		-0.017	0.043	-0.006	0.699		-0.007	0.034	-0.003	0.835		-0.017	0.034	-0.006	0.615	
Website Usage	0.224	0.094	0.069	0.017	*	0.226	0.094	0.070	0.017	*	0.041	0.063	0.015	0.514		0.037	0.063	0.013	0.560	
App Usage	0.026	0.071	0.006	0.717		0.028	0.071	0.007	0.696		0.010	0.057	0.003	0.864		-0.002	0.057	-0.001	0.977	
Average Channel Rating																				
Average Call Centre Rating	0.108	0.074	0.026	0.143		0.102	0.073	0.025	0.165		0.225	0.063	0.057	0.000	**	0.223	0.063	0.056	0.000	**
Average Store Rating	0.445	0.156	0.053	0.004	**	0.438	0.156	0.053	0.005	**	0.219	0.139	0.027	0.114		0.222	0.138	0.028	0.108	
Average Website Rating	-0.581	0.132	-0.082	0.000	**	-0.561	0.132	-0.080	0.000	**	-0.314	0.118	-0.044	0.008	**	-0.297	0.118	-0.042	0.012	*
Average App Rating	-0.076	0.110	-0.012	0.491		-0.071	0.110	-0.011	0.522		-0.175	0.100	-0.028	0.078		-0.176	0.099	-0.028	0.076	
ACSI Constructs																				
Customer Satisfaction	0.801	0.015	0.671	0.000	**	0.818	0.017	0.685	0.000	**	0.764	0.014	0.642	0.000	**	0.823	0.017	0.691	0.000	**
Complaints	-0.423	0.067	-0.081	0.000	**	-0.406	0.067	-0.078	0.000	**	-0.387	0.059	-0.074	0.000	**	-0.341	0.060	-0.065	0.000	**
Customer Type																				
Digital SST	-0.283	0.118	-0.093	0.017	*	0.420	0.305	0.139	0.169											
Multichannel											0.017	0.072	0.007	0.811		1.173	0.208	0.450	0.000	**
Moderation																				
Customer Satisfaction x Digital SST						-0.098	0.039	-0.236	0.013	*										
Customer Satisfaction x Multichannel																-0.159	0.027	-0.454	0.000	**
Adjusted R^2	0.506					0.506					0.459					0.462				
F	168.650	**				161.820	**				190.113	**				184.649	**			
⊿F						6.239	*									35.190	**			
⊿R^2						0.001										0.004				
N	3,608					3,608					4,912					4,912				

** p < 0.01
* p < 0.05

Table 20: Satisfaction-Loyalty Moderated Regression for Telecommunications (Cont'd)

	Multichannel vs Digital SST (Reference)								
	Model 35: Base Model					Model 36: Moderated Regression				
	B	SE	Beta	P-Value		B	SE	Beta	P-Value	
Age	0.004	0.002	0.038	0.057		0.004	0.002	0.038	0.057	
Education	-0.018	0.016	-0.019	0.272		-0.017	0.016	-0.019	0.283	
Gender	-0.006	0.036	-0.003	0.859		-0.008	0.036	-0.003	0.827	
Household Income	0.007	0.011	0.011	0.532		0.006	0.011	0.010	0.555	
Married	0.008	0.047	0.003	0.858		0.009	0.047	0.004	0.844	
Working	0.024	0.069	0.005	0.729		0.022	0.069	0.005	0.744	
Length of Relationship	-0.010	0.011	-0.016	0.373		-0.010	0.011	-0.016	0.377	
Sub-Sector										
Mobile	-0.141	0.052	-0.059	0.007	**	-0.140	0.052	-0.058	0.007	**
Broadband	-0.078	0.057	-0.034	0.169		-0.077	0.057	-0.033	0.176	
Company										
Singtel	-0.110	0.047	-0.047	0.020	*	-0.109	0.047	-0.046	0.021	*
Starhub	-0.048	0.046	-0.021	0.301		-0.046	0.047	-0.020	0.321	
Channel Usage										
Call Centre Usage	0.012	0.052	0.005	0.814		0.009	0.052	0.004	0.864	
Store Usage	-0.019	0.053	-0.008	0.719		-0.020	0.053	-0.009	0.709	
Website Usage	0.097	0.052	0.037	0.062		0.096	0.052	0.036	0.063	
App Usage	0.011	0.045	0.005	0.804		0.011	0.045	0.005	0.816	
Average Channel Rating										
Average Call Centre Rating	0.124	0.077	0.035	0.109		0.126	0.077	0.036	0.104	
Average Store Rating	0.203	0.170	0.029	0.232		0.208	0.170	0.030	0.221	
Average Website Rating	0.012	0.146	0.002	0.932		0.005	0.146	0.001	0.970	
Average App Rating	-0.191	0.121	-0.036	0.116		-0.193	0.121	-0.037	0.112	
ACSI Constructs										
Customer Satisfaction	0.679	0.019	0.553	0.000	**	0.714	0.036	0.582	0.000	**
Complaints	-0.259	0.100	-0.040	0.010	*	-0.260	0.100	-0.040	0.010	*
Customer Type										
Digital SST										
Multichannel	0.048	0.071	0.019	0.501		0.395	0.315	0.159	0.210	
Moderation										
Customer Satisfaction x Digital SST										
Customer Satisfaction x Multichannel						-0.047	0.042	-0.144	0.258	
Adjusted R^2	0.314					0.314				
F	66.604	**				63.770	**			
ΔF						1.277				
ΔR^2						0.000				
N	3,518					3,518				

** p < 0.01
* p < 0.05

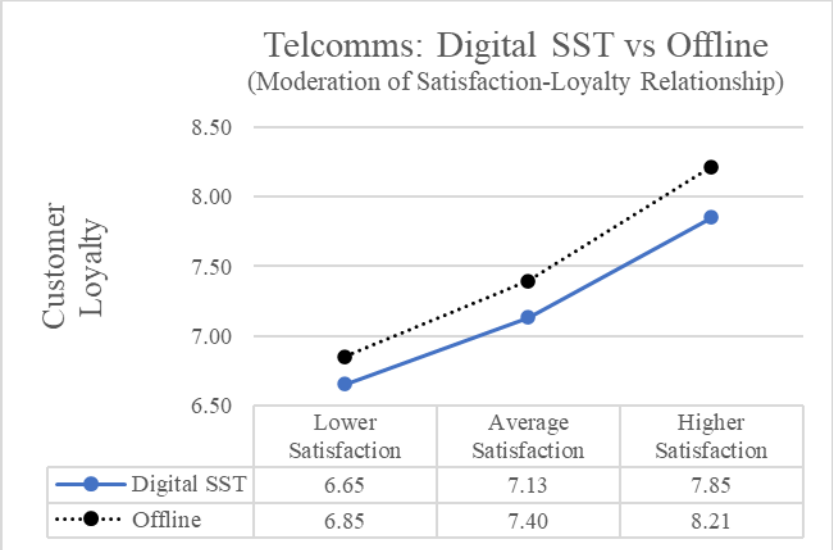


Chart 11: Satisfaction-Loyalty Moderation By Digital SST vs Offline Customers (Telcos)

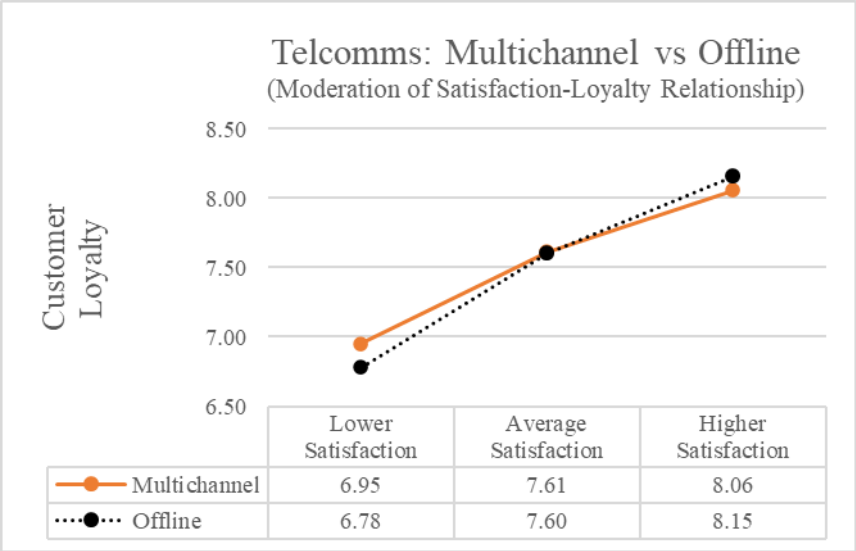


Chart 12: Satisfaction-Loyalty Moderation By Multichannel vs Offline Customers (Telcos)

Chapter 2.6: Discussion

Table 21 summarises our findings. While all the hypotheses were supported for the banking industry, interestingly for the telecommunications industry, only H1B and H4B was supported, with H2 and H5 even having a statistically significant negative moderation effect. We discuss these findings from a theoretical and managerial perspective next.

Table 21: Summary of Findings for Study 2

No.	Proposed Effect	Hypothesis	Banking	Telecoms
		Moderation Effects on Quality-Satisfaction Relationship		
H1A	+	The effect of perceived quality on cumulative satisfaction is stronger for digital SST customers when compared to offline customers	NS	NS
H1B	-	The effect of perceived quality on cumulative satisfaction is weaker for digital SST customers as compared when offline customers	S	S
H2	+	The effect of perceived quality on cumulative satisfaction is stronger for multichannel customers when compared to offline customers	S	NS
H3	+	The effect of perceived quality on cumulative satisfaction is stronger for multichannel customers when compared to digital SST customers	S	NS
		Moderation Effects on Satisfaction-Loyalty Relationship		
H4A	+	The effect of cumulative satisfaction on loyalty is stronger for digital SST customers when compared to offline customers	NS	NS
H4B	-	The effect of cumulative satisfaction on loyalty is weaker for digital SST customers when compared to offline customers	S	S
H5	+	The effect of cumulative satisfaction on loyalty is stronger for multichannel customers when compared to offline customers	S	NS
H6	+	The effect of cumulative satisfaction on loyalty is stronger for multichannel customers when compared to digital SST customers	S	NS

Note: S - Supported, NS - Not Supported

Moderating Effects of Channel User Types on Customer Satisfaction

Our study found different channel user types to have a moderating effect on the established ACSI relationships. the relationship between perceived quality and customer satisfaction, and customer satisfaction and customer loyalty, were both weaker for digital SST customers when compared to offline customer. Additionally, while both these relationships were strongest for multichannel customers in the banking industry, the same could not be said for the telecommunications industry. Apart from Hult et al's (2019) comprehensive study on the moderating effects of online and offline electronics goods customers, there has been limited research on the moderating effects of customer types on

customer satisfaction. Given our findings, we therefore note that while we contribute to the literature by providing more evidence for the presence of the moderating effects of channel user types on the well-established relationships within ACSI model, we further add to the research by finding that these relationships varies across industries.

Moderating Effects of Digital SST Customers

Next, we discuss the research implications of the moderating effects of digital SST customers, and their performance when compared to other channel user types.

Negative Moderation Effect When Compared to Offline Customers

Firstly, the weaker quality-satisfaction relationship for digital SST customers when compared to offline customers across both industries appears in line with the limited research that suggests that the benefits of greater convenience and accessibility do not outweigh the negative effects arising from a lack of socialisation and the overall less satisfying nature of digital encounters (Hult et al., 2019; Shankar et al., 2003; van Birgelen et al., 2006). Therefore, while previous research focused on less complex service environments, our study suggest that those findings can be extended to more complex service settings as well.

Secondly, with regards to the consistently weaker satisfaction-loyalty relationship for digital SST customers when compared to offline customers, previous limited research on e-commerce and lodging suggests a stronger relationship due to the ability to reduce search costs with online platforms (Hult et al., 2019; Shankar et al., 2003). Our research however supports our proposition that within a complex service environment, this relationship would in fact be weaker due the lack of socio-emotional ties and rapport building, and the greater ability to find online alternatives by digitally savvy customers.

Digital SST Customers More Satisfied At Low Performance Levels

Despite the weaker relationships, interestingly a closer examination of the interaction plots reveals that at low levels of perceived quality, digital SST customers are more satisfied than offline customers. However, this difference appears to reverse at higher levels of perceived quality, with the pattern consistent across both industries. Therefore, it would appear at low level of performance, digital SST customers outperforms offline customers in terms of customer satisfaction. One possible reason for this phenomenon is that at lower levels of performance, the benefits of convenience and accessibility, potentially outweighs the relatively poorer offline experiences faced by customers. However, as performance improves, the substitutionary effects become less meaningful as the benefits of positive human interactions start to outweigh the early gains from convenience and accessibility.

Loyalty of Digital SST Customers Differs By Industry At Low Levels of Satisfaction

When we made the same comparison for the satisfaction-loyalty relationship, we note that at lower levels of customer satisfaction, while the banking industry had digital SST customers more loyal than offline customers, telecommunications customers were less loyal than offline customers at low levels of customer satisfaction. In fact, as satisfaction increases, at higher levels of customer satisfaction, the loyalty of offline customer eventually exceeds even digital SST customers for the banking industry. However, for the telecommunications industry, offline customers were more loyal than digital SST customers regardless of the customer satisfaction levels. This suggests that for telecommunication customers, the benefits to customer loyalty with digital channels do not outweigh the benefits of social interactions and rapport building that comes with human-based interactions regardless of how satisfied customers are. We postulate that the reason for this could stem from the (1) commodified nature of telecommunication services and the (2) ease of switching providers within the

Singapore telecommunication industry. This can be seen in the (1) ease of switching mobile providers with full number portability in Singapore, (2) relatively similar content across PayTV providers, and (3) competition generally revolving price, speed, and data (IMDA, 2008; Ng, 2021). Given the lack of differentiation across the industry, the ease of switching, and the limited ability to build online stickiness like in the retail industry (Hult et al., 2019), digital SST telecommunication customers are likely to be less loyal in general when compared to offline customers. Offline telecommunication customers on the other hand are more able to form socio-emotional ties with the company due to the interactions with service staff. Also, offline customers usually have higher search costs when looking for alternatives offline as compared customer who used digital alternative. They would thus have smaller consideration sets (Shankar et al., 2003). This in turn would result in relatively higher loyalty levels than digital SST customers, regardless of the satisfaction levels.

Moderating Effects of Multichannel Customers

Previous research from the multichannel literature led us to postulate that the quality-satisfaction and satisfaction-loyalty relationships should be the strongest for multichannel customers as opposed to digital SST and offline customers. While this finding was supported for the banking industry, we did not find support for these hypotheses in the telecommunications industry. We discuss this divergence in next.

Strongest Moderation Effect for Multichannel Banking Customers

Looking at the banking industry, we found support for our hypotheses for multichannel customers having the strongest quality-satisfaction and satisfaction-loyalty relationship when compared to digital SST and offline customers. In effect, customer satisfaction and customer loyalty were found to increase at a larger rate than offline and

digital SST customers, as perceived quality and customer satisfaction improves respectively. At higher levels of quality and customer satisfaction, multichannel customers had higher levels of customer satisfaction and customer loyalty respectively when compared to both customer types.

Interestingly, a closer examination of the interaction plots shows that while there was a stronger moderation effect, at lower levels of perceived quality, multichannel customers had lower customer satisfaction as compared to both offline and digital SST customers. This pattern was also observed when we examined the satisfaction-loyalty relationship. In fact, digital SST customers appear to be most satisfied and loyal under these conditions. Therefore, in terms of the focal variables, multichannel customers appear to be less satisfied and loyal than offline and digital SST customer at lower levels of perceived quality and customer satisfaction. This finding for the banking industry adds to the multichannel literature which tends to suggest that multichannel strategy should generally lead to better customer satisfaction and loyalty (Ailawadi & Farris, 2017; Neslin et al., 2006). Our study on the banking industry provides a more nuanced finding. While multichannel customers tend to be more satisfied and loyal than other customer types when perceived quality and customer satisfaction level are high, at lower levels of both variables, multichannel customer are the least satisfied and loyal when compared to offline and digital SST customers.

Weaker Moderation Effect for Multichannel Telecommunications Customers

For the telecommunications industry, we found a lack of support for the strongest moderation effect for multichannel customers when compared to the other two customer types. Instead, multichannel customers had a negative moderation effect when compared to offline customers, while the comparison with digital SST customers was not statistically significant. For the latter, directionally while the moderation effect for the quality-satisfaction

relationship was at least positive 0.022 (t(3,133)=0.952, p=0.341) and therefore in the right direction when compared to digital SST customers, the coefficient for the satisfaction-loyalty relationship was negative when compared to the same group of customers at -0.047 (t(3,134)=-1.130, p=0.258).

These findings suggest that for the telecommunications industry, offline customers have a stronger quality-satisfaction and satisfaction-loyalty relationship when compared to multichannel customers. In fact, given the negative moderation effect when comparing digital SST customers with offline customers, the overall picture is one where offline telecommunication customers had the strongest moderation effect for both relationships.

Generally, the potential reasons for this finding could be due to (1) company level heterogeneity, the (2) complexity of service interaction for the telecommunications industry. Regarding company level heterogeneity, the Singapore telecommunications market consist of only three main companies, Singtel, Starhub and M1. As our data only measures customers from these three companies, it may be argued that significant differences in satisfaction and loyalty levels may affect our findings. Accordingly, these differences may stem from firm-level differences in multichannel resourcing and strategies which could have introduced noise into the dataset, resulting in the lack of statistically significance or even a reversal of our proposed relationships. We had attempted to control for some of these potential effects by including company indicator variables, and company level channel satisfaction ratings in the models, thus reducing the likelihood of these effects confounding our results.

The more likely reason for our findings could be due to a bias towards more complex service interactions in the dataset. The CSISG telecommunications survey requires survey participants to have a post-paid account in their own name and had interacted with the company via any of the channels in the last three months. Generally, Singapore telecommunications customers are unlikely to have interacted with their providers unless they

are attempting to (1) resolve some network connectivity related issues, (2) recontract or terminate their existing contracts, or (3) resolve any billing issues. Therefore, the survey methodology is potentially biased towards more complex service interactions where human-based interactions may be more effective in addressing customers' needs.

For the quality-satisfaction relationship, this bias for complex interactions may have outweighed any potential complementary effects from the use of multiple channels. For example, the complexity of technical related issues like a poor broadband connection with its myriad of different root causes, may have resulted in the use of digital SST confusing and frustrating customers due to their lack of technical understanding, thereby reducing any benefits of a reduction in information asymmetry when a customer attempts to search online first before reaching out to an offline channel. Similarly, for the satisfaction-loyalty relationship, any potential increase in customer engagement and stickiness stemming from the use of their preferred channels may be outweighed by the inability of their chosen channel to address their needs due to the complexity of the issue at hand. Hence, given the bias towards more complex service interactions, using an offline channel alone may be more effective at addressing these needs as service staff tend to be better at identifying customers' needs and providing targeted customised solutions that addresses them directly.

Guidance for Managers Embarking on Digital Transformation

Companies have increasingly deployed digital SST to improve their channel mix as part of their digital transformation strategies (Laberge et al., 2020; Zaki, 2019). As highlighted previously, adoption of these technologies has been thought to improve firm outcomes through (1) standardizing of service delivery, (2) lowering labor costs, and (3) expansion of service options (Curran & Meuter, 2005). In terms of managerial implications,

our study provides guidance on how such strategies would affect relational level outcomes in the form of customers satisfaction and loyalty.

Benefits of A Digital Only Channel Offering Declines

Firstly, in terms of deployment of digital SST, our study suggests that a pure digital SST experience would likely lead to better customer satisfaction outcomes only in situations where perceived quality is lower. Across both banking and telecommunications industry, our data shows that in situations where a company can ensure a higher quality of products and services, a purely digital service experience may result in customer satisfaction lagging alternatives which offer a range of channel types. Therefore, for companies in industries with complex service environments, having a digital-only strategy should be viewed with caution. When competing on customer satisfaction, a digital-only strategy would do well when quality is lower. However, to compete at a higher level, more resources would likely be needed to achieve the same level of customer satisfaction as compared to companies with multichannel service offerings.

For the banking industry, our study finds that this relationship applies to customer loyalty as well, with digital SST customers having the lowest loyalty at higher levels of customer satisfaction when compared to offline and multichannel customers. Thus, given that both the quality-satisfaction and satisfaction-loyalty relationships are weaker for digital SST banking customers, when competing with traditional multichannel banks on customer satisfaction and loyalty, purely digital companies such as the emerging FinTech and digital banks, would likely need to ensure their products and services are exceptional, with a high level of quality and satisfaction to adequately compete.

Benefits of Multichannel Strategy Differs By Industry

With regards to the effectiveness of a multichannel strategy, there appears to be mix results, with data from the banking industry supporting our hypotheses, but not so for the telecommunications industry. Therefore, managerially our study suggests that the effectiveness of having a multichannel strategy on relational outcomes in a complex service environment may differ across industries.

For the banking industry, where the quality-satisfaction and satisfaction-loyalty relationships were the strongest for multichannel customers, our study suggests that allowing customers to seamlessly use different channel types appears to have a greater effect on improving satisfaction and loyalty. However, in situations where the bank is only able to deliver a lower quality of products and services, and where satisfaction levels are lower, having customers use only digital SST or offline channels would likely result in better relational outcomes.

In the case of the telecommunications industry, we find the reverse for customer satisfaction. Multichannel usage appears to result in better satisfaction and loyalty outcomes when compared to offline channel usage in situations where perceived quality and customer satisfaction was low respectively.

Consequently, in the absence of clear evidence on the effects of multichannel usage on customer relational outcomes, contrary to the typical retail-centric thinking about the general benefits of a multichannel strategy (Ailawadi & Farris, 2017; Neslin et al., 2006), the outcomes of such strategies may differ across industries. Companies operating in a complex service environment should be mindful that a multichannel strategy may not always be the best strategy to drive satisfaction and loyalty. Additional consumer trials and research may be needed to ascertain its effectiveness.

Wrapping up our discussion on the findings, we therefore note that while all our hypotheses were supported for the banking industry, for the telecommunications industry, only our hypotheses on a weaker relationship for digital SST customers as compared to offline customers was found to be supported. Moreover, we found the digital SST customers tend to be the most satisfied as compared to the other channel user types, only when perceived quality was lower than the average. Additionally, we found multichannel customers had the strongest moderating relationship for the banking industry only. These findings seem to imply that the deployment of digital SST may not always lead to the best relational outcomes for customers.

Section 2.7: Limitations & Future Research

There are several limitations for Study 2. Firstly, the study is unable to control for the types of interactions used for each channel due to data limitations. Van Birgelen et al (2006) found different moderating effects on channel usage and behaviour intentions depending on the type of service interaction. Customers may have gravitated to becoming a specific channel user due to different service level requirements, or the perception that a certain type of channel is best suited to address their service requests. Customers may also have different perceptions and expectations on the role of service interactions which may in turn affect the types of channels and services they choose to engage in. Customers with a preference for self-service may gravitate towards digital SST, and view service interactions as a channel of last resort. On the other hand, customers who view service interactions as a means for socialisation or to solve any issue they might encounter, are likely to use offline channels more frequently. Specific to our dataset, a potential bias towards more complex service interactions for the telecommunications dataset may have contributed to our unsupported hypotheses. Therefore, further research in this area should consider identifying what types of services were used, and the reasons for using a specific channel. This would allow for a deeper analysis on why customers chose to stick to specific types of channels, as well as to control for some of these biases.

Secondly, the research has focused on most of the commonly used SST. However advances in service research have looked at other digital SST such as service robots, artificial intelligence and chatbots (Grewal et al., 2020; van Doorn et al., 2017). The use of these technologies, as well as the emerging livestreaming phenomena, have the potential to allow companies to be more responsive and emotive when it comes to customer interactions. This in turn may potentially overcome the limitations from a lack of social interactions and rapport

building when it comes to website and mobile application interactions. Further research would be needed to better understand their effects.

Thirdly, the research has focused on pre-COVID pandemic data in order avoid any potential noise in the dataset arising from pandemic era restrictions as it may have forced customers to use channels they may otherwise not typically use. For example, our discussion with banks and telecommunication companies surveyed in the dataset reveal that waiting time at branches and call centres were extremely poor during the pandemic due to the lack of manpower and safe distancing restrictions. This may have invariably resulted in customer switching channels not by choice. An offline user for example may be forced to become a digital SST user due to the inability to access offline services. While our research has avoided these potential issues, as more customers try out channels that they may not have typically preferred, over time the current relationships seen in our dataset may change. Therefore, more recent post-pandemic research may need to be done to see if these relationships have shifted over time.

Lastly, as research multichannel research moves towards studying the area from an omnichannel perspective, recent work has begun to look at not just channel usage but at the quality of channel integration (Ailawadi & Farris, 2017; Frasquet-Deltoro et al., 2021; Gao et al., 2021; Hamouda, 2019). To better understand the effects of digital SST and multichannel customers and strategies on the ACSI relationships, future research may wish to consider the level of channel integration and its impact on relational level outcomes.

Section 2.8: Conclusion

How does offering digital SST affect customer satisfaction within a multichannel complex service environment? Is digital always better? Our study addressed these questions by looking at how the relationships between perceived quality, customer satisfaction and

customer loyalty are affected by different channel user types. By comparing across two industries our study found that the answer depends. While we found digital SST customers most satisfied when perceived quality was below average, this positive gap shrinks as quality improves. Additionally, while evidence from the banking industry shows the quality-satisfaction and satisfaction-loyalty relationship to be the weakest for digital SST customers, and the strongest for multichannel customers, this finding applied only to the banking industry. For the telecommunications industry, there was some evidence to suggest offline customers tends to have the strongest relationship between these variables.

Consequently, given our findings, managerially our research shows that companies embarking on their digital transformation should be mindful that the deployment of digital SST within a multichannel setting is not always the most ideal in driving customer satisfaction and loyalty. Depending on their industry and the level of quality they can deliver, customer outcomes may vary.

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