Customer Acceptance of Neobanks: What Role Does National Culture Play?

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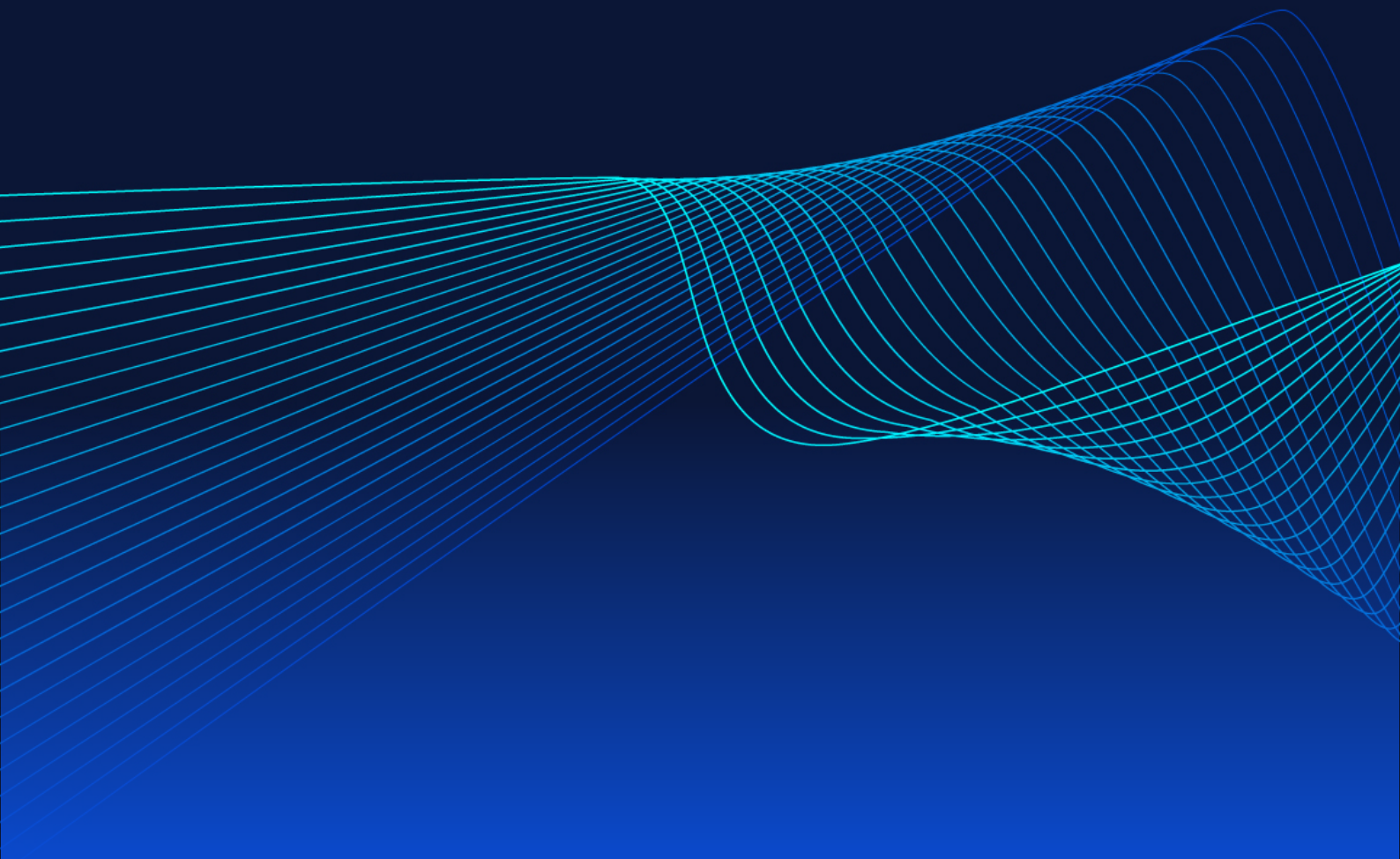

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CUSTOMER ACCEPTANCE OF NEOBANKS: WHAT ROLE DOES NATIONAL CULTURE PLAY?

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ABSTRACT

Changing economic and regulatory environments following the financial crisis of 2008, along with an increase in customer standards for digital experiences and rapid technological advancements have brought life to a new type of bank that could forever change the banking environment. These new banks are called neobanks — financial institutions with no physical branches that operate independently from traditional banks. This study aims to examine the customer acceptance of neobanks and whether there are differences across national cultures.

To garner a better understanding of neobanks, we conduct a systematic literature review outlining the characteristics of neobanks with their advantages and disadvantages compared to incumbents. The findings of our systematic literature review indicate that the technology acceptance model used to measure customer acceptance should be extended with an additional construct, i.e. trust, because consumers are more sceptical about start-ups and digital platforms [4], [60]. Furthermore, the dimensions developed by Hofstede [33] are incorporated to evaluate the national cultural effect on the modified technology acceptance model. To measure the modified technology acceptance model, we collect primary quantitative data through questionnaires, making it easier to obtain a larger sample size to include as many nationalities as possible. Finally, the modified technology acceptance model is assessed through partial least squares structural equation modelling to calculate the complex relationships with reflective constructs.

Our findings indicate that the national cultural dimensions do not have a significant effect on the customer acceptance of neobanks. Furthermore, the original two independent constructs of the technology acceptance model, perceived ease of use and perceived usefulness, have a significant positive weak direct effect on the behavioural intention to use a neobank. Additionally, perceived ease of use has a significant positive strong effect on the perceived usefulness and trust. Finally, the theorised trust dimension has a significant positive weak effect on both the perceived usefulness of, and the behavioural intention to use neobanks.

To conclude, national cultural differences do not impact the customer acceptance of neobanks, whereas the rest of the modified technology acceptance model does. These data imply that neobanks do not need to alter their business models across countries. Instead, perceived ease of use is a major contributing factor in customers' behavioural intention to use neobanks. For this reason, neobanks should aim to promote clear, understandable, and easy to use services. Additionally, since most neobanks use the overall cost leadership strategy, it is essential to have a large and scalable customer base to stay in the market. Therefore, neobanks should not neglect the constructs that have a weaker effect on a customers' behavioural intention to use a neobank, i.e. perceived usefulness and trust, to maximise customer acquisition and retention.

PREFACE & ACKNOWLEDGEMENTS

This thesis originates from my passion for technology and finance. Combining these two aspects, I saw an opportunity to research a new phenomenon in the FinTech industry, namely neobanks. As neobanks are a disruptive force in the banking sector, we research the customer acceptance of neobanks and whether this differs among countries. This thesis is written as partial fulfilment of the requirements for the degree of MSc. in Business Administration.

I want to take this opportunity to express my gratitude to everyone that assisted with the writing process of this master's thesis. Foremost, my first supervisor Dr. Abhistha for his effort, time, guidance, and feedback. With his knowledge and critical questions, I was able to look differently at some of the aspects of my thesis. Moreover, his kindness and enthusiasm helped me to stay motivated. Secondly, I would like to thank Dr. Joosten for wanting to be my second supervisor on such short notice. Thank you for your constructive feedback, it has helped me tremendously improve the writing style and contents of this thesis. Without both of their help, this thesis would not have reached the same level of quality, and I am forever grateful for that.

Furthermore, during my time at the University of Twente, I have had the honour of working with some great friends — Teun, Michel, Nikola, and Arian. I want to thank them for their friendship and great teamwork. I would also like to thank my partner, Friederike, for constantly motivating and pushing me to my limits. Last but not least, I want to thank my amazing parents for always being supportive of me throughout my life and education.

Thank you all, and enjoy reading this thesis,

Koen Meijer

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LIST OF ABBREVIATIONS

d_g	Unweighted least squares discrepancy
d_{uls}	Geodesic discrepancy
f^2	Cohen's effect size measure
ATM	Automated teller machine
AVE	Average variance extracted
BI	Behavioural intention to use
df	Degrees of freedom
eCommerce	Electronic Commerce
FinTech	Financial Technologies
H_0	Null hypothesis
H_A	Alternative hypothesis
H[1-14]	Hypothesis 1 to 14
HI95	95%-percentile confidence interval
HI99	99%-percentile confidence interval
HTMT	Heterotrait-monotrait ratio
IDV	Individiualism vs. collectivism Hofstede dimension
IT	Information technologies
IVR	Indulgence vs. restraint Hofstede dimension
LTO	Long-term vs. short-term orientation Hofstede dimension
MAS	Masculinity vs. femininity Hofstede dimension
n	Sample size
P2P	Peer-to-peer
PDI	Power distance index Hofstede dimension
PEOU	Perceived ease of use
PLS-SEM	Partial least squares structural equation modelling
PU	Perceived usefulness
p-value	Probability value
R^2	Coefficient of determination
SRMR	Standardised root mean squared residual
SQ[1-4]	Sub-question 1 to 4
T	Trust
TAM	Technology acceptance model
t-value	Value used to determine whether significant differences exist between the means of two groups
UAI	Uncertainty avoidance index Hofstede dimension
ρ_A	Dijkstra-Henseler's rho_A

1. INTRODUCTION

There is no doubt that technological advancements have paved the way for new industries and are fundamentally changing existing industries. One industry being affected by technological advancements is the financial services industry. The nature of the financial services industry is being changed by financial technologies, or FinTech, which refers to the use of technology to deliver financial solutions [2]. Consumers being able to create virtual credit cards with a click, to invest in their favourite companies without a single fee, to pay contactless with their mobile phone when they get their morning dose of caffeine, are a case in point. According to KPMG [51], $60.2B were invested in FinTech companies across 2,914 deals in 2017, $150.4B across 3,639 deals in 2018, and $150.4B across 3,286 deals in 2019. The increase in investments indicates the growth of FinTech. Additionally, FinTech start-ups can test technologies and introduce new and innovative products faster than ever before [22]. This allows them to challenge well-established companies [23], [24], causing concern for traditional companies in the financial services industry.

1.1 FinTech and neobanks

The previous paragraph gives insight into the FinTech revolution and how it has been changing the financial services industry in recent years. However, the concept of FinTech is not novel; it can be traced back to the first financial technology. The Trans-Atlantic transmission cable connecting North America and Europe has been operational since 1866, which provided the foundation for the first period of financial globalisation [2], [44]. This period is considered to be FinTech 1.0 (Figure 1), where the financial services industry was interconnected with technology, however remained mainly an analogue industry [2], [44]. FinTech 2.0 started at the latest by 1987 and digitalised the financial services industry [3]. Until 2008, the traditional regulated financial services industry predominately controlled FinTech. Following the financial crisis in 2008, this was not the case anymore as the regulatory, operating, and compliance environment had changed, which facilitated the rapid advancement of FinTech [3]. New start-ups and technology companies were starting to disrupt the traditional financial services industry by delivering their own products and services to businesses and consumers (e.g. Google Pay, Square, PayPal, and Kickstarter) [3], [22]. This period is considered as FinTech 3.0 [44].

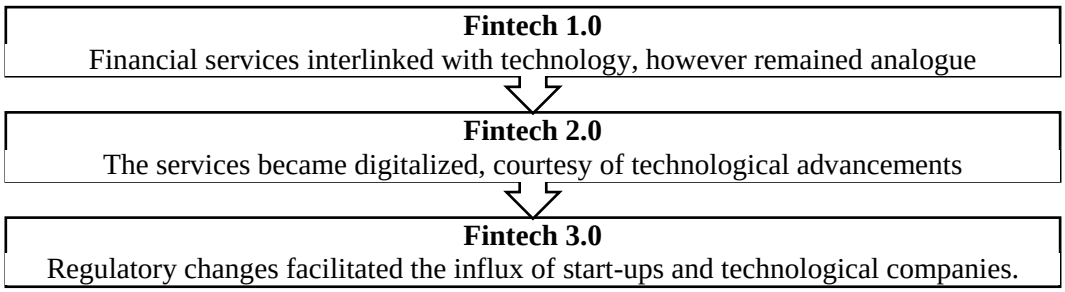

Figure 1. The fintech revolution over the years.

One sector within the financial services industry that is affected by the new entrants is the banking sector. Namely, in recent years a surge of neobanks — independent digital-only entities — in the banking sector has taken place [58]. Revolut is one such example, which allows customers to send money worldwide instantly without fees, invest in fractional shares, and much more [67]. Neobanks either have a banking licence or partner with traditional banks to deliver their products and services. Typically, neobanks are focused on offering newer technology at a lower cost [68]. Additionally, neobanks can launch features and develop partnerships faster than traditional banks [16]. To compete with neobanks, traditional banks are launching online arms called digital banks to compete [48], [58].

In 2020, there were over 350 million customers at over 250 neobanks [68]. The increasing number of neobanks trying to take their market share leads to high competition in customer acquisition and retention in the banking sector [42]. Therefore, customer acceptance of neobanks is essential to traditional banks, digital banks, and neobanks. Additionally, there is a vast difference in the proportion of consumers banking with neobanks between countries. For example, 93 per cent of the consumers in China banked with neobanks in 2020, whereas this number was around 4 per cent in the Netherlands and Germany [68]. The differing adoption rate brings forward the question of whether customer acceptance is affected by national cultures.

1.2 Customer acceptance and culture

As seen in the previous section, the customer acceptance of neobanks across cultures is one important issue. Several models for measuring customer acceptance exist. However, the technology acceptance model is predominantly used to measure the customer acceptance of a specific technology. The original model consists of the perceived ease of use of the application, which positively impacts the perceived usefulness. Both the perceived ease of use and perceived usefulness constructs are theorised to directly positively affect a customer's behavioural intention to use the technology, which has a positive impact on the actual system use (Figure 2).

Researchers have performed a wide array of studies to demonstrate the validity of the model, resulting in many revisions of the technology acceptance model [1], [13], [38], [62]. However, only a few studies have studied the effect of national cultural differences on either the original or one of the

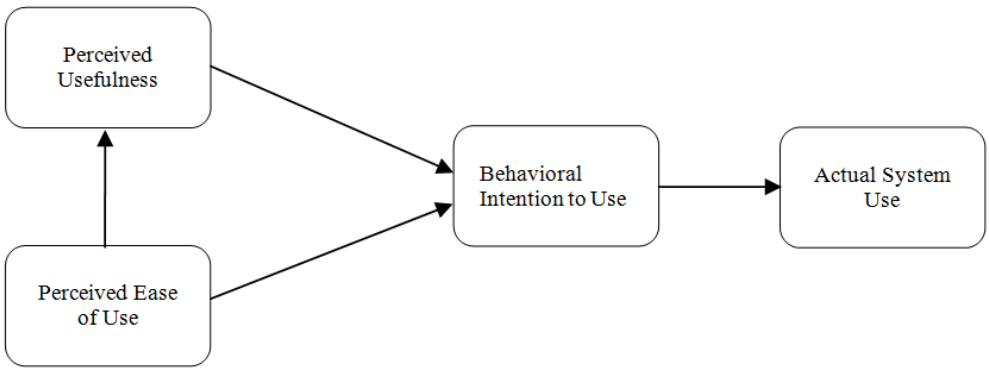

Figure 2. Original technology acceptance model [2]

revised technology acceptance models. An often-used model for comparing national cultural differences is Hofstede's 6-D model. Hofstede [34] created the model in 1983 with the following four dimensions: power distance index, individualism versus collectivism, masculinity versus femininity, and the uncertainty avoidance index. Two additional dimensions were added to the model after the first inception of the Hofstede dimensions. These two dimensions are long-term orientation versus short-term orientation, and indulgence versus restraint [69]. All of the six dimensions are measured on a 0-100 scale.

As can be seen, two motivational factors for examining the cultural differences exist, namely: (1) the effect that national cultures have on the customer acceptance of neobanks, and (2) how the national cultures can be integrated into the technology acceptance model.

1.3 Research objective and questions

In the preceding sections of this chapter, we showed that the financial services industry are changing due to FinTech. One sector within the financial services industry, the banking sector, is being changed by neobanks. Thus, all three types of banks — traditional banks, digital banks, and neobanks — benefit from a better understanding of customer acceptance of neobanks, since they can use this information to adjust their business strategy if needed. Additionally, the adoption rate of neobanks differs among countries. The need to examine cultural differences is consistent with the fact that not many studies have been performed to examine the effect of cultural differences on the technology acceptance model. To summarise, our research aims to examine the influence of different national cultures on the technology acceptance model when applied to neobanks. Therefore, we formulate the following central research question:

CRQ: *"What is the customer acceptance of neobanks across national cultures?"*

We devise four sub-questions to answer the central research question. The first two sub-questions will serve as a theoretical background to formulate and measure the technology acceptance model of neobanks. The third sub-question aims to examine whether or not national cultures affect the customer acceptance of neobanks using empirical data. Lastly, the fourth sub-question will go over the practical implications of the results found in the analysis.

The FinTech revolution brought around several product and service enhancements. Therefore, it is critical for our research to get a better understanding of neobanks and these product and service enhancements to measure neobanks' customer acceptance correctly. Hence, we investigate the defining characteristics of neobanks using secondary data in a systematic literature review in conformity with the first sub-question:

SQ1: *"What are the defining characteristics of neobanks?"*

Besides the characteristics, neobanks can have certain advantages and disadvantages compared to their direct competitors — i.e. digital banks and traditional banks. The advantages and disadvantages of neobanks compared to these substitutes can affect customer acceptance. A better understanding of the advantages and disadvantages will allow for more reliable conclusions based on empirical data. Thus, the following sub-question is inspected in Chapter 2, the literature review:

SQ2: *"What are the advantages and disadvantages of neobanks compared to their competitors?"*

The aforementioned sub-questions will help with formulating and measuring the technology acceptance model. Davis [11] introduced the original technology acceptance model in 1989. Since then, various researchers — e.g. Pikkarainen *et al.* [50], Gefen *et al.* [20], and Yoon [66] — have made slight revisions to the model. We examine these various versions of the technology acceptance model in conjunction with the national cultural dimensions in Chapter 3. Based on the chosen model, we inspect the impact of national culture on the customer acceptance of neobanks through empirical research with primary data collected using a questionnaire. We formulate hypotheses in Chapter 3, the method, to measure various relationships in the chosen technology acceptance model. The outcome of the hypotheses will allow for the comparison between the national cultures and enables us to answer the following sub-question:

SQ3: *"Does national culture impact the customer acceptance of neobanks when applied on the chosen technology acceptance model?"*

The implications of the technology acceptance model and the national cultural impact on the model can be crucial to neobanks and potentially to their competitors. The results can aid in making strategic decisions, such as whether neobanks need to adopt different business models across varying national cultures. Therefore, in the final sub-question, we aim to answer the practical implications of

the results. This final sub-question will be answered in the conclusions and discussion chapter, and is the following:

SQ4: *"What are the practical implications of the results for neobanks?"*

1.4 Methodology

In the previous section, we have shown the formulated sub-questions that aid in answering the central research question. In this section, we present the methodology on how we aim to answer these sub-questions.

We carry out a systematic literature review to answer the first two sub-questions. A systematic literature review will follow a predetermined plan with criteria for the selection and exclusion of articles. This is done with the aim of increasing the transparency and clarity of this research. Additionally, it decreases any bias in the article selection process. After we have conducted the qualitative research, the focus of the research is redirected towards the quantitative part of the study. To answer sub-question three, we collect primary data through an online questionnaire. The questionnaire is structured according to a 5-point Likert-type scale to capture the respondents' opinions on a series of statements. The Likert-type scale will give the questionnaire consistency. Furthermore, because we examine the effect of national cultures on the technology acceptance model, it is vital to have a sample with as many national cultures as possible. Therefore, we distribute the questionnaire on a globally used online service called Amazon Mechanical Turk. Alongside this approach, the survey will be distributed on social media to achieve data source triangulation. After using the results to answer the third sub-question, we aim to answer sub-question 4, giving insights into the practical implications for neobanks.

1.5 Intended contributions

1.5.1 Theoretical contributions

As mentioned before, several studies examined and revised the technology acceptance model. However, not many existing studies have touched upon the effect of national culture on either the original or revised technology acceptance model. Filling this literature gap will give researchers a better understanding of the relationship between the national culture and the technology acceptance model. Furthermore, the topic of neobanks is relatively new, which is reflected in the scarcity of academic studies surrounding neobanks. Additionally, no existing studies measure the customer acceptance of neobanks. Filling this literature gap will give academics insights on neobanks and their customer acceptance. Finally, future research can potentially use the insights from our research.

1.5.2 Practical contributions

Filling the literature gap around neobanks is especially important for the financial services industry. Neobanks can use the information regarding the overall customer acceptance to alter their products and services to increase customer acceptance if needed. Furthermore, neobanks can use the information for choosing which market to expand to in case of differing customer acceptance across national cultures. Moreover, neobanks can create individual marketing strategies depending on the national cultural effect on customer acceptance, which could lead to more effective marketing campaigns. Finally, digital banks and traditional banks can use this information to see how they compare to neobanks and whether or not neobanks are a possible threat to their market share. This can be used to the advantage of traditional and digital banks by adopting similar product and service philosophies.

2. LITERATURE REVIEW

This section of the paper provides a review of the literature on neobanks. In the first section, we discuss the protocol for the selection of literature. Following the description of the protocol, we conduct the literature review to answer the first two sub-questions outlined in the previous chapter. The first sub-question aims to answer the defining characteristics of neobanks. Finally, the second sub-question reviews the advantages and disadvantages of neobanks in comparison to their competitors. The answering of these sub-questions aid with the formulation and measuring of the technology acceptance model, which we discuss in the third chapter.

2.1 Systematic protocol

Before selecting literature to answer the first two sub-questions, we formulate a systematic protocol (see Figure 3). The keywords “neobank”, “neobanks”, “neo bank”, and “neo banks” are used for the search in Scopus, Google Scholar, and the Web of Science databases, which result in 517 articles. Next, we review these articles on the relevancy of the titles. Furthermore, articles that are non-English, duplicates, or are released over five years ago are filtered out. In total, we reject 424 articles in the first stage, and the 92 articles left are assessed on their relevancy through an abstract review. The abstract review resulted in the exclusion of 40 articles, and the remaining 51 articles are reviewed through a full-text reading. In the end, the literature review takes 25 articles into consideration for the answering of the first two sub-questions.

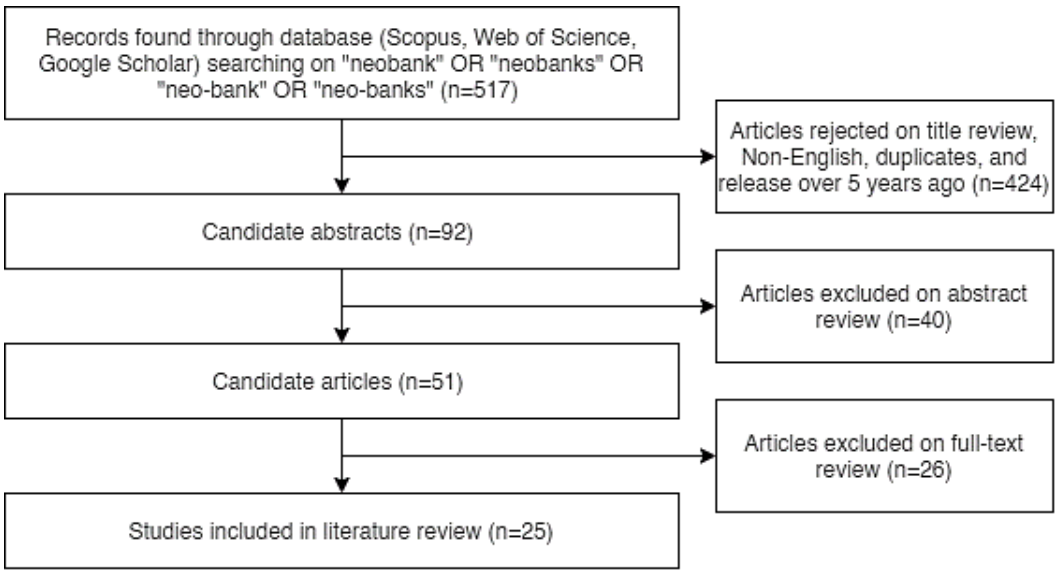

Figure 3. Systematic literature review protocol.

2.2 Defining characteristics of neobanks

2.2.1 Driving forces behind the neobank revolution

The driving forces behind the neobank disruption can be split into three main categories. Arslanian & Fisher [4] mention the following three categories: a changing economic and regulatory landscape, a rapidly evolving technology environment, and changing customer expectations. The last two points align with Vives' [63] view — that the disruption is caused by technological developments on the supply side and changes in customer expectations on the demand side.

Following the global financial crisis of 2008, several economic and regulatory changes enabled the growth of FinTech. Arslanian & Fisher [4], and Vives [63] mention that regulators tightened the regulations to increase the overall safety of the financial system, resulting in financial institutions having to divert their focus to compliance initiatives and risk management. According to Arslanian & Fisher [4], this caused the innovation in products and processes to fade by traditional banks. Several regulators also sought to promote non-traditional competition [4]. Finally, there were low interest rates in the years after the financial crisis [4], [63]. Arslanian & Fisher [4] mention that this increased funding in alternative asset classes like venture capital, as traditional asset classes no longer offered attractive returns.

The changing technology environment is the second driving force. These technological advancements changed how businesses can use technologies when developing new services or business models [63]. Vives [63] mentions that these new developments can be seen in innovative information and automation technology in financial services. Traditional banks can also use the new technologies, however are usually deeply cemented in legacy systems and moving away from these systems can be challenging and costly [4]. Therefore, it is hard for traditional banks to keep up with new technologies. Melnychenko *et al.* [47] mention four enabling technologies for digital banking. These are big data, artificial intelligence, biometrics, and blockchain technologies. These four enabling technologies have various use cases, e.g. big data and artificial intelligence allow for customer behaviour analysis [47]. The complete list of use cases according to Melnychenko *et al.* [47] can be seen in Table 1. Furthermore, besides blockchain technology, Vives [63] mentions other relevant technologies, including application programming interfaces, mobile devices, and cloud computing. Finally, these technologies allow for innovative components that can often be seen in neobanks [55]. Shettar [55] and Wewege *et al.* [65] mention common innovative components of neobanks. For instance, neobanks often allow for fast account opening, international payments without fees, cryptocurrencies, user-friendly interfaces, analysis of expenses, free debit cards, instant payments, multiple currency support, and 24/7 customer support.

TABLE 1
Areas of application and four enabling technologies identified by Melnychenko *et al.* [1]

Areas of application (dominant ideas)	Big data	Artificial intelligence	Biometrics	Blockchain
Analysis of customer behaviour	+	+	-	-
Transaction monitoring	+	+	-	+
Customer segmentation	+	+	-	-
Customer identification	-	-	+	+
Fraud management	+	+	+	+
Personalisation of banking services	+	+	-	-
Risk assessment and regulatory compliance	+	+	-	-
Customer response analysis	+	+	-	-
Process automation	-	+	-	-
Providing financial advice	+	+	-	-
Investment decision-making	+	+	-	+
Trade facilitation	-	-	-	+
Syndicated loan services	-	-	-	+
P2P transfers	-	-	-	+

Finally, customer expectations are the last driving force behind the neobank revolution. Mobile devices have become essential in consumers' lives, with consumers using services by companies like Uber, Airbnb, WhatsApp, and Facebook [4], [63]. According to Arslanian & Fisher [4], and Vives [63], these companies have changed customers' expectations for digital experiences to a higher standard. A growing number of existing customers of incumbents have become frustrated with the outdated user experience and hidden fees [4], [59]. Neobanks and digital banks aim to fill this unmet need by providing a convenient and intuitive customer experience [4], [53], [61], [63]**.** Valero *et al.* [61] add that neobanks direct a majority of their attention to mobile users. Furthermore, neobanks aim to be transparent and respect the consumer's control over privacy [61]. The younger demographic, such as the millennial generation, is the focus of neobanks as this age group is particularly frustrated with the banking experiences at incumbent banks [4], [61]. Additionally, this demographic is more likely to accept a remote provider [41], [61].

2.2.2 Definition of neobanks

Varying interpretations of the "neobank" definition are found in the selected literature, which is consistent with the findings of Larisa *et al.* [41]. The differing interpretations by various authors are listed in Table 2. Whereas there are a few slight differences in the definitions of neobanks, a consensus can be found among most authors as they define neobanks as fully online banks without any physical branch locations, or brick-and-mortar locations. Glushchenko *et al.* [21] mention that neobanks are fully

online banks without an office network. In this context, it is assumed that by “office network”, the author means customers do not have physical locations to visit.

TABLE 2
Definitions of neobanks by other authors.

Author(s)	Definition
Arslanian & Fisher [4]	"The names of these innovators differ from region to region, called virtual banks, digital banks, challenger banks, or neo-banks to distinguish them from their incumbent competitors."
Glushchenko *et al.* [21]	"Neo-banks are fully online banks without office network, built on new technology platforms, in contrast to the traditional banks' outdated infrastructure."
Gouveia *et al.* [25]	"That (neobank) is a 100% digital bank and it reaches customers on mobile apps and personal computer platforms only."
Khayrallah *et al.* [37]	"Neo-banks are an extension of the prepaid card business. They provide synthetic bank-like services with internet-only operations, skipping branches completely."
Knewtson & Rosenbaum [40]	"Digital banks are foundational to the banking-as-a-service ecosystem, which provides customer convenience through mobile and online banking (Agile: Niche Fulfilling). Digital banks include neobanks and challenger banks, which serve a more tech-hungry customer base competing with an increasingly consolidated banking industry."
Larisa *et al.* [41]	"There are different interpretations of the "neobank" definition. For example, neobank is considered a kind of direct bank, which is 100% digital and serves customers through mobile applications and personal computers. Digital banks are just the online player of a larger bank in the financial sector, while the neobanks are completely digital, and they operate independently of traditional banks."
Lumpkin & Schich [45]	"These new digital banking initiatives (not all of them are legally banks) are also sometimes referred to as ‘neo banks’ so as to distinguish them from digital arms of traditional banks."
Martinčević *et al.* [46]	"Neobanks are, in fact, banks with no physical branch locations, serving customers with checking, savings, payment services and loans on fully mobile and digital infrastructure."
Soloviev [56]	"Among the neo-banks, that is, banks that do not have physical branches and are fully working in the digital space"
Tosun [60]	"A digital-only bank or neobank is a bank that operates with no bricks-and-mortar branches and provides digital banking solutions to its customers such as internet and mobile banking [...] mainly all of the traditional banks provide digital banking solutions to their customers today. But these are not included in the digital-only brand concept mentioned in this study."

One of the complications with the definitions by Arslanian & Fisher [4], and Knewtson & Rosenbaum [40] is that neobanks are seen as a type of digital bank. Neobanks are in fact a type of digital bank. However, the term neobank was invented to differentiate the banks without any physical branch locations from the digital arms of traditional banks, which are called digital banks [41], [45], [60]. Furthermore, authors sometimes use the term challenger bank to refer to neobanks. However, some

authors also use the term challenger bank to differentiate them from neobanks, where: challenger banks are FinTech banks with physical branch locations, and neobanks are FinTech banks without physical branch locations [4], [8], [40]. Additionally, the terms virtual bank and digital-only bank are used by some authors, however in this thesis, we refrain from using synonyms to the term neobank to avoid confusion.

A consensus among the authors can be seen that neobanks operate without any physical branches. Additionally, the term neobank is used to distinguish the bank from a digital arm of a traditional bank, or called an incumbent competitor. Based on the common components of the authors' definitions of neobanks (see Table 1), we propose the following definition and use it throughout this research: *"Neobanks are financial institutions with no physical branches that operate independently from traditional banks."*

2.2.3 Licenced and unlicenced neobanks

Differentiation can be made between two types of neobanks, licenced or unlicensed [8], [21], [61]. First, licenced neobanks can offer the full range of banking services on their infrastructure [53], [61]**.** These neobanks have obtained their banking licence and are therefore under strict supervision and regulation [46], [61]. This can sometimes be beneficial to the customer, such as being offered deposit protection. For example, countries part of the European Union offer protection of up to €100,000 or roughly the equivalent in local currency [46]. In the United States, the regulatory barrier is high, as banks must obtain a banking licence at the state level by each state in which they want to operate [8]. Therefore, the second type of neobanks is often seen in countries where there are higher regulatory barriers [21].

The second type of neobanks are unlicensed and partner with existing banks to use the infrastructure of traditional banks for the processes and compliance with regulations [8], [53], [61]. According to Tardieu *et al.* [59], unlicenced neobanks are still managing to win customers, even when only offering a limited number of services. For instance, the neobank called Revolut started as a mobile wallet app without a banking licence in July 2015, and acquired 1.8 million customers by July 2018 [59]. Revolut went on to obtain a banking licence from the European Central Bank in December 2018 [64].

2.2.4 Neobanks' activity and geographic differences

The mode of operation of neobanks differs among countries, and mainly continents. Some Asian neobanks are integrated into trade platforms and chat rooms, e.g. WeBank's integration with WeChat [21]. However, a limited number of neobanks in Asia operate similarly to European or American neobanks [21]. The European and American neobanks typically operate via standalone interfaces and do not rely on integration with other applications. In this case, we refer to neobanks such

as N26, Revolut, Monzo, and Starling Bank. According to Ryan [52], mainly payment apps and digital wallets are setting the charge in Asia, whereas neobanks have set the pace in Europe.

2.3 Advantages and disadvantages of neobanks

2.3.1 Advantages of neobanks

2.3.1.1 No legacy systems and faster technology deployment

Financial institutions, among them traditional banks, were some of the earliest to make significant investments in information technology [4], [5]. According to Arslanian & Fisher [4], this resulted in large amounts of legacy debt on infrastructure that is now inflexible and outdated, often 40 or more years old. Ryan [52] mentions that traditional banks have been held back by these legacy systems, leaving them unfit to deal with modern-day consumer banking challenges. Although traditional banks have realised the potential of new technologies, the implementation of new technologies is complex due to traditional banks typically being bound to legacy systems [4], [5]. Lumpkin & Schich [45], and Tardieu *et al.* [59] mention that traditional banks have made progress has on mobile applications with billions invested, however a serious investment is needed to bring these past basic operations. Additionally, Boot *et al.* [7] state that incumbents will continue to invest massively in IT. However, the organisational complexity of large banks complicates the transition to when banks can fully utilise new technologies. Finally, traditional banks may take a slow-moving approach in adopting new technologies due to reputational risks [7].

Whereas traditional banks are being held back by legacy systems, new entrants such as neobanks have the advantage of not having these complex legacy systems with complicated data structures [61]. Furthermore, FinTech firms can be characterised by efficient organisational design [63]. This allows neobanks to take a fast and flexible approach to changing consumer preferences, resulting in higher innovating capacity than incumbents [63]. The pace of new technology adoption is what gives neobanks a significant advantage over traditional banks [52].

2.3.1.2 Reduced operating costs

Besides the costs of moving away from legacy systems, traditional banks are also at a disadvantage when it comes to the physical branch network. Arslanian and Fisher [5] mention that banks relied on physical branch locations not far in the distant past, which were associated with success. According to Boot *et al.* [7], little doubt exists that the brick-and-mortar type of banking is mainly over, which can also be seen in the fast reduction in bank branches. Arslanian and Fisher [5] add to this by saying that customers are shifting away from bank branches to digital channels, with the prediction that the average British consumer will visit a branch four times a year by 2022, and British millennials visiting only twice a year. This leaves these traditional banks with high fixed costs due to these physical branches

and human capital [5]. In the twelve months leading up to June 2017, more than 1,700 branches closed in the United States [5]. Wewege *et al.* [65] mention that most transactions are still done with cash payments as of 2020. If customers want to withdraw cash, they can use ATMs, meaning that neobanks do not require physical locations. The use of cash could well change in the coming years. Neobanks do not have any physical branch locations, as they purely provide their products and services online. This reduces the need for personnel and branches, giving neobanks the advantage of having lower fixed costs than incumbents [63].

Furthermore, Boot *et al.* [7] and Vives [63] mention that neobanks employ more efficient IT processes and operate as leaner businesses, overall cutting costs. Because of these efficiency gains, they are able to gain market share [63].

2.3.1.3 Favourable operating models

The most frequently seen operating model by neobanks is the cost-leadership approach by offering reduced pricing and higher interest rates. Pricing is one of the most appealing factors for customers of neobanks [60]. Tosun [60] mentions that these operating models are possible due to the lower costs, as seen in the previous section. According to Glushchenko *et al.* [21], neobanks achieve lower costs by optimising non-interest expenses, such as documents circulation, data processing, storage, and staff wages. Meaning that neobanks can achieve a competitive advantage by offering customers competitive prices, lower loan rates, and higher interest rates [56]. This operating model has placed competitive pressure on traditional banks [31]. However, low fees can also lead to problems for revenue generation, which we touch upon later in this chapter.

Furthermore, neobanks can also focus on a niche, offering only a set of products and services , making neobanks specialised providers [7], [40]. Consumers nowadays get the opportunity to bank with several institutions of their choice due to low prices, allowing them to pick services from various institutions [56]. This poses a threat to traditional banks as customer-facing services might be taken over by these specialised FinTech companies [59]. As mentioned before, neobanks tend to target a specific demographic. This demographic is more digitally savvy and drawn to digital banking, such as millennials [45]. Traditional banks are trying to offer new technology to attract this demographic [25], [45]. However, there is a consensus that neobanks provide superior technology over incumbents [25], [52].

2.3.1.4 Lower barriers of entry

Large balance sheets and large customer bases used to be high barriers for new entrants [52]. However, the ability to source IT infrastructure with cloud services considerably lowered this barrier [7]. Additionally, when a neobank opts not to offer loans, the risk is lowered, and regulation is simplified [37]. Furthermore, in some countries, neobanks can use banking regulations to their advantage. For

example, in the United Kingdom, the banking legislation was changed in 2014-2015, resulting in lower entry barriers [53]. However, a negative aspect of regulations is that future imposed regulations on the banking industry can dictate the competitiveness of neobanks [49], [63]. Furthermore, achieving a banking licence can be tricky in some countries. For example, in the United States, a neobank must apply for a banking licence per state in which it wants to operate [7]. Finally, Ryan [52] mentions that neobanks can nowadays go to market within months and be fully operational within two or three years. Of course, this is dependent on other factors, such as products and services provided and whether the neobank is licenced or not. However, it indicates the possibility of having a short timeframe. On the contrary, Arslanian & Fisher [4] mention that FinTech start-ups must go through more scrutiny than other typical digital products.

2.3.2 Disadvantages of neobanks

2.3.2.1 *Difficulty of building trust*

The most frequently emerging disadvantage for neobanks amid the selected literature is the building of trust. Tosun [60] defines brand trust as: "the consumers' belief regarding the integrity, good intentions, and high quality of a brand". Whereas there is an increased interest in FinTech start-ups, it does not result in customer trust [4]. According to Arslanian & Fisher [4], consumers continue to view traditional banks as safer and are sceptical about start-ups, even when regulators approve these. Tosun [60] complements this view by mentioning that digital platforms are perceived riskier in the financial services industry. Valero *et al.* [61] mention that trust must be gained by neobanks from the ground up, unless the neobank is backed by a traditional bank. Additionally, a limited number of customers use neobanks as their primary bank, as it can be a difficult decision for consumers [60]. Incumbents can use this to their advantage if they can adapt quickly to consumers' needs as they are usually already a trusted brand [5]. Additionally, Boot *et al.* [7] mention that traditional banks can focus on specialising as trusted advisors for customers with complex needs if the market dynamics shift. Over time the advantages of brand trust will fade for incumbents [5]. Based on these findings, a dimension for trust will be added in our modified technology acceptance model to test the effect it has on customers' behavioural intention to use neobanks. This is discussed in-depth in the next chapter.

2.3.2.2 Need for a large customer base

As previously mentioned, neobanks can achieve a competitive advantage by offering consumers lower prices, lower loan rates, and higher interest rates. One of the complications with this business model is that it requires an enormous customer base to turn profitable [25]. Additionally, Wewege *et al.* [65] mention that neobanks still encounter challenges when trying to monetise their products effectively. Neobanks can scale with their infrastructure if needed [37]. However, the problem arises with customer awareness and reputation. According to Shettar [55], the customer awareness of

neobanks was on average 7.4% in the United Kingdom in 2018. The lack of reputation and brand recognition is a challenge that FinTech firms need to overcome [63]. Many neobanks started with the aim of replacing traditional banks, however have failed to overcome this obstacle and instead opted to partner with traditional banks [63].

2.4 Summary

The systematic literature review allows us to answer the first two sub-question outlined in the introduction. The answers to both sub-questions aid in the formulation of the technology acceptance model and the questionnaire.

Foremost, the first sub-question (SQ1): *"What are the defining characteristics of neobanks"* will be summed up. The driving forces behind the neobank revolution can be split into three categories: the changing economic and regulatory landscape, rapidly evolving technology environment, and changing customer expectations [4], [63]. The changing economic and regulatory landscape is attributable to the 2008 financial crisis, which enabled the growth of the FinTech industry [4], [63]. Furthermore, the rapidly evolving technology environment changed the way new services or business models are developed, especially for start-ups, as these are not embedded in legacy systems like traditional organisations [4], [61], [63]. Finally, mobile applications have become essential in consumers' lives, and the expectations for digital experiences are now of a higher standard [4], [63]. The incumbents' customers have become frustrated with hidden fees and the outdated user experience, which is the gap that neobanks try to fill [5], [53], [59], [61], [63]. Furthermore, there is a difference between licenced and unlicenced neobanks [8], [21], [61]. Licenced neobanks operate on their infrastructure are under strict supervision and regulation [46], [61]. On the other hand, the unlicenced neobanks rely on the infrastructure of a traditional bank, which limits the ability to offer specific services and products [8], [53], [61]. Additionally, Glushchenko *et al.* [21] mention that geographic differences exist in neobanks, namely that some Asian neobanks are integrated into chat room apps. On the other hand, typical American and European neobanks do not rely on integration with different applications and operate on standalone applications [21]. Finally, in the literature, there is no clear-cut definition of neobanks. Therefore, based on the literature, we propose the following definition of neobanks: *"Neobanks are financial institutions with no physical branches that operate independently from traditional banks."*

The second sub-question (SQ2): *"What are the advantages and disadvantages of neobanks compared to their competitors?"* aims to explore the differences between neobanks and their competitors, and the possible implications these differences have on the customer acceptance of neobanks. The first advantage of neobanks compared to traditional banks is that neobanks are not bound to expensive legacy systems, allowing for easier and faster technology deployment [52], [61], [63]. This pace of technology adoption gives neobanks a significant advantage. Secondly, neobanks have reduced operating costs due to eliminating the physical branch locations and personnel [7], [63]. Neobanks also

employ more efficient IT processes and operate as leaner businesses [63]. Thirdly, these lower operating costs allow neobanks to operate favourable business models, as pricing is one of the most appealing factors for customers [60]. Namely, neobanks can and typically offer reduced prices and higher interest rates to their customers [56]. The last advantage is that neobanks have lower barriers to entering the markets due to the possibility of sourcing IT infrastructure with cloud services or by simplifying regulations by becoming an unlicenced neobank or not offering certain services, e.g. personal loans [7], [37].

Neobanks also have their disadvantages. A critical disadvantage that will be considered with the data analysis is the difficulty of building trust. Arslanian & Fisher [5], and Tosun [60] found that consumers tend to view traditional banks as safer and are sceptical about start-ups. Whereas this is an advantage to incumbents, it is likely to fade as neobanks become more prominent over time [5]. Finally, as previously mentioned, many neobanks have a competitive advantage due to lower prices, lower loan rates, and higher interest rates. A downside of this business model is that there is a need for a large customer base to be profitable [25]. Many neobanks need to overcome the lack of reputation and brand awareness to achieve a large customer base [63].

3. METHOD

This chapter will elaborate upon the research design that is used to investigate the third and fourth sub-question, which will help answer the central research question. Thus, this chapter entails the research objective, the conceptual framework and the hypotheses, the research design and method, the data collection process, and lastly the data analysis process.

3.1 Research objective

The objective of this master's thesis is to address the literature gap that currently exists surrounding neobanks' customer acceptance. As neobanks are a relatively new phenomenon, the existing literature on neobanks is slim, and customer acceptance of neobanks has yet to be studied. Furthermore, limited studies have incorporated the effect of national cultures in the technology acceptance model.

Therefore, our study aims to examine the influence of different national cultures on the technology acceptance model when applied to neobanks. Insights into the differing customer acceptance across national cultures can be used not just by neobanks, but also by traditional banks and digital banks to make crucial strategic decisions. For example, these banks can use the information when expanding to new markets to determine in which markets they have a strategic advantage compared to the competitors if national cultures impact the customer acceptance of neobanks.

Furthermore, the previous chapter, the literature review on neobanks, promotes the general understanding of neobanks, along with the advantages and disadvantages of neobanks. Which will help in formulating the method. Additionally, we use other literature on technology acceptance models and the Hofstede dimensions in conjunction with the already found information in the previous chapter.

3.2 Conceptual framework

Davis [12] devised the original technology acceptance model (TAM) as an adaptation of the theory of reasoned action to tailor to the modelling of user acceptance of information technology in 1989. Many studies have shown the validity and reliability of this model [43]. Therefore, the foundation of our conceptual framework is based on the TAM. On top of the TAM, we take trust into consideration as we found the building of trust to be a disadvantage for neobanks in the systematic literature review. Additionally, we add Hofstede's national cultural dimensions to the TAM to measure for possible interaction effects. Our conceptual framework can be seen in Figure 4, and the hypotheses are summarised in Table 4 at the end of this section.

3.2.1 Trust and the technology acceptance model

Davis & Venkatesh [13] mention that research in TAM and psychology suggest that the users' intention to use, is the best predictor of actual system use. Therefore, the behavioural intention to use (BI), is the dependent variable in our study. BI is found to be determined by the perceived usefulness (PU), and the perceived ease of use (PEOU) [13]. Other more advanced models have been made, however these are heavily catered to a work environment to remove potential biases [12]. Therefore, the original three constructs are used.

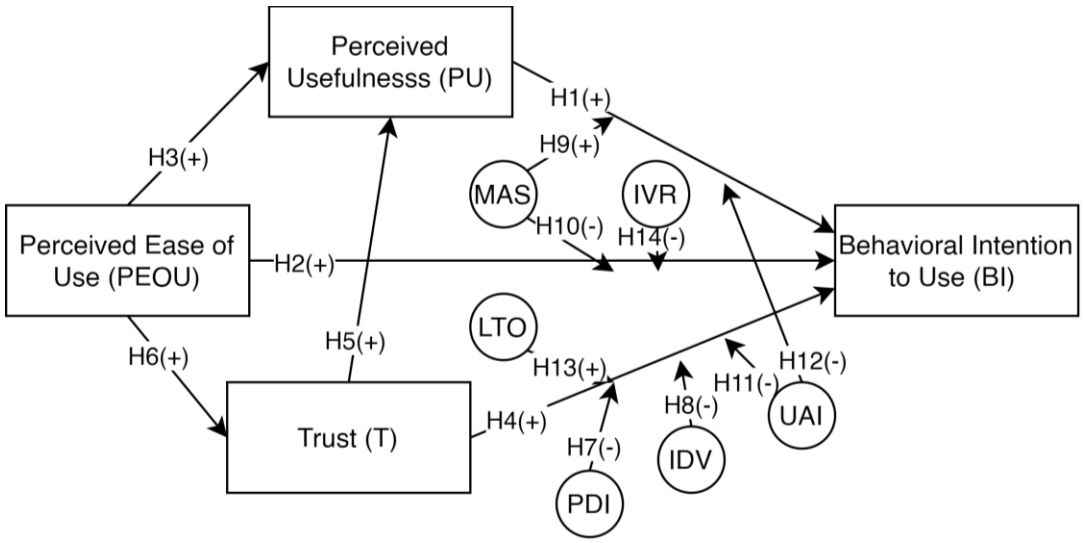

Figure 4. Conceptual framework.

PU is defined as: "the extent to which a person believes that using a particular system would enhance his or her job performance" [11]–[13], [57]. Whereas the definition is focussed on job performance, Pikkarainen *et al.* [50] have decided to omit the job aspect, so it can be used as user acceptance outside of the work environment. It is believed that PU is a major determining factor in the acceptance of information technology. Therefore, we formulate Hypothesis 1:

Hypothesis 1. PU has a positive effect on BI.

Furthermore, the second construct, PEOU, is defined as "the user's perception of the extent to which using a particular system will be free of effort" [11]–[13], [57]. Davis [11] mentions that effort is a finite resource, and finds that PEOU has a positive effect on BI. Additionally, PEOU was found to have a positive effect on PU [11]. Therefore, the following two hypotheses are formulated in accordance with the original TAM:

Hypothesis 2. PEOU has a positive effect on BI.

Hypothesis 3. PEOU has a positive effect on PU.

In the systematic literature review, we found that trust is a disadvantage of neobanks compared to traditional banks. Therefore, we look to incorporate trust into the technology acceptance model to measure for potential correlations. Gefen *et al.* [20] modified the existing technology acceptance model to incorporate trust for measuring customer acceptance in online shopping. Gefen *et al.* [20] compile a list of previous conceptualisations in the following four options. (1) “a set of specific beliefs dealing primarily with the integrity, benevolence, and ability of another party”, (2) a general belief that another party can be trusted, sometimes also called trusting intentions or the 'willingness' of a party to be vulnerable to the actions of another, (3) affect reflected in feelings of confidence and security in the caring response of the other party, or (4) a combination of these elements.

According to Gefen *et al.* [20], trust (T) helps a customer reduce social complexity, which in turn helps reduce subjective undesirable yet possible behaviours. Therefore, we expect T to positively affect BI (see Hypothesis 4). Additionally, the author mentions that using information technology that cannot be trusted will reduce usefulness (see Hypothesis 5) [20]. Finally, Gefen *et al.* [20] mention that an unnecessarily hard to use website in the context of eCommerce does not show a consumer that the business has the ability to care or is caring. This might also make the customer believe that the business is hiding something through the difficult to use user interface. Therefore, we expect PEOU to have a positive effect on T (see Hypothesis 6).

Hypothesis 4. T has a positive effect on BI.

Hypothesis 5. T has a positive effect on PU.

Hypothesis 6. PEOU has a positive effect on T.

3.2.2 Hofstede’s national cultural dimensions

Hofstede’s [33] national cultural dimensions are utilised to measure the national cultural impact on customer acceptance. Yoon [66] managed to test the modification effects of five of the current six Hofstede dimensions on the acceptance of e-commerce. However, the author measured the dimensions at a personal level, while these are defined as societal levels by Hofstede [33]. Therefore, a key difference between our study and Yoon’s [66] is that the last dimension, indulgence versus restraint, is added. Additionally, we use the values determined by Hofstede [33] in our data analysis as opposed to measuring them at an individual level, since the values are depicting a societal level. A summary of each dimension can be seen in Table 3.

TABLE 3
Hofstede's [33] dimensions, abbreviations, and descriptions.

Hofstede's dimension	Abbreviation	Description
Power distance index	PDI	"The extent to which the less powerful members of organizations and institutions (like the family) accept and expect that power is distributed unequally" [33]
Individualism vs. collectivism	IDV	"The degree to which people in a society are integrated into groups" [33]
Masculinity vs. femininity	MAS	"Refers to the distribution of values between the genders which is another fundamental issue for any society" [33]
Uncertainty avoidance index	UAI	"The extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations" [33]
Long-term vs. short-term orientation	LTO	"Values found at this pole [long-term] were perseverance, thrift, ordering relationships by status, and having a sense of shame; values at the opposite, short term pole were reciprocating social obligations, respect for tradition, protecting one's 'face', and personal steadiness" [33]
Indulgence vs. restraint	IVR	"Indulgence stands for a society that allows relatively free gratification of basic and natural human desires related to enjoying life and having fun. Restraint stands for a society that controls gratification of needs and regulates it by means of strict social norms" [33]

3.2.1.1 Power distance index (PDI)

The first dimension is called the power distance index. PDI deals with the extent to which power inequality is accepted by the less powerful members of organizations or institutions [33]. According to Hofstede [33], most societies are unequal, however some are more unequal than others. Yoon [66] mentions that customers from high PDI countries believe that companies are more likely to take part in unethical behaviour compared to customers from low power distance index countries. Therefore, we argue that customers from high PDI countries have less trust in neobanks compared to customers from low PDI countries. We propose the following hypothesis:

Hypothesis 7. A higher level of the PDI dimension has a negative modification effect on the relationship between T and BI.

3.2.1.2 Individualism versus collectivism (IDV)

Secondly, IDV measures the degree to which people within a society are integrated into groups [33]. On the one hand, in countries with a low IDV score, so on the individualism side, individuals are expected to care for themselves, and individuals generally focus more on themselves [33]. According to Yoon [66], individualists identify themselves with a larger society. Additionally, they are good at meeting, relying on, and trusting strangers [66]. On the other hand, individuals in a country with a high IDV score, so on the collectivism side, are expected to care and focus on their families or coherent groups [33]. Moreover, collectivists are unlikely to trust someone outside of their group [66]. Therefore, we argue that a higher level of IDV results in a lower effect of T on BI.

Hypothesis 8. A higher level of the IDV dimension has a negative modification effect on the relationship between T and BI.

3.2.1.3 Masculinity versus femininity (MAS)

The MAS dimension touches on the distribution of values between the male and female gender [33]. The genders in feminine societies have minimal emotional and social role differentiation, and both genders are expected to be modest and caring [33]. On the contrary, women in masculine countries are more assertive and competitive than women in feminine countries, but not as much as men [33]. This means that there is maximum emotional and social role differentiation between the genders [33]. Yoon [66] mentions that PU is closely related to achievements of goals and advancement, and therefore we expect the MAS dimension to have a positive effect on the relationship between PU and BI (see Hypothesis 9). Additionally, feminine values are also related to creating a comfortable and balanced (work) environment [66], [33]. Effort free use is also concerned with creating a pleasant experience, and for this reason, we argue that a lower degree of the MAS dimension results in a higher effect of PEOU on BI (see Hypothesis 10).

Hypothesis 9. A higher level of the MAS dimension has a positive modification effect on the relationship between PU and BI.

Hypothesis 10. A higher level of the MAS dimension has a negative modification effect on the relationship between PEOU and BI.

3.2.1.4 Uncertainty avoidance index (UAI)

The UAI dimension is related to society's discomfort or comfortability in structured or unstructured situations [33]. Hofstede [33] mentions that it is not the same as risk avoidance, and that uncertainty avoiding cultures try to reduce the likelihood of unstructured situations by behavioural codes, laws and rules. On the other hand, countries with weak uncertainty avoidance are more accepting

of unstructured situations [33]. Risk avoidance is not the same as uncertainty avoidance, however, according to Yoon [66], uncertainty avoidance and perceived risk may have similar effects on trust. Therefore, we argue that the higher the value of the UAI dimension, the lower the effects of T on BI are (see Hypothesis 11). Additionally, Straub *et al.* [57] argue that that the effect of PU in a higher UAI culture is weakened compared to one with a lower UAI. Therefore, we formulate Hypothesis 12.

Hypothesis 11. A higher level of the UAI dimension has a negative modification effect on the relationship between T and BI.

Hypothesis 12. A higher level of the UAI dimension has a negative modification effect on the relationship between PU and BI.

3.2.1.5 Long-term versus short-term orientation (LTO)

LTO relates to the degree that society focuses on the future. For example, countries with a higher score on this dimension tend to encourage saving money and efforts in modern education to prepare for the future [33]. On the other hand, countries that score low on this dimension, thus having a short-term orientation, gravitate towards maintaining traditions and norms while being suspicious of societal change [33]. Yoon [66] argues that long-term oriented societies encourage trust, as the future gains outweigh the short-term untrustworthy actions. Hence, we argue that a higher level of the LTO dimension results in a positive modification effect on the relationship between T and BI.

Hypothesis 13. A higher level of the LTO dimension has a positive modification effect on the relationship between T and BI.

3.2.1.6 Indulgence versus restraint (IVR)

The latest addition to the national cultural dimensions by Hofstede is the indulgence versus restraint dimension (IVR), two opposites. A society with indulgence relates to a society that allows for relatively free gratification of basic and natural human desires linked with having fun and enjoying life [33]. On the other hand, restraint relates to a society that controls this gratification through social norms [33]. As countries with a lower level on this dimension, thus indulgence, tend to remember positive emotions more likely, we argue that this positively affects the relationship between PEOU and BI. Therefore, we formulated the following hypothesis:

Hypothesis 14. A higher level of the IVR dimension has a negative modification effect on the relationship between PEOU and BI.

TABLE 4
Null hypotheses and alternative hypotheses.

Null Hypotheses	Alternative Hypotheses
$H1_0$: PU has no effect on BI.	**$H1_A$:** PU has a positive effect on BI.
$H2_0$: PEOU has no effect on BI.	**$H2_A$:** PEOU has a positive effect on BI.
$H3_0$: PEOU has no effect on PU.	**$H3_A$:** PEOU has a positive effect on PU.
$H4_0$: T has no effect on BI.	**$H4_A$:** T has a positive effect on BI.
$H5_0$: T has no effect on PU.	**$H5_A$:** T has a positive effect on PU.
$H6_0$: PEOU has no effect on T.	**$H6_A$:** PEOU has a positive effect on T.
$H7_0$: A higher level of the PDI dimension has no modification effect on the relationship between T and BI.	**$H7_A$:** A higher level of the PDI dimension has a negative modification effect on the relationship between T and BI.
$H8_0$: A higher level of the IDV dimension has no modification effect on the relationship between T and BI.	**$H8_A$:** A higher level of the IDV dimension has a negative modification effect on the relationship between T and BI.
$H9_0$: A higher level of the MAS dimension has no modification effect on the relationship between PU and BI.	**$H9_A$:** A higher level of the MAS dimension has a positive modification effect on the relationship between PU and BI.
$H10_0$: A higher level of the MAS dimension has no modification effect on the relationship between PEOU and BI.	**$H10_A$:** A higher level of the MAS dimension has a negative modification effect on the relationship between PEOU and BI.
$H11_0$: A higher level of the UAI dimension has no modification effect on the relationship between T and BI.	**$H11_A$:** A higher level of the UAI dimension has a negative modification effect on the relationship between T and BI.
$H12_0$: A higher level of the UAI dimension has no modification effect on the relationship between PU and BI.	**$H12_A$:** A higher level of the UAI dimension has a negative modification effect on the relationship between PU and BI.
$H13_0$: A higher level of the LTO dimension has no modification effect on the relationship between T and BI.	**$H13_A$:** A higher level of the LTO dimension has a positive modification effect on the relationship between T and BI.
$H14_0$: A higher level of the IVR dimension has no modification effect on the relationship between PEOU and BI.	**$H14_A$:** A higher level of the IVR dimension has a negative modification effect on the relationship between PEOU and BI.

The hypotheses in Table 4 will be tested as one-tailed hypotheses, which means that we expect the independent variable only either to have a negative or positive effect on the dependent variable. For example, with the alternative Hypothesis 1, it is expected that when the mean of perceived usefulness increases, the mean of the behavioural intention to use also increases.

3.3 Research design

The following section highlights our research design that is the guiding framework for this study. A predetermined research design that is applied consistently assists in improving the reliability of our study. This section discusses the research approach and the survey design.

3.3.1 Research approach

Phenomena can be studied in two ways, namely through quantitative and qualitative research. Garbarino & Holland [19] mention that "qualitative" and "quantitative" refer to the type of data collected. Quantitative research produces data in the form of numbers, whereas qualitative research produces data stated in textual forms [19]. The standard for testing TAM is through quantitative deductive analysis, specifically through factor analysis to test the various relationships between the model. Additionally, a quantitative analysis enables us to gather data on a larger population, which allows us to include as many nationalities as possible to measure the national cultural influences on the technology acceptance of neobanks. Therefore, in this study, we perform a quantitative deductive analysis. We obtain the values for the national cultural dimensions per country from the Hofstede website as of May 2021 [70]. These are not measured per person as these are societal levels. Finally, the remaining items of the TAM are collected through the use of a survey.

3.3.2 Survey

The theoretical constructs mentioned in the conceptual model section – BI, PU, PEOU, and T – are all operationalized using validated items from prior research. We slightly alter the items to fit the topic, however the main concepts of the items remain. The constructs and the questions can be seen in Table 5. All of the questions within all of the constructs, apart from trust, are based on validated items from the original creators of the technology acceptance model – namely Davis & Venkatesh [13], most technology acceptance model studies use these questions or slightly altered questions. Additionally, we add the relevant and validated items to the PU and PEOU constructs from the study from Gefen *et al.* [20]. As previously mentioned Gefen *et al.* [20] modified the existing TAM to incorporate trust for measuring customer acceptance in online shopping. Their validated items are taken into consideration for this study.

Hinkin [32] finds that reverse scoring items reduce the validity of questionnaire response, and could lead to systematic errors to a scale. Additionally, reverse-scored items are typically employed by researchers to weaken pattern bias, however, item loadings for reverse-scored items were found to be lower than positively worded items that loaded on the same factor [32]. For this reason, we design our survey in a way that it does not reverse-score items. Furthermore, Hinkin [32] finds that the coefficient alpha reliability with Likert-type scales increase up to the use of five points, and then it levels off.

Additionally, from all the studies included in the research Hinkin [32] finds that 49% uses a 5-point Likert-type scale. Therefore, the survey was designed with a 5-point Likert-type scale as it is the most frequently used scale and is at the coefficient alpha reliability threshold. The full survey can be found in Appendix A.

3.4 Data collection

3.4.1 Sample and survey participation incentive

The data in our study are collected in two ways – namely by using an online service called Amazon Mechanical Turk, and by spreading the questionnaire on social media. The reason for using the crowdsourcing platform Amazon Mechanical Turk is to have a larger distribution of nationalities in our sample for the measurement of the cultural aspect. Additionally, the gathering of data on social media will be used to achieve data triangulation.

The Amazon Mechanical Turk "workers" have received a reimbursement of €0.5 for filling in the survey. Additionally, for every entry from social media €1,- has been donated to charity. The chosen charity is ShareTheMeal, from the United Nations' World Food Programme. This charity allows a child to be fed for a day for €0.8 and offers complete transparency as to where the meals are distributed. This charity was chosen as I personally value it, and the assumption is made that most other individuals do too. In total, €105,- were donated, equalling 150 meals for children.

TABLE 5
Constructs and the relevant survey questions.

Construct	Question
Behavioural intention to use (BI)	(Davis & Venkatesh [13])
BI1	Assuming I have access to a neobank, I intend to use it.
BI2	Given that I have access to the system, I predict that I would use it.
BI3	I will frequently use the services provided by a neobank.
Perceived usefulness (PU)	(Davis & Venkatesh [13]; Gefen *et al.* [20])
PU1	Using a neobank enables me to utilise banking services more quickly.
PU2	Using a neobank improves my performance of utilizing banking services.
PU3	Using a neobank for my banking services increases my productivity.
PU4	Using a neobank makes it easier for me to utilise banking services.
PU5	I find the neobank to be useful for me to utilise banking services.
PU6	Using a neobank helps me to save money.

Perceived ease of use (PEOU)	(Davis & Venkatesh [13]; Gefen *et al.* [20])
PEOU1	Learning to use the services by a neobank is easy for me.
PEOU2	My interaction with the neobank is clear and understandable.
PEOU3	I find a neobank to be flexible to interact with.
PEOU4	It would be easy for me to become skilful at using the services of a neobank.
PEOU5	I find the services of a neobank easy to use.
Trust (T)	(Gefen *et al.* [20])
T1	Based on my experience with the neobank in the past, I know it is honest.
T2	Based on my experience with the neobank in the past, I know it cares about customers.
T3	Based on my experience with the neobank in the past, I know it is not opportunistic.
T4	Based on my experience with the neobank in the past, I know it is predictable.
T5	Based on my experience with the neobank in the past, I know it is trustworthy.

3.4.2 Sample description

3.4.2.1 Sample size

The original dataset had a sample size of n=273, however due to two cases being dropped because of missing Hofstede dimension values the sample size used in the analysis came down to n=271. Out of the 271 respondents, 105 came through organic sources (e.g., LinkedIn, WhatsApp, Reddit) whereas the other 166 came through the Amazon Mechanical Turk paid source.

TABLE 6
Descriptive statistics of respondents' characteristics.

Measure	Value	Frequency	Percent
Gender	Male	200	73.8
	Female	69	25.5
	Other	2	0.7
Age	25 or below	93	34.3
	Above 25	178	65.7
Previously used a neobank	Yes	240	88.6
	No	31	11.4

3.4.2.2 Gender

The distribution of the respondents' gender is not entirely balanced (see Table 6), with 200 male respondents, and 69 female respondents, two other cases identified as "other". The gender distribution should theoretically not impact the research, as we do not account for individualistic characteristics in our analysis.

3.4.2.3 Age

The average age of the participants was 30.04 years old, with a median age of 29. Furthermore, the standard deviation of age is 8.173 years. The age within the sample ranges from 17 to 71, thus having a range of 54 years. The histogram shows that the age group is relatively normally distributed (see Appendix B). The exact frequencies for the age of the respondents can be found in the appendices (see Appendix C).

3.4.2.4 Country of nationality and the distribution of the Hofstede dimensions

As mentioned before, we removed two cases from the analysis due to missing Hofstede values. These two cases were from Costa Rica and The Federated States of Micronesia. The major contributors are India with 94 respondents (34.7%), the United States of America with 63 respondents (23.2%), the United Kingdom with 62 respondents (22.9%), and the Netherlands with 17 respondents (6.3%). With the other nationalities having fewer than ten respondents (see Appendix D).

The distribution of the Hofstede dimensions is depicted below in Table 7. Each of the Hofstede dimensions ranges on a 0-100 scale. We distribute the dimensions into three categories (low, medium, and high) for descriptive purposes. As can be seen, most of the dimensions tend to have most cases in the medium category. Furthermore, the respondents' values of PDI, IDV, and UAI have more cases in the high category than the low category. For the LTO and IVR dimensions this is the opposite, as they have more cases in the low category compared to the high category. The MAS dimension leftover cases from the medium category are relatively evenly spread over the low and high categories.

TABLE 7
Distribution of Hofstede's [33] dimensions in three categories.

	Low 0-≤30	Medium >30-70<	High ≥70-100
PDI	1	172	98
IDV	4	112	155
MAS	17	244	10
UAI	0	241	30
LTO	66	198	7
IVR	104	165	2

3.4.2.5 Previous use

Out of the 271 respondents, 240 indicated that they had previously used a neobank, with 31 not having used a neobank before (see Table 6). The users who have not used a neobank before were considered in our research, as these consumers' perceptions of neobanks still matter for the overall customer acceptance of neobanks.

3.5 Data analysis

We analyse the data using using partial least squares path modelling (PLS-SEM) in the program SmartPLS. We remove two cases from two different countries with missing Hofstede values, as SmartPLS cannot ignore missing values, and having imputed values can skew our results.

SmartPLS has the ability to calculate interaction effects in various ways, namely the product-indicator, the two-stage, and the orthogonalisation approach. Henseler *et al.* [28] mention that a two-stage approach should be employed. According to Fassott *et al.* [17], in the first stage, the PLS path model is run to obtain the construct scores. These construct scores are then extracted. In the second stage, the interaction term is created by multiplying the construct scores. This interaction term is then inserted as an independent variable and used in a multiple regression on the construct scores of the dependent variable [17]. For SmartPLS, this is all done automatically in the background as opposed to other applications. Therefore, there is a reduced risk of manual error in this part of the analysis.

Following the regression analysis, we analyse the goodness of model fit for both the measurement and structural model. Furthermore, the constructs are operationalized as reflective measurement models, as the reflective measurement model assumes that the covariation among the indicators can be explained by the reflective variable, as opposed to that the indicators build a construct together. We assess these reflective measurement models on construct reliability, convergent validity, discriminant validity, and indicator reliability. Lastly, we test the hypotheses mentioned in Table 4 by looking at the path coefficients, the indirect effects, the effect sizes, and the coefficients of determination.

4. RESULTS

This chapter focuses on the results of the data analysis. We use the results to answer the third and fourth sub-question, which helps answer the central research question. First, we assess the model fit and reflective measurement models before diving into the path coefficients and effect sizes. Lastly, we examine the unadjusted and adjusted correlation coefficients.

Three assumptions must be met to use PLS-SEM. Namely, we must have an appropriate sample size, no uncoded categorical variables, and no isolated constructs [29]. Cohen's [9] power analysis table is utilised to determine an appropriate sample size, where the effect size, the power, the significance level, and the number of independent variables are considered. Taking nine independent variables with a moderate effect size at an alpha level of 0.05 into account, the sample size should be more than n=107. The sample size for our research exceeds that by 164 respondents (n=271). Furthermore, there are no categorical variables, and all constructs are connected with at least one other construct.

We divide the Hofstede [33] dimensions into three categories for descriptive purposes. These three categories (low, medium, and high) are used to calculate the mean and standard deviation values per indicator (see Appendix E). The standard deviations across the categories are similar to each other, unless a category contains few cases. The mean of the indicators is relatively high, seeing as a 1-5 Likert-type scale was used. Furthermore, some clear trends can be seen in the data, such as the IVR dimension having consecutive higher means from low to high categories when looking at the BI and PEOU indicators, indicating positive relationships.

4.1 Assessing model fit and reflective measurement models

4.1.1 Assessing the model fit

The first thing that should be assessed before examining the measurement and structural model is the goodness of fit. This determines how well a statistical model fits a set of observations. Two types of models must be examined, namely the saturated model and the estimated model. According to Benitez *et al.* [6], the saturated model allows all of the constructs to be freely correlated, whereas the estimated model is the model specified by the researcher. Three discrepancy measures can be considered. These can contain various outcomes, however should all be analysed to promote transparency [28]. The three discrepancy measures are the following: the standardised root mean squared residual (SRMR), the unweighted least squares discrepancy (d_{uls}), and the geodesic discrepancy (d_g) [29].

The SRMR was introduced by Henseler *et al.* [27] as a measure for approximate model fit. A value of 0 would indicate a perfect model fit. According to Henseler [28] the SRMR value should be below the threshold of 0.08. This is based on the recommendations by Hu and Bentler [35] who

recommended this threshold, however they also mention a 0.10 threshold when being more conservative. The equation for SRMR as stated by Hu & Bentler [36] can be seen in Equation 1, where; p = number of observed variables, s_{ij} = observed covariances, $\hat{o}_{ij}$ = the reproduced covariances, s_{ii} and s_{jj} are the observed standard deviations.

$$\text{SRMR} = \sqrt{\left\{ 2\sum_{i=1}^{p}\sum_{j=1}^{i}\left[\left(s_{ij} - \hat{o}_{ij}\right) / \left(s_{ii}s_{jj}\right)\right]^{2} \right\} \div\ p(p+\ 1)} \quad (1)$$

Limited information is available surrounding the usefulness, behaviour, relevance, and application of exact model fit criteria. We use bootstrap confidence interval results to estimate the exact model fits, and these are recommended to be below the 95% or 99% quantile [29]. This method can be applied to the bootstrap confidence interval of SRMR, however also of the d_{uls} and d_g [14]. d_{uls} and d_g are two approaches to quantify how much the empirical correlation matrix differs from the model-implied correlation matrix [28]. We interpret these values against the confidence intervals, as solely these values cannot be interpreted [29]. Klesel *et al.* [39] mention the distance functions depicted in Equation 2 and Equation 3, where; K = number of rows from one of the correlation matrices, $\sigma_{ij,1}$ and $\sigma_{ij,2}$ are elements of the respective correlation matrix, and φ_i = the i-th eigenvalue of the correlation matrix.

$$d_{uls} = \frac{1}{2}\sum_{i=1}^{K}\left(\sigma_{ij,1} - \sigma_{ij,2}\right)^{2} \quad (2)$$

$$d_g = \frac{1}{2}\sum_{i=1}^{K}\ln(\varphi_i)^{2} \quad (3)$$

The saturated and estimated model fit prior to the removal of indicators are shown in Table 8. Due to indicator reliability, we removed several indicators, this is discussed in section 4.1.2.4. The model fit greatly improved after removing the indicators, which can be seen in Table 9. The SRMR was initially above the 0.08 threshold for both the saturated and estimated model, but below the more lenient 0.10 threshold. After we remove the indicators, the SRMR was 0.07 for the saturated model which is below the recommended threshold of 0.08, and 0.082 for the estimated model which is slightly above the 0.08 threshold but below the 0.10 threshold. Thus, the SRMR indicates a relatively good model fit. When using bootstrapped confidence intervals to determine the exact model fit, all of the values are above the 99% confidence interval, thus indicating a bad model fit. We also attempt to remove non-

neobank users from the analysis, however this did not improve either the approximate or exact model fit. Sarstedt *et al.* [54] mention that researchers should be cautious when reporting and using model fit in PLS-SEM, as the criteria are in the early stages of research. For this reason, we decided to continue with our research despite not meeting the exact model fit criteria.

TABLE 8
Saturated and estimated model fit prior to the removal of indicators.

	Goodness of Model Fit (Saturated Model)			Goodness of Model Fit (Estimated Model)		
	Value	HI95	HI99	Value	HI95	HI99
SRMR	0.086	0.052	0.055	0.099	0.059	0.061
d_{uls}	2.390	0.082	0.970	3.173	1.123	1.216
d_g	0.579	0.351	0.375	0.647	0.386	0.423

TABLE 9
Saturated and estimated model fit after the removal of indicators.

	Goodness of Model Fit (Saturated Model)			Goodness of Model Fit (Estimated Model)		
	Value	HI95	HI99	Value	HI95	HI99
SRMR	0.070	0.048	0.050	0.082	0.056	0.060
d_{uls}	1.024	0.481	0.527	1.422	0.648	0.754
d_g	0.395	0.253	0.273	0.452	0.288	0.324

4.1.2 Assessing the reflective measurement models

4.1.2.1 Construct reliability

SmartPLS allows for the assessment of construct reliability, or composite reliability, through various measures — Cronbach's Alpha, Dijkstra-Henseler's rho_A, and composite reliability. These values range between 0 and 1, and a higher value indicates better reliability. According to Benitez *et al.* [6], Dijkstra-Henseler's rho (ρ_A) should be used. Dijkstra & Henseler [15] denote the equation for ρ_A as seen in Equation 4, where; $\hat{w}$ = the estimated weight vector of the latent variable, $\hat{w}'$ = the number of indicators directly associated with the latent variable in $\hat{w}$, and S = the empirical covariance matrix of the respective indicator.

$$\rho_A = (\hat{w}'\hat{w})^2 * \frac{\hat{w}'\left(S - diag\,(S)\right)\hat{w}'}{\hat{w}'\left(\widehat{\hat{w}\hat{w}'} - diag(\widehat{\hat{w}\hat{w}'})\right)\hat{w}} \quad (4)$$

TABLE 10
Evaluation of the reflective measurement models.

Code	Construct / Indicator	ρ_A	AVE	Weight	Loading
	Behavioural intention to use (BI) (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: BI1)	0.765	0.671		
BI1	Assuming I have access to a neobank, I intend to use it.			0.455***	0.863***
BI2	Given that I have access to the system, I predict that I would use it.			0.402***	0.798***
BI3	I will frequently use the services provided by a neobank.			0.361***	0.794***
	Perceived usefulness (PU) (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: PU1)	0.794	0.465		
PU1	Using a neobank enables me to utilise banking services more quickly.			0.304***	0.761***
PU2	Using a neobank improves my performance of utilizing banking services.			0.281***	0.755***
PU3	Using a neobank for my banking services increases my productivity.			0.180***	0.633***
PU4	Using a neobank makes it easier for me to utilise banking services.			0.241***	0.710***
PU5	I find the neobank to be useful for me to utilise banking services.			0.281***	0.731***
PU6	Using a neobank helps me to save money.			0.149***	0.451***
	Perceived ease of use (PEOU): (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: PEOU1)	0.803	0.558		
PEOU1	Learning to use the services by a neobank is easy for me.			0.270***	0.750***
PEOU2	My interaction with the neobank is clear and understandable.			0.276***	0.766***
PEOU3	I find a neobank to be flexible to interact with.			0.254***	0.683***
PEOU4	It would be easy for me to become skilful at using the services of a neobank.			0.265***	0.756***
PEOU5	I find the services of a neobank easy to use.			0.273***	0.778***
	Trust (T): (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: T1)	0.874	0.591		
T1	Based on my experience with the neobank in the past, I know it is honest.			0.354***	0.824***
T2	Based on my experience with the neobank in the past, I know it cares about customers.			0.292***	0.802***
T3	Based on my experience with the neobank in the past, I know it is not opportunistic.			0.159***	0.708***
T4	Based on my experience with the neobank in the past, I know it is predictable.			0.154***	0.662***
T5	Based on my experience with the neobank in the past, I know it is trustworthy.			0.312***	0.832***

Note: *p < 0.05, **p <0.01, ***p < 0.001 (lower p-values indicate greater confidence of the statistical test), one-tailed t-test (t-values in appendix F, df=239)

A value greater than 0.707 is desirable as this indicates that the latent variable can explain over 50% of the variance in the construct scores. The values for ρ_A can be seen in Table 10 before the removal of the indicators and in Appendix G after the removal of the indicators. In both instances, all the values are above 0.707, thus above the recommended threshold. The other two measures were also taken into consideration and show identical results. These values indicate reliable constructs.

4.1.2.2 Convergent validity

Convergent validity measures the degree to which indicators that measure the same construct are related [6]. The average variance extracted (AVE) is typically used to measure the convergent validity [6]. The AVE shows how much of the variance in the indicators can be explained by the latent variable [6]. A value of 0.5 is suggested by Benitez *et al.* [6] as this means that the latent variable can explain 50% of the variance in an indicator. Henseler *et al.* [30] state the formula seen in Equation 5, where; ξ_j = the construct, λ_{jk} = the indicator loading, K_j = the number of indicators of the construct, and Θ_{jk} = the error variance of the k^{th} indicator. The values from BI, PEOU, and T are above the 0.5 recommended value, however PU is below this value before removing several indicators. After the removal of several indicators, all of the values are above the 0.5 threshold, indicating good convergent validity.

$$AVE\xi_j = \frac{\sum_{k=1}^{K_j} \lambda_{jk}^2}{\sum_{k=1}^{K_j} \lambda_{jk}^2 + \Theta_{jk}} \tag{5}$$

4.1.2.3 Discriminant validity

Discriminant validity measures whether or not reflective variables are different enough to represent two theoretical concepts [6]. Benitez *et al.* [6] and Henseler *et al.* [30] mention that the heterotrait-monotrait ratio (HTMT) should be used to assess discriminant validity, instead of the similar Fornell-Larcker criterion. Henseler *et al.* [30] state Equation 6, where; $\xi_j$and ξ_i are two different constructs, and $K_j$and K_i are respectively the indicators for these constructs.

$$\mathrm{HTMT}_{ij} = \frac{1}{K_i\, K_j} \sum_{g=1}^{K_i} \sum_{h-1}^{K_j} r_{ig,jh} \div \left(\frac{2}{K_i\,(K_i - 1)} * \sum_{g=1}^{K_i} \sum_{h-1}^{K_j} r_{ig,ih} * \frac{2}{K_j\,(K_j - 1)} * \sum_{g=1}^{K_i} \sum_{h-1}^{K_j} r_{jg,jh} \right) \tag{6}$$

The value should be below 0.85 or 0.90 [6], [30]. The 0.85 value is stricter than the more lenient value of 0.90 [6], [30]. The HTMT values before the removal of indicators can be found in Table 11.

As can be seen, only PEOU and BI have a value greater than 0.9. PU and BI, and PU and PEOU have a value greater than 0.85. The values after the removal of the indicators can be found in Appendix H. The three previous values are now above 0.9. Additionally, one can look at the bootstrapped values, these should be and are lower than 1 [29]. The values above 0.9 can be taken with a grain of salt because discriminant validity is only relevant to constructs that are similar to each other, which is not the case for the constructs violating the HTMT criteria — BI and PU, BI and PEOU, PU and PEOU.

TABLE 11
Heterotrait-monotrait ratio prior to the removal of indicators.

	BI	PU	PEOU
BI	-	-	-
PU	0.855	-	-
PEOU	0.906	0.879	-
T	0.511	0.663	0.623

4.1.2.4 Indicator reliability

Finally, the indicator reliability should be examined. According to Hair *et al.* [26] indicator reliability is the degree to which a set of indicators are internally consistent with their measurements. Benitez *et al.* [6] mention that the unsquared factor loadings should be above 0.707, and the squared factor loadings above 0.499. The unsquared factor loadings can be seen in Table 10.

Initially, PU3, PU6, PEOU3, and T4 are below the recommended threshold. Additionally, after removing T4, T3 had a value below 0.707, and was therefore removed. We removed the indicators following a stepwise approach by starting at the lowest loadings, as the loadings are recalculated after each removal. The removal of the indicators vastly improved the model fit, the AVE, and the construct reliability. However, it slightly worsened the discriminant validity as mentioned before. Furthermore, in both instances the factors are significant at 0.001. The factor loadings, AVE and ρA after the removal of these indicators can be seen in Appendix G.

4.2 Assessing structural model and interpretation

4.2.1 Path coefficients and effect sizes

In the previous chapter, the method, fourteen null hypotheses and alternative hypotheses were formulated. These hypotheses will be tested in accordance with the path coefficients and the confidence intervals. Path coefficients are standardised regression coefficients. The path coefficients indicate the change in standard deviations of the dependent variable when an independent variable increases by one

standard deviation while also keeping all other constructs unchanged [6], [28]. One can look at the t-values to determine the significance, however one can also look at the 95% confidence interval. When this does not cross the zero mark, there is at least a significant effect at an alpha level of 0.05 [6]. However, the t-values are easier to interpret and will mainly be referred to.

TABLE 12
Path coefficients and effect sizes.

Relationship	Path coefficients	Cohen's f^2
H1 | PU --> BI	0.321*** (4.505) [0.199, 0.435]	0.103
H2 | PEOU --> BI	0.329*** (4.194) [0.194, 0.451]	0.097
H3 | PEOU --> PU	0.613*** (12.043) [0.526, 0.693]	0.588
H4 | T --> BI	0.171** (2.632) [0.071, 0.288]	0.037
H5 | T --> PU	0.198*** (3.419) [0.104, 0.292]	0.061
H6 | PEOU --> T	0.537*** (11.992) [0.469, 0.612]	0.406
H7 | PDI * T --> BI	-0.157 (1.021) [-0.360, 0.131]	0.014
H8 | IDV * T --> BI	-0.240 (1.445) [-0.484, 0.042]	0.026
H9 | MAS * PU --> BI	-0.050 (0.588) [-0.146, 0.122]	0.005
H10 | MAS * PEOU --> BI	0.012 (0.132) [-0.152, 0.140]	0.000
H11 | UAI * T --> BI	-0.056 (0.989) [-0.139, 0.040]	0.005
H12 | UAI * PU --> BI	0.043 (0.771) [-0.040, 0.138]	0.004
H13 | LTO * T --> BI	-0.036 (0.595) [-0.128, 0.069]	0.003
H14 | IVR * PEOU --> BI	-0.055 (0.860) [-0.149, 0.064]	0.004

Note: *p < 0.05, **p <0.01, ***p < 0.001 (lower p-values indicate greater confidence of the statistical test), one tailed t-test values in parentheses, 95% bootstrap percentile confidence intervals in brackets.

Besides the path coefficients, the effect sizes are also shown in Table 12. Cohen's [10] f^2 equal or greater than 0.35 indicates a strong effect, equal or greater than 0.15 and less than 0.35 a moderate effect, equal or greater than 0.02 and less than 0.15 a weak effect, and less than 0.02 an unsubstantial effect [28].

As can be seen in Table 12, hypotheses H1, H2, H3, H5, and H6 are significant at an alpha level of 0.001. Whereas hypothesis H4 is significant at an alpha level of 0.01. The path coefficient for PU on BI is 0.321, meaning that BI moves 0.321 standard deviations when PU moves one standard deviation. Furthermore, it has a weak effect size ($f^2 = 0.103$). PEOU on BI has a path coefficient of 0.329 and has a weak effect size ($f^2 = 0.097$). PEOU on perceived usefulness PU has a path coefficient of 0.613 and a strong effect size ($f^2 = 0.588$). The path coefficient of T on BI is 0.171 and has a weak effect size ($f^2 = 0.037$). Furthermore, T on PU also has a weak effect size ($f^2 = 0.061$). and a path

coefficient of 0.198. Lastly, PEOU on T has a path coefficient of 0.537 and a strong effect size ($f^2 = 0.406$). We have enough statistical evidence to reject null hypotheses $H1_0$, $H2_0$, $H3_0$, $H4_0$, $H5_0$, and $H6_0$.

Additionally, all the interaction effects by the Hofstede dimensions are insignificant at an alpha level of 0.05. Furthermore, the effect sizes across hypotheses H7 throughout H14 are all unsubstantial. This means that there is not enough statistical evidence to reject the null hypotheses and allows us to assume that the Hofstede dimensions do not have an interaction effect on either of the independent variables (PU, PEOU, and T) on behavioural intention to use (BI). The hypotheses and the respective significance, direction, and effect size are summed up below:

H1: PU has a significant (at .001 alpha) positive weak (f^2= 0.103) direct effect on BI.
H2: PEOU has a significant (at .001 alpha) positive weak (f^2= 0.097) direct effect on BI.
H3: PEOU has a significant (at .001 alpha) positive strong (f^2= 0.588) direct effect on PU.
H4: T has a significant (at .01 alpha) positive weak (f^2= 0.037) direct effect on BI.
H5: T has a significant (at .001 alpha) positive weak (f^2= 0.061) direct effect on PU.
H6: PEOU has a significant (at .001 alpha) positive strong (f^2= 0.406) direct effect on T.
H7: PDI*T has an insignificant negative unsubstantial (f^2= 0.014) direct effect on BI.
H8: IDV*T has an insignificant negative weak (f^2= 0.026) direct effect on BI.
H9: MAS*PU has an insignificant negative unsubstantial (f^2= 0.005) direct effect on BI.
H10: MAS*PEOU has an insignificant positive unsubstantial (f^2= 0.000) direct effect on BI.
H11: UAI*T has an insignificant negative unsubstantial (f^2= 0.005) direct effect on BI.
H12: UAI*PU has an insignificant positive unsubstantial (f^2= 0.004) direct effect on BI.
H13: LTO*T has an insignificant negative unsubstantial (f^2= 0.003) direct effect on BI.
H14: IVR*PEOU has an insignificant negative unsubstantial (f^2= 0.004) direct effect on BI.

4.2.2 R^2 and adjusted R^2

Finally, we inspect the unadjusted and adjusted coefficients of determination. The coefficients of determination indicate how much variance can be explained in a dependent variable by an independent variable [28]. Whereas the unadjusted R^2 does not take the sample size or the number of independent variables into consideration, the adjusted R^2 does [28]. The latter is most often used in more complex models and will always be lower. Both coefficients of determination will be denoted, however as this model is complex, the adjusted R^2 should be considered.

The unadjusted R^2 of BI is 0.647, and the adjusted R^2 is 0.623. This means that either 64.7% or 62.3% of the variance in BI can be explained by PU, PEOU, and T.

Furthermore, the unadjusted and adjusted R^2 of PU is respectively 0.545 and 0.542, which means that 54.5% or 54.2% can be explained by the independent variables PEOU and T.

Lastly, the coefficients of determination for T are 0.289 (unadjusted R^2), and 0.286 (adjusted R^2). Therefore, connoting that 28.9% or 28.6% of the variance can be explained by PEOU.

A graphical representation of the model can be found in Figure 5, which condenses the results. This figure shows the loadings for the factors, the path coefficients and p-values for the inner model, and the adjusted R^2 for the constructs if applicable.

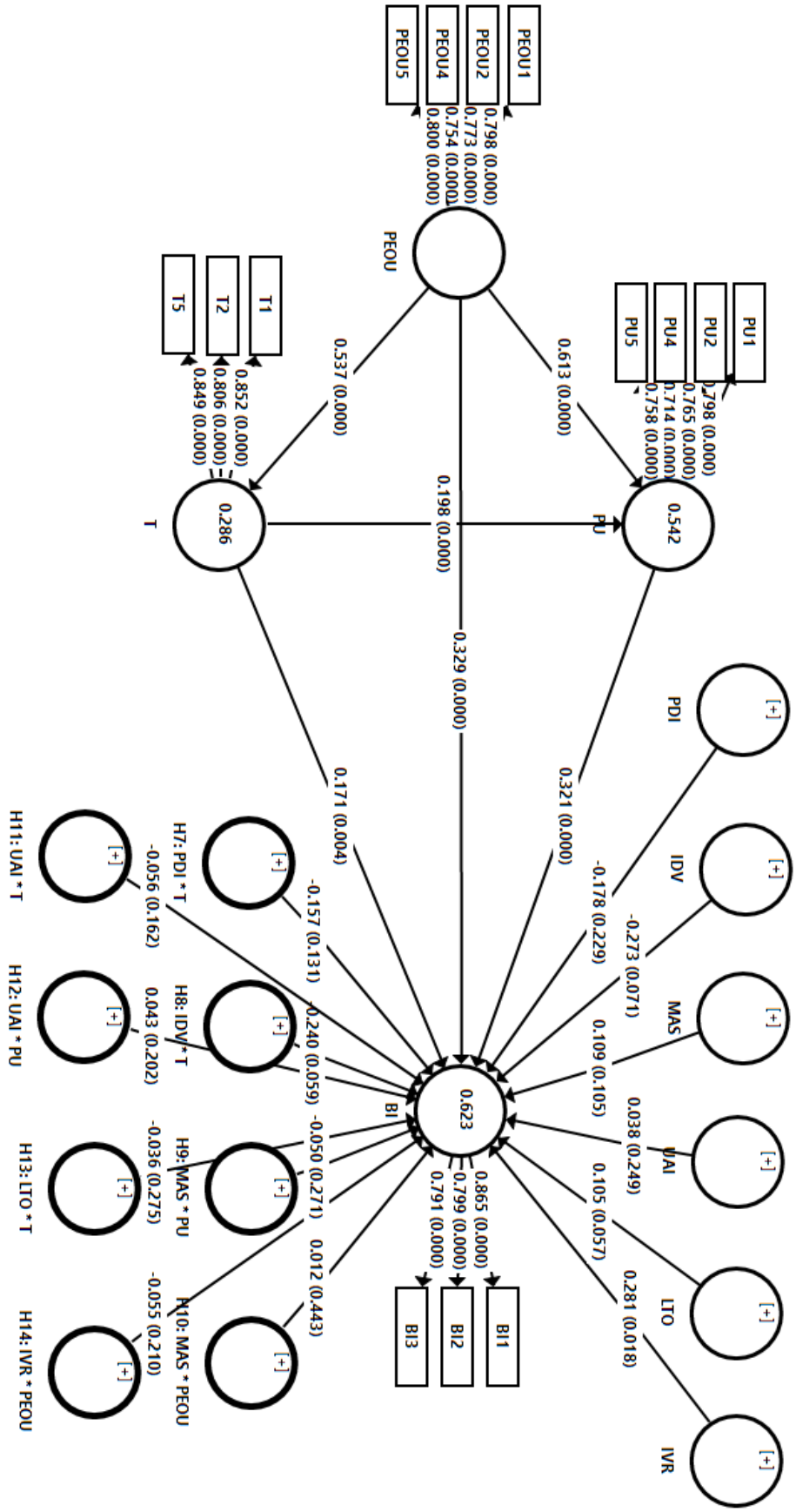

Figure 5. Inner model (path coefficients and p-values), outer model (loadings and p-values), and constructs (adjusted R^2).

5. DISCUSSION & CONCLUSIONS

In this chapter, the main findings of our thesis are summarised and discussed. We first restate the motivation of our thesis and summarise the main findings by answering the central research question in accordance with the sub-questions. Afterwards, the practical and theoretical implications are discussed. Finally, we present the limitations of our research and the directions for possible future research.

5.1 Discussion of main findings

Neobanks are a relatively novel and disruptive force in the financial services industry, specifically the banking sector. A better comprehension of customer acceptance will help to identify the aspects that neobanks and their competitors should consider for strategic decision-making about their business model. Additionally, the proportion of consumers banking with a neobank vastly differs per country. For example, in China, 93 per cent of consumers banked with neobanks in 2020, whereas in the Netherlands and Germany this was 4 per cent [68]. Understanding whether national cultural differences impact customer acceptance is essential and will help neobanks analyse new market opportunities. For these reasons, we formulated the following central research question in Chapter 1:

CRQ: *"What is the customer acceptance of neobanks across national cultures?"*

To answer the above central research question, we formulated four sub-questions in Chapter 1. The sub-questions are revisited to systematically summarise and discuss the main findings. The first sub-question aims to describe the defining characteristics of neobanks and we conduct a systematic literature review in Chapter 2 to obtain the information to answer this sub-question. The sub-question is as follows:

SQ1: *"What are the defining characteristics of neobanks?"*

Our systematic literature review shows that three factors contributed to the emergence of neobanks: the changing economic and regulatory landscape following the financial crisis of 2008, the rapidly evolving technology environment, and the increased customer expectations . Furthermore, our systematic literature review identifies that neobanks entertain no physical branches and are independent of incumbents. As there is no clear definition of neobanks, we propose the following holistic definition: *"Neobanks are financial institutions with no physical branches that operate independently from traditional banks.* These characteristics can carry forth several advantages and disadvantages. To inspect these advantages and disadvantages, we formulated the following sub-question:

SQ2: *"What are the advantages and disadvantages of neobanks compared to their competitors?"*

The first advantage for neobanks is that they are typically not bound to expensive outdated legacy systems as opposed to incumbents, allowing for faster technology deployment compared to incumbents. Secondly, the efficient IT processes neobanks employ, the elimination of physical branches and the reduction of employees on these locations result in reduced operating costs compared to traditional banks. These lower operating costs allow for the ability to operate a favourable overall cost-leadership business model, where customers are offered reduced prices and higher interest rates. The last advantage of neobanks is the lower barrier of entry because of the possibility of outsourcing IT infrastructure with cloud services, opting for simplified regulation by partnering with a traditional bank, or solely offering products and services that are not heavily regulated. One of our recommendations to traditional banks is to heavily invest in moving away from inflexible and outdated legacy systems. Although this may seem expensive and complex at first, up-to-date systems come with many advantages. It allows for faster technology deployment, helping traditional banks adjust to changing consumer demands by taking a fast and flexible approach. Additionally, more efficient IT processes lead to reduced operating costs. Finally, these reduced costs allow for lower pricing strategies, which consumers favour.

However, besides these advantages, neobanks also encounter two dominant disadvantages. On the one side, due to the often chosen overall cost-leadership business model, they require a large customer base to be profitable. On the other side, neobanks struggle with the building of consumers' trust. The lack of reputation and brand awareness of neobanks causes customers to stick with traditional banks. Consumers tend to view conventional banks as safer and are more sceptical towards FinTech start-ups. As a result, neobanks struggle to establish trust with potential customers. Therefore, we integrated the impact of trust on the customer acceptance of neobanks into the conceptual model that we research through the third sub-question:

SQ3: *"Does national culture impact the customer acceptance of neobanks when applied on the chosen technology acceptance model?"*

We inspect the impact of national cultures on the customer acceptance of neobanks through a quantitative analysis using partial least squares structural equation modelling with a sample size of n=271. The original technology acceptance model by Davis [11] is typically used to measure the customer acceptance. This original model consists of three constructs: perceived ease of use, perceived usefulness, and the behavioural intention to use. We modify the original technology acceptance model by adding the construct trust, and the Hofstede dimensions — power distance index, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance index, long-term versus short-term orientation, and indulgence versus restraint (see Table 3) — as separate constructs to measure for the national cultural effect on the customer acceptance. Figure 6 shows the hypotheses and their respective rejection status.

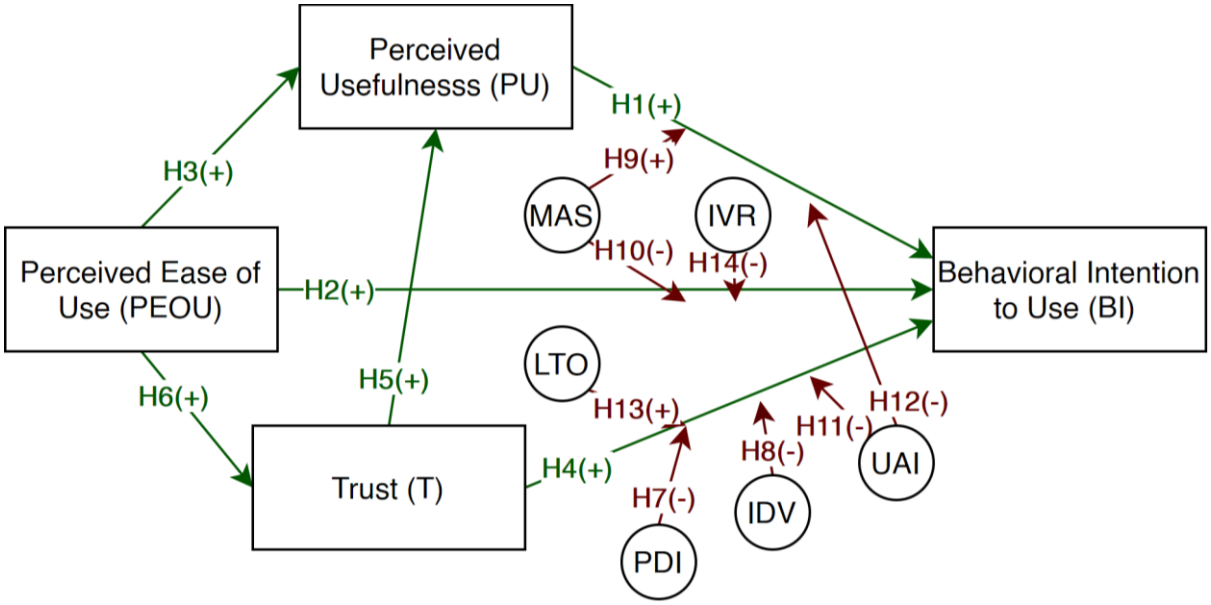

Figure 6. Conceptual framework and the rejected (green) and unrejected (red) null hypotheses.

First, we test the original technology acceptance model on neobanks through hypotheses H1, H2, and H3. The data show that perceived usefulness and perceived ease of use both have a significant direct effect on the behavioural intention to use a neobank, although weak. Additionally, perceived ease of use has a significant strong effect on perceived usefulness. The significant effects mean that we have enough statistical evidence to reject the null hypotheses. Therefore, we believe that the original technology acceptance model applies to neobanks.

Secondly, we find in our systematic literature review that building trust is considerably more difficult for neobanks. For this reason, we incorporated trust into the conceptual model. Gefen *et al.* [20] previously managed to successfully incorporate trust in the technology acceptance model. Hypotheses H4, H5, and H6 aim to explore the relationship between trust and the three constructs of the original technology acceptance model. All three hypotheses are significant, and therefore we have enough statistical evidence to reject the null hypotheses: the results entail that trust has a significant and positive weak effect on the behavioural intention to use neobanks and the perceived usefulness of neobanks. Additionally, trust has a significant strong effect on the perceived ease of use. Firstly, we argue that trust reduces social complexity and thus increases the behavioural intention to use a neobank [20]. Secondly, Gefen *et al.* [20] mention that information technology that cannot be trusted will reduce perceived usefulness, explaining the significant effect of trust on the perceived usefulness. Lastly, unnecessarily hard to use information technology can indicate that organisations are incapable or might not care about their business [20]. Thus, explaining the significant effect of perceived ease of use on trust found in our study.

Furthermore, we examined the interaction effects of the Hofstede dimensions in hypotheses H7 throughout H14. These hypotheses were formulated based on a previous study by Yoon [66], where the

moderation effects of the Hofstede dimensions are applied to the technology acceptance of e-commerce. The Hofstede dimensions show no significant interaction effects in our study, and thus we have no statistical evidence to reject any of the null hypotheses. Additionally, all the interaction effects showed unsubstantial effect sizes, apart from hypothesis H10 — the modification effect of individualistic versus collectivism dimension on the relationship between trust and the behavioural intention to use a neobank — which showed a weak effect. Therefore, based on the insignificance, with its unsubstantial and weak effect sizes, it is arguably safe to assume that national cultures do not influence the customer acceptance of neobanks. We now discuss the implications of these findings.

5.1.1 Practical implications

Now that the main findings are summarised and reviewed, what practical implications do these findings have? We will now discuss sub-question four to outline these practical implications:

SQ4: *"What are the practical implications of the results for neobanks?"*

Whereas traditional banks have been around for centuries, neobanks are still in the early stages of development, and the majority of the customers are innovators or early adopters. The most frequently seen strategy by neobanks is cost leadership through offering competitive prices, lower loan rates, and higher interest rates [56]. Consumers favour these business models, however neobanks require a large customer base for a neobank to be profitable, which is even more challenging because of the high competition in customer acquisition and retention [25], [42], [65]. Therefore, we believe it is of utmost importance for neobanks to increase the customers' behavioural intention to use their neobank.

One way for neobanks to improve customer acceptance is through improving the perceived usefulness of their services and products. Because neobanks are not bound to outdated legacy systems, we recommend them to leverage the agility when it comes to operations and technology deployment, allowing neobanks to quickly adapt to changing customer needs [52], [63]. Finally, neobanks currently offer superior technology over traditional banks, and we suggest that neobanks keep investing in technology to stay ahead of the competition.

Arguably the most crucial factor in increasing customer acceptance is for neobanks to focus on improving customers' perceived ease of use. We have shown that perceived ease of use has the most substantial effect on customers' behavioural intention to use neobanks. In addition, our literature review found that customers — mainly the younger demographic — have become frustrated with the outdated user experience offered by incumbents [5], [59], [61], [63]. Therefore, we suggest neobanks continue promoting clear, understandable, and easy to use services to maintain a competitive advantage and increase the consumers' intention to use their neobank.

Additionally, we found that building trust is a disadvantage for neobanks, simply because trust is built on personal relationships and time, and digital platforms are perceived to be riskier [60], [61].

As previously mentioned, trust had a positive weak effect on the behavioural intention to use a neobank. To overcome this disadvantage, we advise neobanks to actively promote trust by having transparent and straightforward user interfaces and interactions with their customers. An example of how neobanks can promote transparency is by respecting consumers' control over privacy by being transparent surrounding the collection and use of consumer data [61]. As neobanks are in the relatively early stages, we believe that time is needed for the majority of consumers to become acquainted and comfortable with the new banking environment. After all, early adopters are dissimilar in the risk propensity compared to later adopters [18].

If neobanks that follow the cost leadership strategy still have difficulties building a large customer base and turning profitable despite having followed the above recommendations, we advise them to look into alternative strategies. For example, neobanks can differentiate by offering unique services, such as peer-to-peer lending, financial advice, or facilitating stock trades. Additionally, neobanks can focus on a niche or a specific demographic. All in all, as is customary for markets that are being disrupted, we expect to see some players in the banking sector — e.g. neobanks, digital banks, and incumbents — flourish, and others struggle to stay solvent.

Finally, an integral part of this research was to see whether national cultural differences impact the customer acceptance of neobanks. No significant interaction effects are found in our research between the Hofstede dimensions and the modified technology acceptance model. Neobanks can use this information in several ways. Firstly, this indicates that neobanks do not need to change their business model across various countries to be accepted by customers, making expansions into other regions less complicated. Compared to traditional banks, neobanks can more rapidly expand due to their lean business model where no physical branches or additional employees are needed. However, the regulatory framework should also still be taken into consideration. Unlicensed neobanks are at an advantage over licensed neobanks, as they partner with incumbents to comply with regulations, which is faster than acquiring a banking licence [8], [53], [61]. However, a disadvantage is that these unlicenced neobanks can only offer a limited number of services and benefits compared to licenced neobanks, meaning that the services might not always live up to the customers' needs. Either way, we argue that neobanks do not need to alter their business model per country to increase customers' behavioural intention to use their neobanks. However, we want to accentuate that altering business models can still have other advantages, which is highly dependent on a neobank's current business model and objectives.

5.1.2 Theoretical implications

Our study has several important theoretical implications. First of all, limited literature is available on neobanks and no literature on the customer acceptance of neobanks. Our thesis aims to fill this literature gap by measuring a modified technology acceptance model. Furthermore, we have evaluated

the effect of national cultures and trust on the modified technology acceptance model. This builds on top of the original technology acceptance model and provides new insight into Yoon's modified technology acceptance model [66]. To summarise: our research (1) expands the literature on neobanks, (2) applies the technology acceptance model on neobanks, (3) provides additional insights into the interaction effects of the Hofstede dimensions on the technology acceptance model, and (4) provides additional insights on adding the construct trust to the technology acceptance model.

5.2 Limitations and future research

5.2.1 Limitations

We recognise that our study has its limitations. First, a limitation of the literature review is that no snowballing method was used, which would have resulted in a broader range of articles. The reason for not utilising this method is because the literature review is not the primary focus of our research and was performed to aid in the formulation of the method. Overall, the snowballing method would not have lead to different results, however it could have resulted in additional insights. Secondly, we did not question the participants in a controlled environment. Additionally, the participants have experiences with different neobanks, which can mean that experiences vary. This means that the results are harder to generalize. An improvement would have been to have all the participants use a determined neobank or a set of neobanks, which would be followed by the designed questionnaire. This might change the perspectives of individuals who have not used neobanks before and might more accurately measure the technology acceptance model.

Furthermore, there is a participation bias because the majority that answered were individuals that have used a neobank before. This indicates that they are less sceptical of neobanks than those that have not used a neobank before, which could have impacted the results. Finally, in the data analysis, we found that the model fit was suboptimal for the estimated model and the saturated model. Although the model fit criteria are in the early stages of research, and researchers are not certain if it should be applied on PLS-SEM, this limitation should still be noted. Our study also did not tackle individual characteristics, such as age, which could influence the behavioural intention to use a neobank. We collected basic control variables, however these were not used in the data analysis as this was not the main focus of our study and would have complicated the conceptual model and the data analysis process significantly.

5.2.2 Future research

Our study builds on the modified technology acceptance models developed by Yoon [66], and Gefen *et al.* [20]. More studies on the validity and reliability of these modified technology acceptance models are needed. Additionally, in the literature review we found that the younger demographic is

mainly frustrated by services provided by incumbents. Neobanks aim to focus on filling this need, however our study did not consider individual characteristics, such as age. Therefore, the effect that these individual characteristics have on customer acceptance is unknown. We recommend that a follow-up study is needed to test for these variables in a controlled environment. Overall, more research must be done surrounding neobanks as it is a relatively new topic. Lastly, as neobanks are in the early stages of adoption we think it might be interesting to investigate and forecast the adoption curve, or also called diffusion, of neobanks. We list several possibilities for future research and their titles below:

- "Validity and reliability testing of the modified customer acceptance models by Gefen *et al.* and Yoon."
- "The impact of individual characteristics on the customer acceptance of neobanks."
- "Modelling and forecasting the diffusion of neobanks."

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APPENDICES

Appendix A. Survey design.

Questionnaire: neobanks

Survey Introduction

Hello, my name is Koen Meijer and I am a student at the University of Twente in the Netherlands studying business administration. I am looking for people that have previously used the services of a neobank. A neobank is a financial institution that does not have any physical branches and operates independently from a traditional bank (e.g. Revolut, N26, Monzo, and Bunq). I am looking to learn more about the usage and perception of neobanks across national cultures for my master thesis. Participants who have used a neobank in the past are preferred, however we appreciate anyone that fills in this survey. Thank you in advance for filling in the questionnaire!

Demographics

What is your age?	_____ years old
What is your gender?	Male ☐ Female ☐ Other ☐
What is your country of nationality?	Dropdown menu with countries & other / prefer not to say

Usage

Neobank description: Neobanks are financial institutions that do not have physical branches, and operate with or without a banking licence, and independently from traditional banks. Some examples of these neobanks are Revolut, N26, Monzo, and Bunq.

I have used a neobank in the past. Yes ☐ No ☐

	Totally disagree **1**	Disagree **2**	Neutral **3**	Agree **4**	Totally agree **5**
Assuming I have access to a neobank, I intend to use it.	☐	☐	☐	☐	☐
Given that I have access to the system, I predict that I would use it.	☐	☐	☐	☐	☐
I will frequently use the services provided by a neobank.	☐	☐	☐	☐	☐

	Totally disagree **1**	Disagree **2**	Neutral **3**	Agree **4**	Totally agree **5**

Perceived Usefulness

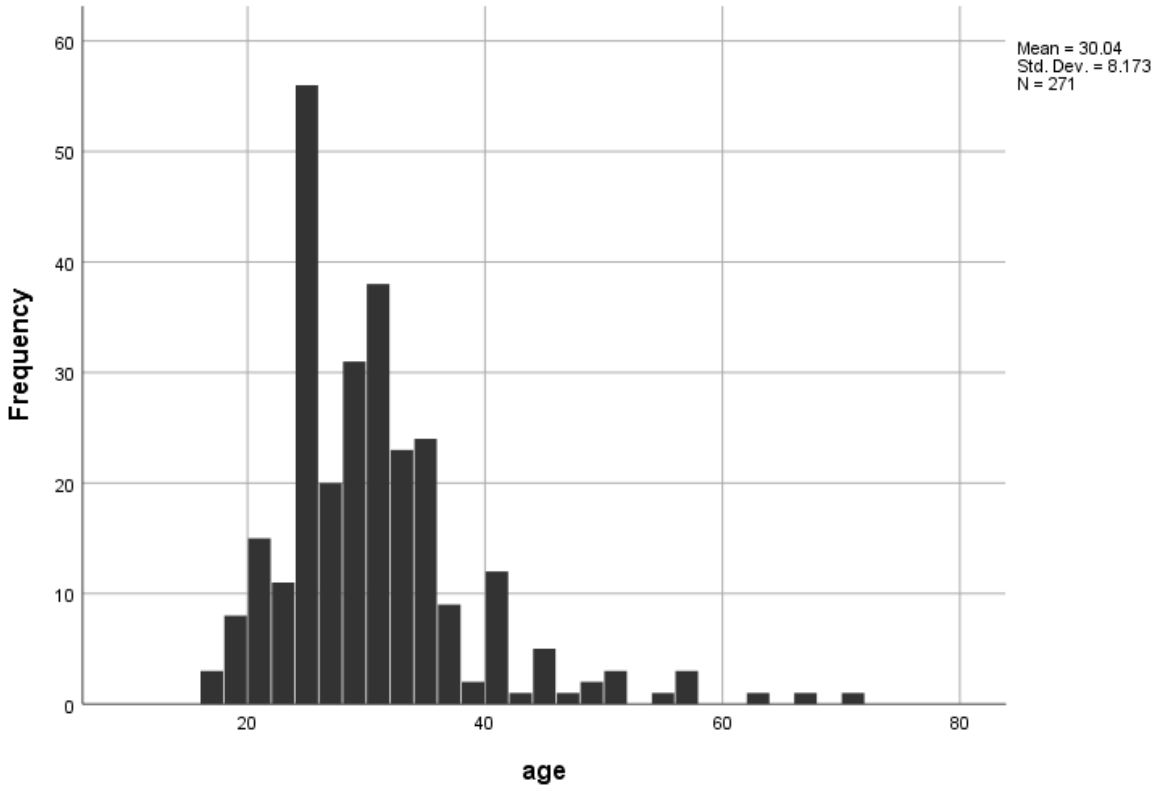
Using a neobank enables me to utilise banking services more quickly.	☐	☐	☐	☐	☐
Using a neobank improves my performance of utilizing banking services.	☐	☐	☐	☐	☐

Using a neobank for my banking services increases my productivity.					
Using a neobank makes it easier for me to utilise banking services.					
I find the neobank to be useful for me to utilise banking services.					
Using a neobank helps me to save money.					

	Totally disagree **1**	Disagree **2**	Neutral **3**	Agree **4**	Totally agree **5**
Perceived Ease of Use					
Learning to use the services by a neobank is easy for me.					
My interaction with the neobank is clear and understandable.					
I find a neobank to be flexible to interact with.					
It would be easy for me to become skilful at using the services of a neobank.					
I find the services of a neobank easy to use.					

	Totally disagree **1**	Disagree **2**	Neutral **3**	Agree **4**	Totally agree **5**
Trust					
Based on my experience with the neobank in the past, I know it is honest.					
Based on my experience with the neobank in the past, I know it cares about customers.					
Based on my experience with the neobank in the past, I know it is not opportunistic.					
Based on my experience with the neobank in the past, I know it is predictable.					
Based on my experience with the neobank in the past, I know it is trustworthy.					

Appendix B. Age distribution histogram.



Appendix C. Age frequencies.

		Frequency	Percent	Valid Percent	Cumulative
Valid	17	3	1.1	1.1	1.1
	18	5	1.8	1.8	3.0
	19	3	1.1	1.1	4.1
	20	5	1.8	1.8	5.9
	21	10	3.7	3.7	9.6
	22	6	2.2	2.2	11.8
	23	5	1.8	1.8	13.7
	24	18	6.6	6.6	20.3
	25	38	14.0	14.0	34.3
	26	13	4.8	4.8	39.1
	27	7	2.6	2.6	41.7
	28	17	6.3	6.3	48.0
	29	14	5.2	5.2	53.1
	30	27	10.0	10.0	63.1
	31	11	4.1	4.1	67.2
	32	13	4.8	4.8	72.0
	33	10	3.7	3.7	75.6
	34	13	4.8	4.8	80.4
	35	11	4.1	4.1	84.5
	36	5	1.8	1.8	86.3
	37	4	1.5	1.5	87.8
	38	1	.4	.4	88.2
	39	1	.4	.4	88.6
	40	7	2.6	2.6	91.1
	41	5	1.8	1.8	93.0
	42	1	.4	.4	93.4
	44	2	.7	.7	94.1
	45	3	1.1	1.1	95.2
	47	1	.4	.4	95.6
	48	2	.7	.7	96.3
	50	2	.7	.7	97.0
	51	1	.4	.4	97.4
	55	1	.4	.4	97.8
	56	2	.7	.7	98.5
	57	1	.4	.4	98.9
	62	1	.4	.4	99.3
	66	1	.4	.4	99.6
	71	1	.4	.4	100.0
	Total	271	100.0	100.0	

Appendix D. Descriptive statistics of respondents' nationalities.

Measure	Value	Frequency	Percent
Country of nationality	Austria	1	0.4
	Belgium	2	0.7
	Brazil	7	2.6
	Bulgaria	1	0.4
	France	3	1.1
	Germany	4	1.5
	Greece	3	1.1
	Hungary	1	0.4
	India	94	34.7
	Italy	7	2.6
	Mexico	2	0.7
	Netherlands	17	6.3
	Poland	1	0.4
	Portugal	1	0.4
	Slovakia	1	0.4
	Spain	1	0.4
	United Kingdom	62	22.9
	United States of America	63	23.2

Appendix E. Mean and standard deviation across categories of Hofstede dimensions.

	BI1	BI2	BI3	PU1	PU2	PU3	PU4	PU5	PU6
PDI-L (n-=1)	4.000 (-)	4.000 (-)	4.000 (-)	4.000 (-)	3.000 (-)	3.000 (-)	4.000 (-)	4.000 (-)	3.000 (-)
PDI-M (n=172)	4.395 (0.697)	4.413 (0.748)	4.349 (0.882)	4.256 (0.881)	4.110 (0.927)	3.849 (0.974)	4.192 (0.833)	4.250 (0.773)	3.797 (1.003)
PDI-H (n=98)	3.867 (0.833)	3.980 (0.919)	4.071 (0.736)	3.908 (0.838)	3.929 (0.911)	4.000 (0.799)	4.122 (0.828)	3.898 (0.818)	4.092 (0.851)
IDV-L (n=4)	5.000 (0.000)	4.750 (0.500)	4.250 (0.957)	4.500 (0.577)	3.500 (1.000)	3.250 (1.258)	3.750 (1.500)	3.750 (0.957)	4.500 (1.000)
IDV-M (n=112)	3.920 (0.840)	4.018 (0.920)	4.098 (0.771)	3.911 (0.886)	3.929 (0.937)	3.938 (0.862)	4.107 (0.853)	3.902 (0.849)	3.982 (0.910)
IDV-H (n=155)	4.387 (0.687)	4.413 (0.737)	4.355 (0.873)	4.277 (0.849)	4.135 (0.905)	3.890 (0.944)	4.219 (0.792)	4.290 (0.729)	3.826 (0.988)
MAS-L (n=17)	4.222 (0.636)	3.944 (0.899)	3.556 (1.326)	3.833 (1.091)	3.556 (0.943)	3.278 (1.047)	3.556 (0.870)	3.944 (0.857)	3.111 (1.275)
MAS-M (n=244)	4.197 (0.808)	4.275 (0.843)	4.287 (0.791)	4.164 (0.855)	4.078 (0.924)	3.955 (0.899)	4.217 (0.805)	4.131 (0.806)	3.980 (0.891)
MAS-H (n=10)	4.400 (0.516)	4.300 (0.483)	4.400 (0.516)	3.900 (0.994)	4.000 (0.667)	3.600 (0.699)	3.900 (0.994)	4.300 (0.675)	3.500 (1.179)
UAI-L (n=0)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)
UAI-M (n=241)	4.154 (0.804)	4.220 (0.860)	4.220 (0.845)	4.112 (0.885)	4.037 (0.937)	3.929 (0.912)	4.170 (0.822)	4.116 (0.808)	3.909 (0.953)
UAI-H (n=30)	4.600 (0.498)	4.533 (0.571)	4.467 (0.776)	4.267 (0.828)	4.067 (0.828)	3.667 (0.922)	4.133 (0.900)	4.167 (0.791)	3.833 (1.020)
LTO-L (n=66)	4.106 (0.726)	4.333 (0.751)	4.242 (0.745)	4.015 (0.850)	3.939 (0.959)	3.833 (0.954)	4.152 (0.789)	4.076 (0.730)	3.939 (0.875)
LTO-M (n=198)	4.242 (0.801)	4.242 (0.856)	4.278 (0.848)	4.197 (0.853)	4.101 (0.890)	3.955 (0.874)	4.202 (0.799)	4.167 (0.804)	3.919 (0.963)
LTO-H (n=7)	4.000 (1.000)	3.857 (1.069)	3.429 (1.134)	3.286 (1.380)	3.286 (1.254)	3.000 (1.291)	3.286 (1.496)	3.286 (1.113)	3.000 (1.291)
IVR-L (n=104)	3.895 (0.816)	4.000 (0.898)	4.105 (0.731)	3.933 (0.844)	3.971 (0.880)	4.000 (0.776)	4.143 (0.801)	3.962 (0.817)	4.076 (0.844)
IVR-M (n=165)	4.394 (0.704)	4.412 (0.757)	4.339 (0.894)	4.261 (0.883)	4.103 (0.941)	3.855 (0.983)	4.194 (0.833)	4.242 (0.774)	3.788 (1.011)
IVR-H (n=2)	5.000 (0.000)	5.000 (0.000)	4.500 (0.707)	4.000 (0.000)	3.000 (1.414)	2.500 (0.707)	3.500 (2.121)	3.000 (0.000)	4.000 (1.414)

	PEOU1	PEOU2	PEOU3	PEOU4	PEOU5	T1	T2	T3	T4	T5
PDI-L (n-=1)	5.000 (-)	4.000 (-)	4.000 (-)	3.000 (-)	5.000 (-)	2.000 (-)	2.000 (-)	4.000 (-)	2.000 (-)	2.000 (-)
PDI-M (n=172)	4.401 (0.739)	4.273 (0.838)	4.047 (0.923)	4.343 (0.760)	4.390 (0.737)	3.913 (0.878)	3.750 (0.986)	3.529 (1.005)	3.570 (0.980)	3.919 (0.939)
PDI-H (n=98)	3.918 (0.769)	4.051 (0.878)	4.010 (0.843)	3.939 (0.797)	4.133 (0.713)	3.776 (0.856)	3.959 (0.907)	3.980 (0.849)	4.000 (0.746)	3.969 (0.818)
IDV-L (n=4)	4.500 (0.577)	4.500 (0.577)	4.500 (0.577)	4.250 (0.957)	4.750 (0.500)	4.000 (1.414)	4.500 (0.577)	4.500 (1.000)	4.250 (0.500)	4.500 (0.577)
IDV-M (n=112)	3.991 (0.788)	4.027 (0.843)	3.973 (0.843)	3.973 (0.788)	4.170 (0.721)	3.777 (0.867)	3.839 (0.926)	3.857 (0.879)	3.839 (0.855)	3.902 (0.838)
IDV-H (n=155)	4.394 (0.743)	4.303 (0.856)	4.065 (0.931)	4.348 (0.769)	4.381 (0.741)	3.910 (0.871)	3.787 (1.000)	3.555 (1.014)	3.619 (0.975)	3.935 (0.951)
MAS-L (n=17)	4.278 (0.470)	3.611 (1.121)	3.444 (1.004)	3.944 (0.500)	3.944 (0.857)	2.944 (1.061)	2.722 (0.931)	2.889 (1.111)	2.722 (0.996)	3.000 (1.298)
MAS-M (n=244)	4.209 (0.807)	4.258 (0.803)	4.094 (0.863)	4.209 (0.812)	4.316 (0.728)	3.930 (0.831)	3.922 (0.911)	3.770 (0.937)	3.811 (0.883)	4.016 (0.821)
MAS-H (n=10)	4.600 (0.516)	3.600 (1.075)	3.600 (0.966)	4.100 (0.876)	3.500 (0.516)	3.500 (0.850)	3.300 (0.949)	3.200 (0.919)	3.300 (0.675)	3.500 (0.972)
UAI-L (n=0)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)
UAI-M (n=241)	4.187 (0.792)	4.207 (0.860)	4.037 (0.887)	4.170 (0.811)	4.257 (0.753)	3.834 (0.874)	3.838 (0.972)	3.697 (0.964)	3.755 (0.923)	3.925 (0.914)
UAI-H (n=30)	4.567 (0.626)	4.067 (0.828)	4.000 (0.947)	4.367 (0.669)	4.633 (0.490)	4.033 (0.890)	3.667 (0.922)	3.667 (1.061)	3.433 (0.935)	3.967 (0.809)
LTO-L (n=66)	4.106 (0.897)	4.273 (0.735)	4.015 (0.903)	4.212 (0.869)	4.242 (0.805)	3.924 (0.847)	4.091 (0.872)	3.864 (0.857)	3.924 (0.829)	4.091 (0.818)
LTO-M (n=198)	4.268 (0.743)	4.187 (0.879)	4.061 (0.870)	4.187 (0.774)	4.323 (0.710)	3.843 (0.879)	3.753 (0.963)	3.657 (0.989)	3.672 (0.923)	3.894 (0.909)
LTO-H (n=7)	4.286 (0.756)	3.571 (1.134)	3.429 (1.272)	4.143 (0.900)	4.143 (0.900)	3.571 (1.134)	3.143 (1.345)	3.143 (1.345)	3.143 (1.574)	3.429 (1.272)
IVR-L (n=104)	3.971 (0.775)	4.029 (0.897)	3.981 (0.847)	3.962 (0.793)	4.171 (0.712)	3.771 (0.847)	3.924 (0.900)	3.895 (0.849)	3.943 (0.742)	3.943 (0.817)
IVR-M (n=165)	4.394 (0.747)	4.291 (0.819)	4.055 (0.919)	4.339 (0.769)	4.382 (0.745)	3.897 (0.895)	3.745 (1.004)	3.539 (1.015)	3.564 (1.002)	3.909 (0.955)
IVR-H (n=2)	4.500 (0.707)	4.500 (0.707)	5.000 (0.000)	4.500 (0.707)	4.500 (0.707)	4.500 (0.707)	4.500 (0.707)	5.000 (0.000)	4.500 (0.707)	4.500 (0.707)

Note: mean values denoted without brackets, standard deviation denoted in brackets.

Appendix F. Indicators' t-values for weights and loadings

Code	Construct / Indicator	Weight t-values	Loading t-values
	Behavioural intention to use (BI) (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: BI1)		
BI1	Assuming I have access to a neobank, I intend to use it.	20.419	50.167
BI2	Given that I have access to the system, I predict that I would use it.	20.967	31.385
BI3	I will frequently use the services provided by a neobank.	15.830	23.094
	Perceived usefulness (PU) (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: PU1)		
PU1	Using a neobank enables me to utilise banking services more quickly.	14.624	24.951
PU2	Using a neobank improves my performance of utilizing banking services.	15.448	24.358
PU3	Using a neobank for my banking services increases my productivity.	8.491	13.039
PU4	Using a neobank makes it easier for me to utilise banking services.	13.145	16.885
PU5	I find the neobank to be useful for me to utilise banking services.	16.058	21.432
PU6	Using a neobank helps me to save money.	6.025	7.216
	Perceived ease of use (PEOU): (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: PEOU1)		
PEOU1	Learning to use the services by a neobank is easy for me.	18.021	23.890
PEOU2	My interaction with the neobank is clear and understandable.	17.458	21.381
PEOU3	I find a neobank to be flexible to interact with.	13.913	19.388
PEOU4	It would be easy for me to become skilful at using the services of a neobank.	19.264	26.896
PEOU5	I find the services of a neobank easy to use.	19.750	28.360
	Trust (T): (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: T1)		
T1	Based on my experience with the neobank in the past, I know it is honest.	14.242	41.477
T2	Based on my experience with the neobank in the past, I know it cares about customers.	12.834	31.102
T3	Based on my experience with the neobank in the past, I know it is not opportunistic.	5.792	14.733
T4	Based on my experience with the neobank in the past, I know it is predictable.	5.704	13.015
T5	Based on my experience with the neobank in the past, I know it is trustworthy.	12.252	33.243

Appendix G. Evaluation of the reflective measurement models after removing indicators.

Code	Construct / Indicator	ρA	AVE	Weight	Loading
	Behavioural intention to use (BI) (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: BI1)	0.767	0.670		
BI1	Assuming I have access to a neobank, I intend to use it.			0.460***	0.865***
BI2	Given that I have access to the system, I predict that I would use it.			0.402***	0.799***
BI3	I will frequently use the services provided by a neobank.			0.355***	0.791***
	Perceived usefulness (PU) (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: PU1)	0.762	0.577		
PU1	Using a neobank enables me to utilise banking services more quickly.			0.368***	0.798***
PU2	Using a neobank improves my performance of utilizing banking services.			0.333***	0.765***
~~PU3~~	~~Using a neobank for my banking services increases my productivity.~~				
PU4	Using a neobank makes it easier for me to utilise banking services.			0.279***	0.714***
PU5	I find the neobank to be useful for me to utilise banking services.			0.333***	0.758***
~~PU6~~	~~Using a neobank helps me to save money.~~				
	Perceived ease of use (PEOU): (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: PEOU1)	0.789	0.611		
PEOU1	Learning to use the services by a neobank is easy for me.			0.331***	0.798***
PEOU2	My interaction with the neobank is clear and understandable.			0.318***	0.773***
~~PEOU3~~	~~I find a neobank to be flexible to interact with.~~				
PEOU4	It would be easy for me to become skilful at using the services of a neobank.			0.306***	0.754***
PEOU5	I find the services of a neobank easy to use.			0.324***	0.800***
	Trust (T): (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: T1)	0.797	0.699		
T1	Based on my experience with the neobank in the past, I know it is honest.			0.453***	0.852***
T2	Based on my experience with the neobank in the past, I know it cares about customers.			0.358***	0.806***
~~T3~~	~~Based on my experience with the neobank in the past, I know it is not opportunistic.~~				
~~T4~~	~~Based on my experience with the neobank in the past, I know it is predictable.~~				
T5	Based on my experience with the neobank in the past, I know it is trustworthy.			0.383***	0.849***

Note: *p < 0.05, **p <0.01, ***p < 0.001 (lower p-values indicate greater confidence of the statistical test), one-tailed test (t-values in appendix D, df=239)

Appendix H. Indicators' t-values for weights and loadings after removing indicators.

Code	Construct / Indicator	Weight t-values	Loading t-values
	Behavioural intention to use (BI) (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: BI1)		
BI1	Assuming I have access to a neobank, I intend to use it.	21.105	54.159
BI2	Given that I have access to the system, I predict that I would use it.	20.441	29.858
BI3	I will frequently use the services provided by a neobank.	15.169	22.934
	Perceived usefulness (PU) (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: PU1)		
PU1	Using a neobank enables me to utilise banking services more quickly.	17.693	29.055
PU2	Using a neobank improves my performance of utilizing banking services.	16.208	24.548
~~PU3~~	~~Using a neobank for my banking services increases my productivity.~~		
PU4	Using a neobank makes it easier for me to utilise banking services.	13.701	16.704
PU5	I find the neobank to be useful for me to utilise banking services.	17.029	25.347
~~PU6~~	~~Using a neobank helps me to save money.~~		
	Perceived ease of use (PEOU): (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: PEOU1)		
PEOU1	Learning to use the services by a neobank is easy for me.	21.494	33.285
PEOU2	My interaction with the neobank is clear and understandable.	17.326	24.511
~~PEOU3~~	~~I find a neobank to be flexible to interact with.~~		
PEOU4	It would be easy for me to become skilful at using the services of a neobank.	20.044	25.518
PEOU5	I find the services of a neobank easy to use.	20.225	32.053
	Trust (T): (1: strongly disagree, 5: strongly agree) (Composite measurement model, mode B, dominant indicator: T1)		
T1	Based on my experience with the neobank in the past, I know it is honest.	16.775	40.407
T2	Based on my experience with the neobank in the past, I know it cares about customers.	14.747	30.131
~~T3~~	~~Based on my experience with the neobank in the past, I know it is not opportunistic.~~		
~~T4~~	~~Based on my experience with the neobank in the past, I know it is predictable.~~		
T5	Based on my experience with the neobank in the past, I know it is trustworthy.	15.017	31.538

Appendix F. Heterotrait-monotrait ratio after the removal of indicators.

	BI	PU	PEOU
BI	-	-	-
PU	0.908	-	-
PEOU	0.913	0.927	-
T	0.651	0.682	0.679