

The Impact of AI-Enabled Checkouts on Shoppers' Attitudes and Purchase Intent in Saudi Arabia

Salman Ghazwani

A thesis submitted to Auckland University of Technology (AUT) in partial
fulfilment of the requirements for the degree of the
Degree of Master of Business

Faculty of Business, Economics and Law
Department of Marketing

Auckland, New Zealand
2021

Attestation of Authorship

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.”

Signature

SALMAN HUSSAIN GHAZWANI

Name

March / 2021

Date

Ethics Approval

This research was been approved by the Auckland University of Technology Ethics Committee (AUTEK) on July 17, 2020, for three years (i.e. through July 17, 2023) with the ethics application number 20/202.

Acknowledgements

First of all, I would like to express my deepest gratitude to my supervisor, Dr. Patrick van Esch, who provided me with guidance throughout this journey. I started this research at a difficult time, the beginning of the COVID-19 pandemic, but Dr. van Esch made it as easy for me as possible and spent as much time as he could to support me, which allowed me to feel confident about finishing this thesis. I am very grateful for his dedication, support, and encouragement to complete my thesis.

Also, I must extend my sincere thanks and gratitude to my father, Hussein Al-Ghazwani, for his constant motivation throughout the master's stage. Also, I do not forget my mother, Fatimah, for her support and her prayers for me to succeed. I am also very grateful to my wife, Shoogah, for making this time easier, and without her assistance, I would have got nothing done during this time. Thank you, Shoogah, for your continued support; it is impossible to forget all your efforts creating a beautiful atmosphere for me to accomplish this thesis. Lastly, I would like to thank all the participants who took part in data collection; their time spent completing the questionnaires is very much appreciated.

Abstract

Checkout technology enabled by artificial intelligence (AI) is a new innovation in the rapidly changing retail sector. The first example of this technology was recently launched by Amazon. This research was conducted in Saudi Arabia to examine shoppers' attitudes towards AI-enabled checkouts and their purchase intent. Using a sample of 655 Saudi respondents, convenience was examined as boundary condition (Study 1) and anxiety as the underlying causal mechanism (Study 2).

The results show that there was a positive impact of AI-enabled checkouts on purchase intent, with a direct interaction but a negative impact on purchase intent when anxiety mediated the interaction. However, the convenience associated with AI-enabled checkouts played a role in reducing anxiety. This study provides several contributions to the developing framework of marketing literature and offers to marketers and retail owners a better understanding of the influence of AI-enabled checkouts on shoppers' attitudes. Furthermore, by explaining shoppers' attitudes towards AI-enabled checkouts, this study indicates that the perceived convenience of such checkouts can reduce anxiety in acceptance of this innovative technology. The results also suggest that measures should be taken to increase public awareness of an AI-enabled system before its adoption, as some consumers may find it a source of anxiety and so avoid it. Thus, the findings presented here can help researchers, marketers, and managers in choosing the steps to take in order to maximize the benefits of AI-enabled checkouts.

Table of Contents

Attestation of Authorship.....	i
Ethics Approval	ii
Acknowledgements.....	iii
Abstract.....	iv
List of Figures	viii
List of Tables	ix
Chapter 1: Background	1
Introduction.....	1
1.1 Research Problem	2
1.2 Research Questions and Objectives	3
1.3 Significance of the Research.....	4
1.4 Methodology.....	5
1.5 Definition of Key Terms Used in the Thesis	6
1.6 Outline of the Thesis.....	6
Chapter 2: Literature Review.....	8
Introduction.....	8
2.1 Artificial Intelligence.....	9
2.2 Artificial Intelligence in Retail	11
2.2.1 Traditional checkouts.....	17
2.2.2 Self-checkout technology.....	18
2.2.3 AI checkout technology	19
2.3 The Impact of Convenience and Shoppers’ Anxiety on Purchase Intention for AI Retailers	21
2.4 Use of AI Technologies and Convenience in the Shopping Experience	22
2.5 Attitudes towards AI-enabled Checkouts and Purchase Intention.....	23
2.6 Summation	24
2.7 Conceptual Framework.....	26
2.7.1 Shopping Convenience	27
2.7.2 Anxiety.....	28
2.8.1 The direct effect of AI-enabled checkouts on customer purchase intention....	30
2.8.2 The mediation-moderated effect on the relationship between AI-enabled checkouts and purchase intention	31
Chapter 3: Methodology	34

3. Introduction.....	34
3.1 Aim of the Research.....	34
3.2 Implementation of the Methodology	34
3.3 Rationale for Utilising the Method	35
3.4 Objectives of the Study.....	36
3.5 Measurement and Pre-test.....	36
3.6 Sampling Plan	38
3.7 Survey Procedure	39
3.8 Data Analysis	39
3.9 Research Ethics.....	40
Chapter 4: Data Analysis	41
4. Introduction.....	41
4.1 Experimental Study.....	41
4.1.1 Response rate of the two surveys.....	41
4.1.2 Respondents' characteristics for Study 1	42
4.1.3 Reliability analysis.....	43
4.1.4 Total correlation test	44
4.1.5 T-test	45
4.1.6 Moderation analysis.....	46
4.2 Study 2	47
4.2.1 Respondents' characteristics for Study 2.....	48
4.2.2 Total Correlation Test.....	49
4.2.3 T-test	50
4.3 Moderated Mediation Analysis.....	51
Chapter 5 Discussion and Contributions.....	53
Introduction.....	53
5.1 Interpretations of the Results	53
5.1.1 The link between AI-enabled checkout and purchase intention	53
5.1.2 The interaction between AI-enabled checkouts and anxiety	55
5.1.3 The relationship between anxiety about AI-enabled checkouts and purchase intention	58
5.1.4 The moderated mediation interaction	59
5.2 Research Contribution and Implications.....	61
5.2.1 Theoretical Contribution.....	62
5.2.2 Practical Implications.....	63

Chapter 6 Conclusion.....	65
Introduction.....	65
6.1 Summary of the Research	65
6.2 Limitations of the Study.....	66
6.3 Suggestions for Future Research	67
6.4 Conclusion	68
References.....	69
Appendices.....	81
1. Appendix A: SPSS Moderation Analysis Output of Study One.....	81
2. Appendix B: SPSS Moderated mediation Analysis Outcomes of Study 2.	83
3. Appendix C: Ethical Approval.....	86
4. Appendix D: Study Information sheet and Participant Consent Form the English Version.....	87
5. Appendix E: AI-enabled Questionnaire the English Version	90
6. Appendix F: Normal Checkout Questionnaire the English Version.....	96
7. Appendix G: Study Information sheet and Participant Consent Form the Arabic Version.....	102
8. Appendix H: AI-enabled Questionnaire the Arabic Version	105
9. Appendix I: Normal Checkout Questionnaire the Arabic Version	111

List of Figures

Figure 1: Conceptual framework. 29
Figure 2: Comparison of anxiety levels among participants in the study..... 57

List of Tables

Table 1: <i>Frequency Statistics</i>	42
Table 2: <i>Reliability Statistics</i>	43
Table 3: <i>Correlation Statistics</i>	44
Table 4: <i>Descriptive Statistics</i>	45
Table 5: <i>Frequency Statistics</i>	48
Table 6: <i>Reliability Statistics</i>	49
Table 7: <i>Correlation Statistics</i>	50
Table 8: <i>Descriptive Statistics</i>	50

Chapter 1: Background

Introduction

The Global Retail Development Index (GRDI) for the year 2019 revealed that Saudi Arabia had become one of the most attractive developing markets for retail investment in the Middle East and North Africa, rising to seventh in the world behind China, India, Malaysia, Ghana, Indonesia, and Senegal (Alwatan, 2019). Consumers spend about \$125.5 billion annually in this sector. Consequently, there has been a strong drive to improve the retail environment through the adoption of new technological innovations (Afriyie et al., 2018; Vilaseca-Requena et al., 2007). A recent innovation in retail is the adoption of artificial intelligence (AI) in stores to create a smart-shopping experience (Özdemir & Hekim, 2018).

The prevalence of modern technology in business settings has led to a change in how organizations and stakeholders interact with and relate to each other, allowing firms to stay competitive by adopting new technological innovations in their services (Adner & Kapoor, 2010). For instance, in fields such as marketing (including sales and purchase experiences), technology-enabled processes have direct impacts on the final results. The application of technology in retail checkout systems allows customers to decide whether they want to interact or communicate with frontline employees (van Esch et al., 2020). Accordingly, retail shops are considering applying AI-enabled checkout services to improve the purchase experiences of retail customers. Also, using AI can increase the effectiveness of checkout systems in retail stores, as customers can better control communications and interactions with the staff (Cui et al., 2021).

Shopping is an important element of individuals' daily lives. Marketers, managers, and competitive companies seek to provide an exciting and convenient shopping experience for customers by adopting innovations to improve the speed and efficiency of their services (Nam & Kannan, 2020). Smart stores are a new, major innovation through which companies aim to create to offer a more satisfying shopping experience for customers and increase sales for firms (Rastegar, 2018). Amazon launched the first cashierless store on January 22, 2018 (Zhang et al., 2019). This technology, called "Just Walk Out," provided customers with a fast and easy shopping journey to minimize their common frustrations of waiting in line, interacting with others, and carrying cash (Cui et al., 2021). As this innovation in retailing provides customers with a new shopping experience, there is a need to study not only the AI-enabled technology but also customers' attitudes towards it, including the anxiety experienced by some (Bleier et al., 2020). This research focused on the relationship between AI-enabled checkouts and the mediation of purchase intent owing to anxiety. It also explored the effects of shopping convenience on the mediation relationship.

1.1 Research Problem

AI-enabled technology was established to improve customers' shopping journeys and to increase purchase intention in stores (Frank, 2021). This technology eliminates the need for shoppers to wait in line or pay by cash, therefore providing a more convenient and quick purchasing experience (Xu et al., 2020). It is clearly vital that managers, marketers, and other stakeholders have as much knowledge of customers' attitudes as possible when adopting new technologies, including AI-enabled checkouts, in order to utilise them effectively (Black & van Esch, 2020). Previous studies (Gelbrich & Sattler,

2014a; Johnson et al., 2020) found that, when new technology was adopted in retail stores, various factors influenced customers' attitudes towards it and intentions to use it, such as its perceived ease of use and usefulness in the purchasing process (Iqbal et al., 2018). There have been calls to investigate whether the attitudes that prevail among customers using older, existing technology (e.g. self-service checkouts) apply to AI-enabled checkouts (Ostrom et al., 2019). When considering the adoption of AI-enabled checkouts, anxiety could be a major factor impacting shoppers' attitudes and purchase intent (Meuter et al., 2003).

Therefore, this research project was designed to investigate the impact of AI-enabled checkouts on shoppers' purchase intent owing to anxiety. The research also examined the effects of convenience on anxiety among shoppers. The expectation was that shopping convenience would play a significant role in decreasing anxiety. In addition, the research assessed shoppers' attitudes towards AI-enabled checkouts in Saudi Arabia and the impacts of these attitudes on purchase intent. The aim was to provide stakeholders in Saudi Arabia with a better understanding of shoppers' attitudes towards AI-enabled checkouts and a basis for future researchers to explore other theoretical, practical, and methodological aspects of the issues raised here.

1.2 Research Questions and Objectives

Traditional retail checkouts create an interaction between shoppers and retail store employees, usually cashiers. The use of technology in checkout services, such as AI-enabled checkout systems, reduces interactions among individuals in a store—especially between employees and customers. This technology may also improve service quality by providing faster checkout processes, reducing the time spent waiting in line, and

eliminating the need to carry cash for payment. However, adopting a new technology may create anxiety amongst shoppers that may, in turn, influence their intention to use it. Hence, there is a need to allow retail shoppers to control communications between themselves and employees to improve service quality. The aim of this research was, therefore, to address the following questions:

- How do various checkout types (traditional, AI-enabled) impact the shopping experience in Saudi Arabia?
- What are the attitudes of Saudi retail shoppers towards the application of AI-enabled checkout services?
- How does anxiety impact the purchase intent of customers in Saudi Arabia when using AI-enabled stores?
- Does the shopping convenience associated with using AI-enabled checkouts reduce anxiety?

1.3 Significance of the Research

The development goals of shopping environments in every society are to create positive feelings towards the store and, thus, increase the number of customers, which will lead, in turn, to an increase in purchase intention (Sherman et al., 1997). The adoption of new AI technologies in the marketing field requires knowledge of customers' attitudes towards this technology for this new service to enter markets successfully (Prentice et al., 2020). This was the first research undertaken in Saudi Arabia regarding shoppers' attitudes towards AI-enabled checkouts. The importance of this research lies in its contributions in practical and theoretical terms. The perspective of this study is that AI-enabled checkouts offer benefits as well as emotional utility to shoppers. Further, the

research sought to explore the relationship between AI-enabled checkouts and shoppers' anxiety, which in turn affects their purchase intent (van Esch et al., 2020)

Methodologically, the study used experimental randomised data collection to ensure representative sampling of the research population. The researcher adopted scales for measuring shoppers' attitudes towards AI-enabled checkouts that can be used in future marketing research to evaluate shoppers' experiences. In practical terms, the study outcomes offer service providers and marketers a deeper understanding of the need to enhance marketing strategy plans when introducing AI-enabled checkouts and thereby improve the shopping environment. Marketers can also benefit from the analysis of the evolution of the effects of AI-enabled checkouts on shoppers' attitudes and purchase intent. This analysis can help service providers to adopt the technology successfully. This study explored shoppers' attitudes towards AI-enabled checkouts in Saudi Arabia. Understanding these attitudes can facilitate efforts to increase the profitability of companies by providing a more efficient shopping environment to their customers.

1.4 Methodology

This study began during the COVID-19 pandemic, which made it necessary for the researcher to utilise online experimental surveys to ensure the validity of the responses and to confirm the results. This study actually took the form of two studies using randomised subjects. The researcher conducted moderation analysis using PROCESS macro in SPSS (Model 1, 10,000 bootstrapped samples; Hayes 2018), and moderated mediation analysis (Model 7, 10,000 bootstrapped samples; Hayes 2018).

1.5 Definition of Key Terms Used in the Thesis

AI-enabled checkout refers to technology that allows pre-registered shoppers to enter a store, collect the items that they want, and exit the store without having to interact with a cashier or other employee (Wankhede et al., 2018b) since all processes, including payment, are online.

Traditional checkouts are purchasing arrangements in which customers pay money to a cashier when shopping in-store (Rafaeli, 1989).

Shopping convenience refers to customers' feelings of comfort about the perceived benefits and values of AI-enabled checkouts in the shopping journey (Jiang et al., 2013b).

Anxiety is a feeling or body's response to stress or the perceived risks of AI-enabled checkouts (Meuter et al., 2003).

Purchase intent refers to customers' likelihood of patronizing stores that use AI-enabled checkouts (Morwitz & Schmittlein, 1992).

1.6 Outline of the Thesis

This thesis is organised into six chapters. This first chapter has presented an overview of the objectives (i.e. AI-enabled checkouts' attributes, shoppers' attitudes towards AI-enabled checkouts, and the mediation effect of anxiety between AI-enabled checkouts and purchase intent) and of the research problem, research questions, research aims, research setting, and research terms. The second chapter consists of an in-depth literature review and a presentation of the conceptual framework and research hypotheses. The third chapter describes the methodology and approaches used to collect the data and develop the measurements as well as the analytical method and ethics approval process. The fourth chapter presents an analysis of the data with quantitative

tests of their validity, the use of SPSS software to assess the relationships among the research variables, and the application of the moderated mediation analysis to test the research hypotheses. The fifth chapter presents a discussion on the research outcomes, in particular the extent to which the findings supported the study hypotheses, and the contributions of the research in practical, methodological, and theoretical terms. The final chapter presents the research limitations and suggestions for future research, and some concluding observations.

This chapter, then, has laid out the basic principles of this study, highlighted the key issues and problems, justified the research, and provided definitions of some key terms. The methodology and the limitations were also presented and justified. These considerations provide a basis for the discussion that follows.

Chapter 2: Literature Review

Introduction

Marketers and managers are usually keen to adopt a new technology that can offer proven benefits in terms of improved service quality and customer satisfaction (Mahmoud et al., 2018; Simon & Yaya, 2012). Innovative firms have frequently used AI to remain competitive and increase customer loyalty (Grguric et al., 2020). A notable technological development in the retail sector has been the introduction of AI-enabled checkouts, a revolutionary idea which was pioneered by Amazon, which has changed the face of retail with its Amazon Go technology (van Esch et al., 2020). This technology provides customers with a new shopping experience characterized by such creative purchasing solutions as product navigation abilities and removes the need for shoppers to wait in line for a manual checkout. Another existing technology that has been adopted by some retailers is the self-service checkout, which allows customers to choose not to interact with store employees or stand in the cashier line (Polacco & Backes, 2018).

The implementation of technology in a retail store that specifically reduces waiting times enhances customers' shopping experience by making it faster and easier, thereby improving sales (Lu et al., 2013). Customers can now shop online for nearly any product, but the in-store shopping journey still plays a pivotal role in most purchasing decisions (van Esch et al., 2020). Here, the focus is on the future of retailing with respect to self-checkout options and AI-enabled checkouts, including their impact on shoppers' attitudes and purchase intent.

2.1 Artificial Intelligence

AI refers to a computer system that can perform human tasks (van Esch & Black, 2019), including those that require intelligence or thinking (van Esch et al., 2020). For example, driverless cars, which are based on intelligent computer systems, use information on speed, location, and direction and 360-degree vision to “know” what is around them and drive as a human would. AI is one of the emerging technologies in the field of business, and it is changing and growing constantly (Garbuio & Lin, 2019). A computer or a computer-robot or piece of software that can think intelligently, in the way that an intelligent human being thinks, and respond to certain behaviours can be described as AI (Visvikis et al., 2019). AI can be viewed from various perspectives, for instance, as the conversion of a machine so that it acts intelligently, that is, in a manner similar to the manner in which human beings expect each other to act. Likewise, from a business perspective, AI is a powerful technology for solving problems related to operations. From a programming perspective, AI can be used in searches, symbolic programming, and problem-solving (Tripathi & Parmar, 2019).

Simon (1995) described AI as a part of computer science, as the phenomenon of machines performing tasks that, if performed by a human, would be perceived as requiring intelligent thinking. For Wirth (2018), AI refers to any machine that recognizes its environment and uses responses that increase its likelihood of completing a given task. Patrick and Williams (2020) defined AI as a machine that simulates human intelligence and can perform tasks that require intelligence when humans do them. The related concept of computer knowledge, a subfield of AI, includes the development of computer programs that learn by detecting patterns in data such that computer system develops in

step with the amount of information available. For example, AI can be used to identify individuals in photos. AI exceeds human capacity in that it has no need for rest, does not make the same error twice, and can access massive troves of digital data in moments (Healey, 2020).

Research into AI started in the 1950s with efforts to use “thinking devices” to solve complex mathematical problems (Turing, 1950). From the start, there have been two competing procedures. One involves the application of formal practices to manage symbols, a logic-based procedure with no connection to biology and came to be known as “good old-fashioned artificial intelligence” (GOFAI; Healey, 2020). The other procedure involves recreating the way in which the human mind behaves using “artificial neural systems” that learn, using set procedures, to perform tasks (Hawley et al., 1990).

In real-world contexts, however, GOFAI did not achieve any progress with regard to AI functioning as human consciousness, whereas the current desired outcome for AI is to bypass human behaviour (Manzotti & Chella, 2018). Healey (2020) described a loss of funding in the 1970s resulting in a reduction in research and decreased interest in AI. In the 1980s, changes began to take place in both the rules-based GOFAI systems and biologically inspired neural systems. Earlier difficulties were being overcome, and AI showed promise once again. However, the goals and hype overtook what was possible, and, by the 1990s, AI research again waned.

Current smart systems easily exceed human intelligence in nearly all respects. Wirth (2018) distinguished models of AI systems, including a “narrow” AI system that deals with a specific function chosen by a human operator. Kaplan and Haenlein (2019) call this model of AI “business automation”; since it involves a specific task, it is not

readily adapted to new applications. Accordingly, these researchers observed, in the automation of business processes, AI algorithms perform well-defined tasks with little or no human intervention. For example, Apple's Siri, the Google Assistant, and Amazon's Alexa perform set tasks. Furthermore, AI is often useful when a machine can be used to simulate functions such as learning and problem-solving. In this era of technological advances and development, AI has proved to be an effective new tool, especially in customer service contexts (Xu et al., 2020), having come a long way in the past decade.

This second type of AI system, "strong" or "general" AI, is, as the name suggests, more powerful than narrow AI; it is also more flexible (Patrick & Williams, 2020). This type of AI can think on its own and act as human intelligence does rather than being restricted to a specific task or problem. Davenport et al. (2020) noted that both narrow and general AI may match or exceed human performance, but the former is focused on one field and cannot spread to new domains, whereas general AI can adapt to new fields. These researchers argued that general AI is closer to task automation. Wirth (2018) suggested that an AI solution should be capable of learning, knowledge representation, reasoning, and prediction or planning. The question thus remains whether an AI solution can replace the human expertise required to generate valuable marketing insights in modern retail contexts.

2.2 Artificial Intelligence in Retail

The adoption of AI to perform everyday activities has been increasing over the past decade, whether or not individuals are aware that they are using such technology (Black & van Esch, 2020). The widespread adoption of technologies such as smartphones has increased the use of speech recognition programs, such as Apple's Siri and Google's

Allo, and digital personal assistants driven by natural language processing (Xu et al., 2020). These apps are utilised by customers to examine information and personalized recommendations relating to products and services available in the market (Tussyadiah & Miller, 2019). Individuals also knowingly or unknowingly use these technologies for such purposes as the facilitated purchase of retail products and services online and offline. Additionally, retail stores use advanced AI capabilities for business advantages such as improved customer service (Xu et al., 2020). Leading retail companies, such as Unilever, have been investing large sums in advanced algorithms to analyse the satisfaction of their employees and customers, which is obviously a significant business consideration (van Esch & Black, 2019).

However, customers lack trust in AI when it comes to tasks that require emotional and social intelligence. Many seem to feel that tools such as chatbots have yet to be refined sufficiently to detect emotions, sentiments, or context or to solve complex problems (Xu et al., 2020). Thus, customers consider AI so far behind human intelligence in the areas of emotion and cognition (Jarek & Mazurek, 2019). However, contrary to public opinion in this regard, technologies have now been developed that can analyse the emotional responses of individuals through their facial expressions and vocal tones better than the average human being.

Retail stores are always searching for ways to increase profits by improving the customer experience while simultaneously reducing costs. The retail industry has quickly expanded its quality of service by making use of updated technologies (Xu et al., 2020). The advance of technology has provided new tools for improving various processes in retail shopping environments as well as for increasing users' perceptions of utility and

satisfaction during shopping experiences (Pantano & Timmermans, 2014). According to Batra (2019), retailers can use AI to improve the customer experience throughout the shopping journey. When effectively integrated into a retail store's operations, the technology can improve competitiveness and customer attraction. AI is helping retailers to understand and anticipate customers' needs better and to make the optimal decisions in terms of enhancing the lifetime value of customers (van Esch, Black, & Arli, 2020).

In recent years, retail stores have changed their operations through automation and digitalization, including integrating retail transactions into online and smartphones for checkout (Hagberg et al., 2016a). Skilled, knowledgeable, and dedicated employees on a retailer's staff enhance the customer experience, but hiring and retaining such a staff has the disadvantage of increasing overhead in the form of labour costs (Andrews, 2009). Other approaches involve a similar trade-off. Accordingly, improved ways of automating various aspects of the retail experience are essential. Applying technology in retail stores allows retailers to offer a high quality of customer service while staying competitive and increasing their effectiveness in work monitoring (Lartey, 2020). Areas that can be improved by using AI in retail include control of inventory, analysis of sales information, and customer service, thereby leading to improved overall service productivity (Scherer et al., 2015). According to Masse (1996), controlling inventory is a critical factor for a retail store's success. With automated inventory, retailers use computer systems to determine the minimum and maximum product stock levels by examining sales histories so that they can reorder products before shelves are empty. Another advantage of automation is scanning technology, which helps with the management and rapid monitoring of inventory; with RFID, tasks can be completed in moments that used to

require the efforts of several workers over multiple days (Manthou & Vlachopoulou, 2001). Furthermore, instead of having to worry about a cashier making an incorrect call on a price, an AI store can set up the system to automatically handle various pricing options and apply strategic price adjustments quickly and efficiently (Oh & Lucas, 2006). These options can process coupons, special markdowns, or preferred-customer discounts.

Most importantly, a well-achieved point-of-sale operation can help retail stores develop their customer experience as customers interact with retailers in the current shopping process and in the case of future repurchase (Katherine & Peter, 2016). This kind of operation is what differentiates small retailers from big retailers. Using a computer system, a store can process sales transactions quickly, thereby enhancing its overall relationship with customers. For example, when customers use self-service checkout systems, they are able to process their purchases on their own, saving valuable time compared with standing in a queue for a cashier (Hauser et al., 2019). For today's retailer, a computer system can reduce the amount of time spent managing inventory and allow for focus on the customer's specific needs and wants.

Digitalization, in general, refers to the adoption of digital services in the daily activities of service providers, from essential online payments to e-government applications (Mammadli & Klivak, 2020). In this research, "digitalization" refers to the application of digital services in the retail industry. The increase in the use of mobile devices that rely on the Internet has rapidly changed in-store services. Thus, digitalization is more likely to have a significant future effect on retailers, consumers, and employees (Hagberg et al., 2016b). According to Westland and Grace (1997), digital retailing provides a convenient shopping experience to customers. In the modern retailing era, AI

causes significant changes in a retail store's atmosphere and services (Westland & Grace, 1997). With improved technology and changes in consumers' attitudes and behaviour relating to the shopping experience and purchase intent, AI has made the shopping journey more exciting. However, this improvement in the shopper experience comes with a downside; thus, Brougham and Haar (2018) pointed out that use of technology reduces the opportunities for a worker to secure a retail job. Individual retailers may or may not choose to address this human relations issue.

AI has the potential to change most retail activities in terms of customers' access to products and services, relationships, and transactions (Pantano & Timmermans, 2014). It is reasonable to conclude, therefore, that one of the significant changes in the era of modern retail has been the application of AI-enabled checkouts that allow customers to shop checkout-free (e.g. Amazon Go). The involvement of technology in retail shopping, particularly during the checkout process, has had positive impacts on the overall purchase experience (Betzing et al., 2018). According to Wankhede et al. (2018a), AI-enabled checkouts, which were established by Amazon, are the new face of retail. This technology enables customers to enter the store and, using a smartphone, select what they want and then simply walk out. The payment is made through an Amazon account, so there are no lines, no cashiers, and no concern about using credit cards. According to Rafaeli (1989), customers waste a great deal of time waiting to be served by cashiers. Also, they may view negatively their communication and interaction with cashiers due to the emotional and mental state of the latter.

AI-enabled checkout systems allow customers to decide whether to engage with store employees in communication or not (Ivanov & Webster, 2017). Thus, shoppers

using AI-enabled checkout systems may be more likely to achieve their shopping goals, make referrals, and return to a retailer that uses such systems. Also, as Miranda (2008) suggested, AI-enabled checkout systems may save time by keeping communication and interaction between customers and staff to a minimum. Ivanov and Webster (2017), asserted that AI-enabled checkout systems are economical and increase the profit margins of retailers, pointing out that customers' purchase intentions result from associated attitudes and emotions. That is, the type of checkout system used in retail stores determines the feelings and attitudes of customers, thus influencing their purchase intentions.

According to Cronan et al. (2018), an individual's behaviour is usually determined by their willingness and intentions. Thus, previous studies demonstrated that, when customers have confidence in and familiarity with specific technology, they tend to be willing to use it (van Esch & Black, 2019). Various factors determine customers' intentions to adapt to AI technologies in a service-related business, among which hedonic motivation is the primary factor influencing the intention and willingness to use AI tools and technologies in retail settings (van Esch et al., 2020). Also, the attitude and behaviour intentions of customers in using the devices and tools of artificial intelligence are influenced, or depend upon, their expectations regarding the devices and the quality of their services in a general-service setting. Likewise, studies have shown that the perceived usefulness of the devices and ease of use of new technology such as AI devices influences the attitude and behaviour intentions of customers when adopting new and advanced technologies (Venkatesh & Bala, 2008). However, Lu et al. (2019) contended

that these factors in fact are likely to concern specifically customers' learning to use new and advanced technologies.

Retailers have gradually improved their checkout systems over time by adopting new payment innovations and technologies as they have been introduced (Hagberg et al., 2016a). Traditional retail purchases required face-to-face transactions during which a cashier handled physical payment and interacted directly with shoppers (Rafaeli, 1989). An improvement then came in the form of self-service checkouts (Zhao et al., 2008), which require less interaction with store employees; thus, cash and online payment can be made without the need for a cashier (Wang et al., 2012). However, these systems usually require customers to wait for an available checkout. The latest innovation, which transcends these shortcomings, is the AI-enabled checkout.

2.2.1 Traditional checkouts

Most convenience stores use traditional checkout systems that, as just discussed, require the presence of a cashier to perform the checkout process for shoppers. In this context, among the factors that impact shoppers' attitudes and purchase intent, shoppers' comfort with store employees enhances their satisfaction and perception of service quality (Sharma et al., 2015) and trust and reduces their anxiety (Hennig-Thurau et al., 2002). Thus, shoppers motivated by convenience are not concerned about such factors as waiting in line to pay when they have strong relationships with retailers (Edirisinghe et al., 2020).

Furthermore, cultural and religious differences also impact customers' feelings about some activities, including shopping (Sharma et al., 2012). At retailers with traditional checkouts, an understanding of these differences is necessary to achieve

service satisfaction amongst shoppers. Based on the role theory, Solomon et al. (1985) demonstrated that individuals interact more with others who belong to the same society. When customers have positive feelings about the employees at a store, they tend to pay more and experience enhanced purchase intent (Sutton & Rafaeli, 1988).

However, customers tend to prefer privacy when making a purchase. Boyce et al. (2006) found that customers can feel anxious about buying sensitive products and taking them to the cashier. Hillier et al. (1998) likewise found that shoppers, especially women, feel embarrassed when paying a cashier for sensitive products (see also Ronis & LeBouthillier, 2013). Furthermore, waiting in line at the checkout can negatively affect customers' purchase intent (Weng et al., 2017).

2.2.2 Self-checkout technology

In the modern retail industry, many customers are assumed to prefer using a checkout system that allows those with just a few items to complete their payments without standing in line for the cashier (Kokkinou & Cranage, 2013). More recently, many retailers have expanded self-checkout systems (Kokkinou & Cranage, 2015). Implementing new technology in retail is often necessary to maintain or grow a business and may motivate customers' intentions (Penttinen et al., 2014). On the other hand, adopting new technology may have a negative influence on customers' intentions; thus, some customers avoided using self-service checkouts when they were first introduced (Bobbitt & Dabholkar, 2001), reflecting the level of anxiety of self-checkouts at that time (Meuter et al., 2003).

However, perceived benefits of this technology positively impact customers' intentions to use it. According to Hudson and Zimmerman (2007), in order to achieve an

excellent customer experience when they implement a self-service checkout system, retailers should design and provide it in a context that limits their customers' waiting time. Morimura and Nishioka (2016) noted that waiting to complete the checkout process at the cashier leads to boredom and diminishes customer satisfaction with the shopping experience. Therefore, if customers receive benefits, such as faster transactions and a feeling of privacy, when using self-checkout, they will be satisfied with their shopping experience and increase their frequency of visiting a retailer and the amount that they spend (Turner & Szymkowiak, 2019).

Automated payment transactions enable consumers to scan and bag their purchased products, thus providing convenient shopping experiences in terms of shorter lines and greater privacy and control (Demoulin & Djelassi, 2016). Customers often prefer to use self-checkout when they are buying sensitive personal products, as just discussed being reluctant to use a traditional checkout out of concern that cashiers may judge them negatively (Sumak et al., 2014). Bulmer et al. (2018) argued that customers may have negative shopping experiences with self-service checkout when forced to use it or must wait to do so.

2.2.3 AI checkout technology

Self-checkouts, then, tend to mean shorter queues, more privacy, and greater control than traditional checkouts (Larson, 2019). The new checkout technology of AI-enabled checkouts allows customers to avoid having to get in any line at all and provide privacy since there is no interaction at all with store employees or other shoppers (van Esch et al., 2020). Amazon has adopted this technology in its Go app, which is connected to a shoppers' Amazon account (Polacco & Backes, 2018). As Hamstra (2018) described

the process, customers scan the app when entering the store and pick what they want from shelves, for which they are automatically charged when they walk out of the store. This new technology helps stores to reduce the labour cost of cashiers while saving time and providing a new shopping atmosphere for customers, benefitting both them and retailers (Hamstra, 2018).

Compared with ordinary retail stores, then, smart retail provides customers with a new shopping experience during which they do not need to interact with anyone in the store, either staff members or other shoppers, because the whole transaction is self-service (van Esch et al., 2020). The most important element is the checkout, which provides customers full freedom and privacy: they buy what they want and leave the store (Fangwei et al., 2009; Polacco & Backes, 2018). However, in AI stores, cameras and sensors monitor customers' movements and the items that they select during the shopping journey (Johnston, 2018). The AI system can use the data to analyse customers' shopping experiences, and the sensors manage the addition and removal of items from their carts, for which reason, customers may be concerned about privacy (van Esch et al., 2020).

Despite the increase in the popularity of online shopping, the wide variety of products available globally suggests that customers enjoy spending time in supermarkets, especially in large, bustling cities (Farag et al., 2007). Some stores currently use this AI technology, with shoppers offering generally positive reviews about their experiences (Martin, Wang, Artis, & Uncleback, n.d.). Other advantages of AI just noted that have resulted in increased consumer satisfaction include the reduced shopping time, leaving consumers more time for their day-to-day activities, and the minimal in-store interaction with staff and other shoppers (van Esch et al., 2020).

2.3 The Impact of Convenience and Shoppers' Anxiety on Purchase Intention for AI Retailers

Companies adopt technology in their operations for many reasons, such as reducing costs, staying competitive, and improving the quality of service and products (Hagberg et al., 2016a). Adopting AI in retailing helps retailers stay competitive and achieve customer satisfaction by making the shopping journey attractive, and customers' attitudes towards, and acceptance of, other new technologies increase the possibility of adopting these AI technologies in retail (Pikkarainen et al., 2004). Various factors influence customers' behaviour and attitudes during the adoption of AI technology and self-service checkouts by retailers, including hedonic motivation (Oluwajana et al., 2019; To et al., 2007). Customers looking to simplify their everyday lives (Roy et al., 2018) and have the intention and ability to learn new and advanced technologies can be expected to have a positive attitude and behaviour intent when it comes to adapting to the use of new technologies such as AI and self-service checkouts (Lim et al., 2019).

Moreover, the acceptance of AI technologies by potential customers is also influenced by such variables as their ease of use and perceived usefulness for purchasing products and services in both online and offline retail contexts (Venkatesh, 2000). On the one hand, the use of AI technologies allows retail stores to improve their services while reducing costs by adequately managing and improving their management operations (e.g. customer service; Xu et al., 2020). On the other hand, customers find it easy to purchase products and services through retail stores as they can quickly check out their products thanks to AI devices that boost the speed of service (Davis & Hodges, 2012). Thus, customers usually have a positive attitude and behaviour intention regarding the use of AI

devices and technologies when they find the technologies to be smooth and efficient. Further, when customers' expectations for the technologies are met and they are satisfied, they are more likely to use them and associated devices (Renko & Druzijanic, 2014).

Venkatesh et al. (2012), argued that such individual differences as gender, age, and experience are key drivers of the attitudes and behaviour intentions of customers regarding the use of AI technologies and devices. Usually, young and middle-aged people are likely to use advanced and new technologies in everyday activities (Owens et al., 2015). Examples include the use of smartphones for searching information and recommendations for purchasing products and services as well as availing themselves of AI-enabled and self-service checkouts (Comunello et al., 2017). These people also have more experience with such devices, so they find it more convenient to use them (DeGennaro, 2008). Furthermore, from the perspective of gender, women and girls are more likely to be concerned about the risks of using new technologies than men and boys (Siegrist, 2000), so such concerns can also influence the attitude and behaviour intentions of customers. According to Setiyadi et al. (2019), accepting new technologies is a function of an individual's psychological state (e.g. people who deal with technology in their day-to-day lives are more likely to accept and enjoy using AI in the retail setting). According to Pikkarainen et al. (2004), the acceptance of technology leads to more fun, so perceived enjoyment while shopping in AI stores may have a positive impact on customers' intention to shop at these retailers in the future.

2.4 Use of AI Technologies and Convenience in the Shopping Experience

The use of AI technologies has been expanding both online and as part of the in-store shopping journey. In retail stores, AI can create personalized experiences for

customers by integrating advanced digital technologies (Perry et al., 2019). AI-driven technologies and devices are currently most common in the e-commerce environment (Cha et al., 2019). These devices and advanced technologies provide customers with rewarding shopping experiences. Moreover, in the future, AI-driven personalised devices and technologies will offer a limitless shopping experience to customers in both online and offline settings (Guha et al., 2021). Customers find it easy and convenient to shop using AI-driven technologies and devices (Kumar, 2007). Moreover, customers in retail settings tend to be more confident that they will purchase the products that they want through the use of advanced technologies when they trust them and expect them to save time in deciding what to purchase (Ul Hassan et al., 2020).

AI in e-commerce and offline retail stores enhances and supports an improved customer experience (Cha et al., 2019). The use of AI likewise helps companies to adopt more sustainable manufacturing processes (Di Vaio et al., 2020) and enhances logistics and personalization (Mose, 2019). Thus, AI improves the quality of the products and services offered to customers in retail stores, offering better and more convenient services in a comfortable shopping environment (Mose, 2019). The digitization of companies' activities and their use of e-commerce to sell their products and services are providing their customers with a smoother digital journey for customers (van Esch et al., 2020).

2.5 Attitudes towards AI-enabled Checkouts and Purchase Intention

Earlier studies have demonstrated the link between customers' attitudes and the adoption of technology (Gelderman et al., 2011; Moutinho & Smith, 2000). One of the most popular theories in this regard is the technology acceptance model (Davis, 1989). From this perspective, perceived benefits and ease of use when adopting new technology

significantly influence customers' attitudes towards and increase their intentions to use it (Adams et al., 1992; Davis, 1989; Davis et al., 1989). Similarly, according to planned behaviour theory, customers' attitudes towards AI-enabled checkouts influence purchase intent (Ajzen, 2011). From this perspective, beliefs are antecedent to attitude (Mathieson, 1991), so, when customers trust in the perceived benefits of AI-enabled checkouts, their purchase intent is enhanced.

However, previous studies (Cui et al., 2009; Kim & Lee, 2019; Lu & Su, 2009) have shown that anxiety can have a significant effect on purchase intention when a new technology is adopted. Also, a pair of previous studies found that anxiety negatively influenced the intention to use a self-service technology (Meuter et al., 2005; Meuter et al., 2003). In this study, anxiety refers to shoppers' feelings or emotions when they use AI-enabled stores regarding the potential risks involved (Cambre & Cook, 1985).

2.6 Summation

Innovation is an essential factor for retailers in order to achieve customer satisfaction and loyalty (Özdemir & Hekim, 2018). By adopting walkout technology, service providers can maintain a highly competitive profile in retailing (Xu et al., 2020). AI is changing the face of retail, and the acceptance of new technology by customers provides retailers with an excellent opportunity to adopt AI technology in their stores, thereby achieving customer satisfaction and creating a new shopping experience for potential customers (Wankhede et al., 2018a). Various factors influence the attitudes and behaviour intentions of customers regarding the use of advanced technologies and devices (Gursoy et al., 2019). Hedonic motivation is the primary factor influencing the attitude and behaviour intentions of customers in adopting advanced technologies for

purchasing products and services from retail stores (Cha, 2020). Similarly, variables such as perceived usefulness, ease-of-use and individual differences also influence the attitude and behaviour intentions of customers in using AI technologies (Venkatesh, 2000).

Furthermore, the use of AI technologies and devices allows retail stores to offer better and improved services to customers and ensure that the shopping journey for customers will be more enjoyable and convenient (Ameen et al., 2021).

However, there has been only limited study of the relationship between shopping convenience and anxiety of using new technology (Pillai et al., 2020), such as AI-enabled checkouts, which needs to be balanced with the enjoyment that some customers associate with this shopping experience (Kasilingam, 2020). In addition, there has been relatively little research into either the relationship between AI-enabled checkouts and purchase intention or the mediation effect of anxiety between AI-enabled checkouts and purchase intention. The AI-enabled checkouts attitude and purchase intent model (Figure 1) was designed based on previous research in services marketing (Gelderman et al., 2011; Moutinho & Smith, 2000), management science, and psychology (Adams et al., 1992; San Martín & Herrero, 2012). The theoretical framework for the AI-enabled, attitude and purchase intent model is discussed in the following section along with the research variables and the development of the hypotheses.

2.7 Conceptual Framework

A detailed review of the literature concerning the attitudes of shoppers and relevant anthropological, historical, and retail concepts informed the development of the conceptual framework (Adams et al., 1992; Davis, 1989). The in-store purchasing journey in the context of AI-enabled retailers is a new shopping experience, so its effectiveness remains to be assessed (van Esch et al., 2020). In Saudi Arabia, most consumers shop at physical stores, though there are often impediments to this shopping experience, such as long waiting times at service counters (Haque et al., 2013). The checkout systems used currently in Saudi supermarkets are traditional (Mahfooz, 2014). Several studies have concluded that the modern retail industry is in need of development and innovation in regard to its facilitation of service and the quality of customers' shopping experiences (Guha et al., 2021). Such development could be achieved through the adoption of advanced applied technology in retail transactions, including, again, the implementation of AI-enabled checkout systems such as Amazon Go. The concept of the shopping experience is one of the major focuses of this study.

This study examined the impact of AI-enabled checkouts on shoppers' attitudes. The adoption of an AI-enabled system was based on existing research about the acceptance of technology (e.g. Venkatesh, 2000) as well as the demand for innovation that makes the shopping journey in supermarkets faster and more convenient. The analysis took into account three variables associated with AI-enabled checkout, namely convenience, anxiety, and purchasing intentions. The following discussion considers research on the convenience of AI-enabled shopping as well consumers' anxiety about it.

2.7.1 Shopping Convenience

The shopping experience plays a significant role in the impact of a preferred shopping environment and affects purchase intention. According to Foroudi et al. (2018), retailers need to enhance the customer experience, and consumers' knowledge of how to use technology and perceptions of its benefits determine their satisfaction and convenience and thus influences the number of items purchased. These researchers concentrated on the online shopping environment, and AI-enabled online stores have some similar attributes, such as the use of the Internet and the need for customers to create an account and provide credit card details. However, Jiang et al. (2013a) emphasized that shopping convenience as a marketing concept refers to goods that buyers purchase regularly and quickly transact at convenience stores. The present study assessed whether AI-enabled checkouts enhanced the customer experience. AI-enabled stores offer significant advantages, being convenient for consumers who prefer to shop in-store; as discussed, consumers can purchase without communicating with store staff and need not wait in line to complete the checkout. The convenience in this context involves saving time and work (Sethi & Sethi, 2016).

The expectation, then, was that AI-enabled checkouts would appeal to young customers in Saudi Arabia, helping them to feel comfortable shopping in retail stores—especially those who deal extensively with technology in their day-to-day lives (Alfallaj & Alfallaj, 2020). On the other hand, the expectation was that older customers might feel more comfortable with a traditional checkout, the reasoning being that they tend to prefer human interactions to offset feelings of loneliness. In addition, from a gender perspective, in Saudi Arabia, it is commonly accepted that women prefer little or no interaction with

male employees in a retail environment, and AI-enabled checkouts provide a shopping environment with little or no interaction required (van Esch et al., 2020). The research was thus designed with regard to social habits and cultural norms in Saudi Arabia, the purpose being to investigate the impact of AI-enabled checkouts on shopping convenience, which affects purchase intent. Also, the effort was made to determine whether shopping convenience moderates the relationship between AI-enabled stores and anxiety compared with traditional checkouts.

2.7.2 Anxiety

To use an AI-enabled system in supermarkets, customers must have a smartphone and credit card and create an online account. They scan their smartphones at the electronic gate, select their purchases, and then walk out (van Esch et al., 2020). The payments are made through their accounts with a credit card. However, every society has concerns regarding privacy (Meuter et al., 2003). Advanced technology that collects customers' private information, such as images and credit cards, and stores the data for retailers, may make customers anxious (Park et al., 2019). Saudi culture has unique concerns about privacy; many Saudis believe that sensitive details such as credit cards should be saved and not shared with others in most cases (Khalil, 2014). In addition, the level of anxiety may increase among shoppers when using new technology, especially older ones (Lee et al., 2010).

According to Gelbrich and Sattler (2014b), anxiety negatively influences its use. It is also thought that traditional checkouts in the context of Saudi culture may create behavioural anxiety, including for shoppers queueing for cashiers or buying sensitive products, especially female and younger shoppers (Boyce et al., 2006).

Building on previous research, the present study was designed to explore whether anxiety about new technology impacts overall purchase intention (Dewi et al., 2019) and whether and if so to what extent anxiety factors mediate the relationship between AI-enabled checkout and purchase intention.

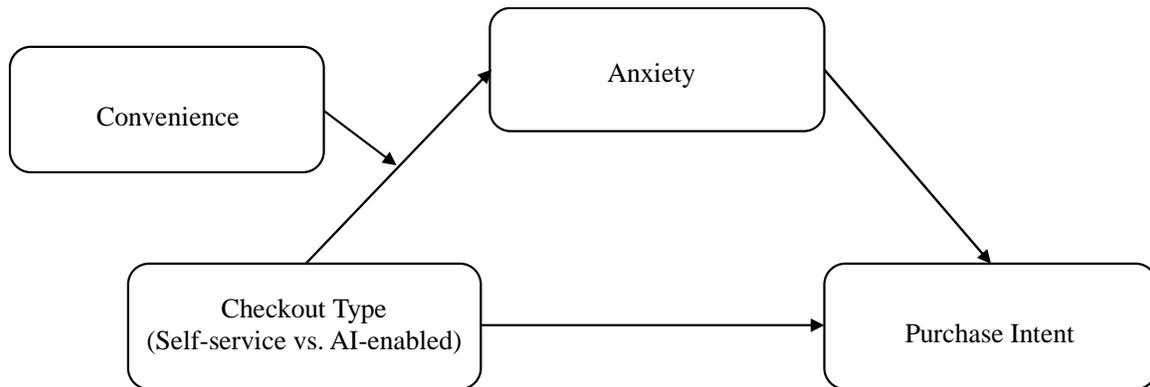


Figure 1: *Conceptual framework.*

2.8 Development of the Hypotheses

The hypotheses were developed using several variables: AI-enabled checkouts served as the independent variable; shopping convenience served as the moderator; anxiety served as the mediator; and purchase intention served as the dependent variable (van Esch et al., 2020). Both the direct and indirect relationships were considered. The extent to which the adoption of AI-enabled checkouts in retail stores reduces anxiety and leads to purchase intent depends on the perspective of and the sample used in a study. Many studies have reviewed effects associated with the use of technologies and ways to increase the convenience of the experience for customers when they incorporate technology into their shopping journeys (Beatson et al., 2006). Comfort using technology is a challenging variable for researchers because differences in attitude and expertise impact customers' responses to technology (Bolton et al., 2018).

2.8.1 The direct effect of AI-enabled checkouts on customer purchase intention

Typically, in-store shopping attracts the majority of retail customers. However, customers are increasingly looking for ways to buy day-to-day goods easily and quickly. The involvement of technology in retail shopping, particularly during the checkout process, positively impacts the overall purchase experience (Betzing et al., 2018). An AI-enabled checkout in a supermarket gives shoppers a rapid purchasing experience compared with retailers that rely on traditional checkouts (Bock et al., 2020). Also, when customers' satisfaction increases when they know that they do not have to waste time at the cashier (Xu et al., 2020) and therefore may spend more time in-store and purchase more products. Consumers who have a positive attitude about technology tend to have a more satisfying retail shopping experience overall than those who have a negative attitude (Beatson et al., 2006).

Shopping convenience refers to customers' comfort, in this case, with the use of AI-enabled checkouts. Past studies found that service satisfaction levels correlated with shoppers' behavioural intentions and pleasure (Aagja et al., 2011). Time-poor customers continue seeking providers that offer value in terms of convenience of use and purchase. It is thought that AI-enabled stores save shoppers significant time and effort (Xu et al., 2020). In regard to internet shopping, customers' purchase intention increases in conjunction with their confidence that they will save time (Kin & Farida, 1970). Customers who feel comfortable with internet shopping can be expected to frequent AI stores, where they will spend considerable time and make purchases.

Shoppers in Saudi may tend to purchase more products using AI-enabled checkouts than using traditional checkouts (van Esch et al., 2020). For example, if

customers enter a store that uses traditional checkouts and see a long queue, they can be expected to purchase only essential items or even to leave without buying anything (Brown et al., 2013). In this respect, customers' purchase intentions result from associated attitudes and emotions (Ivanov & Webster, 2017). In light of these considerations, it was hypothesized that

H1: AI-enabled checkouts (vs. traditional checkout) will have a positive impact on purchase intention.

2.8.2 The mediation-moderated effect on the relationship between AI-enabled checkouts and purchase intention

With the rapid development and adoption of new technologies, anxiety increases among its potential users (Meuter et al., 2003). Anxiety in the context of the present study relates to the value that shoppers place on the use of AI-enabled checkouts, and ease of use relates to acceptance of the technology (Sohn & Kwon, 2020). The potential anxiety associated with AI-enabled checkouts includes both computer anxiety and internet anxiety (Torkzadeh & Angulo, 1992). Regarding computer anxiety, researchers have found that individuals may experience negative feelings when using computers owing to the potential to lose important data or make a mistake (Barbeite & Weiss, 2004) that negatively impact their attitudes and behaviours (Harrison & Rainer Jr, 1992).

Internet anxiety refers, as might be expected, to the anxiety that occurs when individuals use the internet (Presno, 1998). Individuals may have anxiety when using electronic devices, and they may also have anxiety when dealing with the internet (Thatcher et al., 2007). Thus, customers who use a smartphone and feel confident dealing with electronic devices but still have internet anxiety may choose to shop in a traditional

store and avoid AI-enabled checkouts. The requirements for AI-enabled checkout, as discussed, include online registration and credit card information (Johnston, 2018), which could create anxiety and therefore hesitancy among shoppers to use AI-enabled stores. Customers' concerns may include the security of a firm's internet systems and the potential for loss of private information and credit card fraud (Celik, 2016a; Nagar & Gandotra, 2016). Thus, shoppers with significant anxiety are less likely to use AI-enabled stores (Balaji & Roy, 2017).

Customers who do not use a smartphone or fear new technology can be expected to experience anxiety that impacts their purchase intention (Gelbrich & Sattler, 2014a) and reduces their likelihood to use AI-enabled stores. Also, again, AI-enabled checkouts require an online payment that deducts money from customers' credit card accounts through their smartphones (Johnston, 2018). Given the prevalence of online extortion and fraud globally, trust is typically a significant factor that influences the use of AI retail stores. According to Mortimer et al. (2015), the perception of risk associated with online banking negatively impacts purchasing intent. Buyers' trust in financial secrecy is included, and an absence of trust may negatively affect customer attitudes and, thus, purchase intention (Liao & Cheung, 2001). Also, in regard to the shopping experience, customers may feel less comfortable when shopping at a store equipped with cameras throughout that record their behaviour. Cultures differ in regard to sensitivity to private information, with the members of some communities preferring not to share their information with retailers, especially anything associated with their credit cards or photo identification (Liao & Cheung, 2001). When shoppers feel anxious about an AI-enabled

system, they can be expected to feel less comfortable overall and to experience decreased purchase intent.

However, the adoption of advanced technology can improve the customer shopping experience (Diallo & Collin-Lachaud, 2019). AI-enabled stores offer a low-anxiety environment to customers who prefer not to interact with strange people in the queues at crowded stores. In other words, when shoppers experience more convenience in their shopping journeys, their anxiety about interacting with strangers is likely to diminish (Oghazi et al., 2012). Anand et al. (2019) asserted that customers who trust the Internet have positive attitudes toward online shopping. Thus, online payment and the ability to avoid queuing for checkout can be expected to offer Saudi customers a sense of comfort during the shopping experience in AI-enabled stores, leading, in turn, to enhanced purchase intention as described by the technology acceptance model theory (Venkatesh & Davis, 2000) with respect to perceived ease of use. The perceived benefits theory regarding enhancement of the overall shopping convenience (Anand et al., 2019) suggests that consumers who trust online payment systems do not perceive AI-enabled checkout to be risky. In light of these considerations, it was hypothesized that

H2: The negative mediation effect of anxiety is moderated by the convenience of AI checkouts (vs. traditional checkout). Specifically, the indirect negative effect diminishes when shoppers perceive AI-enabled checkout to be more convenient than traditional checkout.

Chapter 3: Methodology

3. Introduction

This chapter includes discussion of the design of the research, data collection, and analysis methods and the rationale for choosing them to achieve the objectives of the study and answer the research questions. Also discussed is the process of ethical approval for the research. The randomised survey is described with respect to the dimensions of the sample, the sampling method, the measurement scale, and the ethical considerations involved.

3.1 Aim of the Research

The aim of the research was to discuss the attitudes of Saudi retail shoppers towards AI-enabled checkout services and their impact on the shopping experience (van Esch et al., 2020) in Saudi Arabia. The research focused on three variables, namely convenience (Pham et al., 2018), anxiety, and intent (Celik, 2016b). The research also took into account the interactions among these variables under the conditions of the two types of checkouts (traditional and AI-enabled; van Esch et al., 2020) and considered the extent to which convenience moderates the interaction between AI-enabled checkouts and purchase intent. The researcher also sought to determine the effect of the interaction when convenience moderates anxiety as a mediator between AI-enabled checkouts and intent.

3.2 Implementation of the Methodology

The standard checkout type served as the control group and AI-enabled checkout served as the experimental study group. The researcher performed two online surveys, one for each group, using the Qualtrics tool. The questionnaire for the randomised survey

consisted of two blocks, one dealing with traditional checkouts and the other with AI checkouts. The survey as a whole consisted of two sections, one of demographic questions and the other of item measures. The questions were closed-ended and were answered using a seven-point Likert scale. The software divided the participants into two equally sized groups. Before taking the survey, the participants were required to watch two videos, one for each type of checkout: the control group viewed a video about the normal checkout process, and the experimental group viewed a video about AI-enabled checkouts. Both videos presented the conditions so that the participants understood the issues involved and were able to form opinions before answering the questions. The responses were collected using Qualtrics and exported to Excel files for organising and filtering. After the data were organised, SPSS software was used for the statistical analysis.

3.3 Rationale for Utilising the Method

The main method used was, then, a two-experimental, between-subjects research design. The researcher chose this method because it provides internal validity and the ability to control the influential factors. The sample control and experimental groups were selected randomly (Turner, 2020). Both groups used the same level of the measured variable to control the statistical regression and the mean at the same level. The fact that the researcher conducted the study while in New Zealand—the Covid-19 epidemic made it impossible to travel to Saudi Arabia to conduct a field survey and interviews—created challenges for the data collection and pilot testing. The researcher used online surveys instead and replicated the study to ensure validity and reliability and to confirm the interaction effect of AI-enabled checkouts on purchase intent.

3.4 Objectives of the Study

The objective of this study was to detect any differences between shoppers using traditional as opposed to AI-based checkout systems. The focus was accordingly on

- the influence of AI-enabled checkouts on retail shoppers' attitudes in Saudi Arabia,
- the differences between shoppers' perceptions of regular checkout and AI checkout systems (i.e. convenience and anxiety), and
- whether an AI checkout experience influenced the continuous usage intention with regard to checkout-enabled retail.

3.5 Measurement and Pre-test

The researcher designed a measurement scale based on a review of previous literature relating to the attributes of AI and customers' attitudes and also adopted proven constructs from the marketing literature, in particular the all-items scale by Bruner (2019). The measurement scale has been adopted to quantify the interaction between the designated research variables, which included the conditions (traditional or AI-enabled), anxiety, shopping convenience, and purchase intent. The questionnaire form was designed and published online. The two blocks of questions were devised using the randomising tool in Qualtrics to divide the sample into two equal and random groups. Each block of the questionnaire contained variables: 9 items relating to convenience, 9 items relating to anxiety, and 12 items relating to intent. Most of the questions were answered using a seven-point scale, including an information sheet and consent form on the first page, followed by the demographics questions. After participants answered these questions, the software directed them randomly to the selected block of questions about either traditional or AI-enabled checkout. As mentioned, participants then viewed a short

video about one or the other type of checkout before proceeding to the survey to ensure that they understood the issues involved and were able to provide their opinions about the selected type of checkout. The survey was designed in English and then translated into Arabic. The Arabic version was selected as the default because it was the first language of the target population. The translation was essential to provide the participants with a full understanding of the questionnaire and guarantee the quality of the responses. The researcher translated the survey into Arabic, which is his first language, and then set up an online meeting with specialists for the pilot test to make sure that the translation communicated the exact meaning of the English text.

The researcher developed four variables to measure shoppers' attitudes towards AI-enabled checkouts and several items to measure each variable. The independent variable corresponded to the conditions and items designed to measure the shoppers' attitudes towards AI-enabled checkout; the measurement was adopted from Chuawatcharin and Gerd Sri (2019). The items for the moderator variable were designed to measure the effect of the convenience of AI-enabled checkout using the procedure developed by Bruner (2019). The items for the mediator variable were designed to measure the effect of anxiety associated with AI-enabled checkout; this measurement was also adopted from Bruner (2019). Lastly, the dependent variable was purchase intent; again, the measurement was also adopted from (Bruner, 2019).

Furthermore, all of these measures underwent pre-testing before the researcher distributed the survey in order to detect and correct any errors that could cost time or affect the measurement of the study results. For the technical pilot study, the researcher pre-tested the electronic copy and prepared the measurement scale for all of the items.

Five close friends of the researcher with experience using the software program (Qualtrics) took part in a pre-test of the survey to ensure that the instructions were clear and to check the random inside survey. The researcher also ran a pre-test with a sample of the research population to ensure that all of the questions were intelligible to the participants, estimate the time required to complete the study, and assess the randomisation tool and the recorded value of each item before its use in the main study. Through the pre-testing, the researcher identified and corrected an error in the recording value by the SPSS software that was automatically setting the items' values. Based on past studies and marketing-scale books, the seven-point Likert scale was used in this research so as to avoid validation problems in the data analysis. There were also some additional measures based on marketing specifics; for instance, the following question was added under the anxiety variable in light of the pilot study: "With Covid-19 shopping restrictions in mind, do you think that shopping at AI-enabled stores would reduce your anxiety about interacting with others?"

3.6 Sampling Plan

To measure Saudi shoppers' attitudes accurately, a large number of participants was required; specifically, each checkout group (traditional and AI-enabled) was expected to include 200 participants. The age of participants selected for the research ranged from 18 to over 60 years of age. The sample included both men and women. Local participants were selected to ensure that the outcomes were specific to shoppers in the research population.

3.7 Survey Procedure

The online survey for collecting the research data was approved by the Ethics Committee of the Auckland University of Technology. The first page of the survey application consisted of an information sheet, at the end of which potential participants were asked to decide whether to start the questionnaire or not to participate in the study. Starting the questionnaire was considered consent to be involved in the study. As mentioned, the survey was translated into and provided in the Arabic language since the target population consisted of native Arab speakers. Thus, the researcher ensured that all of the participants were fully informed regarding all of the items in the survey. After examining the questionnaire and ensuring that all of the criteria were met, the researcher published it through social media applications in Saudi Arabia. The survey was open through Qualtrics from July 17 to August 14, 2020. This timeframe was selected to ensure that the target sample size was achieved.

3.8 Data Analysis

The results of the two surveys were analysed using SPSS software. The researcher analysed data from the first study with respect to

- *frequency, to examine the multivariate distribution and identify missing values;*
- *reliability, using Cronbach's alpha to determine validity; and*
- *correlation, to determine any relationships among the research variables.*

The researcher also performed a t-test to detect any significant differences in the means of the control and experimental groups as well as moderation during the data analysis to test the boundary condition and research hypotheses. Study 2 replicated the boundary condition of convenience, serving to confirm the findings from Study 1 and to improve

its reliability. This procedure also effectively confirmed the variable interactions discovered in the first study and provided additional validation of the data from that study. Finally, the moderated mediation was applied to the second study to assess the interaction of the final model.

3.9 Research Ethics

Ethical approval was required for this research owing to the method of data collection. The researcher met with the Auckland University of Technology's Ethics Committee (AUTECH) and received ethical approval for the research assuring that the data collection method was lawful and would avoid any ethical issues. There was no risk to the participants associated with their involvement in this research. Their actual participation involved sharing information about their feelings and experiences using traditional and AI-enabled checkout procedures. The questionnaire requested no personal or sensitive data about the respondents. The only potential risk was the timeframe to complete the survey. The information sheet informed the participants that participation was voluntary and assured them that they would not be asked to disclose personal information. The participants were given a limited amount of time to complete the questionnaire. They received the contact information for the researcher, the supervisor of the project, and the Ethics Committee to express any further concerns that they may have had.

Chapter 4: Data Analysis

4. Introduction

This chapter presents the analysis and the outcomes of the two experimental studies that the researcher conducted. The analysis included frequency, a t-test, a reliability test, and total correlations to measure the validity of the data. Finally, the researcher used Hayes Process Model One in a regression analysis to measure the moderation interaction effects in Study 1. Also, the researcher then replicated the moderation analysis in Study 2 and then examined anxiety as the underlying causal mechanism, resulting in a moderated mediation.

4.1 Experimental Study

The between-subject surveys contained the same questions for the two checkout condition types, traditional and AI-enabled. The researcher utilised the “compute variable” function of SPSS to sort the answers to the questions into three categories (convenience, anxiety, and intent) and then analysed the statistical differences between the two conditions (traditional and AI-enabled) for each. The three variables were used for the statistical analyses (i.e. the t-test, total correlations, moderation, and moderated mediation).

4.1.1 Response rate of the two surveys

The two surveys were published in Saudi Arabia and were available from July 17 through August 14, 2020. The number of respondents for Study 1 was 352; after removal of the aberrant (e.g. incomplete responses and/or duplicate IP address), 327 participants remained to form the final sample, for a response rate of 92.9%. The number of

respondents for Study 2 was 364; after removal of aberrant responses, 328 participants formed the final sample, for a response rate of 90.0%.

4.1.2 Respondents' characteristics for Study 1

The demographics of the respondents, included gender, age, qualifications, and employment status, are presented in Table 1 for the two checkout types.

Table 1: *Frequency Statistics*

		Frequency	%
Checkout Type	Traditional	164	50.2
	AI	163	49.8
Gender	Male	275	84.1
	Female	52	15.9
Age	18-25	56	17.1
	26-35	138	42.2
	36-45	95	29.1
	46-59	33	10.1
	Over 60	5	1.5
Qualification	High School	81	24.8
	Diploma	36	11.0
	Bachelor's	173	52.9
	Master's	31	9.5
	Ph.D.	6	1.8
Employment	Full-time	228	69.7
	Part-time	15	4.6
	Unemployed	65	19.9
	Retired	19	5.8
Total		327	100.0

Saudi culture and the Islamic faith limit the interactions between men and women. The researcher, as a Muslim male, accordingly had limited opportunities to recruit female respondents. Even in the case of surveys conducted online, Saudi women are reluctant to engage with male researchers. Culturally, from a Saudi perspective, supermarket

shopping for household necessities is a male duty. For these reasons, the sample skewed towards male respondents.

A plurality of the respondents was in the age range of 25 to 35, and the next-best-represented age group was that from 36 to 45. Regarding their education level, most of the respondents were university graduates. Regarding employment, most were full-time workers. The demographics of the sample—which skewed not only male but young, well-educated, and employed full-time—explained their knowledge of and daily experience with technology. Additionally, such individuals tend to be busy and driven to minimise the time that they spend shopping.

4.1.3 Reliability analysis

A reliability test was conducted in Study 1 on the research variables (i.e. shopping convenience, anxiety, and purchase intent) to determine whether the data were highly reliable before further steps in the analysis. The SPSS scale tests indicated that the Cronbach’s alpha values for the 9 items that measured shopping convenience averaged .76, meaning a high level of reliability (Peterson, 1994). The values for the 9 items that measured anxiety were .778, and those for the 12 items that measured purchase intent were .877, again meaning a high level of reliability. Table 2 summarizes these results.

Table 2: *Reliability Statistics*

	Cronbach’s alpha	Number of Items
Convenience	.762	9
Anxiety	.778	9
Purchase intent	.877	12

4.1.4 Total correlation test

A Pearson correlation test was conducted to examine the relationships among the variables. Scales scores for all of the questions were conducted using a seven-point scale, with each question having a minimum possible score of 1 and a maximum of 7. The mean value for the convenience variable was 4.99 ($SD = 1.22$); that for anxiety was 4.78 ($SD = 1.29$); and that for intent was 4.3 ($SD = 1.25$). For convenience, a significant positive correlation with anxiety ($r [327] = .6, p=.001$) was observed. A large significant positive correlation was observed between convenience and intent ($r [327] = .67, p=.001$). A significant positive correlation was observed between intent and anxiety ($r [327] = .4, p=.001$). Table 3 summarizes these results.

Table 3: *Correlation Statistics*

		Convenience	Anxiety	Intent
Convenience	Pearson Correlation	1		
	N	327		
Anxiety	Pearson Correlation	.598**	1	
	N	327	327	
Intent	Pearson Correlation	.671**	.399**	1
	N	327	327	327

4.1.5 T-test

An independent samples test was conducted in Study 1 to examine the differences between traditional and AI checkout types for the three variables (Table 4.2.1.5).

Table 4: *Descriptive Statistics*

Variables	Checkout type	N	Mean	SD
Convenience	traditional	164	4.5034	1.10868
	AI	163	5.4744	1.14403
Anxiety	traditional	164	4.4966	1.39949
	AI	163	5.0613	1.10824
Intent	traditional	164	3.7190	.94046
	AI	163	4.8655	1.26474

In Study 1, the traditional group results ($N = 164$) were as follows: shopping convenience $M = 4.5$ ($SD = 1.1$), anxiety $M = 4.4$ ($SD = 1.39$), and purchase intent $M = 3.7$ ($SD = 0.9$). The AI group results ($N = 163$) were as follows: shopping convenience was significantly higher at $M = 5.4$ ($SD = 1.14$); the value for anxiety was $M = 5.0$ ($SD = 1.1$) and that for purchase intent $M = 4.8$ ($SD = 1.2$). Additionally, there was a significantly different mean between traditional and AI checkouts with regard to shopping convenience ($t[325] = -7.79$, $p < .001$, Cohen's $D = .86$). The independent samples test showed was a significantly different mean between traditional and AI checkout with regard to anxiety level ($t[325] = -4.04$, $p < .001$, Cohen's $D = .44$). Lastly, there was a significantly different mean between traditional and AI checkout with regard to purchase intent ($t[325] = -9.3$, $p < .001$, Cohen's $D = 1.02$).

4.1.6 Moderation analysis

To test the moderating role of convenience, the researcher conducted a moderation analysis using PROCESS macro in SPSS (Model 1, 10,000 bootstrapped samples; Hayes 2018). In this analysis, checkouts served as the independent variable, purchase intent as the dependent variable, and convenience as the moderator (mean-centred, with the low and high levels operationalized as one standard deviation [SD] below and above the mean, respectively). As H2 predicted, the analysis yielded a significant interaction effect of convenience with the AI-enabled checkout ($\beta = .42$, $t = 4.9$, $p < .001$, $CI_{95\%}: .2509, .5852$).

Further analysis of the detailed interaction effect showed that, at a high level of convenience, purchase intent was significantly greater than the average at a low level of convenience ($\beta = 1.09$, $t = 7.36$, $p < .001$, $CI_{95\%}: .7970, 1.3786$). Also, the analysis showed that, at an average level of convenience, purchase intent was significantly higher than at a low level of convenience ($\beta = .57$, $t = 5.5$, $p < .001$, $CI_{95\%}: .3712, .78$). By contrast, at a low level of convenience, purchase intent did not differ between the two types of checkouts ($\beta = .06$, $t = .43$, $p = .66$, $CI_{95\%}: -.2246, .3512$).

Analysis using the J-N technique demonstrated that, for participants whose level-of-convenience scores were 2.5106 and lower (accounting for only 3.0581% of responses, an exceptionally high level), a low level of convenience correlated with a lower purchase intent ($\beta_{JN} = -.4598$, $SE = .234$, $t = -1.9673$, $p = .050$, $CI_{95\%}: -.9197, .0000$). By contrast, for participants whose convenience-level scores were 4.19 and higher, AI-enabled checkout resulted in a significantly higher purchase intent ($\beta_{JN} = .243$, $SE = .123$, $t = 1.9637$, $p = .050$, $CI_{95\%}: .0000, .4856$). As the level of convenience

increased to scores of 7, the purchase intent also increased ($\beta_{JN} = 1.42$, $SE = .2010$, $t = 7.0506$, $p < .001$, $CI_{95\%}: 1.0216, 1.8123$). The SPSS outcomes are presented in Appendix A.

4.2 Study 2

This replication of Study 1 with different samples was intended to confirm the validity of that study's results. Three hundred and twenty-nine participants completed the survey. The researcher replicated all of the statistical analyses using a moderated mediation analysis.

4.2.1 Respondents' characteristics for Study 2

Table 5 presents the characteristics of the respondents, which included gender, age, qualifications, and employment status.

The skewing of the sample toward young, male university graduates with full-time jobs was explained above; both study groups were drawn from the same sample and therefore showed the same skewing.

Table 5: *Frequency Statistics*

		Frequency	Per cent
Checkout type	Traditional	165	50.3
	AI	163	49.7
Gender	Male	263	80.2
	Female	65	19.9
Age	18-25	73	22.3
	26-35	139	42.4
	36-45	78	23.8
	46-59	36	11.0
	Over 60	2	0.6
Qualification	High School	67	20.4
	Diploma	71	21.6
	Bachelor's	146	44.5
	Master's	40	12.2
	Ph.D.	4	1.2
Employment	Full-time	226	68.9
	Part-time	18	5.5
	Unemployed	76	23.2
	Retired	8	2.4
Total		328	100.0

A reliability test was conducted in Study 1 for the research variables (again, shopping convenience, anxiety, and purchase intent) to determine whether the data were highly reliable before further examination. Based on the SPSS scale tests, the Cronbach's alpha values for the 9 items that measured shopping convenience were .768, showing a

high level of reliability according to (Peterson, 1994). In the SPSS scale tests, the Cronbach's alpha values for the 9 items that measured anxiety averaged .772, and those for the 12 items that measured purchase intent averaged .874, in both cases indicating a high level of reliability (Peterson, 1994). Table 6 presents these SPSS outcomes.

Table 6: *Reliability Statistics*

	Cronbach's alpha	Number of Items
Convenience	.768	9
Anxiety	.772	9
Purchase intent	.874	12

4.2.2 Total Correlation Test

The researcher conducted a Pearson correlation test to examine the relationships among the three variables. Scales scores for all of the questions were calculated using a seven-point scale with a minimum possible score of 1 and maximum of 7 for each question. The mean for convenience was 4.94 ($SD = 1.22$), for anxiety 4.77 ($SD = 1.28$), and for intent 4.38 ($SD = 1.22$). Comparison With Study 1 showed similar means and standard deviations. There was a significant positive correlation between convenience and anxiety ($r[328] = .54, p=.001$); a large significant positive correlation between convenience and intent ($r[328] = .75, p=.001$), and a significant positive correlation between intent and anxiety ($r [328] = .42, p=.001$). The results showed a slightly stronger correlation between convenience and little difference for other variables. Table 7 presents the SPSS correlation results.

Table 7: *Correlation Statistics*

		Convenience	Anxiety	Intent
Convenience	Pearson Correlation	1		
	N	328		
Anxiety	Pearson Correlation	.541**	1	
	N	328	328	
Intent	Pearson Correlation	.755**	.420**	1
	N	328	328	328

4.2.3 T-test

An independent samples test was conducted in Study 2 to examine the differences between traditional and AI checkout types with respect to the three variables. Table 4.3.2.3 presents the descriptive statistics.

Table 8: *Descriptive Statistics*

Variables	Checkout type	N	Mean	SD
Convenience	traditional	165	4.3751	1.03937
	AI	163	5.5460	1.11285
Anxiety	traditional	165	4.5003	1.40849
	AI	163	5.0484	1.07599
Intent	traditional	165	3.7687	.93643
	AI	163	5.0123	1.13218

In Study 2, the traditional group ($N = 165$) responded as follows: shopping convenience, $M = 4.37$ ($SD = 1.0$); anxiety, $M = 4.5$ ($SD = 1.11$); and purchase intent, $M = 3.76$ ($SD = 0.93$). The AI group ($N = 163$) responded as follows: shopping convenience was significantly higher, at $M = 5.5$ ($SD = 1.11$); anxiety, $M = 5.0$ ($SD = 1.07$); and purchase intent, $M = 5.0$ ($SD = 1.13$). Additionally, the means differed significantly between traditional and AI checkout with respect to shopping convenience ($t[326] = -9.8$, $p < .001$, Cohen's $D = 1.08$). Further, the independent samples test showed a significantly

different mean between traditional and AI checkout in anxiety level ($t[326] = -3.95, p < .001$, Cohen's $D = .44$). Finally, there was a significantly different mean between traditional and AI checkout with purchase intent ($t[326] = -10.8, p < .001$, Cohen's $D = 1.19$).

The two studies thus complemented each other. Study 1 tested the direct effect of AI-enabled checkouts on purchase intention, moderated by convenience. Study 2 confirmed the results of Study 1 and, furthermore, tested the indirect effect of AI-enabled checkouts on purchase intention when mediated by anxiety with convenience as the moderator.

4.3 Moderated Mediation Analysis

To test further whether the conditional effect of checkouts was driven by anxiety associated with the AI-enabled checkouts, the researcher conducted a moderated mediation analysis (Model 7, 10,000 bootstrapped samples; Hayes 2018). The focal independent variable was checkouts; the dependent variable was purchase intention; the moderator was shopping convenience; and the mediator was anxiety. The analysis yielded a significant moderated mediation model ($MMI = -.246, SE = .11, p = .027, CI95\%: -.4635, -.0281$). The analysis showed that anxiety did not differ between the types of checkouts ($\beta = 1.06, t = 1.89, p = .0596, CI95\%: -.0433, 2.1655$). However, a high convenience level for the participants corresponded with lower anxiety about the checkouts when convenience scores of 5.5196 and higher were achieved using the J-N technique and convenience was the moderator ($\beta = -.2956, t = -1.9673, p = .05, CI95\%: -.5911, -.0000$).

More detailed analysis showed a significant interaction effect of anxiety on purchase intent without convenience being a moderator ($\beta = .306$, $t = 7.18$, $p < .001$, $CI95\%: .2224, .3903$). Integrating the previously noted results, for low-convenience participants, the indirect effect of anxiety on purchase intent was not significant ($\beta = .0440$, $SE = .0624$, $CI95\%: -.0859, .1594$). However, for high-convenience participants, the indirect effect of anxiety on purchase intent was significantly negative ($\beta = -.1404$, $SE = .0614$, $CI95\%: -.2672, -.0272$). By contrast, the direct effect of checkouts on purchase intent was significantly positive ($\beta = 1.0757$, $SE = .1092$, $CI95\%: .8608, 1.2906$), showing that there was crossover effect. Appendix B presents the SPSS outcomes.

Chapter 5 Discussion and Contributions

Introduction

This chapter includes a discussion of the findings presented in Chapter 4 about the outcomes of the two studies and conclusions regarding whether the results support the research hypotheses and are consistent with the results of the literature review.

5.1 Interpretations of the Results

5.1.1 The link between AI-enabled checkout and purchase intention

Study 1 was conducted to measure the interaction between AI-enabled checkouts and purchase intention (van Esch et al., 2020) that is moderated by convenience (Lalicic & Weismayer, 2021). The results indeed showed such a significant positive effect.

Grewal et al. (2020) pointed out that in-store technology enhances convenience, and the results showed that all of the participants who experienced different levels of convenience of AI-enabled checkouts in retail outlets had positive levels of purchase intention based on the convenience level. Conceptually, purchase intention correlates with the possibility of using a service provider again in the future (Dhruv et al., 2020).

There are several possible explanations for this result. AI-enabled checkouts provide transactional convenience to retail shoppers in many ways, offering easy and quick payment options compared with traditional checkouts (Hoyer et al., 2020). In addition, shoppers generally find the experience convenient owing to the ease and speed of transactions (Shiu & Tzeng, 2018). In this respect, technologies that provide a time-saving and pleasant shopping experience best match shoppers' goals in such supermarket contexts (Willems et al., 2017). An additional example of transactional convenience is that AI-enabled checkouts provide shoppers with more privacy because they require

fewer or no interactions with store employees, therefore enhancing the shopping experience (Yadav & Pavlou, 2020).

The variables that significantly affected the results were the participants' age, gender, and cultural beliefs. Taking each of these variables in turn, when the researcher looked at the age of the participants as a factor in relation to their purchase intention, the younger participants who routinely dealt with technology tended to prefer shopping in technologically advanced environments (Hoyer et al., 2020). That is, these participants tended to find AI-enabled checkouts highly convenient because they tended to be young.

Regarding the participants' gender, AI-enabled checkouts had a strong positive influence on women living in conditions in which interactions between men and women are limited owing to cultural and religious considerations (Al-Shahri, 2002; Almutairi & McCarthy, 2012; Arora & Aggarwal, 2018). Additionally, retail shoppers in cultures with a strong patriarchal or individualistic structure seem to prefer less interaction with others when shopping, making them especially receptive to AI-enabled checkouts (Nam & Kannan, 2020).

The results also showed a significantly positive difference in attitudes towards AI-enabled and traditional checkouts. This difference is evidence that acceptance of AI-enabled checkouts can enhance purchase intent (Lisichkova & Othman, 2017). The positive effects of AI-enabled checkouts that emerged from the analysis were that the perceived transactional convenience of using this technology in retail outlets was intrinsic only to AI-enabled checkouts (Xu et al., 2020).

The research, then, established a link between previous perceived transactional convenience and AI-enabled checkouts in retail outlets. Strikingly, the perceived

convenience of AI-enabled retail outlets was the most positive aspect of the technology in terms of encouraging purchase intention (van Esch et al., 2020). This result demanded replication of the study to confirm that AI-enabled checkouts have an influence on purchase intention that is moderated by convenience. The results of Study 2 confirmed the interaction between AI-enabled checkouts and purchase intention found in Study 1. That is, the findings of Study 2 confirmed the significant positive effect of AI-enabled checkouts on purchase intention moderated by convenience and attributable to the value that AI-enabled checkout creates through time-saving and convenience (Park et al., 2019; Xu et al., 2020). The results also showed that all of the participants—whose levels of convenience with respect to AI-enabled checkouts in retail outlets varied—showed positive purchase intention based on the convenience level.

5.1.2 The interaction between AI-enabled checkouts and anxiety

The researcher also measured the interaction between AI-enabled checkouts and anxiety moderated by convenience. The results showed a significant positive effect of AI-enabled checkouts on anxiety with high levels of convenience, meaning that shoppers who experienced a high level of convenience in AI-enabled stores experience decreased anxiety (Hwang & Kim, 2007). Further, no relationship was observed between AI-enabled checkouts and anxiety with average and low levels of convenience. This result was expected based on the reasoning that shoppers tend to experience increased anxiety when confronted with a new technology during their shopping journeys. In addition, consumers' anxiety increases when they are uncertain how a new system works (Yang & Forney, 2013). The anxiety negatively influences the perceived benefits of using the new technology (Hwang & Kim, 2007). For instance, less-confident consumers, when

confronted with AI-enabled checkouts, can experience anxiety that renders them unable to perceive the value of the technology.

However, the level of anxiety about technology decreases once it is regarded as useful, easy-to-use, and needed. The technology acceptance model (Venkatesh & Bala, 2008) suggests that attitudes towards technology depend on two major factors. The first factor is perceived usefulness; thus, AI-enabled checkouts may provide shoppers with increased privacy, reduced interactions with store employees, and, consequently, time savings (van Esch et al., 2020). The second factor is perceived ease of use; thus, AI-enabled checkouts are easy to use for anyone familiar with a smartphone. While previous researchers found that new technology in checkouts failed to catch on when customers did not know how to use it (Polacco & Backes, 2018), the technology acceptance model explains the distinct results for AI-enabled checkout technology compared with the previous results reported (Dutot, 2015). The finding that confidence in AI-enabled checkouts reduced anxiety about the new checkout system confirmed their acceptability to the members of this research population.

The only significant effect in this regard was on participants with high levels of confidence in AI-enabled checkouts who perceived the benefits thereof (e.g. trust, privacy, and security; Yang & Forney, 2013). These participants were confident when working with technology in general or sensitive to interactions with others. A significant finding was that women were more anxious than men about traditional checkouts and appreciated the convenience of AI-enabled checkouts, which helped to decrease their anxiety significantly. The new technology is culturally acceptable since, again, in Islamic societies and in this research society, interactions between men and women are limited

(Almutairi & McCarthy, 2012). Thus, AI-enabled checkouts can ensure Saudi women that, when shopping, they will not need to interact with others. This finding is further evidence that customers' habits and cultures affect their acceptance of technology (Junsawang et al., 2020).

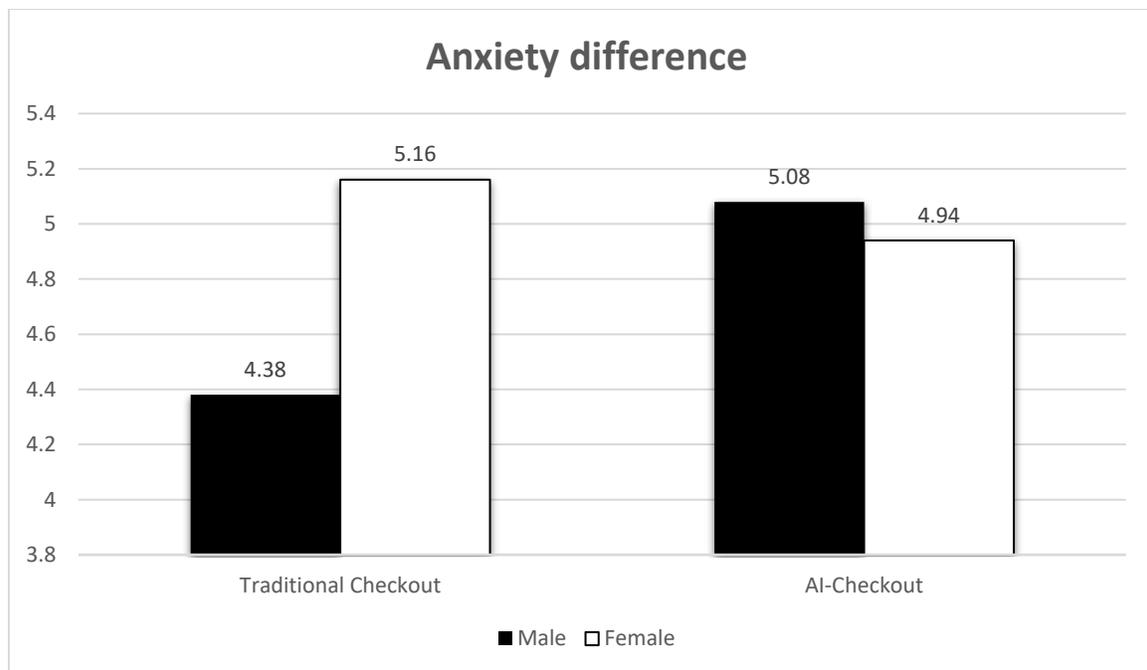


Figure 2: Comparison of anxiety levels among participants in the study.

Additionally, the current global pandemic has placed a spotlight on physical interactions and may well increase the acceptance of AI-enabled checkouts, which facilitate efforts to maintain social distance within stores and obviate the need for cash to change hands (Cui, 2021). As a result, the use of AI-enabled checkouts may become ingrained in the everyday shopping experience, for it is reasonable to expect that, once the use of an AI-enabled checkout becomes habitual, shoppers will continue to prefer AI-enabled checkouts even after health risks are no longer associated with retail shopping.

Also because AI-enabled checkouts rely on digital payments rather than cash, shoppers can easily review their purchases and payment history (Chen et al., 2019).

In sum, the results of this part of the study, involving the measurement of the interaction between AI-enabled checkouts and anxiety as moderated by convenience, indicated that Saudi shoppers preferred AI-enabled checkout technology to traditional checkouts

5.1.3 The relationship between anxiety about AI-enabled checkouts and purchase intention

Anxiety served as a mediator variable between the independent variable (AI-enabled checkouts) and the dependent variable (in this case, purchase intention). The results showed a significant negative interaction between anxiety and purchase intention (Park et al., 2019). This was the expected outcome of presenting an unfamiliar technology to shoppers. One of the most important factors when using AI-enabled checkouts is privacy (George, 2004). There is a relationship between privacy and the level of anxiety when using AI-enabled checkouts. Customers are concerned about their personal information, which needs to be provided when using such advanced technology (Çelik, 2011). In one study, anxiety was the main factor negatively affecting purchase intention (Bujisic et al., 2017). Other studies showed that anxiety associated with such perceived risks as privacy infringement and credit card fraud can significantly influence purchase intention during online shopping (Celik, 2016a; Nagar & Gandotra, 2016) and that trust regarding the payment method is in a reciprocal relationship with perceived risk (Chang & Chen, 2008). These fears also apply to AI-enabled checkouts since they use e-payment through a credit card. The respondents to the survey in this study likewise

indicated that anxiety was a major affective barrier to their use of AI-enabled checkouts. Dewi et al. (2019) reported that anxiety can significantly influence purchase intention during online shopping, especially for women. In the present study, by contrast, the female participants were less anxious than the male ones about AI-enabled checkouts, again owing to limited interaction between men and women in Saudi society (Wheeler (2001): AI-enabled checkouts provide women shoppers with a shopping environment in which they need not interact with others. Also, there was a statistically significant difference between men and women in purchase intention regarding the AI-enabled attributes that, once more, mean less interaction with others (see also Ronis & LeBouthillier, 2013). One of the results of this study, then, was that the relationship between AI-enabled checkout anxiety and purchase intention was stronger for men than women.

5.1.4 The moderated mediation interaction

The researcher applied moderated mediation analysis to determine whether the conditional effect on purchase intention of AI-enabled checkouts was driven by anxiety. Shopping convenience served as the moderator variable and anxiety as a mediator between AI-enabled checkouts and purchase intention. The results showed that a high convenience level for participants correlated with lower anxiety regarding AI-enabled checkouts and had a significant negative effect on purchase intention as an indirect effect between AI-enabled checkouts and purchase intention. While a previous study showed that the direct effect between AI-enabled checkouts and purchase intention was significantly positive (van Esch et al., 2020), the present study found a cross-over effect

between AI-enabled checkouts and purchase intention owing to statistically significant direct and indirect relationships that were positive and negative, respectively.

The positive effect refers to the perceived convenience of AI-enabled checkouts. The positive effect of AI-enabled checkouts on purchase intention has been attributed to the perceived value (Kuo et al., 2009) that AI-enabled checkouts provide to shoppers: quick transactions, not having to carry cash, fewer interactions with others, and an easily reviewed purchase history. A previous study reported that perceived value drove attitudes towards specific behaviours (Homer & Kahle, 1988). The perspectives of perceived value and benefit refer to what consumers overall evaluate as the service provision of what is received (i.e. convenience) and what is given (i.e. time and effort; Zeithaml, 1988). In other words, perceived value describes what is received in relation to what is spent, which includes privacy, transactions, a pleasant experience, and time spent making the purchase (Gan & Wang, 2017; Kuo et al., 2009). In the present study, shopping convenience based on perceived value explained the participants' positive attitudes towards AI-enabled checkouts.

The indirect negative effect of anxiety on purchase intention when using AI-enabled checkouts refers to the perceived risks associated with AI-enabled checkouts (Lee, 2015). Here, anxiety served as a mediator between AI-enabled checkouts and purchase intention and shopping convenience as a moderator of anxiety. The negative effect of anxiety on purchase intention diminished with shopping convenience, a result that supports H2. The outcomes showed statistically the change in the direct relationship between AI checkouts and purchase intention from positive to negative. Key attributes of AI-enabled checkouts include reliance on online payment and visual recording of

shoppers during their shopping journeys. When consumers engage with a new internet service, they may be concerned about their privacy and payment information (Samadi & Yaghoob-Nejadi, 2009). In an earlier study, the perceived financial and psychological risks in retail outlets negatively affected purchase intention (Bhukya & Singh, 2015). Usually, consumers form an image of a retailer based on their trust, which positively influences purchase intention, so perceived risk may be reduced by increasing customers' level of trust (Ling et al., 2011).

Overall, then, anxiety had an indirect negative cross-over effect on the relationship between AI-enabled checkouts and purchase intention, whereas the direct effect on the relationship between AI-enabled checkouts and purchase intention was significantly positive.

5.2 Research Contribution and Implications

Owing to the rapid development of artificial intelligence (AI) technology and its implications for the retail environment, academic researchers and marketers need to understand shoppers' attitudes towards and perceptions of it. Previous research has shown that the use of AI-enabled checkouts has significant effects on shoppers' attitudes, which this study was designed to assess. The outcomes also provide marketers with a key consideration to incorporate into marketing strategies regarding the adoption of AI-enabled checkouts in retail stores. The statistical analysis showed that, based on the direct relationship between AI-enabled checkouts and purchase intent, adoption of the checkouts in a retail environment can increase the number of shoppers. The analysis also indicated that shoppers' anxiety about the perceived risks of using AI-enabled checkouts can negatively influence their purchase intent. Knowledge of these results can help

retailers ameliorate shoppers' anxiety about AI-enabled checkouts, specifically the finding that a high level of convenience may overcome apprehension about the technology. Thus, this study makes theoretical, methodological, and practical contributions to the understanding of shoppers' perceptions of AI-enabled checkouts in Saudi retail stores.

5.2.1 Theoretical Contribution

AI-enabled checkouts were still considered new technology when this study was conducted. At that time, there had been limited empirical study of the effects of AI-enabled checkouts on customers' attitudes (van Esch et al., 2020). This study is the first to assess the effect of AI-enabled checkouts on Saudi shoppers' purchase intentions. Its contribution to the marketing literature is the consideration of customers' behaviour in relation to this latest development in the retailing industry. The finding that shoppers used AI-enabled checkouts because they were easy and quick is consistent with the Technology Acceptance Model 3 of Jaradat and Al-Mashaqba (2014). This study extended the theory of technology acceptance to include AI, in particular its convenience, which, again, contributed to reducing anxiety about technology.

The findings further contribute to the literature on the AI shopping experience by accounting for the impact of anxiety on purchase intention. Specifically, the researcher found that customers' convenience when using AI-enabled checkouts played an important role in reducing their anxiety and, thereby, enhancing their purchase intention. This finding corroborates a previous report that perceived value reduced anxiety (Meuter et al., 2003). The perceived convenience of AI-enabled checkouts dissipates the effect of anxiety on purchase intention, confirming the findings of van Esch et al. (2020). The

research outcomes also contribute to the diffusion-of-innovation theory by integrating the theory into the technology acceptance model (Min et al., 2019). Considering the research outcomes, despite the associated anxiety, AI-enabled checkouts seem likely to be adopted by retailers once their customers perceive the convenience and ease of use (Rogers, 2010).

5.2.2 Practical Implications

AI-enabled checkouts are a new innovation that offers emotional benefits to shoppers in-store, and this study contributes to the marketing literature by revealing actionable insights relating to the technology for retailers and marketers. Thus, to begin with, the results suggest that consumers tend to respond favourably to the deployment of new technology when they perceive that it enhances the in-store shopping experience. Further, the results should encourage retailers to adopt AI-enabled technology so as to provide more shopping convenience for their customers and, thereby, increase their purchase intent while keeping in mind that AI can also be disruptive and unacceptable to some customers (van Esch et al., 2020). Another implication of the results is that retailers should make the public aware of a system before implementing it so as to avoid the anxiety that it may cause for some consumers. Accordingly, marketers should emphasize the potential benefits, which may be psychological (such as saving time and effort), technical (relating to security and privacy), and social (especially during public health emergencies such as the Covid-19 pandemic). Indeed, by stressing that AI-enabled checkouts benefit public health by reducing human interactions and limiting the handling of cash by shoppers, marketers and managers have an additional basis for launching this new technology. Practitioners and retailers can also benefit from the suggestions provided

here for avoiding customer anxiety related to AI-enabled checkouts. To the extent that knowledge is power, this new knowledge gives marketers the power to reduce shoppers' anxiety by making them aware of the convenience and other benefits associated with AI-enabled checkouts that can enhance purchase intention and, thereby, increase a retailer's profitability.

To sum up, this research provides several theoretical and practical contributions to the existing literature in various research fields, such as marketing and anthropology. Specifically, the AI-enabled checkout experience and associated concepts, mainly convenience and anxiety, can inform current and future marketing, retail, and management research into consumers' attitudes towards AI-enabled checkouts and their relationship to purchase intent. Finally, this research can also help entrepreneurs to understand this developing technology and associated marketing strategies when implementing AI-enabled checkouts in Saudi Arabia.

Chapter 6 Conclusion

Introduction

This chapter consists of a detailed discussion of the implications of the research for AI-enabled checkouts, the limitations of the research, suggestions for future research, and a general conclusion.

6.1 Summary of the Research

Shoppers' attitudes towards AI-enabled checkouts were understood here in the context of the "attitudes toward a behaviour." Taylor and Todd (1995) defined an attitude toward a behaviour as the degree to which an individual takes a positive or negative attitude towards or makes a positive or negative appraisal of the behaviour to be acted upon. The overall aim of this study was to shed light on the impacts of the use of AI on shoppers in supermarkets from a marketing perspective. This study had several more specific aims relating to marketing, retail, and management. Thus, the researcher investigated the effects AI-enabled checkouts, in particular shopping convenience (Moeller et al., 2009) and anxiety (Meuter et al., 2003), and shoppers' attitudes towards the various aspects of these checkouts in relation to purchase intent (van Esch et al., 2020) by conducting two experimental online studies.

The main findings of this study are as follows. First, there was a positive correlation of the direct effect between AI-enabled checkouts and purchase intent that was moderated by convenience. Second, there was a crossover effect through the mediation effect. The findings showed a negative correlation between AI-enabled checkouts and purchase intent when anxiety was applied as a mediator as a result of shoppers' anxiety towards technology (Meuter et al., 2003). Lastly, the results indicated that women in Saudi Arabia were less anxious than men about AI-enabled checkouts.

Moreover, shopping convenience partly moderated anxiety (Lee, 2015), indicating a negative correlation between convenience and anxiety. Thus, there is a need for further research to identify factors that increase convenience. Marketers and retailers would benefit from an understanding of how to alleviate anxiety so as to increase purchase intent when AI-enabled checkouts are adopted in Saudi Arabia.

Lastly, this study contributes to marketing literature. To begin with, the scales developed to measure shoppers' attitudes towards AI-enabled checkouts can be used in future marketing research. In addition, the researcher developed questions based on the seven-point scale to measure customers' attitudes towards AI-enabled checkouts that can be utilised in future research. This research can also contribute to companies' efforts to improve service quality and understand customers' attitudes as they implement AI-enabled checkouts.

6.2 Limitations of the Study

This is, to the researcher's knowledge, the first study to examine Saudi shoppers' attitudes towards AI-enabled checkouts, and it, like all research, was subject to limitations. These limitations need to be acknowledged both for the constraints that they place on interpreting the results and because they represent avenues for future research. This study was conducted online, and it involved treating the participants as potential users of AI-enabled checkouts. The findings showed that the participants felt anxiety about this technology that diminished their purchase intent. However, the level of anxiety may decrease when the actual use of AI-enabled checkouts is weighed against the benefits that they provide (e.g. shopping efficiency and time-saving), which could not be factored into the online experiment. Because this study was performed during the

COVID-19 pandemic, the researcher had to rely on online surveys instead of conducting a field study. AI-enabled checkouts are a new technology, so other, unexpected variables that affect shoppers' attitudes may remain to be explored through field studies.

A further limitation relates to the fact that the sample for this research was drawn from a Saudi population. In Saudi Arabia, cultural restrictions limit the interactions between men and women, so, because the researcher is male, a majority of participants in the study were male. Thus, the finding that the female participants were less anxious and had a greater preference for AI technology than the male participants was based on the uneven gender distribution of the sample. Further, there was no major effect on the overall results on the participants' purchase intent. Also, the findings relating to the Saudi sample may be generalizable to other Arab and Islamic countries but not to populations outside the Arab or Islamic world.

6.3 Suggestions for Future Research

This study points to several avenues for future research into shoppers' attitudes towards AI-enabled checkouts and purchase intent. In the first place, the worldwide health crisis necessitated the use of an online survey, so future research should employ field studies to enhance the understanding of the shoppers' attitudes and behaviour towards AI-enabled checkouts. Thus, the scales developed for the online experiment in this research can be adapted for a field study. Further, this was the first study of its type conducted in Saudi Arabia, and the scales could be adapted to measure Saudi shoppers' attitudes towards other technology (e.g. self-service checkouts). Future researchers should, likewise, explore in greater depth the causes of and ways to ameliorate anxiety towards AI-enabled checkouts. Through field studies in which they interview shoppers,

researchers could explore other potential mediators of the relationship between AI-enabled checkouts and purchase intent. Also, future research could take into account situational factors that may influence shoppers' attitudes and enhance purchase intent in AI-enabled stores. Stimuli such as enjoyment and excitement usually affect customers. Also, there is a need for more study of technology readiness in Saudi Arabia, for the present study found a high level of anxiety that, again, negatively affected the purchase intent.

6.4 Conclusion

With the growth in the retail sector in Saudi Arabia, companies have been competing to attract customers by improving their services. AI-enabled checkouts are among the recent innovations in retail outlets, having been launched by Amazon. AI-enabled checkouts offer customers fast service and a convenient shopping experience and also help service providers to improve their services and attract customers. Thus, there is a need for research into the potential consequences of adopting this technology and Saudi shoppers' readiness to use it.

This research documented Saudi shoppers' attitudes towards AI-enabled checkouts and their influence on purchase intent. The results indicated that there was a direct positive effect between AI-enabled checkouts and purchase intent. However, when anxiety served as a mediator, a negative, indirect relationship was observed between AI-enabled checkouts and purchase intent. Thus, researchers, managers, and marketers need to explicate further the factors that cause anxiety about AI-enabled checkouts among Saudi shoppers soon to help make decisions regarding the adoption of AI-enabled checkouts in the country.

References

- Aagja, J. P., Mammen, T., & Saraswat, A. (2011). Validating service convenience scale and profiling customers: A study in the Indian retail context. *Vikalpa*, 36(4), 25-49.
- Adams, D. A., Nelson, R. R., & Todd, P. A. (1992). Perceived usefulness, ease of use, and usage of information technology: A replication. *MIS Quarterly*, 227-247.
- Adner, R., & Kapoor, R. (2010). Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal*, 31(3), 306-333.
- Afriyie, S., Duo, J., Appiah, K., & Musah, A. I. (2018). The nexus between types of innovation and marketing performance of SME in an emerging economy. *International Review of Management and Marketing*, 8(6), 78.
- Ajzen, I. (2011). *The theory of planned behaviour: Reactions and reflections*. Taylor & Francis.
- Al-Shahri, M. Z. (2002). Culturally sensitive caring for Saudi patients. *Journal of Transcultural Nursing*, 13(2), 133-138.
- Alfallaj, F. S. S., & Alfallaj, F. (2020). Technology in Saudi EFL undergraduate classrooms: Learning tool or weapon of distraction? *The Asian ESP Journal*, 16(4), 97-115.
- Almutairi, A., & McCarthy, A. (2012). A multicultural nursing workforce and cultural perspectives in Saudi Arabia: An overview. *The Health*, 3(3), 71-74.
- Alwatan. (2019). Saudi Arabia is the seventh in the world in the retail trade, *alwatan*.
- Ameen, N., Tarhini, A., Reppel, A., & Anand, A. (2021). Customer experiences in the age of artificial intelligence. *Computers in Human Behavior*, 114, 106548.
- Anand, T., Ramachandran, J., Sambasivan, M., & Batra, G. S. (2019). Impact of hedonic motivation on consumer satisfaction towards online shopping: Evidence from Malaysia. *e-Service Journal*, 11(1), 56.
- Andrews, C. K. (2009). *Do-it-yourself: Self-checkouts, supermarkets, and the self-service trend in American business*.
- Arora, N., & Aggarwal, A. (2018). The role of perceived benefits in formation of online shopping attitude among women shoppers in India. *South Asian Journal of Business Studies*.
- Balaji, M., & Roy, S. K. (2017). Value co-creation with Internet of things technology in the retail industry. *Journal of Marketing Management*, 33(1-2), 7-31.
- Barbeite, F. G., & Weiss, E. M. (2004). Computer self-efficacy and anxiety scales for an Internet sample: testing measurement equivalence of existing measures and development of new scales. *Computers in Human Behavior*, 20(1), 1-15.
- Batra, M. M. (2019). Strengthening customer experience through artificial intelligence: An upcoming trend. *Competition Forum*, 17(2), 223-231.
- Beatson, A., Coote, L. V., & Rudd, J. M. (2006). Determining consumer satisfaction and commitment through self-service technology and personal service usage. *Journal of Marketing Management*, 22(7-8), 853-882.
- Betzing, J. H., Hoang, A.-Q. M., & Becker, J. (2018). *In-store technologies in the retail servicescape*. Paper presented at the Proceedings of the Multikonferenz Wirtschaftsinformatik.

- Bhukya, R., & Singh, S. (2015). The effect of perceived risk dimensions on purchase intention. *American Journal of Business*.
- Black, J. S., & Van Esch, P. (2020). AI-enabled recruiting: What is it and how should a manager use it? *Business Horizons*, 63(2), 215-226.
- Bleier, A., Goldfarb, A., & Tucker, C. (2020). Consumer privacy and the future of data-based innovation and marketing. *International Journal of Research in Marketing*.
- Bobbitt, L. M., & Dabholkar, P. A. (2001). Integrating attitudinal theories to understand and predict use of technology-based self-service. *International Journal of Service Industry management*.
- Bock, D. E., Wolter, J. S., & Ferrell, O. (2020). Artificial intelligence: Disrupting what we know about services. *Journal of Services Marketing*.
- Bolton, R. N., McColl-Kennedy, J. R., Cheung, L., Gallan, A., Orsingher, C., Witell, L., & Zaki, M. (2018). Customer experience challenges: bringing together digital, physical and social realms. *Journal of Service Management*, 29(5), 776.
- Boyce, W., Doherty-Poirier, M., MacKinnon, D., Fortin, C., Saab, H., King, M., & Gallupe, O. (2006). Sexual health of Canadian youth: Findings from the Canadian youth, sexual health and HIV/AIDS study. *Canadian Journal of Human Sexuality*, 15(2), 59.
- Brougham, D., & Haar, J. (2018). Smart technology, artificial intelligence, robotics, and algorithms (STARA): Employees' perceptions of our future workplace. *Journal of Management & Organization*, 24(2), 239-257.
- Brown, A., Kappes, J., & Marks, J. (2013). Mitigating theme park crowding with incentives and information on mobile devices. *Journal of Travel Research*, 52(4), 426-436.
- Bruner, G. C. (2019). *Marketing scales handbook*. GCBII Productions, LLC.
- Bujisic, M., Bogicevic, V., Yang, W., Cobanoglu, C., & Bilgihan, A. (2017). "Hobson's choice" servicescape: Consumer anxiety and enjoyment. *Journal of Consumer Marketing*.
- Bulmer, S., Elms, J., & Moore, S. (2018). Exploring the adoption of self-service checkouts and the associated social obligations of shopping practices. *JOURNAL TITLE*, 42, 107-116.
- Cambre, M. A., & Cook, D. L. (1985). Computer anxiety: Definition, measurement, and correlates. *Journal of Educational Computing Research*, 1(1), 37-54.
- Celik, H. (2016a). Customer online shopping anxiety within the Unified Theory of Acceptance and Use Technology (UTAUT) framework. *Asia Pacific Journal of Marketing and Logistics*, 28(2), 278-307.
- Celik, H. (2016b). Customer online shopping anxiety within the Unified Theory of Acceptance and Use Technology (UTAUT) framework. *Asia Pacific Journal of Marketing and Logistics*.
- Çelik, H. (2011). Influence of social norms, perceived playfulness and online shopping anxiety on customers' adoption of online retail shopping. *International Journal of Retail & Distribution Management*.
- Cha, N., Cho, H., Lee, S., & Hwang, J. (2019). *Effect of AI recommendation system on the consumer preference structure in e-commerce: Based on two types of preference*. Global IT Research Institute (GIRI).

- Cha, S. S. (2020). Customers' intention to use robot-serviced restaurants in Korea: relationship of coolness and MCI factors. *International Journal of Contemporary Hospitality Management*.
- Chang, H. H., & Chen, S. W. (2008). The impact of online store environment cues on purchase intention. *Online Information Review*.
- Chen, A. N., Zeltmann, S. M., Griffin, K., Rubach, M., & Ellis, M. E. (2019). *Trends and technology in e-Payment*. Paper presented at the Competition Forum.
- Chuawatcharin, R., & Gerdri, N. (2019). Factors influencing the attitudes and behavioural intentions to use just walk out technology among Bangkok consumers. *International Journal of Public Sector Performance Management*, 5(2), 146-163.
- Comunello, F., Fernández Ardèvol, M., Mulargia, S., & Belotti, F. (2017). Women, youth and everything else: Age-based and gendered stereotypes in relation to digital technology among elderly Italian mobile phone users. *Media, Culture & Society*, 39(6), 798-815.
- Cronan, T. P., Mullins, J. K., & Douglas, D. E. (2018). Further understanding factors that explain freshman business students' academic integrity intention and behavior: Plagiarism and sharing homework. *Journal of Business Ethics*, 147(1), 197-220.
- Cui, G., Bao, W., & Chan, T. S. (2009). Consumers' adoption of new technology products: The role of coping strategies. *Journal of Consumer Marketing*.
- Cui, Y., Van Esch, P & Jain, S. P. (2021). Just walk out: The effect of AI-enabled checkouts. *European Journal of Marketing*.
- Davenport, T., Guha, A., Grewal, D., & Bressgott, T. (2020). How artificial intelligence will change the future of marketing. *Journal of the Academy of Marketing Science*, 48(1), 24-42.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 319-340.
- Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35(8), 982-1003.
- Davis, L., & Hodges, N. (2012). Consumer shopping value: An investigation of shopping trip value, in-store shopping value and retail format. *Journal of Retailing and Consumer Services*, 19(2), 229-239.
- DeGennaro, D. (2008). Learning designs: An analysis of youth-initiated technology use. *Journal of Research on Technology in Education*, 41(1), 1-20.
- Demoulin, N. T., & Djelassi, S. (2016). An integrated model of self-service technology (SST) usage in a retail context. *International Journal of Retail & Distribution Management*.
- Dewi, C. K., Mohaidin, Z., & Murshid, M. A. (2019). Determinants of online purchase intention: a PLS-SEM approach: Evidence from Indonesia. *Journal of Asia Business Studies*.
- Dhruv, G., Noble, S. M., Roggeveen, A. L., & Jens, N. (2020). The future of in-store technology. *Journal of the Academy of Marketing Science*, 48(1), 96-113.
- Di Vaio, A., Palladino, R., Hassan, R., & Escobar, O. (2020). Artificial intelligence and business models in the sustainable development goals perspective: A systematic literature review. *Journal of Business Research*, 121, 283-314.

- Diallo, M. F., & Collin-Lachaud, I. (2019). Impact of hedonic evaluation of technological innovations on revisit intention in a store digitalization context. *International Journal of Technology and Human Interaction*, 15(4), 38-53.
- Dutot, V. (2015). Factors influencing near field communication (NFC) adoption: An extended TAM approach. *The Journal of High Technology Management Research*, 26(1), 45-57.
- Edirisinghe, D., Nazarian, A., Foroudi, P., & Lindridge, A. (2020). Establishing psychological relationship between female customers and retailers. *Qualitative Market Research: An International Journal*.
- Fangwei, Z., Huang, J., & Meagher, M. (2009). The introduction and design of a new form of supermarket: Smart market, 608-611.
- Farag, S., Schwanen, T., Dijst, M., & Faber, J. (2007). Shopping online and/or in-store? A structural equation model of the relationships between e-shopping and in-store shopping. *Transportation Research Part A: Policy and Practice*, 41(2), 125-141.
- Foroudi, P., Gupta, S., Sivarajah, U., & Broderick, A. (2018). Investigating the effects of smart technology on customer dynamics and customer experience. *Computers in Human Behavior*, 80, 271-282.
- Frank, B. (2021). Artificial intelligence-enabled environmental sustainability of products: Marketing benefits and their variation by consumer, location, and product types. *Journal of Cleaner Production*, 285, 125242.
- Gan, C., & Wang, W. (2017). The influence of perceived value on purchase intention in social commerce context. *Internet Research*.
- Garbuio, M., & Lin, N. (2019). Artificial intelligence as a growth engine for health care startups: Emerging business models. *California Management Review*, 61(2), 59-83.
- Gelbrich, K., & Sattler, B. (2014a). Anxiety, crowding, and time pressure in public self-service technology acceptance. *Journal of Services Marketing*.
- Gelbrich, K., & Sattler, B. (2014b). Anxiety, crowding, and time pressure in public self-service technology acceptance. *Journal of Services Marketing*, 28(1), 82-94.
- Gelderman, C. J., Paul, W. T., & Van Diemen, R. (2011). Choosing self-service technologies or interpersonal services: The impact of situational factors and technology-related attitudes. *Journal of Retailing and Consumer Services*, 18(5), 414-421.
- George, J. F. (2004). The theory of planned behavior and Internet purchasing. *Internet Research*.
- Grewal, D., Noble, S. M., Roggeveen, A. L., & Nordfalt, J. (2020). The future of in-store technology. *Journal of the Academy of Marketing Science*, 48(1), 96-113.
- Grguric, A., Vlacic, E., & Drvenkar, N. (2020). Assessing firms' competitiveness and technological advancement by applying artificial intelligence as a differentiation strategy: A proposed conceptual model. *Economic and Social Development: Book of Proceedings*, 43-61.
- Guha, A., Grewal, D., Kopalle, P. K., Haenlein, M., Schneider, M. J., Jung, H., Moustafa, R., Hegde, D. R., & Hawkins, G. (2021). How artificial intelligence will affect the future of retailing. *Journal of Retailing*.

- Gursoy, D., Chi, O. H., Lu, L., & Nunkoo, R. (2019). Consumers acceptance of artificially intelligent (AI) device use in service delivery. *International Journal of Information Management*, 49, 157-169.
- Hagberg, J., Sundstrom, M., & Egels-Zandén, N. (2016a). The digitalization of retailing: an exploratory framework. *International Journal of Retail & Distribution Management*.
- Hagberg, J., Sundström, M., & Nicklas, E.-Z. (2016b). The digitalization of retailing: an exploratory framework. *International Journal of Retail & Distribution Management*, 44(7), 694-712.
- Hamstra, M. (2018). Checking out the future: Amazon Go's "no-checkout" system has grabbed the headlines, but self-scanning apps may hold more potential for retailers. *Drug Store News*, 40(11), 30-36.
- Haque, M. I., Sultan, Z. A., & Ali, S. (2013). Customers' satisfaction and retail banking in the Kingdom of Saudi Arabia. *Editorial Advisory Board*, 38(3), 309-320.
- Harrison, A. W., & Rainer Jr, R. K. (1992). The influence of individual differences on skill in end-user computing. *Journal of Management Information Systems*, 9(1), 93-111.
- Hauser, M., Günther, S. A., Flath, C. M., & Thiesse, F. (2019). Towards digital transformation in fashion retailing: A design-oriented research study of automated checkout systems. *Business & Information Systems Engineering*, 61(1), 51-66.
- Hawley, D. D., Johnson, J. D., & Raina, D. (1990). Artificial neural systems: A new tool for financial decision-making. *Financial Analysts Journal*, 46(6), 63-72.
- Healey, J. (2020). *Artificial intelligence*. The Spinney Press.
- Hennig-Thurau, T., Gwinner, K. P., & Gremler, D. D. (2002). Understanding relationship marketing outcomes: An integration of relational benefits and relationship quality. *Journal of Service Research*, 4(3), 230-247.
- Hillier, L., Harrison, L., & Warr, D. (1998). "When you carry condoms all the boys think you want it": Negotiating competing discourses about safe sex. *Journal of Adolescence*, 21(1), 15-29.
- Homer, P. M., & Kahle, L. R. (1988). A structural equation test of the value-attitude-behavior hierarchy. *Journal of Personality and Social Psychology*, 54(4), 638.
- Hoyer, W. D., Kroschke, M., Schmitt, B., Kraume, K., & Shankar, V. (2020). Transforming the customer experience through new technologies. *Journal of Interactive Marketing*, 51, 57-71.
- Hudson, K., & Zimmerman, A. (2007). *Big boxes aim to speed up shopping; time-pressed customers get help finding wanted items; the self-checkout debate: 1*. Dow Jones & Company, Inc.
- Hwang, Y., & Kim, D. J. (2007). Customer self-service systems: The effects of perceived web quality with service contents on enjoyment, anxiety, and e-trust. *Decision Support Systems*, 43(3), 746-760.
- Iqbal, M. S., Hassan, M. U., & Habibah, U. (2018). Impact of self-service technology (SST) service quality on customer loyalty and behavioral intention: The mediating role of customer satisfaction. *Cogent Business & Management*, 5(1), 1423770.
- Ivanov, S. H., & Webster, C. (2017). Adoption of robots, artificial intelligence and service automation by travel, tourism and hospitality companies: A cost-benefit

- analysis. *Artificial Intelligence and Service Automation by Travel, Tourism and Hospitality Companies—A Cost-Benefit Analysis*.
- Jaradat, M.-I. R. M., & Al-Mashaqba, A. M. (2014). Understanding the adoption and usage of mobile payment services by using TAM3. *International Journal of Business Information Systems*, 16(3), 271-296.
- Jarek, K., & Mazurek, G. (2019). Marketing and artificial intelligence. *Central European Business Review*, 8(2).
- Jiang, L., Ipar, A., Yang, Z., & Jun, M. (2013a). Measuring consumer perceptions of online shopping convenience. *Journal of Service Management*, 24(2), 191-214.
- Jiang, L. A., Yang, Z., & Jun, M. (2013b). Measuring consumer perceptions of online shopping convenience. *Journal of Service Management*.
- Johnson, V. L., Kiser, A., & Woolridge, R. W. (2020). Factors affecting coproduction resentment within a self-checkout environment. *Journal of Computer Information Systems*, 1-10.
- Johnston, C. (2018). Amazon opens a supermarket with no checkouts. *Business Reporter, BBC News*.
- Junsawang, S., Chaiyasoonthorn, W., & Chaveesuk, S. (2020). *Willingness to use self-service technologies similar to Amazon Go at supermarkets in Thailand*. Paper presented at the Proceedings of the 2020 Second International Conference on Management Science and Industrial Engineering.
- Kaplan, A., & Haenlein, M. (2019). Siri, Siri, in my hand, who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence. *Business Horizons*, 62(1), 15-25.
- Kasilingam, D. L. (2020). Understanding the attitude and intention to use smartphone chatbots for shopping. *Technology in Society*, 62, 101280.
- Katherine, N. L., & Peter, C. V. (2016). Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6), 69.
- Khalil, N. (2014). Factors affecting the consumer's attitudes on online shopping in Saudi Arabia. *International Journal of Scientific and Research Publications*, 4(11), 1-8.
- Kim, S., & Lee, Y. (2019). Effect of self-service technology service quality on cognitive response and purchase intention in fashion retail store. *Journal of the Korean Society of Clothing and Textiles*, 43(5), 634-648.
- Kin, N., & Farida, N. (1970). Effects of convenience online shopping and satisfaction on repeat-purchase intention among students of higher institutions in Indonesia. *The Journal of Internet Banking and Commerce*, 21(2), ---.
- Kokkinou, A., & Cranage, D. A. (2013). Using self-service technology to reduce customer waiting times. *International Journal of Hospitality Management*, 33, 435-445.
- Kokkinou, A., & Cranage, D. A. (2015). Why wait? Impact of waiting lines on self-service technology use. *International Journal of Contemporary Hospitality Management*.
- Kumar, A. (2007). From mass customization to mass personalization: a strategic transformation. *International Journal of Flexible Manufacturing Systems*, 19(4), 533.

- Kuo, Y.-F., Wu, C.-M., & Deng, W.-J. (2009). The relationships among service quality, perceived value, customer satisfaction, and post-purchase intention in mobile value-added services. *Computers in Human Behavior*, 25(4), 887-896.
- Lalicic, L., & Weismayer, C. (2021). Consumers' reasons and perceived value co-creation of using artificial intelligence-enabled travel service agents. *Journal of Business Research*.
- Larson, R. B. (2019). Supermarket self-checkout usage in the United States. *Services Marketing Quarterly*, 40(2), 141-156.
- Lartey, J. O. (2020). *Digitalization and service work in the retail industry*.
- Lee, H.-J., Jeong Cho, H., Xu, W., & Fairhurst, A. (2010). The influence of consumer traits and demographics on intention to use retail self-service checkouts. *Marketing Intelligence & Planning*, 28(1), 46-58.
- Lee, S. H. (2015). The impact of convenience value of mobile banking service on customer satisfaction and Re-usage intention: the moderate effect of technology anxiety. *Journal of Information Technology Services*, 14(2), 1-14.
- Liao, Z., & Cheung, M. T. (2001). Internet-based e-shopping and consumer attitudes: an empirical study. *Information & Management*, 38(5), 299-306.
- Lim, S. H., Kim, D. J., Hur, Y., & Park, K. (2019). An empirical study of the impacts of perceived security and knowledge on continuous intention to use mobile fintech payment services. *International Journal of Human-Computer Interaction*, 35(10), 886-898.
- Ling, K. C., Daud, D. B., Piew, T. H., Keoy, K. H., & Hassan, P. (2011). Perceived risk, perceived technology, online trust for the online purchase intention in Malaysia. *International Journal of Business and Management*, 6(6), 167.
- Lisichkova, N., & Othman, Z. (2017). *The impact of influencers on online purchase intent*.
- Lu, H. P., & Su, P. Y. J. (2009). Factors affecting purchase intention on mobile shopping websites. *Internet Research*.
- Lu, L., Cai, R., & Gursoy, D. (2019). Developing and validating a service robot integration willingness scale. *International Journal of Hospitality Management*, 80, 36-51.
- Lu, Y., Musalem, A., Olivares, M., & Schilkrut, A. (2013). Measuring the effect of queues on customer purchases. *Management Science*, 59(8), 1743-1763.
- Mahfooz, Y. (2014). Relationship between service quality and customer satisfaction in hypermarkets of Saudi Arabia. *International Journal of Marketing Studies*, 6(4), 10.
- Mahmoud, M. A., Hinson, R. E., & Anim, P. A. (2018). Service innovation and customer satisfaction: the role of customer value creation. *European Journal of Innovation Management*.
- Mammadli, E., & Klivak, V. (2020). Measuring the effect of the digitalization. *Digitaliseerimise Efektide Mõõtmise*, 119, 3-14.
- Manthou, V., & Vlachopoulou, M. (2001). Bar-code technology for inventory and marketing management systems: A model for its development and implementation. *International Journal of Production Economics*, 71(1-3), 157-164.

- Manzotti, R., & Chella, A. (2018). Good old-fashioned artificial consciousness and the intermediate level fallacy. *Frontiers in Robotics and AI*, 5, 39.
- Martin, T., Wang, H., Artis, M. W. J. J. D., & Uncleback, A. (n.d.). *Amazon Go! Cashierless retail analysis*.
- Masse, P. J. (1996). The benefits of retail automation systems. *Business Journal Serving Southern Tier, CNY, Mohawk Valley, Finger Lakes, North*, 10(2), 11.
- Mathieson, K. (1991). Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior. *Information Systems Research*, 2(3), 173-191.
- Meuter, M. L., Bitner, M. J., Ostrom, A. L., & Brown, S. W. (2005). Choosing among alternative service delivery modes: An investigation of customer trial of self-service technologies. *Journal of Marketing*, 69(2), 61-83.
- Meuter, M. L., Ostrom, A. L., Bitner, M. J., & Roundtree, R. (2003). The influence of technology anxiety on consumer use and experiences with self-service technologies. *Journal of Business Research*, 56(11), 899-906.
- Min, S., So, K. K. F., & Jeong, M. (2019). Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model. *Journal of Travel & Tourism Marketing*, 36(7), 770-783.
- Miranda, M. J. (2008). Determinants of shoppers' checkout behaviour at supermarkets. *Journal of Targeting, Measurement & Analysis for Marketing*, 16(4), 312-321.
- Moeller, S., Fassnacht, M., & Ettinger, A. (2009). Retaining customers with shopping convenience. *Journal of Relationship Marketing*, 8(4), 313-329.
- Morimura, F., & Nishioka, K. (2016). Waiting in exit-stage operations: Expectation for self-checkout Systems and overall satisfaction. *Journal of Marketing Channels*, 23(4), 241-254.
- Mortimer, G., Neale, L., Hasan, S. F. E., & Dunphy, B. (2015). Investigating the factors influencing the adoption of m-banking: A cross cultural study. *International Journal of Bank Marketing*, 33(4), 545-570.
- Morwitz, V. G., & Schmittlein, D. (1992). Using segmentation to improve sales forecasts based on purchase intent: Which "intenders" actually buy? *Journal of Marketing Research*, 29(4), 391-405.
- Mose, C. J. (2019). *The impact of emerging trends in retail technology on customer shopping experience: Case study of customers in Wetlands, Nairobi County*. United States International University-Africa.
- Moutinho, L., & Smith, A. (2000). Modelling bank customer satisfaction through mediation of attitudes towards human and automated banking. *International Journal of Bank Marketing*.
- Nagar, K., & Gandotra, P. (2016). Exploring choice overload, internet shopping anxiety, variety seeking and online shopping adoption relationship: Evidence from online fashion stores. *Global Business Review*, 17(4), 851-869.
- Nam, H., & Kannan, P. (2020). Digital environment in global markets: Cross-cultural implications for evolving customer journeys. *Journal of International Marketing*, 28(1), 28-47.
- Oghazi, P., Mostaghel, R., Hultman, M., & Parida, V. (2012). Antecedents of technology-based self-service acceptance: a proposed model. *Services Marketing Quarterly*, 33(3), 195-210.

- Oh, W., & Lucas Jr, H. C. (2006). Information technology and pricing decisions: Price adjustments in online computer markets. *MIS Quarterly*, 755-775.
- Oluwajana, D., Idowu, A., Nat, M., Vanduhe, V., & Fadiya, S. (2019). The adaption of students' hedonic motivation system model to gamified learning environment. *Journal of Theoretical and Applied Electronic Commerce Research*, 14(3), 0-0.
- Ostrom, A. L., Fotheringham, D., & Bitner, M. J. (2019). Customer acceptance of AI in service encounters: Understanding antecedents and consequences. In *Handbook of Service Science, Volume II* (pp. 77-103). Springer.
- Owens, J. M., Antin, J. F., Doerzaph, Z., & Willis, S. (2015). Cross-generational acceptance of and interest in advanced vehicle technologies: A nationwide survey. *Transportation Research Part F: Traffic Psychology and Behaviour*, 35, 139-151.
- Özdemir, V., & Hekim, N. (2018). Birth of industry 5.0: Making sense of big data with artificial intelligence,"the internet of things" and next-generation technology policy. *Omic: A Journal of Integrative Biology*, 22(1), 65-76.
- Pantano, E., & Timmermans, H. (2014). What is smart for retailing? *Procedia Environmental Sciences*, 22, 101-107.
- Park, J., Ahn, J., Thavisay, T., & Ren, T. (2019). Examining the role of anxiety and social influence in multi-benefits of mobile payment service. *Journal of Retailing and Consumer Services*, 47, 140-149.
- Patrick, B., & Williams, K. L. (2020). What is artificial intelligence? *Journal of Accountancy*, 229(2), 1-4.
- Penttinen, E., Rinta-Kahila, T., Rönkkö, M., & Saarinen, T. (2014). Triggering intention to use to actual use: Empirical evidence from self-service checkout (SCO) systems. *IEEE*, 3347-3355.
- Perry, P., Kent, A., & Bonetti, F. (2019). The use of mobile technologies in physical stores: The case of fashion retailing. In *Exploring omnichannel retailing* (pp. 169-195). Springer.
- Peterson, R. A. (1994). A meta-analysis of Cronbach's coefficient alpha. *Journal of Consumer Research*, 21(2), 381-391.
- Pham, Q. T., Tran, X. P., Misra, S., Maskeliūnas, R., & Damaševičius, R. (2018). Relationship between convenience, perceived value, and repurchase intention in online shopping in Vietnam. *Sustainability*, 10(1), 156.
- Pikkarainen, T., Pikkarainen, K., Karjaluoto, H., & Pahlila, S. (2004). Consumer acceptance of online banking: An extension of the technology acceptance model. *Internet research*.
- Pillai, R., Sivathanu, B., & Dwivedi, Y. K. (2020). Shopping intention at AI-powered automated retail stores (AIPARS). *Journal of Retailing and Consumer Services*, 57, 102207.
- Polacco, A., & Backes, K. (2018). The Amazon Go concept: Implications, applications, and sustainability. *Journal of Business and Management*, 24(1), 79-92.
- Prentice, C., Weaven, S., & Wong, I. A. (2020). Linking AI quality performance and customer engagement: The moderating effect of AI preference. *International Journal of Hospitality Management*, 90, 102629.
- Presno, C. (1998). Taking the byte out of Internet anxiety: instructional techniques that reduce computer/Internet anxiety in the classroom. *Journal of Educational Computing Research*, 18(2), 147-161.

- Rafaëli, A. (1989). When cashiers meet customers: An analysis of the role of supermarket cashiers. *Academy of Management Journal*, 32(2), 245-273.
- Rastegar, N. (2018). *Adoption of self-service kiosks in quick-service restaurants*.
- Renko, S., & Druzijanic, M. (2014). Perceived usefulness of innovative technology in retailing: Consumers' and retailers' point of view. *Journal of Retailing and Consumer Services*, 21(5), 836-843.
- Rogers, E. M. (2010). *Diffusion of innovations*. Simon and Schuster.
- Ronis, S. T., & LeBouthillier, D. M. (2013). University students' attitudes toward purchasing condoms. *The Canadian Journal of Human Sexuality*, 22(2), 86-94.
- Roy, S. K., Shekhar, V., Lassar, W. M., & Chen, T. (2018). Customer engagement behaviors: The role of service convenience, fairness and quality. *Journal of Retailing and Consumer Services*, 44, 293-304.
- Samadi, M., & Yaghoob-Nejadi, A. (2009). A survey of the effect of consumers' perceived risk on purchase intention in e-shopping. *Business Intelligence Journal*, 2(2), 261-275.
- San Martín, H., & Herrero, Á. (2012). Influence of the user's psychological factors on the online purchase intention in rural tourism: Integrating innovativeness to the UTAUT framework. *Tourism Management*, 33(2), 341-350.
- Scherer, A., Wunderlich, N. V., & Von Wangenheim, F. (2015). The value of self-service. *MIS Quarterly*, 39(1), 177-200.
- Sethi, U. J., & Sethi, R. S. (2016). Impact of internet usage riskiness, attitude towards website safety, online shopping convenience on online purchase intention. *CLEAR International Journal of Research in Commerce & Management*, 7(10), 11-14.
- Setiyadi, M. I., Mangiwa, B. B., & Nugraheni, D. M. K. (2019). Analysis of e-commerce using technology acceptance model and its interaction with risk, enjoyment, compatibility variables. *IEEE*, 1-6.
- Sharma, P., Tam, J. L., & Kim, N. (2012). Intercultural service encounters (ICSE), an extended framework and empirical validation. *Journal of Services Marketing*.
- Sharma, P., Tam, J. L., & Kim, N. (2015). Service role and outcome as moderators in intercultural service encounters. *Journal of Service Management*.
- Sherman, E., Mathur, A., & Smith, R. B. (1997). Store environment and consumer purchase behavior: Mediating role of consumer emotions. *Psychology & Marketing*, 14(4), 361-378.
- Shiu, J. Y., & Tzeng, S.-Y. (2018). Consumer confusion moderates the inertia-purchase intention relationship. *Social Behavior and Personality: An International Journal*, 46(3), 387-394.
- Siegrist, M. (2000). The influence of trust and perceptions of risks and benefits on the acceptance of gene technology. *Risk Analysis*, 20(2), 195-204.
- Simon, A., & Yaya, L. H. P. (2012). Improving innovation and customer satisfaction through systems integration. *Industrial Management & Data Systems*.
- Simon, H. A. (1995). Artificial intelligence: An empirical science. *Artificial Intelligence*, 77(1), 95-127.
- Sohn, K., & Kwon, O. (2020). Technology acceptance theories and factors influencing artificial Intelligence-based intelligent products. 47.

- Solomon, M. R., Surprenant, C., Czepiel, J. A., & Gutman, E. G. (1985). A role theory perspective on dyadic interactions: The service encounter. *Journal of Marketing*, 49(1), 99-111.
- Sumak, B., Pušnik, M., & Heričko, M. (2014). An empirical study of factors affecting the adoption of self-service checkout terminals in Slovenia. *MIPRO*, 453-458.
- Sutton, R. I., & Rafaeli, A. (1988). Untangling the relationship between displayed emotions and organizational sales: The case of convenience stores. *Academy of Management Journal*, 31(3), 461-487.
- Taylor, S., & Todd, P. A. (1995). Understanding information technology usage: A test of competing models. *Information Systems Research*, 6(2), 144-176.
- Thatcher, J. B., Loughry, M. L., Lim, J., & McKnight, D. H. (2007). Internet anxiety: An empirical study of the effects of personality, beliefs, and social support. *Information & Management*, 44(4), 353-363.
- To, P.-L., Liao, C., & Lin, T.-H. (2007). Shopping motivations on the Internet: A study based on utilitarian and hedonic value. *Technovation*, 27(12), 774-787.
- Torkzadeh, G., & Angulo, I. E. (1992). The concept and correlates of computer anxiety. *Behaviour & Information Technology*, 11(2), 99-108.
- Tripathi, A., & Parmar, R. (2019). *Business reshaping using artificial intelligence*.
- Turing, I. B. A. (1950). Computing machinery and intelligence-AM Turing. *Mind*, 59(236), 433.
- Turner, D. P. (2020). *Experimental study designs*. Wiley Online Library.
- Turner, J. J., & Szymkowiak, A. (2019). An analysis into early customer experiences of self-service checkouts: Lessons for improved usability. *Engineering Management in Production and Services*, 11(1), 36-50.
- Tussyadiah, I., & Miller, G. (2019). Perceived impacts of artificial intelligence and responses to positive behaviour change intervention. In *Information and communication technologies in tourism 2019* (pp. 359-370). Springer.
- Ul Hassan, M., Iqbal, M. S., & Habibah, U. (2020). Self-service technology service quality: Building loyalty and intention through technology trust in the Pakistani service sector. *SAGE Open*, 10(2), 2158244020924412.
- Van Esch, P., & Black, J. S. (2019). Factors that influence new generation candidates to engage with and complete digital, AI-enabled recruiting. *Business Horizons*, 62(6), 729-739.
- Van Esch, P., Black, J. S., & Arli, D. (2020). Job candidates' reactions to AI-enabled job application processes. *AI and Ethics*, 1-12.
- Van Esch, P. v., Cui, Y., & Jain, S. P. (2020). Stimulating or intimidating: The effect of AI-enabled in-store communication on consumer patronage likelihood. *Journal of Advertising*, 1-18.
- Venkatesh, V. (2000). Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, 11(4), 342-365.
- Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273-315.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.

- Venkatesh, V., Thong, J. Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 157-178.
- Vilaseca-Requena, J., Torrent-Sellens, J., & Jiménez-Zarco, A. I. (2007). ICT use in marketing as innovation success factor. *European Journal of Innovation Management*.
- Visvikis, D., Le Rest, C. C., Jaouen, V., & Hatt, M. (2019). Artificial intelligence, machine (deep) learning and radio (geno)mics: Definitions and nuclear medicine imaging applications. *European Journal of Nuclear Medicine and Molecular Imaging*, 46(13), 2630-2637.
- Wang, C., Harris, J., & Patterson, P. G. (2012). Customer choice of self-service technology: the roles of situational influences and past experience. *Journal of Service Management*.
- Wankhede, K., Wukkadada, B., & Nadar, V. (2018a). Just walk-out technology and its challenges: A case of Amazon Go. *IEEE*, 254-257.
- Wankhede, K., Wukkadada, B., & Nadar, V. (2018b). *Just walk-out technology and its challenges: A case of Amazon Go*. Paper presented at the 2018 International Conference on Inventive Research in Computing Applications (ICIRCA).
- Weng, S. J., Gotcher, D., & Kuo, C. F. (2017). Lining up for quick service: The business impact of express lines on fast-food restaurant operations. *Journal of Foodservice Business Research*, 20(1), 65-81.
- Westland, J. C., & Grace, A. (1997). A comparison of shopping experiences across three competing digital retailing interfaces. *International Journal of Electronic Commerce*, 2(2), 57.
- Wheeler, D. (2001). New technologies, old culture: A look at women, gender, and the Internet in Kuwait. In *Culture, technology, communication: Towards an intercultural global village* (pp. 187-212).
- Willems, K., Smolders, A., Brengman, M., Luyten, K., & Schöning, J. (2017). The path-to-purchase is paved with digital opportunities: An inventory of shopper-oriented retail technologies. *Technological Forecasting and Social Change*, 124, 228-242.
- Wirth, N. (2018). Hello marketing, what can artificial intelligence help you with? *International Journal of Market Research*, 60(5), 435-438.
- Xu, Y., Shieh, C.-H., van Esch, P., & Ling, I.-L. (2020). AI customer service: Task complexity, problem-solving ability, and usage intention. *Australasian Marketing Journal*, 28(4), 189-199.
- Yadav, M. S., & Pavlou, P. A. (2020). Technology-enabled interactions in digital environments: a conceptual foundation for current and future research. *Journal of the Academy of Marketing Science*, 48(1), 132-136.
- Yang, K., & Forney, J. C. (2013). The moderating role of consumer technology anxiety in mobile shopping adoption: differential effects of facilitating conditions and social influences. *Journal of Electronic Commerce Research*, 14(4), 334.
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2-22.
- Zhang, Y., Xiao, Z., Yang, J., Wraith, K., & Mosca, P. (2019). *A hybrid solution for smart supermarkets based on actuator networks*. Paper presented at the Seventh International Conference on Information, Communication and Networks (ICICN).

Zhao, X., Mattila, A. S., & Tao, L. S. E. (2008). The role of post-training self-efficacy in customers' use of self-service technologies. *International Journal of Service Industry Management*.

Appendices

1. Appendix A: SPSS Moderation Analysis Output of Study One.

Run MATRIX procedure:

***** PROCESS Procedure for SPSS Version 3.5 *****

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

Model : 1
Y : Intent
X : Conditions (checkout types; artificial intelligence and traditional)
W : Convenience

Sample
Size: 327

OUTCOME VARIABLE:
Intent

Model Summary

	R	R-sq	MSE	F	df1	df2	p
	.7279	.5298	.7435	121.3211	3.0000	323.0000	.0000

Model

	Coeff	se	t	p	LLCI	ULCI
constant	2.0153	.2825	7.1343	.0000	1.4595	2.5710
Conditions	-1.5094	.4353	-3.4679	.0006	-2.3657	-.6531
Convenience	.3783	.0609	6.2105	.0000	.2585	.4982
Int_1	.4180	.0850	4.9207	.0000	.2509	.5852

Product terms key:

Int_1 : Conditions x Convenience

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	.0352	24.2136	1.0000	323.0000	.0000

Focal predict: Conditions (X)
Mod var: Convenience (W)

Conditional effects of the focal predictor at values of the moderator(s):

Convenience	Effect	se	t	p	LLCI	ULCI
-------------	--------	----	---	---	------	------

3.7621	.0633	.1463	.4327	.6655	-.2246	.3512
4.9874	.5756	.1039	5.5394	.0000	.3712	.7800
6.2128	1.0878	.1478	7.3593	.0000	.7970	1.3786

Moderator value(s) defining Johnson-Neyman significance region(s):

Value	% below	% above
2.5106	3.0581	96.9419
4.1914	24.1590	75.8410

Conditional effect of focal predictor at values of the moderator:

Convenience	Effect	se	t	p	LLCI	ULCI
1.0000	-1.0914	.3533	-3.0887	.0022	-1.7865	-.3962
1.3000	-.9659	.3291	-2.9355	.0036	-1.6133	-.3186
1.6000	-.8405	.3050	-2.7560	.0062	-1.4405	-.2405
1.9000	-.7151	.2812	-2.5435	.0114	-1.2683	-.1620
2.2000	-.5897	.2576	-2.2888	.0227	-1.0966	-.0828
2.5000	-.4643	.2345	-1.9795	.0486	-.9257	-.0029
2.5106	-.4598	.2337	-1.9673	.0500	-.9197	.0000
2.8000	-.3389	.2120	-1.5985	.1109	-.7560	.0782
3.1000	-.2135	.1902	-1.1223	.2626	-.5876	.1607
3.4000	-.0880	.1694	-.5197	.6036	-.4214	.2453
3.7000	.0374	.1501	.2489	.8036	-.2579	.3327
4.0000	.1628	.1329	1.2250	.2215	-.0987	.4242
4.1914	.2428	.1234	1.9673	.0500	.0000	.4856
4.3000	.2882	.1187	2.4283	.0157	.0547	.5217
4.6000	.4136	.1087	3.8058	.0002	.1998	.6274
4.9000	.5390	.1041	5.1782	.0000	.3342	.7438
5.2000	.6644	.1056	6.2896	.0000	.4566	.8723
5.5000	.7899	.1131	6.9860	.0000	.5674	1.0123
5.8000	.9153	.1253	7.3034	.0000	.6687	1.1618
6.1000	1.0407	.1412	7.3722	.0000	.7630	1.3184
6.4000	1.1661	.1595	7.3099	.0000	.8523	1.4799
6.7000	1.2915	.1796	7.1898	.0000	.9381	1.6449
7.0000	1.4169	.2010	7.0506	.0000	1.0216	1.8123

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:
95.0000

W values in conditional tables are the mean and +/- SD from the mean.

----- END MATRIX -----

2. Appendix B: SPSS Moderated mediation Analysis Outcomes of Study 2.

Run MATRIX procedure:

```
***** PROCESS Procedure for SPSS Version 3.5 *****
          Written by Andrew F. Hayes, Ph.D.      www.afhayes.com
          Documentation available in Hayes (2018). www.guilford.com/p/hayes3
*****
Model   : 7
  Y     : Intent
  X     : Condition
  M     : Anxiety
  W     : Convenience

Sample
Size:   328

*****
OUTCOME VARIABLE:
  Anxiety

Model Summary
      R      R-sq      MSE      F      df1      df2      p
      .5528   .3056   1.1520  47.5352  3.0000  324.0000  .0000

Model
      coeff      se      t      p      LLCI      ULCI
constant  1.3240   .3626   3.6518  .0003   .6107   2.0372
Condition  1.0611   .5614   1.8902  .0596  -.0433   2.1655
Convenience .7260   .0806   9.0035  .0000   .5674   .8847
Int_1     -.2458   .1107  -2.2212  .0270  -.4635  -.0281

Product terms key:
  Int_1      :      Condition x      Convenience

Test(s) of highest order unconditional interaction(s):
      R2-chng      F      df1      df2      p
X*W      .0106   4.9337   1.0000  324.0000  .0270
-----
      Focal predict: Condition (X)
      Mod var: Convenience (W)

Conditional effects of the focal predictor at values of the moderator(s):

      Convenience      Effect      se      t      p      LLCI      ULCI
      3.7326      .1437   .1887   .7612   .4471   -.2276   .5149
      4.9570     -.1573   .1351  -1.1644   .2451   -.4230   .1084
      6.1814     -.4582   .1939  -2.3636   .0187   -.8396  -.0768

Moderator value(s) defining Johnson-Neyman significance region(s):
      Value      % below      % above
      5.5196     62.5000     37.5000

Conditional effect of focal predictor at values of the moderator:
      Convenience      Effect      se      t      p      LLCI      ULCI
      1.0000      .8153   .4547   1.7929   .0739   -.0793   1.7099
      1.3000      .7416   .4232   1.7525   .0806   -.0909   1.5740
      1.6000      .6678   .3918   1.7044   .0893   -.1030   1.4387
```

1.9000	.5941	.3609	1.6463	.1007	-.1158	1.3040
2.2000	.5204	.3303	1.5754	.1161	-.1295	1.1702
2.5000	.4466	.3003	1.4872	.1379	-.1442	1.0374
2.8000	.3729	.2711	1.3756	.1699	-.1604	.9062
3.1000	.2991	.2428	1.2318	.2189	-.1786	.7769
3.4000	.2254	.2160	1.0433	.2976	-.1996	.6504
3.7000	.1517	.1913	.7930	.4283	-.2246	.5279
4.0000	.0779	.1694	.4601	.6457	-.2553	.4112
4.3000	.0042	.1517	.0277	.9779	-.2942	.3026
4.6000	-.0695	.1397	-.4977	.6190	-.3444	.2053
4.9000	-.1433	.1350	-1.0609	.2895	-.4089	.1224
5.2000	-.2170	.1384	-1.5677	.1179	-.4893	.0553
5.5000	-.2907	.1493	-1.9474	.0524	-.5845	.0030
5.5196	-.2956	.1502	-1.9673	.0500	-.5911	.0000
5.8000	-.3645	.1662	-2.1930	.0290	-.6914	-.0375
6.1000	-.4382	.1875	-2.3371	.0200	-.8071	-.0693
6.4000	-.5119	.2119	-2.4161	.0162	-.9288	-.0951
6.7000	-.5857	.2384	-2.4565	.0146	-1.0547	-.1166
7.0000	-.6594	.2664	-2.4749	.0138	-1.1836	-.1352

OUTCOME VARIABLE:

Intent

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6048	.3658	.9333	93.7167	2.0000	325.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	2.3901	.2062	11.5921	.0000	1.9845	2.7957
Condition	1.0757	.1092	9.8488	.0000	.8608	1.2906
Anxiety	.3063	.0427	7.1811	.0000	.2224	.3903

***** DIRECT AND INDIRECT EFFECTS OF X ON Y *****

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
1.0757	.1092	9.8488	.0000	.8608	1.2906

Conditional indirect effects of X on Y:

INDIRECT EFFECT:

Condition -> Anxiety -> Intent

Convenience	Effect	BootSE	BootLLCI	BootULCI
3.7326	.0440	.0624	-.0859	.1594
4.9570	-.0482	.0454	-.1446	.0324
6.1814	-.1404	.0614	-.2672	-.0272

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
Convenience	-.0753	.0344	-.1440	-.0085

***** ANALYSIS NOTES AND ERRORS *****

Level of confidence for all confidence intervals in output:

95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

10000

W values in conditional tables are the mean and +/- SD from the mean.

WARNING: Variables names longer than eight characters can produce incorrect output

when some variables in the data file have the same first eight characters.
Shorter

variable names are recommended. By using this output, you are accepting all risk

and consequences of interpreting or reporting results that may be incorrect.

----- END MATRIX -----

3. Appendix C: Ethical Approval



Auckland University of Technology Ethics Committee (AUTEC)

Auckland University of Technology
D-88, Private Bag 92006, Auckland 1142, NZ
T: +64 9 921 9999 ext. 8316
E: ethics@aut.ac.nz
www.aut.ac.nz/researchethics

17 July 2020

Patrick van Esch
Faculty of Business Economics and Law

Dear Patrick

Re Ethics Application: **20/202 The impact of AI-enabled checkouts on Saudi Arabian retail shoppers**

Thank you for providing evidence as requested, which satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC).

Your ethics application has been approved for three years until 17 July 2023.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the [Auckland University of Technology Code of Conduct for Research](#) and as approved by AUTEC in this application.
2. A progress report is due annually on the anniversary of the approval date, using the EA2 form.
3. A final report is due at the expiration of the approval period, or, upon completion of project, using the EA3 form.
4. Any amendments to the project must be approved by AUTEC prior to being implemented. Amendments can be requested using the EA2 form.
5. Any serious or unexpected adverse events must be reported to AUTEC Secretariat as a matter of priority.
6. Any unforeseen events that might affect continued ethical acceptability of the project should also be reported to the AUTEC Secretariat as a matter of priority.
7. It is your responsibility to ensure that the spelling and grammar of documents being provided to participants or external organisations is of a high standard and that all the dates on the documents are updated.

AUTEC grants ethical approval only. You are responsible for obtaining management approval for access for your research from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

Please quote the application number and title on all future correspondence related to this project.

For any enquiries please contact ethics@aut.ac.nz. The forms mentioned above are available online through <http://www.aut.ac.nz/research/researchethics>

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: kf8212@autuni.ac.nz

4. Appendix D: Study Information sheet and Participant Consent Form the English Version



Participant Information Sheet

Date Information Sheet Produced:
05 Jun 2020

Project Title
The impact of AI-enabled checkouts on Saudi Arabian retail shoppers

An Invitation
As-salamu alaykum, my name is Salman Ghazwani and I am currently a master's student at the Business School at Auckland University of Technology. You are invited to take part in a study on the impact of AI-enabled checkouts on Saudi Arabian retail shoppers. The participation in this survey is voluntary and you have the right to withdraw any time from this research without impacting you. This survey is part of a research conducted in Auckland University of Technology and will contribute to my obtaining a master's degree qualification.

What is the purpose of this research?
The findings of this research may be used for academic publications and presentations. The purpose of this study is to examine the influence of AI-enabled checkout systems on shopper comfort and purchasing intent. The primary question to be answered in this research is: "How do checkout types (traditional vs. AI-enabled) impact the shopping experience in Saudi Arabia?"

How was I identified and why am I being invited to participate in this research?
This invitation is sent to potential shoppers in Saudi who are 18 years old or higher only.

How do I agree to participate in this research?
Your participation in this research is voluntary (it is your choice) and ~~whether or not~~ you choose to participate will neither advantage nor disadvantage you. You ~~are able to~~ withdraw from the study at any time. If you choose to withdraw from the study, then you will be offered the choice between having any data you provided to be removed or allowing it to continue to be used. However, once the findings have been produced, removal of your data may not be possible. Also, the data will be collected anonymously so there will be no way to identify any participant.

What will happen in this research?
You are asked to watch a short video for AI-enabled in supermarket then answer the survey of this questionnaire voluntarily. The collected data will be analysed to answer the research question of the related research. Statistical measures such as means, medians and standard deviations of questionnaire items will be used in report, not individual responses.

What are the discomforts and risks?
Participation will be anonymous and there will be no personally identifying information collected such as names, address and email. If you do not want to answer any of the questions, you are able to withdraw from the study or simply move on to the next question, at any time.

What are the benefits?
The research purpose is to explore more about the behaviours of shoppers regarding to AI-enabled checkout, and that will be a benefit that will be generated from this research for retailers, marketers and researchers. Additionally, this research will assist the researcher to achieve his Master of Business at Auckland University of Technology as it is a requirement to obtain the mentioned degree.

16 February 2021 page 1 of 3 This version was edited in November 2019



How will my privacy be protected?

The survey will not require your name and the data will be anonymised. Also, the data will not be linked back to any individual and it will be stored and destroyed safely. In addition, the data collected will remain confidential. Information will be kept in a safe (locked) place. You will not be identified in the final reporting. The findings will be reported in aggregate.

What are the costs of participating in this research?

Participation is free of charge and completion time is expected to take about 15 minutes at a maximum.

What opportunity do I have to consider this invitation?

Taking part in this survey will be available for three weeks from the date of survey publication.

Will I receive feedback on the results of this research?

The results of this research will be published on this link <https://ai-enabled.weebly.com/>

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr Patrick van Esch, patrick.van.esch@aut.ac.nz, +64 99219999 ext 7437.

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEK, ethics@aut.ac.nz, (+649) 921 9999 ext 6038.

Whom do I contact for further information about this research?

Please keep this Information Sheet and a copy of the Consent Form for your future reference. You are also able to contact the research team as follows:

Researcher Contact Details:

Salman Ghazwani, Auckland University of Technology, New Zealand
khf8212@autuni.ac.nz

Research Supervisor Contact Details:

Dr Patrick van Esch, Auckland University of Technology, New Zealand
patrick.van.esch@aut.ac.nz +64 99219999 ext 7437.

**Consent**

- I understand that I should complete the survey **only if I am 18 years old or over.**

I have been given information about the study " The impact of AI-enabled checkouts on Saudi Arabian retail shoppers ".

- I have read the Participant Information Sheet on the first page and have had the opportunity to ask the researcher further questions I may have had.
- I understand that my participation in this research is voluntary and that I can withdraw from the study at any time.
- I understand that the information from this study will be used as part of a master's theses and may be published in journal articles or presented at conferences.
- I understand that my name and any personal data will not be identified in any analysis or publication of the result.
- If I have any concerns regarding the way the research is or has been conducted, I can contact the primary researcher Salman Ghazwani email: khf8212@autuni.ac.nz.

***By completing the survey, I am consenting to participate in the research study.**

I agree

Q22 I like being able to check my payments history when using AI.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q23 I like that shopping at AI stores means that I do not need to carry cash.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q 24 I like that shopping at AI stores helps me save time.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q25 I like that shopping at AI stores means that I will not have to wait in line for cashiers.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Referring to the video:

Q26 I think it will be easy for me to become skilful in using this technology.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q27 I think I would find this technology easy to use in AI stores.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

<input type="radio"/>						
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Q28 With Covid-19 shopping restrictions in mind, do you think that shopping at AI stores would reduce your anxiety about handling cash.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q29 With Covid-19 shopping restrictions in mind, do you think that shopping at AI stores would reduce your anxiety about interacting with others.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q 30 How likely is it that you would choose to shop in AI stores?

Very unlikely						Highly likely
1	2	3	4	5	6	7
<input type="radio"/>						

Q 31 I have a generally favourable attitude toward using AI.

Yes	No
<input type="radio"/>	<input type="radio"/>

Q32 I intend to shop at AI stores in the future because of the convenience they offer.

Yes	No
<input type="radio"/>	<input type="radio"/>

Would never consider						Would definitely consider
1	2	3	4	5	6	7
<input type="radio"/>						

Q7 To what extent do you like the concept of normal checkout stores.

Not at all						Completely
1	2	3	4	5	6	7
<input type="radio"/>						

Q8 After watching the video, I feel positive towards normal checkout stores.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q9 If there are AI-enabled stores, normal checkout stores would be still my preferred choice.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q10 I will continue to shop at normal checkout stores in the future.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q11 After watching the video, I felt happy to continue shopping at normal checkout stores in the future.

Strongly disagree						Strongly agree
1	2	3	4	5	6	7

Q28 With Covid-19 shopping restrictions in mind, do you think that shopping at normal checkout stores reduces your anxiety about handling cash?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q29 With Covid-19 shopping restrictions in mind, do you think that shopping at normal checkout stores reduces your anxiety about interacting with others?

Strongly disagree						Strongly agree
1	2	3	4	5	6	7
<input type="radio"/>						

Q 30 How likely is it that you would continue to shop at normal checkout stores if there was an alternative available?

Very unlikely						Highly likely
1	2	3	4	5	6	7
<input type="radio"/>						

Q 31 I have a generally favourable attitude toward shopping at normal checkout stores.

Yes	No
<input type="radio"/>	<input type="radio"/>

Q32 I intend to shop at normal checkout stores in the future because of the convenience they offer.

Yes	No
<input type="radio"/>	<input type="radio"/>

7. Appendix G: Study Information sheet and Participant Consent Form the Arabic Version



TE WĀNANGA ARONUI
O TĀMAKI MAKĀU RAU

ورقة معلومات المشارك

تاريخ إعداد ورقة المعلومات

2020/06/05

عنوان البحث

أثر أنظمة الدفع المدعومة بالذكاء الاصطناعي على المتسوقين في المملكة العربية السعودية

دعوة

السلام عليكم ورحمة الله وبركاته، اسمي سلمان غزواني وأنا حالياً طالب ماجستير في كلية إدارة الأعمال بجامعة أوكلاند للتكنولوجيا. أنت مدعو للمشاركة في دراسة حول تأثير عمليات الدفع المدعومة بالذكاء الاصطناعي على المتسوقين بالتجزئة في المملكة العربية السعودية. المشاركة في هذا الاستطلاع تطوعية ولديك الحق في الانسحاب في أي وقت من هذا البحث دون التأثير عليك. هذا الاستطلاع جزء من بحث يتم إجراؤه في جامعة أوكلاند للتكنولوجيا وسيساهم في الحصول على درجة الماجستير للباحث.

ما هو الغرض من هذا البحث؟

يمكن استخدام نتائج هذا البحث في المجالات الأكاديمية والعروض التقديمية في المؤتمرات. كما أن الغرض من هذه الدراسة هو فحص تأثير أنظمة الخروج المدعومة بالذكاء الاصطناعي على راحة المتسوق ونوايا الشراء. السؤال الأساسي الذي سنتم الإجابة عنه في هذا البحث هو: "كيف تؤثر أنظمة الخروج المختلفة (التقليدية مقابل تمكين الذكاء الاصطناعي) على تجربة التسوق في المملكة العربية السعودية؟"

كيف تم تحديد هويتي ولماذا تتم دعوتي للمشاركة في هذا البحث؟

يتم إرسال هذه الدعوة للمتسوقين المحتملين في المملكة العربية السعودية الذين يبلغون من العمر 18 عاماً أو أكثر فقط

كيف أوافق على المشاركة في هذا البحث؟

مشاركتك في هذا البحث تطوعية (هو اختيارك) وما إذا كنت تختار المشاركة أم لا لن يفيدك ولا يضر بك. يمكنك الانسحاب من الدراسة في أي وقت. إذا اخترت الانسحاب من الدراسة، فسيتم عرض عليك الاختيار بين إزالة أي بيانات قدمتها أو السماح للباحث بمواصلة استخدامها. ومع ذلك، بمجرد الانتهاء من المشاركة، قد لا تكون إزالة بياناتك ممكنة ولكن قد لا يمكن استخدامها. أيضاً، سيتم جمع البيانات بشكل مجهول حتى لا تكون هناك طريقة لتحديد أي مشاركتك.

ماذا سيحدث في هذا البحث؟

يطلب منك مشاهدة مقطع فيديو قصير للذكاء الاصطناعي في السوبر ماركت ثم الإجابة تطوعاً على الاستبيان. سيتم تحليل البيانات التي تم جمعها للإجابة على سؤال البحث. سيتم استخدام التدابير الإحصائية في التقرير، وليس الردود الفردية.

ما هي المضايقات والمخاطر؟

ستكون المشاركة مجهولة ولن تكون هناك معلومات تعريف شخصية تم جمعها مثل الأسماء والعناوين والبريد الإلكتروني. إذا كنت لا ترغب في الإجابة عن أي من الأسئلة، يمكنك الانسحاب من الدراسة أو الانتقال إلى السؤال التالي في أي وقت

AUT

TE WĀNANGA ARONUI
O TĀMAKI MAKAU RAU**ما هي المنافع؟**

الغرض من البحث هو استكشاف المزيد حول سلوكيات المتسوقين فيما يتعلق بالدفع باستخدام تقنية الذكاء الاصطناعي، وستكون هذه فائدة سيتم إنشاؤها من هذا البحث لتجار التجزئة والمسوقين والباحثين. بالإضافة إلى ذلك، سيساعد هذا البحث الباحث على تحقيق درجة الماجستير في إدارة الأعمال من جامعة أوكلاند للتكنولوجيا حيث أنه شرط للحصول على الدرجة المذكورة.

كيف سيتم حماية خصوصيتي؟

لن يتطلب الاستطلاع اسمك وستكون البيانات مجهولة المصدر. أيضاً، لن يتم ربط البيانات بأي شخص وسيتم تخزينها وإتلافها بأمان. بالإضافة إلى ذلك، ستبقى البيانات التي تم جمعها سرية. سيتم الاحتفاظ بالمعلومات في مكان آمن (مغلق). لن يتم تحديده في التقرير النهائي. سيتم الإبلاغ عن النتائج بشكل إجمالي.

ما هي تكاليف المشاركة في هذا البحث؟

المشاركة مجانية ويتوقع أن يستغرق وقت الانتهاء حوالي 15 دقيقة كحد أقصى

ما الفرصة المتاحة لي للنظر في هذه الدعوة؟

المشاركة في هذا الاستطلاع ستكون متاحة لمدة ثلاثة أسابيع من تاريخ نشر الاستطلاع

هل سألتقى تعليقات حول نتائج هذا البحث؟

سيتم نشر نتائج هذا البحث على هذا الرابط

<https://ai-enabled.weebly.com/>

ماذا أفعل إذا كانت لدي مخاوف بشأن هذا البحث؟

يجب الإبلاغ عن أي مخاوف تتعلق بطبيعة هذا المشروع في المقام الأول إلى مشرف البحث، الدكتور باتريك فان إيش،

patrick.van.esch@aut.ac.nz

+64 99219999 ext 7437

أيضاً يجب الإبلاغ عن المخاوف المتعلقة بإجراء البحث إلى الأمين التنفيذي للجنة الأخلاقيات بجامعة أوكلاند للتكنولوجيا

ethics@aut.ac.nz

(+649) 921 9999 ext 6038

بمن أتصل للحصول على مزيد من المعلومات حول هذا البحث؟

يرجى الاحتفاظ بورقة المعلومات هذه للرجوع إليها في المستقبل. يمكنك أيضاً الاتصال بفريق البحث على النحو التالي:



عنوان الاتصال بالباحث:

سلمان غزواني، جامعة أوكلاند للتكنولوجيا، نيوزيلندا

khf8212@autuni.ac.nz

عناوين الاتصال بمشرف البحث

الدكتور باتريك فان إيش، جامعة أوكلاند للتكنولوجيا، نيوزيلندا

patrick.van.esch@aut.ac.nz

+64 99219999 ext 7437

تمت الموافقة عليه من قبل لجنة الأخلاقيات بجامعة أوكلاند بتاريخ 15 يوليو 2020 رقم المرجع 20/202

*من خلال استكمال الاستبيان ، أوافق على المشاركة في الدراسة البحثية .

بدأ الاستبيان

8. Appendix H: AI-enabled Questionnaire the Arabic Version

استبانة الذكاء الاصطناعي

يرجى مشاهدة هذا الفيديو قبل الإجابة على الأسئلة.

<https://www.youtube.com/watch?v=NrmMk1Myrxc>

س1: الجنس

○ ذكر ○ انثى

س2: العمر

○ 25 - 18 ○ 35-26 ○ 45-36 ○ 59-46 ○ أكبر من 60

س3: المؤهل العلمي

○ شهادة الثانوية ○ دبلوم ○ بكالوريوس ○ ماجستير ○ دكتوراه

س4: الحالة الوظيفية

○ موظف دوام كامل ○ موظف دوام جزئي ○ غير موظف ○ متقاعد

س5 بشكل عام، التسوق في المتجر مهم بالنسبة لي.

غير مهم على الاطلاق						مهم جداً
1	2	3	4	5	6	7
○	○	○	○	○	○	○

س6: إشارة إلى مقطع الفيديو، ما مدى احتمال تسوقك في متجر مزود بذكاء اصطناعي؟

لن أجرب على الاطلاق						سأجرب بكل تأكيد
1	2	3	4	5	6	7
○	○	○	○	○	○	○
لن أبحث عنه على الاطلاق						سأبحث عنه بكل تأكيد
1	2	3	4	5	6	7
○	○	○	○	○	○	○
غير محتمل على الاطلاق						محتمل جداً
1	2	3	4	5	6	7
○	○	○	○	○	○	○

س28: مع وضع قيود التسوق لأزمة كورونا في الاعتبار، هل تعتقد أن التسوق في متاجر الذكاء الاصطناعي سيقفل من قلقك بشأن التعامل بالنقد؟

لا أوافق بشدة						أتفق بشدة
1	2	3	4	5	6	7
<input type="radio"/>						

س29: مع وضع قيود التسوق لأزمة كورونا في الاعتبار، هل تعتقد أن التسوق في متاجر الذكاء الاصطناعي سيقفل من قلقك بشأن التعامل مع الآخرين؟

لا أوافق بشدة						أتفق بشدة
1	2	3	4	5	6	7
<input type="radio"/>						

س30: ما مدى احتمال اختيارك التسوق في متاجر الذكاء الاصطناعي؟

غير مرجح على الإطلاق						من المرجح جدا
1	2	3	4	5	6	7
<input type="radio"/>						

س31: لدي موقف إيجابي تجاه استخدام الذكاء الاصطناعي.

لا	نعم
<input type="radio"/>	<input type="radio"/>

س32: أعتزم التسوق في متاجر الذكاء الاصطناعي في المستقبل بسبب الراحة التي تقدمها.

لا	نعم
<input type="radio"/>	<input type="radio"/>

9. Appendix I: Normal Checkout Questionnaire the Arabic Version

استبانة نظام الدفع العادي
يرجى مشاهدة هذا الفيديو قبل الإجابة على الأسئلة.

<https://www.youtube.com/watch?v=MPJ0UUNONaI>

س1: الجنس

ذكر انثى

س2: العمر

25 - 18 35-26 45-36 59-46 أكبر من 60

س3: المؤهل العلمي

شهادة الثانوية دبلوم بكالوريوس ماجستير دكتوراه

س4 الحالة الوظيفية

موظف دوام كامل موظف دوام جزئي غير موظف متقاعد

س5 بشكل عام، التسوق في المتجر مهم بالنسبة لي.

مهم جداً	6	5	4	3	2	غير مهم على الإطلاق
7	6	5	4	3	2	1
<input type="radio"/>						

س6: إذا كان هناك نظام ذكاء صناعي للمحاسبة، فما مدى احتمالية تجربته؟

سأجرب بكل تأكيد	6	5	4	3	2	لن أجرب على الإطلاق
7	6	5	4	3	2	1
<input type="radio"/>						
سأبحث عنه بكل تأكيد	6	5	4	3	2	لن أبحث عنه على الإطلاق
7	6	5	4	3	2	1
<input type="radio"/>						
محتمل جداً						غير محتمل على الإطلاق

س28: مع وضع قيود التسوق لأزمة كورونا في الاعتبار، هل تعتقد أن التسوق في متاجر الدفع العادية سيقال من قلفك بشأن التعامل بالنقد؟

لا أوافق بشدة						أُتفق بشدة
1	2	3	4	5	6	7
<input type="radio"/>						

س29: مع وضع قيود التسوق لأزمة كورونا في الاعتبار، هل تعتقد أن التسوق في متاجر الدفع العادية سيقال من قلفك بشأن التعامل مع الاخرين؟

لا أوافق بشدة						أُتفق بشدة
1	2	3	4	5	6	7
<input type="radio"/>						

س30: ما مدى احتمال استمرارك في التسوق في متاجر الدفع العادية إذا كان هناك بديل متاح؟

غير مرجح على الاطلاق						من المرجح جدا
1	2	3	4	5	6	7
<input type="radio"/>						

س31: لدي موقف إيجابي عمومًا تجاه التسوق في متاجر الدفع العادية.

لا	نعم
<input type="radio"/>	<input type="radio"/>

س32: أنوي التسوق في متاجر الدفع العادية في المستقبل بسبب الراحة التي تقدمها.

لا	نعم
<input type="radio"/>	<input type="radio"/>

