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Adoption of self-service checkouts in retailing

A study of Norwegian Grocery retail chains

Bachelor's thesis in Marketing, Innovation and Management

Supervisor: Richard Glavee-Geo

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Faculty of Economics and Management
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ABSTRACT

Purpose – The purpose of this study is to bring extensive insights regarding the key factors that influence the adoption of self-service technology in the Norwegian grocery retail chain market.

Design/methodology - An online-based approach was used with a sample of 176 responses from all parts of Norway. The choice of research method was the quantitative method, with the use of a self-selection strategy. The survey consisted of a digital questionnaire, which was shared on different social media.

Findings – This thesis found significant support for the greater proportion of the hypotheses. The constructs originating from the diffusion innovation theory all show significant contributions in explaining the dependent variables. The construct of customer empowerment also showed significance in predicting attitude and perceived relative advantage. Surprisingly, the results showed that none of the constructs, fear & anxiety of covid-19 and psychological distress, showed to have a significant role in predicting attitude, intention, or perceived relative advantage.

Practical implications – This study is among the first that examines the factors influencing the adoption of self-service checkout in the Norwegian market. Grocery retail chains could increase the adoption rate by creating awareness around the benefits of the service. By involving the customer in the co-creation process of value, they may experience a reduction in operating costs. By sparing expenses, the grocery chains can further develop the technological qualities of the service – making it more manageable. To implement self-service checkout successfully, managers should thereby provide the customer with different choices of checkouts. By doing so, the customer is empowered in making its own choices and not being forced, and thus develops more favourable attitudes toward the self-service checkout.

Originality/Value – The results present knowledge and theories of consumer behaviour for the grocery retail chain industry. As opposed to earlier studies, this thesis has included the concepts of customer empowerment as a potential predictor of positive attitudes regarding self-service checkout. Further, the study presents the covid-19's impact on consumer behaviour concerning self-service checkout adoption. Last, as the hypothesis defined by diffusion innovation theory were all significant, it contributes with additional strength and validity to the established framework.

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PREFACE

We are two students, and this thesis is the final part of our bachelor's degree in marketing, innovation and management at the Norwegian University of Science and Technology, Ålesund. Carrying out this study has been an exciting, educational and at the same time challenging process. The choice of theme and issue is based on a general interest in marketing and consumer behaviour.

In the autumn of 2021, we completed the course marketing research, where our interest and knowledge of overall methodology increased. In this course we were approached by our lecturer who had a proposal for a research question, which we chose to take further. Our interest in consumer behaviour in combination with innovation meant that the chosen theme fell on a theoretical task, where we analyse various factors that drive people's adoption intention toward self-service checkout. By using theories and knowledge that we have acquired during our three years of education, we wish to come up with new and interesting insights and to form a basis for further studies.

The process of compiling the task has required good cooperation, but also skills we have been given through lectures and exercises within different subjects. To have knowledge of how SPSS works, and how data is obtained is to be considered a great benefit. We would thus like to thank NTNU Ålesund and its lecturers, who have facilitated and motivated us to carry out this study. Finally, we would like to give a special thank you to our supervisor throughout the writing, Richard Glavee-Geo, who has during the process assisted us with the research question, contributed with much helpful feedback, overall guidance and support.

May, 2022.

1 INTRODUCTION

1.1 BACKGROUND FOR THE SELECTED THEME

Consumers are today connecting with different technology solutions instead of cooperating with service personnel, forming a co-creation between services and consumers. The technology that makes co-creation attainable is the service-providers use of self-service technologies, also known as SST. The rapid and constant development of technology and its possibilities of use are therefore creating new and diverse ways for grocery retail chains to interact with their customers (Orel & Kara, 2014). In an increasingly globalized world, with a rising degree of competitors, the constant need for efficiency and competitive advantage may seem to be of great importance. To cut down on costs, increase profit and improve customer satisfaction, several Norwegian grocery retail chains have in the recent years implemented various technological self-service solutions, where self-service checkout is one of their most common SST at present. Most of them have supplied their stores and customers with the choice of self-service checkout, as an option for the regular manned checkout. However, there are still several stores rejecting to offer their customer such a solution. Some managers believe that self-service checkouts cannot replace the people who work in the stores, as the staff always are and will be their biggest competitive advantage (Fosse, 2019).

To our knowledge, previous research has mostly focused on self-service technologies in e.g., logistics, more specifically in the delivery of packages, mobile banking services and e-retailing (Glavee-Geo, Shaikh, & Karjaluoto, 2017; Yuen et al., 2018; Wang et al, 2018). However, relatively few studies have been focusing on the area of self-service checkouts. There seems also to lack of empirical studies examining factors affecting customer adoption behaviour of self-service checkout, within the Norwegian retail chain market. Hence, the purpose of this study is to investigate the key factors that influence the adoption of self-service technology.

1.2 THE NORWEGIAN RETAIL CHAIN MARKET

The Norwegian retail chain market today consists of Norgesgruppen, Coop and Rema 1000. It is these three so called umbrella grocery chains that largely monopolize the Norwegian retail chain market (NielsenIQ, 2021). The smallest market share corresponds to the retail chain stores of Bunnpris, as well as other smaller sized retailers (NielsenIQ, 2021). Together, they constitute for

up to 3858 stores, and had a turnover of NOK 208 billion in 2021. The leading and considerable largest chain is Norgesgruppen, holding a market share of 44% of the entire market. This share decreased from previous year by 0.1% of total market share (NielsenIQ, 2021). Norgesgruppen consists of the chains Kiwi, Meny, Eurospar/Spar and Joker, where Kiwi is the chain with the biggest turnover share of 50.9%, and a net grocery sale of 22.4% in the year of 2021. This seems to be a decline compared to 2020, which showed a total of 22.6% (NielsenIQ, 2021).

The second largest chain, Coop, consists of the stores Coop Mega, Obs!, Coop Prix, Coop Marked, Coop Extra and Matkroken (NielsenIQ, 2021). Together they hold a market share of 29.7%, which is an increase from previous year of 2020, by 0.4%. Their largest store is Coop Extra, with an internal turnover share of 55.1% and a net grocery sale of 16.4 % (NielsenIQ, 2021). This seems to have increased, given that year 2020 showed numbers of 15.6% of net grocery sale.

The third largest chain is Rema 1000, which accounts for 22.9% of total market share. They seem to experience a slight decline in market share, given that previous years showed a total market share of 23.2%. And lastly are the stores of Bunnpris with a total market share of 3.4%, which are the same numbers as in 2020 (NielsenIQ, 2021).

These figures refer to a shift in market shares from 2020 to 2021 between different store chains. There are and can be many factors that influence these ups and downs. At the same time, it can be argued that the various chains' implementation of self-service checkouts is one of the factors that influences the shifts. As mentioned, the various chains have to a varying degree chosen to implement the innovation, and it is conceivable that customers prefer the stores that offers the service.

1.3 COVID-19

At the end of 2019 the coronavirus disease, known as Covid-19, was identified in China (Duong, 2021). The disease continued to rapidly spread at a global scale and The World Health Organization (WHO) declared it as a 'pandemic' on 11 March 2020 (Duong, 2021). The pandemic brought massive deaths to the world, as of 25 February 2022, WHO reported 5.9 million deaths due to covid-19 (WHO Coronavirus (COVID-19) Dashboard, 2022). In addition to causing deaths globally, this pandemic is also posing a threat on mental health (Duong, 2021).

A lot of people around the world were forced by the government in their country to stay in lockdown, hoping to slow down the spread of the virus. Governments imposed social and physical distancing and schools were closing to reduce physical contact.

Due to the major disruption caused by the covid-19 pandemic there has been a change in consumers shopping behaviours (Wang et al., 2021). The social contact has been minimized by using different contactless technologies such as virtual voice assistants or chatbots that guide shoppers' information search before shopping, e-commerce or mobile-commerce platforms along with self-checkout portals for purchasing and unmanned self-collection facilities for parcel deliveries after shopping (Wang et al., 2021). The pandemic has created a global trend of digitalization at a rapid pace, which further leads to an orientation shift in the service industry from high touch to high-tech orientation (Wang et al., 2021). Meaning that the demand for self-service checkout may have been increased along with this.

1.4 PURPOSE OF THE THESIS

The purpose of this study is to find out what influences people's actions when it comes to the adoption of self-service technology, especially the self-service checkout cashiers. The objective is to be able to give useful and deeper insights about customers attitudes and adoption of the self-service checkouts, and to contribute to a theoretical understanding of how customers perceive the use of such self-services. Our desire is therefore to detect which factors affects the customers perception of the innovation. The ambition is also to examine whether the pandemic and its consequences had an influence on customers intention towards adoption of self-service checkouts.

As this is a relatively new area being studied, limited previous research have been presented and our hope is that the results from this study can be used to uncover new and interesting insights. The goal is to present findings useful for the grocery chains in the Norwegian retail market. Additionally, the desire with the task is to sustain findings relevant for retail chain managers, in addition to marketing managers in retailing and other industries. Lastly, our ambition is to provide answers to whether an implementation of self-service checkouts would be positively received by the customers.

As per today, many retailers have chosen not to implement technological check-out options for their customers. Other retailers, for example fashion-clothing companies, furniture dealers and pharmacies might also benefit from the results of this study. In this manner, the thesis will be useful in better targeting certain groups using the service, as well as those who do not use it when doing their shopping. The ambition therefor is to contribute with an increased understanding of how customers perceive the use of self-service checkout and how their attitude and intention towards adoption of self-service checkout is formed.

1.5 RESEARCH QUESTION

The research question is the main question to be answered in this bachelor thesis. The research question of this thesis is as followed: ***“Which factors stimulate favourable attitude towards adoption of self-service checkout?”***. But the thesis also deals with discussions about in what ways the coronavirus enabled the adoption of self-service checkout, as well as what grocery retail chains can do to increase people’s adoption of self-service checkout.

1.6 OUTLINE OF THE PAPER

This thesis starts with an introduction in chapter 1, which deals with the choice of theme and its underlying causes. Here the given research question is presented, as well as why this certain research question should be highlighted. Furthermore, there is an introduction of the purpose of the task. In chapter 2, the theoretical premise is presented and to be able to answer the stated research question, theories about consumer behaviour are presented as a basis for the later sections. With regards to examining and drawing attention to the theme and research question, the section of method is in chapter 3, where emphasis is placed on the quantitative method. Chapter 4 presents the analysis part. Here the processing of the collected data is handled, and the various analyses used are presented in connection with the results from these analyses. This leads to the last chapters, 5 & 6, where discussion, summary, limitations and proposals for further research are presented.

2 THEORETICAL PREMISE

2.1 ADOPTION THEORIES

Digitalisation has had a major effect on the development of self-service technologies (SSTs).

Thus, changing the behaviour of consumers and their interaction with retail chains has become a critical issue in recent times. As the underlying theme for this research is still a new and rather unexplored area, it is challenging to find suitable and applicable theories that are consistent with what is being studied. An extensive amount of research has been made in the field of consumer behaviour. Some of the most influential theories of human behaviour, according to Wang et al. (2018), are the theory of reasoned action (TRA) in addition to theory of planned behaviour (TPB). Theory of reasoned action is based on social psychology (Wang et al. 2018) and theory of planned behaviour (TPB) is an extension of this theory (Wang et al. 2018). Together, these theories function as the foundation of many other behaviour studies (Wang et al. 2018). In the context of these studies, it is theorised that consumers' behaviour is a "psychological process on deciding to adopt or reject certain actions" (Wang et al. 2018). Both TRA and TPB present behavioural intention as the most instant predictor of individual consumer's behaviour (Wang et al. 2018).

Cognitive dissonance theory can be used to explain intention in this context. Festinger (1957, as cited in Wang et al. 2018) argues that perceived differences between actual behaviour and behavioural intention can cause a psychological tension (cognitive dissonance), and that individuals want to minimise this kind of tension. Therefore, individuals tend to align their behaviour with their intention, according to this theory. The association between intention and actual behaviour has been taken for granted, to some extent (Wang et al. 2018). Our study focuses on understanding the individuals' intention to adopt self-service checkouts as a predictor of actual behaviour. Thus, intention will be used as a dependent variable in this study, rather than actual behaviour.

2.1.1 Attitude

Attitude is known in the consumer behaviour literature as "a learned predisposition to behave in a consistently favourable or unfavourable manner with respect to a given object" (Schiffman et al, 2012, p.233). Each part of the definition is important to understand attitude in consumer behaviour (Schiffman et al, 2012). While the tricomponent attitude model suggests that attitude

consist of conation, cognition and affect, multi-attribute attitude models, such as TRA and TPB, suggest that attitude toward an object is a function of the consumers evaluation and perception of the object's key attributes or beliefs held toward the object (Schiffman et al, 2012). This “belief-attitude-intention” causality is also presented in the diffusion of innovation literature (Wang et al. 2018).

2.1.2 Innovation diffusion theory and technology acceptance model

In the field of SST adoption studies, it is common to use the inclusion of perceived characteristics of the service system as key independent variables (Wang et al. 2018). Diffusion innovation theory (DOI) along with the technology acceptance model (TAM) is commonly used theoretical frameworks to identify these characteristics.

Rogers (1983, 1995, as cited in Wang et al., 2018) founded the basis of Innovation diffusion literature by mapping thousands of innovation studies and identified five characteristics of an innovation. The literature was further developed by Moore and Benbasat in 1991, who changed the focus from the primary characteristics of the innovation itself, to the perceived characteristics of innovation (Wang et al. 2018). These perceptions are divided into five different dimensions in line with Rogers' original five characteristics of an innovation: *perceived compatibility*, *perceived complexity*, *perceived trialability*, *perceived observability* and *perceived relative advantage* (Wang et al. 2018). According to Wang et al. (2018) it is rationalised that the primary attribute of an innovation is present in the innovation, independent of how potential adopters might perceive the innovation. Further, the attitudes of the potential adopter or users are dependent on the perception these individuals have towards the attributes of the innovation (Wang et al. 2018).

TAM was originally developed by Davis in 1989 and drawn from the theory of reasoned action (TRA) (Glavee-Geo, Shaikh, & Karjaluoto, 2017). The theory has been used in research across nations to address technology adoption, and been extensively validated (Glavee-Geo, Shaikh, & Karjaluoto, 2017). While DOI has several perceived characteristics, TAM presents two major constructs, which is “perceived ease of use” and “perceived usefulness” (Wang et al., 2018). When comparing these constructs with the ones presented by DOI, one can see that TAM can be considered embed into DOI (Wang et al., 2018).

2.2 HYPOTHESES AND CONCEPTUAL MODEL

2.2.1 Perceived compatibility

Perceived compatibility is the degree to which the innovation is perceived as being aligned with the individual's lifestyle, existing values, past experiences, and needs (Yuen et al., 2018).

Perceived compatibility evaluates the level of coherence between the innovation and different aspects of the situation where the innovation applies (Wang et al., 2018). Compatibility is one of the perceived characteristics of innovation mentioned in innovation diffusion theory. However, other studies have also suggested similar characteristics to have an important role in explaining attitude. An exploratory study by Bulmer et al. (2018) researching the adoption of self-service checkouts and the associated social obligations of shopping practice, suggest that the opportunity to use self-service checkout technology has led to variations in shopping practices. These variations reflect shoppers' existing habits and routines, influenced by particular individual situations and family/household circumstances. These circumstances might be perceived as similar to "consumer lifestyle". Shwu-Ing Wu (2003) used the TRA framework to examine the relationship between consumer characteristics and attitude toward online shopping. One of the characteristics used in this study was "consumer lifestyle".

In the context of self-service checkout adoption, it is possible that perceived compatibility can vary between different groups of consumers. For example, individuals who shop for groceries approximately one time per week and for an entire household, may have a low degree of perceived compatibility with self-service checkouts. A single individual shopping for groceries every day just for themselves may, on the contrary, perceive a high degree of compatibility.

Perceived compatibility represents inherent motivators (Wang et al., 2018). Thus, when an individual's needs, values and lifestyle is compatible with the given innovation, it creates an inner motivation and makes the individual more willing to adopt the innovation (Wang et al., 2018). Therefore, the following hypotheses are proposed:

H₁: Perceived compatibility is positively associated with attitude

H₂: Perceived compatibility is positively associated with perceived relative advantage

2.2.2 Perceived complexity

Perceived complexity is the degree to which the consumer perceives the innovation as being both difficult to understand and difficult to use (Yuen et al., 2018). According to Yuen et al. (2018) it

was found that if the consumer must develop new skills and understanding in order to adopt the innovation, the innovation will be adopted at a slower rate in comparison to innovations that are perceived to be less complex. Perceived complexity is reoccurring in the broader innovation adoption literature as a construct to predict the consumers' attitude towards adoption (Wang et al., 2018). One can find a parallel to this construct in the technology of acceptance model, where "perceived ease of use" measures the same characteristics (Wang et al., 2018).

For self-service checkout, complexity arises when users interact with the self-service checkout at the retail stores. Customers who use the self-service checkouts are managing the entire scanning and paying process themselves, without any interaction with the staff. In some stores, there might be staff available for helping in certain situations, or when problems occur, but generally the customer do everything on their own. This process generates some extra effort that is imposed on the users. While some customers might perceive the extra effort as only marginal, or even favourable, for others it might cause anxiety and stress, thus creating unfavourable attitude toward self-service checkouts.

In the context of this study, individuals who perceive the use of self-service checkouts to be complex are likely to be more resistant or hesitant of the system and are expected to have a more negative attitude toward self-service checkouts. It is also expected that the individuals who experience this service to be complex will experience a lower degree of advantageousness. As mentioned later, advantageousness is a central part of perceived relative advantage. Therefore, the following hypotheses is proposed:

H₃: Perceived complexity is negatively associated with attitude.

H₄: Perceived complexity is negatively associated with perceived relative advantage.

2.2.3 Customer empowerment

The fundamental theory of the conceptualization of customer empowerment relies on societal psychological literature (Auh et al., 2019). It derives from the reasoning that engagement and empowerment are mostly related with each other. Empowerment can be explained as the "Process by which individuals gain mastery or control over their own lives and democratic participation in the life of their community" (Zimmerman & Rappaport, 1988). Whereas Spreitzer (1995) characterize empowerment as the motivational concept of self-perception. She also argues that psychological empowerment cannot be obtained by one specific concept, and

that it is characterized by a set of four cognitions. The four cognitions indicate an individual's adaption to his or her work role and involves meaning, competence, self-determination, and impact. Meaning implicates a match between the demands of a person's work role and their values, beliefs, and behaviours (Spreitzer, 1995). Competence is explained as an individual's confidence in his or her ability to pursuit activities with expertise, while Self-determination, on the other hand, is an individuals' impression of having options in initiating their own actions (Spreitzer, 1995).

The wide concept of empowerment can be found in diverse branches of knowledge. However, seen in the perspective of marketing it is described as "the extent to which a firm provides its customers avenues to connect with the firm and actively shape the nature of transactions, and connect and collaborate with each other by sharing information; praise; criticisms; suggestions; and ideas about its products, services and policies" (Ramani & Kumar, 2008). And as per today, customer empowerment has a key role in customers shift from being non-active recipients to having functioning participation in the production and distribution of services (Auh et al., 2019).

Furthermore, the conception of consumer empowerment has been studied in earlier literature.

Commonly the literature distinguishes between two divergent meanings of the concept.

Primarily, it indicates allowing a person to obtain asymmetric abilities to control and manage other people (Zhang et al., 2018). Aside from that, it also concerns permitting someone to pursue things according to their own course and terms (Zhang et al., 2018). The secondly presented definition of the concept is the one best corresponding with this study. This is because grocery chain retailers normally supply their customers with various alternatives to enhance their possibility of making a purchase determination. A theoretical factor of consumer empowerment in grocery retailing rests in the customers' ability to oversee their own options (Watheiu et al., 2002).

Previous research has to a great extent studied the connections between customer empowerment and behavioural intention factors such as the experience of trust, satisfaction, and competence.

As stated by Zhang et al. (2018) and in accordance with self-determination theory, people of the society consistently aim for autonomy. Seen in the perspective of grocery retailing, the consideration by consumers is that retailers are seen as more dependable when they recognize a self-determination more superior in their interactions with the retailers. Also, to empower

consumers means providing them with sufficient knowledge and self-determination to allow them to exercise control and authority over a particular decision (Khenfer et al., 2020). For this reason, the essence of customer empowerment depends on customers distinguishing their own skills and capabilities as sufficient to pursue successfully, despite of their actual competences (Khenfer et al., 2020).

If consumers perceive to have been provided with this kind of customer empowerment by the retailer, it might positively affect the attitude the consumer has toward the retailer and its products and services. An individual who is forced to use either manned checkout or self-service checkout, might experience less customer empowerment and further develop negative attitude toward the alternative. This might further influence the individual's attitude toward the retail chain. It is therefore likely that customer empowerment plays a significant role in consumers attitude formation, and perceived relative advantage regarding checkout-alternatives. Therefore, the following hypotheses are proposed:

H₅: Customer empowerment is positively associated with attitude.

H₆: Customer empowerment is positively associated with perceived relative advantage.

2.2.4 Covid-19

Due to the major disruption caused by the covid-19 pandemic there has been a change in consumers shopping behaviours (Wang et al., 2021). The social contact has been minimized by using different contactless technologies, such as self-service checkouts (Wang et al., 2021). The pandemic has created a global trend of digitalization at a rapid pace, which further leads to an orientation shift in the service industry from high touch to high-tech orientation (Wang et al., 2021).

Wang et al. (2021) argues that the pandemic has brought new perspectives into consumer's minds, which has led consumers to think of self-service as no longer just a service consideration, but also a consideration of health and psychological importance. Further, Duong (2021) examined the impact of fear and anxiety of covid-19 on life satisfaction, using psychological distress and sleep disturbance as mediators. The study show evidence that there is a strong link between psychological distress and fear and anxiety of covid-19. Whereas psychological distress is a negatively emotional form that indicates unpleasant emotional reactions to stressful

situations (Duong, 2021). For example, emotions about a situation being uncontrolled and overwhelming (Duong, 2021). Fear is a reactive state of emotion to a real or potential threat perception, which is associated with thoughts about instant danger and escape actions (Duong, 2021). It is further accompanied by anxiety when the individual is trying to deal with a threat unsuccessfully, these two unlikable states are often experienced together (Duong, 2021).

These definitions can explain the relevancy of using the concepts in this study. Because covid-19 are identified as a contagious and deadly disease with no specific cure or vaccine, many individuals might be undergoing intensified fear and anxiety for this reason (Duong, 2021). If this is the case for the consumer it might be natural to perceive self-service checkout as a better alternative due to the minimized contact with other people, thus also minimizing the risk of getting infected with the virus. Therefore, fear and anxiety of covid-19 might be directly influencing the consumers attitude and perceived relative advantage of the service. However, as proven by Duong (2021), fear and anxiety of covid-19 can also influence the internal psychological distress of the individual. To exemplify, the rapid spread of the pandemic combined with the uncertainty many people might have felt because the virus was new and unknown, it is likely that fear and anxiety of covid-19 can lead an individual to perceive the situation as being uncontrolled and overwhelming.

Additionally, psychological distress might directly influence attitude and perceived relative advantage. Individuals generally feeling overwhelmed, depressed, and anxious might experience less such negative emotion using self-service checkout in comparison to other alternatives. For example, when using manned checkout, the customer is forced to physically interact with the staff. This kind of social contact might increase the level of anxiety if one is more receptive to this kind of emotion. Thus, further increasing the attitude toward self-service. Hence, the following hypotheses are proposed:

H₇: Fear & anxiety of covid-19 is positively associated with attitude

H₈: Fear & anxiety of covid-19 is positively associated with perceived relative advantage

H₉: Fear & anxiety of covid-19 is positively associated with psychological distress.

H₁₀: Psychological distress is positively associated with attitude

H₁₁: Psychological distress is positively associated with perceived relative advantage

2.2.5 Perceived relative advantage and attitude

Perceived relative advantage is the degree to which the individual or consumer views the innovation to be better than other alternatives (Wang et al., 2018). It is dependent on whether the innovation is perceived to be advantageous by the individual (Yuen et al., 2018).

Several studies on SSTs are based on the theoretical framework of diffusion innovation theory (DOI). The paper on self-collection service via automated parcel station written by Wang et al. (2018) is an example of that. They used The Theory of Reasoned Action (TRA) to provide the underlying theoretical structure of their study and supplemented with the innovation diffusion literature to provide a theoretically based set of beliefs concerning the perceived characteristics of innovation (Wang et al., 2018).

Wang et al. (2018) reveal that attitude is the most important factor for explaining the consumers' adoption intention of APS. Based on the similarities between APS and self-service checkouts, it is natural to expect the same relations in the context of this paper. Given the definition of attitude, it is likely that perceived relative advantage would be a part of the "learned predisposition" of an attitude. To exemplify, if an individual perceives self-service checkout to align with their lifestyle or needs, this might be due to direct experience from trying self-service checkouts, it might also be due to word-of-mouth and information acquired from others. Hence, the perception of advantageousness is learned from previous interactions with the service. Therefore, it is likely that this perception would affect the overall attitude in a positive way, and the following hypothesis is proposed:

H₁₂: Perceived relative advantage is positively associated with attitude

2.2.6 Perceived relative advantage and adoption intention

According to Wang et al. (2018) perceived relative advantage is "consistently the best predictor of consumers' adoption of innovation". He further states that there is a significant difference between this construct and other innovation characteristics given by the innovation adoption literature. Perceived relative advantage stressing the degree to which using the innovation is better than other alternatives, thus being a comparative term, while the other characteristics are concerned with the innovation itself (Wang et al., 2018). A high degree of perceived relative advantage will mean that the overall evaluation made by the individual or consumer is that the innovation is better than other alternatives available (Wang et al., 2018). Based on this argument, a consumer that is rational would form a strong adoption intention because the other alternatives

are no longer optimal (Wang et al., 2018). Wang et al. (2018) therefore argued that “perceived relative advantage is a second-tier perception, comparable to the attitude construct, built upon a comprehensive assessment of the innovation and directly contributing to the consumers’ adoption intention”. Their research showed that perceived relative advantage is directly linked to the consumers’ adoption intention (Wang et al., 2018).

When comparing the innovation to other alternatives, this can be done using measures in economic terms, social-prestige factors, convenience, and satisfaction (Yuen et al., 2018). In the context of this study, individuals may perceive self-service to be more advantageous than a manned checkout for their economic value, e.g., coupons or other incentives used by the retailer. It can also be perceived as more advantageous due to social prestige, e.g., a wish to conformance with important referents such as family members and close friends who prefer using self-service checkouts. Convenience can also be the reason for perceived advantageousness, e.g., the manned checkout has longer queues. Additionally, it can be perceived as more advantageous because of satisfaction, e.g., bad experience with the staff working in the manned checkout, or better experiences from previous usage of self-service checkouts compared to manned checkout. When an individual perceives such advantage over manned checkout, they might have stronger intentions to use self-service checkouts. Therefore, the following hypothesis is proposed:

H₁₃: Perceived relative advantage is positively associated with adoption intention

2.2.7 Attitude and adoption intention

Given the definition of attitude mentioned previously, it is natural to expect attitude to have an impact on intention. If the object is self-service checkouts, the attitude held by a given individual would be a learned predisposition to behave in a consistently favourable or unfavourable way regarding self-service checkouts. The keyword in this sentence is behave. For example, if the attitude is positive the individual would have a predisposition to behave in a favourable way regarding the self-service checkouts. In the context of this study, this would mean using the self-service checkouts. It therefore seems to be a clear connection between attitude and behaviour. Thus, it is also expected that there will be a connection between attitude and behavioural intention. Hence, the following hypothesis is proposed:

H₁₄: Attitude is positively associated with adoption intention

2.2.8 Conceptual model

The theoretical foundation and discussion have resulted in fourteen suggested hypotheses. These hypotheses are summarized in the conceptual model of this study, illustrated in figure 1.

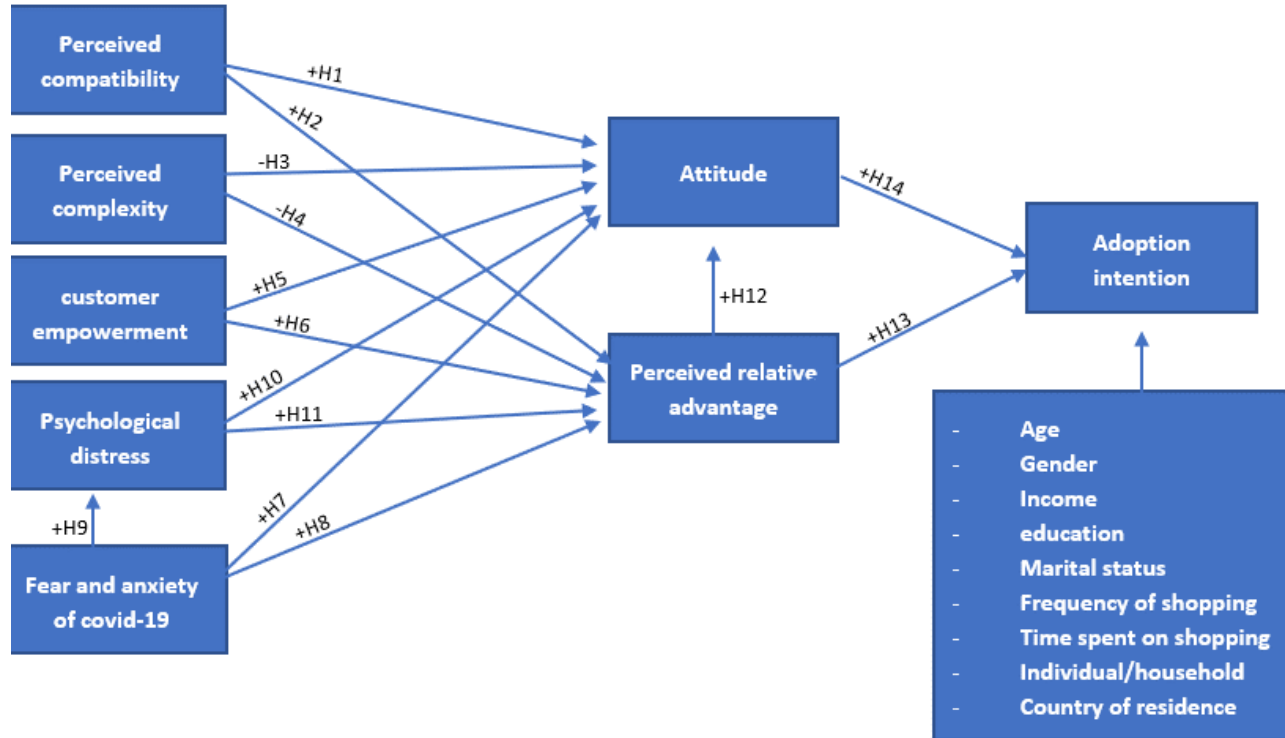


Figure 1: Conceptual model

3 METHODOLOGY

3.1 INTRODUCTION

Our ambition with this study is to investigate which factors that stimulate favourable attitudes toward the adoption of self-service checkouts. In this part of the thesis, we present the choice of research method and elaborate on the approach and implementation of the methodology and research process. This is presented so that the reader will get a clear overview of how we proceeded when designing and carrying out the research. It will also demonstrate how the data was obtained and handled, to answer the given research question. First, the development of the research question and choice of research design is presented and described, where it is also argued as to why this choice of method is made concerning the subject of matter. After that, the choice of research method is presented, followed by the operationalisation and consistency of measure, as well as the accuracy of measurement. Additionally, the selection strategy and data collection procedure are introduced, and lastly, the ethical aspects of the methodology and research are elaborated.

3.2 DEVELOPMENT OF RESEARCH QUESTION

The starting point for every empirical study is the chosen topic, meaning the field one wishes to cover. Here you point out hypotheses that are to be regarded as an assertion about how a relationship behaves (Jacobsen, 2018). This emphasises the fact that any research questions designed must be able to be studied empirically, meaning that the research question must be concretized and thus be brought from a theoretical level to an operational level (Jacobsen, 2018). In this case, we were approached by our lecturer in marketing research, who had a suggestion regarding the research question. Since the proposal was a topic that we found to be very interesting and felt relevant at this point - we took it into further consideration. In combination with reading earlier research on the topic of matter and narrowing it down to the specific concept and variables we wanted to investigate, we were able to establish the research questions and conceptual framework of our study.

3.3 CHOICE OF RESEARCH DESIGN

When the research question was developed and settled, we had to make a choice about the research design best aimed at answering it. Considering our goal is to examine which conditions

or factors occur at one given point, we concluded with a cross-section study. Thereon we decided to conduct a study containing many respondents, to get a complete overview. Hence, the choice of a sample survey was made. This was chosen because the sample would consist of different individuals, from different contexts. Sample studies thereon periodize the variation and possibilities for statistical generalization (Jacobsen 2018). However, the negative aspect is the chance of ending up with thin descriptions. You therefore, possess the risk of not being able to explain the substantial interaction between individual and context (Jacobsen 2018). Despite the negative aspects, we determined that a cross-sectional study was best suited for our study.

3.4 CHOICE OF RESEARCH METHOD

The choice of method in this research is the quantitative method. This was because we wanted to conduct a study that covered many units; thus, an extensive approach became the most suitable choice. The purpose of such a method is the ability to easily systematize the data we have retrieved, by reducing information obtained into variables used for analysis (Jacobsen, 2018). Such a method also refers to variation and relation between different conditions, making it easy for us to structure the information (Jacobsen, 2018). By using the program of SPSS, a statistical software system, it was easy to import our collected data for further analysis.

Since standardizing the data means being able to collect large amounts of data, we avoided the problem linked to high costs and time consumption. This meant that we were able to obtain many respondents, which led us to have the opportunity for generalization. However, the disadvantage is the challenge of going in depth with regards to individual variations in the respondents (Jacobsen, 2018). It is also a quite inflexible and rigid method, since most the phases of the study must be performed step by step (Jacobsen, 2018).

3.5 OPERATIONALISATION

Considering that quantitative studies are based on categorization and clarification being made on key factors *before* that survey can be conducted, Jacobsen (2018) argues that it is highly crucial to pre-categorize the concepts. For this reason, the concern of conceptual validity becomes highly relevant (Jacobsen, 2018). To be able to handle the concern regarding conceptual validity, we had to operationalize the concepts we wished to measure. However, it is not possible to know all the questions measuring a concept. This made us emphasize the implementation of the

theoretical basis. Operationalisation means concretizing complex, abstract and subjective conceptions (Jacobsen, 2018). Meaning that when you operationalize a concept, you transform it into a concept that is both operational and measurable (Jacobsen, 2018).

In this study, the operationalisation was carried out by us searching for previous research and articles. We studied and read articles that dealt with the subjects and concepts that shaped what we wished to examine and for the given research question. Since such concepts cannot be measured directly, one must develop concrete indications of them – by concretising the concepts into specific questions. In that regard, we found articles that had previously operationalized and shaped questions and dimensions that were measuring the concepts implemented in our conceptual framework. Meaning that it had been tested over time and poor questions have already been singled out (Jacobsen, 2018). This led us to be left with the questions that best measured the abstract concepts, and therefore have the aspects of being validated.

The indicators/Items for the constructs are provided in table 1 below. For additional information, see codebook in appendix 8.1.

Constructs	Indicators/Items
Perceived compatibility	CPA1, CPA2, CPA3, CPA4
Perceived complexity	CPL1, CPL2, CPL3, CPL4, CPL5
Perceived relative advantage	RAD1, RAD2, RAD3, RAD4, RAD5
Attitude	ATT1, ATT2, ATT3, ATT4
Adoption Intention	INT1, INT2, INT3
Customer Empowerment	CE1, CE2, CE3, CE4, CE5
Psychological distress	PD1, PD2, PD3, PD4, PD5, PD6
Fear and anxiety of covid-19	FAC1, FAC2, FAC3, FAC4, FAC5

Table 1: Constructs and indicators

3.6 RELIABILITY AND VALIDITY

A study should be a method of collecting empirical data and regardless of what empirical data one is studying, it should satisfy the requirements of being reliable and valid (Jacobsen, 2018). The quality of quantitative data is therefore expressed in terms of reliability and validity – where the reliability examines how trustworthy the data is, and where validity ensures that the

operational definition is following the theoretical terms used in the research question (Oppen, Mørk & Haus, 2020). Conceptual and internal validity are thus strictly necessary for our research to be meaningful and possible to generalize (Oppen, Mørk & Haus, 2020). Convergent validity can be defined as the degree of correlation between questions that should measure the same concept (Oppen, Mørk & Haus, 2020). This means that where all the questions associated with the different theoretical concepts come together under the same factor, good convergent validity has been achieved (Oppen, Mørk & Haus, 2020). We ensured this by running factor analysis.

Reliability further indicates whether the results we obtain are reliable, stable, and reproducible (Oppen, Mørk & Haus, 2020). We examined this by running a reliability of scale analysis, which also can be used to measure the internal validity of the data.

3.7 SELECTION STRATEGY

As mentioned, the main reason for choosing a quantitative method is the intention of getting a representative description of the population (Jacobsen, 2018). In this context, it means obtaining answers from many respondents. Since it was impossible to obtain answers from every citizen in Norway – we had to have a selection strategy. Our strategy was to make use of a non-probability choice, more specifically self-selection (Jacobsen, 2018). The attribute of such a strategy is that units decide for themselves whether they want to participate or not (Jacobsen, 2018). We chose to share our survey on various social media, where we also encouraged people to share the link further. As we knew it can be difficult to get people to respond to such “general” surveys, we tried targeting certain groups we thought would be suitable and willing to answer. However, our main target group was people above the age of 18.

It was important for us to ensure that the selection was representative to not end up with a systematically skewed selection (Jacobsen, 2018). We were aware that the chosen strategy could lead to some respondent dropouts. Some respondents might pass up on some of the questions in the survey, and others might perceive some questions to be of a sensitive kind. We also took into consideration that the survey is posted online, where you risk missing out on a large proportion of elderly people. This is due to users of social media are often of the younger generation, and perhaps more accustomed to such types of surveys. One solution would be to stand in the mall to collect answers, but due to the coronavirus, it was not possible. Therefore, it is considered a

limitation in the study. On the other hand, the strategy was timesaving, making it possible for us to focus on other parts of the study meanwhile.

3.8 DATA COLLECTION

When collecting primary data, you usually make use of a questionnaire, and regardless of the data collection method used, some instruments must be designed to best document the information being collected (Wilson, 2012). The focus here is the measurement of devices, i.e., the questions being asked in the questionnaire. It is the questions that act as instruments for measuring the theoretical concepts (Jacobsen, 2018). And as previously mentioned, we used already operationalized questions to measure the concepts we had implemented in our conceptual model. Further, we changed the questions from the previous research, so they would better fit our study, see appendix 8.2.

There are three different kinds of measurement levels for the questions, nominal, ordinal, and ratio (Jacobsen, 2018). We chose to have a combination of all three in our questionnaire. The concepts of *Perceived compatibility*, *Perceived complexity*, *Customer empowerment*, *Fear & anxiety of Covid-19*, *Perceived relative advantage*, *Psychological distress*, and *Adoption intention* are all measured on an ordinal level, with a seven-point Likert scale. Whereas the concept of *attitude* is also measured with an ordinal level, but with a semantic differential scale. Lastly, the control variables are a combination of open-ended questions (*Age*), categorical (i.e., *Gender*, *Marital status*, *Country of residence*..), and ratio (i.e., *How often do you visit a grocery store per week?*..).

The survey had to contain simple questions without ambiguity (Wilson, 2012). It also needed a functional structure, without any “sensitive” questions at the beginning of the survey, and with no questions that are strongly influenced by the other questions (Wilson, 2012). To deal with these requirements, we chose to have a variation in the order of the questions. We also split the questions measuring *Fear & anxiety of Covid-19* and *Psychological distress*, so that the respondent would not be affected by question context effects (Jacobsen, 2018). In addition, we translated the survey from English to Norwegian, so that the respondents would fully understand the survey. After doing so, we got an independent professor to oversee the translation. Finally, we tested the questionnaire on some selected people who gave us feedback on things difficult to understand, which we changed accordingly before posting it.

To be able to post it on various social media, we chose a web-based questionnaire using Google Forms. Using this software made it easy for us to sort the data that we had retrieved and transfer it further into Microsoft Excel, before conducting the analyses in SPSS. But there are some issues associated with using a web-based questionnaire. Firstly, and as mentioned, it is difficult to get people to answer. It thus requires the respondents to be quite resourceful and possess an interest in the study and its purpose (Jacobsen, 2018). It also took quite a long-time getting answers from people, and much time was spent on pushing the survey. However, on the positive side were the low costs associated with the software free of charge. It was easy to design the questionnaire and did not take a long time to make. All in all, we concluded that the best suited for our study was a web-based design.

3.9 ETHICAL ASPECTS

Research that studies people always has consequences and as researchers, we had to think thoroughly through how our study can affect the respondents, and how the research will be perceived and used (Jacobsen, 2018). This means that we were faced with some ethical dilemmas during the process, which we had to manage. To handle this concern, we made sure that there was informed consent, i.e., that respondents knew that it was voluntary to answer. We also made sure to clearly explain what the study was about, and what it was intended for. It was also important for us that we set privacy requirements for our respondents. As some of the questions in the survey may be of both sensitive and private nature, we made sure that none of the respondents could be identified as individuals. To further ensure the anonymity of the respondents, we will delete the data as soon as the bachelor thesis is handled in. And even though we did not collect any personal information, we sent the project to NSD, Datafalg sekretariat ved Norsk Samfunnsvitenskaplig datatjeneste (Jacobsen, 2018), which approved the application.

As much as we took actions to ensure the ethical aspects, there were some weaknesses. Since it was a web-based survey, anyone who had access to the link would be able to respond. This means that we could not be completely sure that the person choosing to respond had the full competence to do so. Nor could we be entirely sure that the person who answered understood the information given in the survey. It is also important to mention that despite the age limit of 18 years old and above, a minor could have easily manipulated the age by writing a higher number.

No study is thereon without any ethical dilemmas, but these are seen as critical aspects in this study.

4 ANALYSES

4.1 DESCRIPTIVE ANALYSIS

The analysis-process began with cleaning the data. First, we conducted a descriptive analysis, where we used descriptives for the continuous variables and frequencies for the categorical variables. The intention with this is to avoid data errors in further analysis, such as uncovering potential outliers. We discovered data error on item ATT4 where the lowest value was 0, meaning outside the value range. We therefore went back to the raw data and changed accordingly. Further, the dataset had very few cases of missing values. Because the cases were few, we changed these to neutral values. Which resulted in a total number of 176 valid responses, and no missing values.

Neither of the questions in this survey are negatively worded, thus there is no need for recoding into reversed scales. However, age was obtained as a continuous variable which can be challenging to use in further analysis, we therefore computed age into six groups. Most groups have an interval of 9, however we decided to split the age interval from 18 to 30 into two groups. We did this because we consider these groups as individuals in different traditional family lifecycles (Schiffman et al, 2012). These changes resulted in the distribution of percentage shown in figure 2.

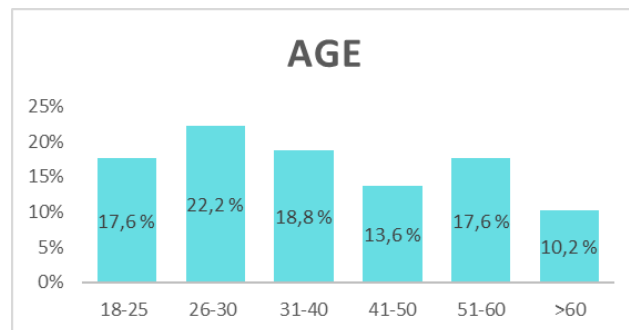


Figure 2: The distribution of percentage in age

4.1.1 Key concepts

As the table in appendix 8.3 show, the mean scores vary from the lowest being 1.76 (CPL2) to the highest being 5.67 (INT3). The mean score is a measure of the central tendency and can be an indication of what the most typical response is (Jacobsen, 2018). One can calculate the mean score by summarizing all responses and divide on the number of responses (Oppen, Mørk & Haus, 2020). If the dataset has extreme values in either the higher or lower end, the mean score

can give a false representation of the most popular response (Oppen, Mørk & Haus, 2020). In such cases, other measures of central tendency would be preferable, for example median or mode.

Further, the standard deviation varies from 1.206 to 1.952. The lowest being on item CPL2 and the highest being on both CPA3 and PD4. Standard deviation will show how much the responses in average deviate from the mean score (Oppen, Mørk & Haus, 2020). A high spread of scores would give a high standard deviation, and if most of the responses are located around the mean score it will be a low spread of scores, thus a low standard deviation (Oppen, Mørk & Haus, 2020).

The indication of normal distribution can be measured by skewness and kurtosis (Oppen, Mørk & Haus, 2020). For the items to be considered as normally distributed, both measures should be within the limit intervals of -2 to 2 (Oppen, Mørk & Haus, 2020). In this case, all items except CPL2, CPL4, PD2 and FAC4 are considered normally distributed. Which again indicates that one can generalize the results from the analyses.

4.1.2 Demographics

Most of the respondents in this study were females, they counted for 67 percent. According to Løvhaug (2018) the distribution between genders in Norway is close to equally distributed, which means that the sample of this study is not representative for the population.

Further, as much as two thirds of the respondents are married or living with a partner (68.8%). To be able to use marital status in analysis later, we recoded the variable into a dummy variable where “single”, “divorced” and “widowed” were joined into “living alone”. Which resulted in a percentage of 31.2 %.

The table of frequencies show an even higher percentage of respondents shopping for a household (72.2%) than respondents living with a partner, in comparison to shopping for one individual and to living alone. This can be due to some individuals might be living without a partner, but in a household with children.

Not many of the respondents report a level of education in the highest or lowest end of the scale, they are mostly surrounded around the middle section. Skewness and kurtosis are respectively -0.42 and -1.114, which means the responses are a bit lower and more to the left, as one can see from figure 3. Still, they are both within the limit intervals, thus create a basis for generalization (Oppen, Mørk & Haus, 2020).

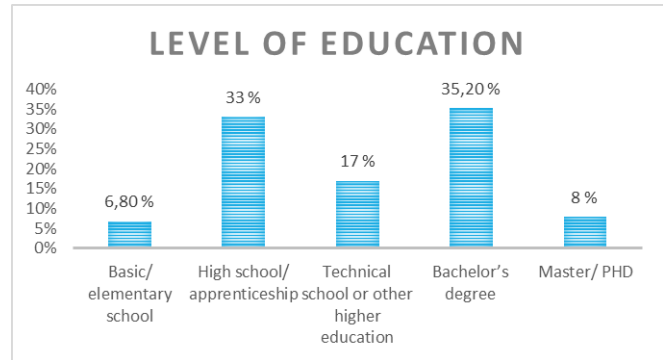


Figure 3: Distribution of percentage between levels of education

Level of income has a mean of 2.93, which means it is close to the middle score of the scale. The middle score represents a yearly gross income between 350 000 NOK and 549 999 NOK, which also count for most of the responses (36.4%). According to Fløtre & Tuv (2022) the average yearly gross income in Norway in 2021 was 610 000 NOK, however the median was 550 000 NOK. Which indicates that our sample represents the lower end of the average. Further, the variable is normally distributed with skewness and kurtosis being respectively -0.088 and -0.585. Thus, there is a basis for generalization.

None of the respondents answered: “not at all” when asked “How often do you visit a grocery retail store per week?”. We therefore created a new variable where we removed the first alternative. After doing so, we got a mean score of 3 and both skewness and kurtosis are within the limit intervals of -2 to 2. However, out of the six items, alternative 2 and 3 count for as much as 60% of the responses, with respectively 30% each.

The most frequent respons when asked about the duration of a typical trip to the grocery store is “10 – 20 min” (51.7%). Less than 10% of the respondents reported alternatives above 30 minutes. This variable is also normally distributed with skewness and kurtosis of respectively 0.867 and 1.109.

<i>Demographics</i>	<i>Category</i>	<i>Frequency</i>	<i>Percent</i>
Gender	Male	58	33
	Female	118	67
Marital status	Single	43	24,4
	Married/ living with partner	121	68,8
	Divorced	7	4
	Widowed	5	2,8
Level of education	Basic/ elementary school	12	6,8
	High school/ apprenticeship	58	33,0
	Technical school or other higher education	30	17,0
	Bachelor's degree	62	35,2
	Master/ PHD	14	8,0
Income	Below 150 000	19	10,8
	150 000 – 349 999	39	22,2
	350 000 – 549 999	64	36,4
	550 000 – 750 000	43	24,4
	Above 750 000	11	6,3
Individual or household	One individual	49	27,8
	A household	127	72,2
Number of visits	Not at all	0	0
	Once per week	19	10,8
	2 times per week	52	29,5
	3 times per week	53	30,1
	4 times per week	26	14,8
	5 times per week	13	7,4
	More than five times per week	13	7,4
Duration per visit	Less than 10 min	30	17,0
	10 – 20 min	91	51,7
	21 – 30	43	24,4
	31 – 40	8	4,5
	More than 40 min	4	2,3

Note: $n = 176$

Table 2: Frequencies of demographics

4.2 FACTOR ANALYSIS

Factor analysis is a collective term for several different analysis approaches, where the purpose and primary use is to reduce quantitative data (Oppen, Mørk & Haus, 2020). It narrows down the number of variables and reduces the data to a smaller set of components, meaning that it identifies the factors that represent the underlying relationship among the related variables (Pallant, 2013).

To conduct a factor analysis, we first assess if the dataset is suitable by checking that certain conditions are fulfilled. The items to be used in the analysis are mostly measured at the interval level with a seven-point Likert scale. The exception is the four items aiming to measure attitude, which is measured at the interval level with a seven-point semantic scale. The sample size is preferred to be higher than 150 (Pallant, 2013), and with respectively 176 responses the sample size of this study is sufficient.

Further, the KMO and Bartlett's test show KMO-value of 0.920, which is above the preferable limit of 0.6 (Pallant, 2013). Additionally, the sig-value of the Bartlett's test is 0.000, which means that the test is significant (see appendix 8.3). The correlation matrix shows that most of the correlations of r is higher than 3.

We conducted a factor analysis because we had several questions measuring each of our concepts, and to examine which questions that belong together. Based on our conceptual model, we had a premonition about which questions integrate with each other and tested this.

SPSS suggested five factors to be extracted and showed four of the variables loading on the same factor (see appendix 8.3). We therefore tried to run the factor analysis again with fixed number of factors to be extracted. Not surprisingly, this gave no better result due to the high correlations between the variables. The results forced us to respecify our conceptual model, which led us to splitting the model into six new models as shown in appendix 8.4. This also led us to a rearrangement of our hypotheses as well as adding five new hypotheses to our research (See table 16).

In the new models we did not remove perceived compatibility, despite this variable also being highly correlated with attitude, intention, and perceived relative advantage. We kept the variable because it was not a dependent variable. Additionally, we tested the correlation between the

variables after computing them into new variables with mean scores, and the correlation was lower than 0.9 as preferred to be suitable for regression analysis to avoid multicollinearity (Oppen, Mørk & Haus, 2020).

After creating new models, we conducted three different factor analyses where we included one dependent variable in each, in accordance with model 1,2 and 3. All the different factor analyses passed the KMO and bartlett’s test, with KMO values greater than 0.6 and sig. value of 0.000. As expected, all of them also suggest extracting five factors because the items measuring perceived compatibility loads on the same factor as the dependent variables (see appendix 8.5). With the purpose of this study, we choose to extract six factors despite these results, as argued earlier.

4.3 RELIABILITY ANALYSIS

<i>Construct</i>	<i>Item</i>	<i>N</i>	<i>Cronbach’s alpha</i>
<i>Intention</i>	INT1, INT2, INT3	3	0.987
<i>Attitude</i>	ATT1, ATT2, ATT3, ATT4	4	0.952
<i>Perceived relative advantage</i>	RAD1, RAD2, RAD3, RAD4, RAD5	5	0.964
<i>Perceived compatibility</i>	CPA1, CPA2, CPA3, CPA4	4	0.981
<i>Perceived complexity</i>	CPL1, CPL2, CPL3, CPL4, CPL5	5	0.922
<i>Customer empowerment</i>	CE1, CE2, CE3, CE4, CE5	5	0.781
<i>Psychological distress</i>	PD1, PD2, PD3, PD4, PD5, PD6	6	0.925
<i>Fear and anxiety of covid-19</i>	FAC1, FAC2, FAC3, FAC4, FAC5	5	0.861

Table 3: Constructs and Cronbach's alpha

Before combining the items to new variables, we had to ensure internal consistency. It is important to ensure this, because internal consistency refers to how much the items in each variable ‘hang together’ (Pallant, 2013). The measure used in this study is Cronbach’s alpha (CA). This measure is based on a calculation taking the variation in the question and the correlation the question has with the other questions related to the same concept into account (Oppen, Mørk & Haus, 2020). A precondition to using this measure is that every construct has a minimum of two items (Oppen, Mørk & Haus, 2020), which one can see from table 3 is fulfilled. Further, the CA value should be greater than 0.7 to be able to conclude with internal consistency (Pallant, 2020). All the variables show sufficient CA value, see table 3. We therefore can conclude with reliability of scale, and thereon created new variables with mean scores to be used in further analysis.

4.4 REGRESSION ANALYSIS

Regression analyses are used to test and show causal relationships (Oppen, Mørk & Haus, 2020), which is why we use it to test our hypotheses. It is a method for describing the connection between one or more independent variables and a dependent variable, where one distinguishes between simple and multiple regression (Oppen, Mørk & Haus, 2020). We conducted six different analyses, one for each of the models.

4.4.1 Model 1

We used a multiple linear regression with the purpose of investigating if intention can be explained by a set of independent variables (H_1 - H_5), see figure 4.

Before testing the hypotheses, we have to make sure some assumptions are fulfilled. First, we check for multicollinearity, which refers to the relationship between the independent variables and are present if these variables are highly correlated (Pallant, 2020).

According to Pallant (2020), such multicollinearity exists if the pearson r coefficient is 0.7 or higher. None, except perceived compatibility show a higher correlation than 0.7, see appendix 8.6.

However, a more accurate way of determining if multicollinearity exist is by assessing tolerance and VIF (Oppen, Mørk & Haus, 2020), and will therefore be used in further analysis. If tolerance is lower than 0.10, it is an indication of high correlation between the variables, thus suggesting multicollinearity (Pallant, 2020). VIF (variance inflation factor) is the inverse of the tolerance and should not be higher than 10 to conclude with no multicollinearity issues (Pallant, 2020). We can see from the coefficient table (see table 5) that both VIF and tolerance are within the limit-intervals for all variables, and we therefore conclude with no multicollinearity issues.

The ANOVA test will assess whether the results from the regression analysis is statistically significant (Pallant, 2020). From appendix 8.7, one can see that the ANOVA test of model 1 is significant with a sig value of 0.000.

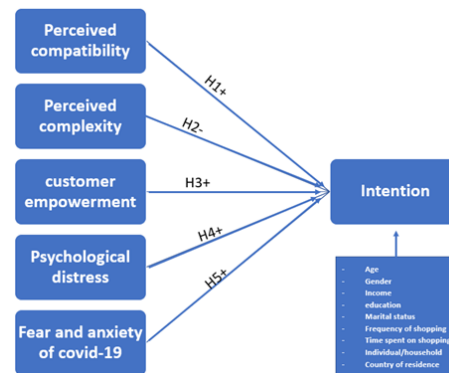


Figure 4: Model 1

Model 1, Summary			
<i>Dependent variable: Intention</i>			
R	R ²	Adjusted R ²	Std. Error of the Estimate
0,856	0,733	0,712	0,96175

Table 4: Model summary of Model 1

After checking that all the assumptions are fulfilled, the next step is to evaluate the model. The model summary provides a measure called R² or R square. This measure expresses the degree to which the variance of the dependent variable (in this case, intention) can be explained by the independent variables (Pallant, 2020). Some scholars argue that one should use the adjusted R² in a multiple regression analysis, because this measure takes the number of independent variables into consideration (Oppen, Mørk & Haus, 2020). However, according to Pallant (2020) the concerns associated with using R² in a multiple regression is only prominent when a small sample is involved. Our sample is, as mentioned earlier, greater than the preferred limit, thus we will use R² in further analysis. As one can see from table 4, the independent variables in model 1 can explain 73.3% of the variance in intention.

MODEL1 – Regression (Dependent variable: Intention)					
	Standardized beta	T	Sig. value	Tolerance	VIF
Perceived compatibility	0,680	12,083	0,000	0,521	1,921
Perceived complexity	-0,206	-4,216	0,000	0,689	1,451
Psychological distress	-0,015	-0,292	0,771	0,653	1,531
Fear and anxiety of covid-19	0,025	0,540	0,590	0,764	1,309
Customer empowerment	0,038	0,792	0,429	0,707	1,413
Gender	0,033	0,732	0,465	0,825	1,212
Age	-0,080	-1,477	0,142	0,557	1,794
Marital status	-0,040	-0,723	0,471	0,525	1,904
Level of education	-0,005	-0,095	0,924	0,707	1,415
Yearly gross income (NOK)	0,030	0,550	0,583	0,536	1,867
Individual or household	-0,023	-0,394	0,694	0,488	2,048
Duration of visit	0,014	0,314	0,754	0,778	1,285
Living with partner or living alone	0,022	0,483	0,630	0,813	1,231

Table 5: Regression analysis of Model 1

Out of the five independent variables in model 1, there are only two variables showing a significant unique contribution to the dependent variable. These two are perceived compatibility (CPA_MEAN) and perceived complexity (CPL_MEAN), both with a sig.value of 0.000. Which further means we can reject hypotheses H₃-H₅ suggesting that customer empowerment, psychological distress and fear and anxiety of covid-19 would have a positive effect on intention.

The variable with the largest contribution in predicting intention out of the two significant predictors is perceived compatibility with a standardised beta value of 0.680. Which means that

if perceived compatibility change with a one standard deviation unit, intention would increase with a 0.680 standard deviation unit. Further, perceived compatibility has a standardised beta value of -0.206, which again would mean that if perceived compatibility would change with a one standard deviation unit, intention would decrease with a 0.206 standard deviation unit.

4.4.2 Model 2

To test model 2, we again conducted a multiple regression analysis. In this regression analysis the aim is to detect whether perceived relative advantage can be explained by the same set of independent variables, see figure 5.

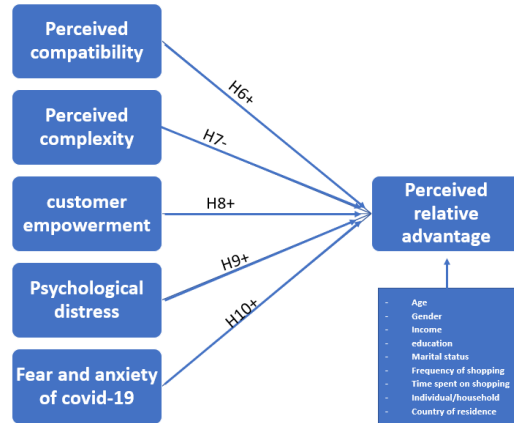


Figure 5: Model 2

From appendix 8.8, one can see that the ANOVA test of model 2 is significant. The same assumptions as in the previous model must also be fulfilled in this analysis. The tolerance and VIF values are all within the limit-intervals, see table 7. Thus, we conclude with no issues regarding multicollinearity.

Model 2, Summary			
<i>Dependent variable: Perceived relative advantage</i>			
R	R ²	Adjusted R ²	Std. Error of the Estimate
0,831	0,690	0,665	0,97642

Table 6: Model summary of Model 2

According to the model summary shown in table 6, the coefficient of determination, R², is 0.690. Meaning that the independent variables explain 69% of the variance in the dependent variable, perceived relative advantage.

MODEL2 – Regression (<i>Dependent variable: Perceived relative advantage</i>)					
	Standardized beta	T	Sig. value	Tolerance	VIF
Perceived compatibility	0,594	9,807	0,000	0,521	1,921
Perceived complexity	-0,157	-2,974	0,003	0,689	1,451
Psychological distress	0,085	1,578	0,116	0,653	1,531
Fear and anxiety of covid-19	0,030	0,602	0,548	0,764	1,309
Customer empowerment	0,160	3,081	0,002	0,707	1,413
Gender	-0,021	-0,440	0,661	0,825	1,212
Age	-0,052	-0,881	0,379	0,557	1,794
Marital status	0,003	0,058	0,954	0,525	1,904
Level of education	0,044	0,853	0,395	0,707	1,415
Yearly gross income (NOK)	0,013	0,217	0,829	0,536	1,867
Individual or household	0,015	0,235	0,814	0,488	2,048
Duration of visit	-0,039	-0,777	0,439	0,778	1,285
Living with partner or living alone	0,043	0,877	0,382	0,813	1,231

Table 7: Regression analysis of Model 2

In model 2, there are three significant predictors. These are perceived compatibility, perceived complexity and customer empowerment with sig. values of respectively 0.000, 0.003 and 0.002. Which further means that we can reject hypotheses H₉ and H₁₀. Despite all three variables mentioned are significant, the level of contribution in explaining the dependent variable (perceived relative advantage) differs between them. Perceived compatibility shows the largest contribution with a standardised beta value of 0.594. In comparison, perceived complexity and customer empowerment have a standardised beta value of respectively -0.157 and 0.160.

4.4.3 Model 3

Model three consist of the same five independent variables as in model 1 and model 2, see figure 6. However, the dependent variable in this model is attitude. In this case we also used a multiple regression analysis to investigate if attitude can be explained by these five variables.

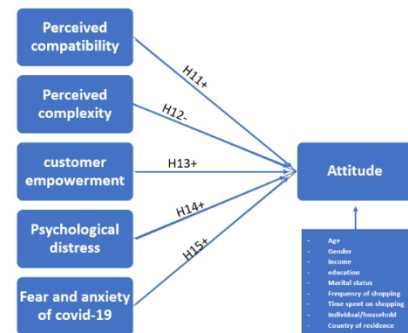


Figure 6: Model 3

The ANOVA test of model 3 is significant, see appendix 8.9.

Both tolerance and VIF are within the preferred limit-intervals

also in this regression analysis, thus we conclude with no multicollinearity issues.

Model 3, Summary			
<i>Dependent variable: Attitude</i>			
R	R ²	Adjusted R ²	Std. Error of the Estimate
0,835	0,697	0,672	0,97405

Table 8: Model summary of Model 3

The coefficient of determination is 0.697. Which means that the independent variables explain 69.7% of the variance in the dependent variable, attitude.

MODEL3 – Regression (Dependent variable: Attitude)					
	Standardized beta	T	Sig. value	Tolerance	VIF
Perceived compatibility	0,619	10,311	0,000	0,521	1,921
Perceived complexity	-0,205	-3,930	0,000	0,689	1,451
Psychological distress	0,026	0,480	0,632	0,653	1,531
Fear and anxiety of covid-19	0,015	0,295	0,769	0,764	1,309
Customer empowerment	0,110	2,136	0,034	0,707	1,413
Gender	-0,035	-0,725	0,469	0,825	1,212
Age	-0,063	-1,080	0,282	0,557	1,794
Marital status	-0,025	-0,418	0,677	0,525	1,904
Level of education	0,012	0,237	0,813	0,707	1,415
Yearly gross income (NOK)	0,049	0,822	0,412	0,536	1,867
Individual or household	0,009	0,138	0,890	0,488	2,048
Duration of visit	0,031	0,622	0,535	0,778	1,285
Living with partner or living alone	0,043	0,887	0,376	0,813	1,231

Table 9: Regression analysis of Model 3

The same predictors found to be significant in explaining perceived relative advantage in model 2 is also found to be significant in predicting attitude. We therefore reject hypotheses 14 and 15, suggesting that psychological distress and fear and anxiety of covid-19 has a significant impact on attitude. The three significant predictors, perceived compatibility, perceived complexity and customer empowerment has sig. values of respectively 0.000, 0.000 and 0.034. Thus, we can conclude that H₁₁-H₁₃ is supported. The significant predictors further show variations in explanatory power. Again, perceived compatibility contributes most in explaining the dependent variable with a standardized beta value of 0.619. However, with a beta value of 0.110, customer empowerment contributes less than perceived complexity with a beta value of -0.205 in explaining attitude. While it was the opposite order in model 2.

4.4.4 Model 4

Model 4 is based on the dependent variables in model 1-3, suggesting that intention can be explained by attitude and perceived relative advantage. Multiple regression analysis was once again used to test the hypotheses.

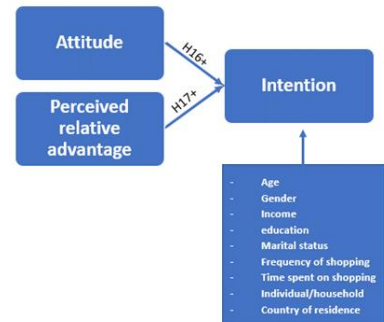


Figure 7: Model 4

The ANOVA test is significant, see appendix 8.10. There are no problems with multicollinearity, both tolerance and VIF are

Model 4, Summary			
<i>Dependent variable: Intention</i>			
R	R ²	Adjusted R ²	Std. Error of the Estimate
0,905	0,818	0,807	0,78674

Table 10: Model summary of Model 4

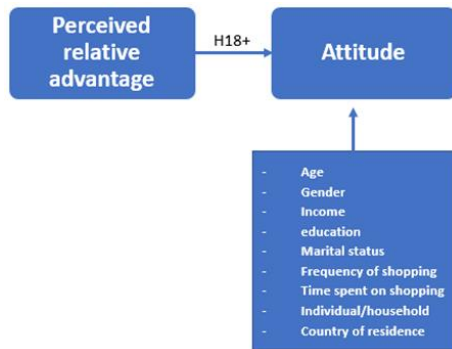
within the limit intervals. The model summary provides a R² value of 0.818. Meaning that 81.8% of the variance in intention can be explained by the independent variables.

MODEL4 – Regression (Dependent variable: Intention)					
	Standardized beta	T	Sig. value	Tolerance	VIF
Perceived relative advantage	0,283	4,355	0,000	0,261	3,837
Attitude	0,633	9,859	0,000	0,267	3,739
Gender	0,049	1,392	0,166	0,886	1,129
Age	-0,036	-0,859	0,392	0,631	1,585
Marital status	-0,021	-0,470	0,639	0,531	1,884
Level of education	0,009	0,245	0,807	0,775	1,290
Yearly gross income (NOK)	-0,014	-0,327	0,744	0,582	1,718
Individual or household	-0,034	-0,727	0,468	0,501	1,996
Duration of visit	-0,001	-0,030	0,976	0,783	1,277
Living with partner or living alone	-0,003	-0,084	0,933	0,840	1,191

Table 11: Regression analysis of Model 4

Both attitude and perceived relative advantage has a sig. value of 0.000. Which means that we can conclude with H₁₆ and H₁₇ to be supported. Further, attitude show a much greater contribution with a beta value of 0.633 in comparison to perceived relative advantage with a beta value of 0.283. Thus, attitude plays a greater role in explaining intention.

4.4.5 Model 5



In the original conceptual model shown in figure 1, there was suggested that perceived relative advantage had a direct influence on attitude, we therefore included this relationship in a separate model, see figure 8. From the model it may seem like a simple regression, however, we included the control variables in this analysis as well. Therefore, a multiple regression was conducted.

Figure 8: Model 5

The ANOVA test is significant, see appendix 8.11. Further, there were no problems with

Model 5, Summary			
Dependent variable: Attitude			
R	R ²	Adjusted R ²	Std. Error of the Estimate
0,856	0,733	0,718	0,90336

Table 12: Model summary of Model 5

multicollinearity, see table 13. In this analysis the R square value shows that 73.3% of the variance in attitude can be explained by the independent variables.

MODEL5 – Regression (Dependent variable: Attitude)					
	Standardized beta	T	Sig. value	Tolerance	VIF
Perceived relative advantage	0,833	18,596	0,000	0,803	1,245
Gender	-0,025	-0,582	0,561	0,888	1,126
Age	-0,060	-1,191	0,236	0,636	1,572
Marital status	-0,024	-0,432	0,666	0,531	1,882
Level of education	0,007	0,159	0,874	0,775	1,290
Yearly gross income (NOK)	0,039	0,747	0,456	0,584	1,712
Individual or household	-0,004	-0,063	0,950	0,501	1,996
Duration of visit	0,058	1,282	0,202	0,791	1,265
Living with partner or living alone	0,025	0,570	0,569	0,841	1,189

Table 13: Regression analysis of Model 5

None of the control variables showed a significant contribution. However, with a sig. value of 0.000 we can conclude that perceived relative advantage contributes to explaining attitude.

Additionally, the standardized beta value is 0.833, meaning that if perceived relative advantage change with a one standard deviation unit, attitude would increase with a 0.833 standard deviation unit.

4.4.6 Model 6

The last model consists of just one hypothesis, which also was suggested in the original conceptual model. This suggest that fear and anxiety of covid-19 has a positive effect on psychological distress. In contrary



Figure 9: Model 6

to the previous models, model 6 consist of just one predictor and no control variables. Therefore, we used a simple linear regression analysis, or bivariate linear regression analyses as it is often called, to test hypothesis 19.

There is no need to control for multicollinearity due to this being a simple regression analysis. The correlation between the dependent and independent variable is 0.377, which is above the preferred limit of 0.3 (Pallant, 2020). The degree of explanation provided by the model summary

Model 6, Summary			
<i>Dependent variable: Psychological distress</i>			
R	R ²	Adjusted R ²	Std. Error of the Estimate
0,377	0,142	0,137	1,41683

Table 14: Model summary of Model 6

show the coefficient of determination to be 0.142.

Meaning that 14.2% of the variance in psychological distress can be explained by fear and anxiety of covid-19.

MODEL6 – Regression (<i>Dependent variable: Psychological distress</i>)					
	Standardized beta	T	Sig. value	Tolerance	VIF
Fear and anxiety of covid-19	0,377	5,361	0,000	1,000	1,000

Table 15: Regression analysis of Model 6

Fear and anxiety of covid-19 with a sig. value of 0.000 is shown to have a significant contribution to explaining psychological distress, thus we conclude that hypothesis 19 is supported. Further, the standardized beta value show that psychological distress would increase with a 0.377 standard deviation unit if fear and anxiety of covid-19 would change with a one standard deviation unit.

4.4.7 Summary of hypotheses and findings

All results from the analyses are summarized in table 16 shown below. Control variables was included in the five first models, however none of them showed a significant contribution to explaining either of the dependent variables.

HYPOTHESES				BETA	SIG	CONCLUSION
H1	Perceived compatibility	+	→ Intention	0,680	0,000	Supported
H2	Perceived complexity	-	→ Intention	-0,206	0,000	Supported
H3	Customer empowerment	+	→ Intention	0,038	0,429	Rejected
H4	Psychological distress	+	→ Intention	-0,015	0,771	Rejected
H5	Fear and anxiety of covid-19	+	→ Intention	0,025	0,590	Rejected
H6	Perceived compatibility	+	→ Perceived relative advantage	0,594	0,000	Supported
H7	Perceived complexity	-	→ Perceived relative advantage	-0,157	0,003	Supported
H8	Customer empowerment	+	→ Perceived relative advantage	0,160	0,002	Supported
H9	Psychological distress	+	→ Perceived relative advantage	0,085	0,116	Rejected
H10	Fear and anxiety of covid-19	+	→ Perceived relative advantage	0,030	0,548	Rejected
H11	Perceived compatibility	+	→ Attitude	0,619	0,000	Supported
H12	Perceived complexity	-	→ Attitude	-0,205	0,000	Supported
H13	Customer empowerment	+	→ Attitude	0,110	0,034	Supported
H14	Psychological distress	+	→ Attitude	0,026	0,632	Rejected
H15	Fear and anxiety of covid-19	+	→ Attitude	0,150	0,769	Rejected
H16	Attitude	+	→ Intention	0,633	0,000	Supported
H17	Perceived relative advantage	+	→ Intention	0,283	0,000	Supported
H18	Perceived relative advantage	+	→ Attitude	0,833	0,000	Supported
H19	Fear and anxiety of covid-19	+	→ Psychological distress	0,377	0,000	Supported

Table 16: Summary of hypotheses

5 DISCUSSION

As the results show, the constructs originating from the DOI literature, such as CPL and CPA show a significant contribution in explaining the dependent variables, intention, attitude and perceived relative advantage. Which means that our hypotheses are supported. This is consistent with the well-established literature on innovation adoption. Also consistent with the literature, H₁₆ suggesting that attitude had a direct effect on intention, was supported.

Additionally, it was argued that perceived relative advantage would have a direct influence on attitude and intention, giving it being built upon a comprehensive assessment of the innovation. The results show that these hypotheses were supported (H₁₇-H₁₈). However, the factor analysis indicated high correlations between perceived compatibility, perceived relative advantage, attitude and intention. A correlation analysis further showed correlations just below the

preferable limit of 0.9. This might indicate problems with the operationalisation of the concepts in this context, despite using well established scales. Which further can challenge the conceptual validity. Another possible explanation is that the concepts might be perceived as very similar by the customer in this context. Which can lead the respondents to answer similar to the different questions, giving similar scores and thus high correlation in SPSS.

Customer empowerment was included in three hypotheses, H₃, H₈ and H₁₃. The results from the analyses support H₃ and H₈, meaning that customer empowerment have a significant role in predicting attitude and perceived relative advantage. However, hypothesis H₃, suggesting that increasing amount of authority provided to consumers would directly have a positive effect on adoption intention was not supported. Interestingly, neither have this been argued for previously. Our findings are consistent with our original conceptual model. Nevertheless, as mentioned above, both attitude and perceived relative advantage has a significant positive effect on intention, thus despite H₃ being rejected customer empowerment still has an indirect influence on intention, as the literature suggests.

Most surprisingly, psychological distress and fear and anxiety of covid-19 did not have any significant contribution in explaining attitude, intention, or perceived relative advantage. Thus, H₄, H₅, H₉, H₁₀, H₁₄ and H₁₅ were rejected. There can be several reasons for such results to occur. Again, there can be an issue with the operationalisation of the concepts, especially because the concepts are relatively new and unexplored. The scales used to measure these concepts are not as well established as for other research areas. However, H₁₉ suggesting that fear and anxiety of covid-19 positively effects psychological distress is supported. This can be an indication of good conceptual validity, because the connection between the constructs shown in previous research has now been tested and supported. Which further indicates no problems with the concepts, rather than the context. The results might be due to the covid-19 having less effect on the consumer behaviour in the Norwegian market than previously researched markets.

Then again, one should keep in mind that the pandemic restrictions were declining when this research was conducted. Additionally, the respondents were self-reporting the fear, anxiety and stress levels related to these constructs. Some respondents might have mis recalled their actual responses to the pandemic, others might perceive the information as sensitive, and thus give

altercated responses. Nevertheless, the expected results from previous research were not supported.

5.1 THEORETICAL CONTRIBUTION

The result from this study contributes to new knowledge about the adoption of self-service checkouts in the Norwegian grocery retailing market. Compared to previous studies, this study has included customer empowerment as a possible concept stimulating positive attitudes towards self-service checkouts. By including this concept one can get a greater understanding of the concepts involved, and the formation of these regarding innovation adoption. The hypotheses provided were supported, indicating that for further research on the topic one should not overlook the explanatory power of customer empowerment.

Further, the study contributes to a more nuanced picture of the covid-19 pandemic's influence on consumer behaviour in the context of self-service checkout adoption. Our study shows no significant relationship between covid-19 and adoption intention, not directly, nor indirectly through attitude and perceived relative advantage. However, Wang et al. (2021) stated that the pandemic changed consumer behaviour towards a more positive attitude in regards of self-service technologies. Thus, the impact of covid-19 is inconclusive and should be further examined. The study still contributes to further supporting the relationship between psychological distress and fear and anxiety of covid-19 provided by Duong (2021).

Additionally, our hypotheses with regards to the perceived characteristics provided by diffusion of innovation literature has been supported. Which provides additional strength and validity to the given framework. Further, the argumentation that perceived relative advantage should be considered a second-tier perception comparable to attitude has been supported. Which again contributes to strengthen the research of Wang et al. (2018).

5.2 MANAGERIAL IMPLICATIONS

Grocery retail chains providing self-service checkouts in the Norwegian market could increase their adoption rate by creating awareness and advise about the benefits around the use of service, this might increase the perceived relative advantage. By involving the customer in the co-creation of values, the company receives the opportunity of reduction in operating costs. By reducing expenses, the grocery retail chains can further develop and exceed the operative and

technological qualities of the self-service checkouts, making it more manageable and reducing the perceived complexity. The chains can thereon take use of the implementations and improvements, to enhance their market values, and by that achieve higher levels of competitive advantage.

Additionally, to successfully implement self-service checkouts, managers should provide the customer with a choice of using self-service checkouts rather than forcing them. By doing so, the customers might experience customer empowerment to a greater extent, thus develop more favourable attitudes towards the self-service checkouts.

Further, the results indicates that the fear and anxiety of covid-19 do not play a significant role in the attitude formation. Thus, managers should not place emphasize in this as a motivation for adopting the innovation. However, since the results are inconclusive with previous research, mangers should not dismiss this entirely either.

6 SUMMARY

Today, the rapid development of technology creates new ways for retail chains to interact with their customers. In a highly competitive market, like the Norwegian grocery retail chain industry, the need for cost-effectiveness forces them to take action to stay competitive. To cut down on costs, increase profit and improve customer satisfaction, several Norwegian grocery retail chains have therefore implemented various technological self-service solutions, where self-service checkout is one of their most common self-service technologies at present. For this reason, this study's goal is to explore what factors influence people's actions, concerning the adoption of self-service checkout. This further led to our research question "*Which factors stimulate favourable attitude towards adoption of self-service checkout?*". Previous research provided the basis necessary to further extend our research question to a conceptual model with specific hypotheses.

Innovation diffusion theory contributes with a theoretical model for understanding how consumers adopt an innovation. The framework has been extensively used in research within the topic (Wang et al. 2018), it is also serving as the basis for our conceptual model. It suggests that perceived characteristics of an innovation, such as, complexity, compatibility and relative advantage influences the attitude and intention to adopt the innovation (Wang et al. 2018).

Further, customer empowerment is the increasing amount of authority provided to consumers by the companies (Wathieu et al., 2002). According to previous research, it has a key role in customers shift from being non-active recipients to having functioning participation in the production and distribution of services (Auh et al., 2019), thus it is expected to contribute to answering our research question.

Lastly, recent studies suggest that the covid-19 pandemic has led to a change in consumers shopping behaviour towards an increase in use of self-service technologies (Wang et al., 2021). The studies suggest that the fear of getting infected by the virus through physical interaction has had a positive effect on attitude towards self-service (Wang et al., 2021).

With the aim to identify factors influencing attitude and intention towards adoption of self-service checkouts in the Norwegian grocery retail market, a conceptual model was developed based on previous research (see figure 1). However, due to high correlations between several of the dependent variables in the model (see chapter 7.2), we were forced to rearrange our model and splitting it into six different models.

The analyses thereon provided support for most of the hypotheses. The exceptions were fear and anxiety of covid-19 and psychological distress, which had no significant contribution to the dependent variables. However, fear and anxiety of covid-19 had a significant contribution in explaining psychological distress. Furthermore, the hypothesis suggesting customer empowerment to have a direct impact on intention was also rejected.

6.1 LIMITATIONS AND FUTURE RESEARCH SUGGESTIONS

No study is without any limitation, and the results of this thesis cannot be portrayed without considering circumstances further discussed. First, this thesis is primarily limited to dealing with Norwegians, in the grocery retail chain market. Even though self-service checkouts today are a quite common service offer in grocery retail stores, studies about self-service adoption seems to be a somewhat new and unexplored field in marketing research. Further research should therefore consider the use of different geographical locations, to compare differences between counties and countries. Findings could also be further tested, to see if the results show similarity and thereon can be concluded as reliable.

Second, the target group is people from the age of 18 and up, as it can be problematic to obtain consent from children and young people who are under aged. It is conceivable that people over the age of 18 have more clearly formed diverse opinions about the use of self-service checkouts, as many have been involved in the shift from exclusively manned checkout to the implementation of self-service checkouts in grocery stores. It may at the same time be seen as a limitation not to include respondents under the age of 18 since one can assume that many of them are frequent users of self-service checkout, considering their use of and familiarity to overall technologies.

Third, as the data collection has consisted of a survey that has been shared on social media channels, it includes the limitation of difficulties in reaching the older generation of respondents. As there was an ongoing pandemic in the world when data collection took place, an online survey was the best solution. This was to avoid the close physical contact otherwise necessary. Since these limitations are considered unavoidable in this case, it is therefore an important consideration in the analysis and conclusion of the task. Future research could therefore choose a selection-strategy and data collection method that better targets parts of the older generation.

Fourth, when using a quantitative research method, you meet with the demands of internal validity. This study encountered some problems regarding correlations between concepts, in the conceptual model. This further indicated there might be some limitations regarding the operationalisation. Further research could therefore make use of a combination of quantitative and qualitative method. Knowledge from a qualitative approach can thus be used to increase the validity (Jacobsen, 2018).

Finally, to implement the control variables and test differences between e.g., income, gender and level of education, further research could conduct t-test analyses.

Regardless of these limitations, we found interesting and new discoveries to be used for further research. An important note Jacobsen (2018) puts emphasis on, is that no perfect research exists, and all research have its weaknesses and lack of precision. Our goal in this study was not to avoid all errors but to present the possible limitations that could affect this study.

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8 APPENDIX

8.1 CODEBOOK

SPSS name	Description of variable	Values
ID	Identification number	
CPA1	Using self-service-checkouts would be compatible with my lifestyle	1- Strongly disagree
CPA2	Using self-service-checkouts would be compatible with my needs.	2- Disagree
CPA3	Using self-service-checkouts would be compatible with the way I like to shop for my groceries	3- Somewhat disagree
CPA4	Using self-service-checkouts would be compatible with my current life situation.	4- Neutral
CPL1	Using self-service checkout to shop for my groceries would be difficult.	5- Somewhat agree
CPL2	I believe self-service checkout would be difficult to learn how to use*.	6- Agree
CPL3	Using self-service checkout to shop for my groceries would be frustrating.	7- Strongly agree
CPL4	I believe self-service checkout would be troublesome to use.	1- Strongly agree
CPL5	Using self-service checkout to shop for my groceries would require a lot of efforts.	2- Agree
CE1	In my dealings with grocery retail chains, I feel I am in control	3- Somewhat agree
CE2	The ability to influence the services (e.g. self-checkout, manned checkout) of grocery retailers is beneficial to me	4- Neutral
CE3	I feel good because of my ability to influence the choice set of services (e.g. self-checkout, manned checkout) offered to me by grocery retailers	5- Somewhat disagree
CE4	During the shopping process, I can select products (e.g. tobacco, paracet) freely	6- Disagree
CE5	My influence over grocery retailers has increased relative to the past	7- Strongly disagree
FAC1	I felt worried when I read or listened to news about the covid-19 pandemic	1- Strongly disagree
FAC2	I had trouble sleeping because I was thinking about the covid-19 pandemic	2- Disagree
FAC3	I felt powerless when I was exposed to information about the covid-19 pandemic	3- Somewhat disagree
FAC4	I lost my appetite when I was exposed to information about the covid-19 pandemic	4- Neutral
FAC5	I felt nauseous (e.g. stomach problems) when I was exposed to information about the covid-19 pandemic	5- Somewhat agree
RAD1	Using self-service checkout would improve my overall grocery shopping experience compared other options (e.g. manned checkout)	6- Agree
RAD2	Using self-service checkout would make it easier to shop for my groceries compared to other options (e.g. manned checkout)	7- Strongly agree
RAD3	Using self-service checkout would enable me to speed up my grocery shopping compared to other options (e.g. manned checkout)	1- Strongly disagree
RAD4	Using self-service checkout would be advantageous compared to other options (e.g. manned checkout)	2- Disagree
RAD5	Using self-service checkout is the best way to shop groceries	3- Somewhat disagree
PD1	Generally, I often feel nervous	1- Strongly disagree
PD2	I often feel so nervous that nothing could calm me down	2- Disagree
PD3	I often feel hopeless	3- Somewhat disagree

PD4	I often feel restless	4- Neutral
PD5	I often feel depressed	5- Somewhat agree
PD6	Sometimes, I feel so sad that nothing could cheer me up	6- Agree 7- Strongly agree
ATT1	Using self-service checkout would be a bad/good idea	1- Bad 2- 2 3- 3 4- 4 5- 5 6- 6 7- Good
ATT2	Using self-service checkout would be foolish/wise idea	1- Foolish 2- 2 3- 3 4- 4 5- 5 6- 6 7- Wise
ATT3	I dislike/like the idea of using self-service checkouts	1- Dislike 2- 2 3- 3 4- 4 5- 5 6- 6 7- Like
ATT4	Using self-service checkout would be unpleasant/pleasant	1- Unpleasant 2- 2 3- 3 4- 4 5- 5 6- 6 7- Pleasant
INT1	I will consider using self-service checkout for my grocery shopping needs	1- Strongly disagree 2- Disagree
INT2	Using self-service checkout for my grocery shopping is something I would do	3- Somewhat disagree 4- Neutral
INT3	I can see myself using self-service checkout when shopping for groceries	5- Somewhat agree 6- Agree 7- Strongly agree
AGE	What is your age?	(Open)
GENDER	What is your gender?	0. Male 1. Female
MAR_STAT	What is your marital status?	1. Single 2. Married / Living with partner 3. Divorced 4. Widowed
COUNTRES	What is your country of residence?	1. Norway 2. Sweden 3. Other
LEV_EDUC	What is your level of education?	1. Basic/Elementary school 2. High school /apprenticeship

		<ul style="list-style-type: none"> 3. technical school or other higher education 4. Bachelor's degree 5. Master/PHD
INC	What is your yearly gross income (in NOK)?	<ul style="list-style-type: none"> 1. Below 150 000 2. 150 000 – 349 999 3. 350 000 – 549 999 4. 550 000 – 750 000 5. Above 750 000
SP1	Do you normally shop for one individual (yourself) or a household?	<ul style="list-style-type: none"> 0. One individual 1. Household
SP2	How often do you visit a grocery retail store per week?	<ul style="list-style-type: none"> 1. Not at all 2. Once per week 3. 2 times per week 4. 3 times per week 5. 4 times per week 6. 5 times per week 7. More than five times per week
SP3	How much time would you normally spend during a visit to a grocery retail store?	<ul style="list-style-type: none"> 1. Less than 10 min 2. 10 – 20 min 3. 21 – 30 4. 31 – 40 5. More than 40 min

8.2 OPERATIONALISATION, PREVIOUS AND NEW QUESTIONS.

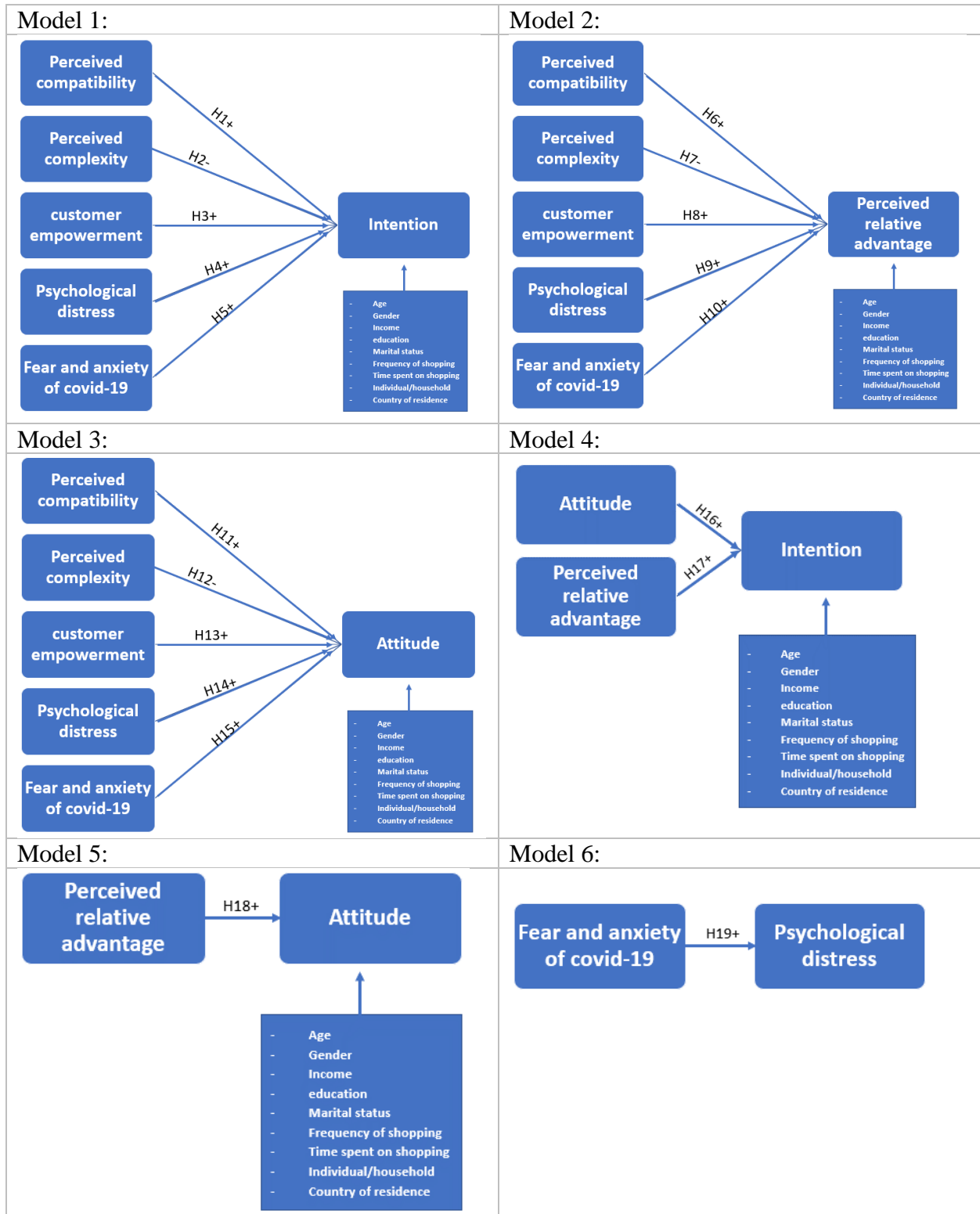
Construct	Item	Source question	Our question	Source
Perceived compatibility	CPA1	Using APS to self-collect my parcels would be compatible with my lifestyle	Using self-service-checkouts would be compatible with my lifestyle	Wang et al. (2018)
	CPA2	Using APS to self-collect my parcels would be compatible with my needs.	Using self-service-checkouts would be compatible with my needs.	
	CPA3	Using APS to self-collect my parcels would be compatible with the way I like to receive parcels*.	Using self-service-checkouts would be compatible with the way I like to shop for my groceries	
	CPA4	Using APS to self-collect my parcels would be compatible with my current situation.	Using self-service-checkouts would be compatible with my current life situation.	
Perceived complexity	CPL1	Using APS to self-collect my parcels would be difficult.	Using self-service checkout to shop for my groceries would be difficult.	Wang et al. (2018)
	CPL2	I believe APS would be difficult to learn how to use*.	I believe self-service checkout would be difficult to learn how to use*.	
	CPL3	Using APS to self-collect my parcels would be frustrating.	Using self-service checkout to shop for my groceries would be frustrating.	
	CPL4	I believe APS would be cumbersome to use.	I believe self-service checkout would be troublesome to use.	
	CPL5	Using APS to self-collect my parcels would require a lot of efforts.	Using self-service checkout to shop for my groceries would require a lot of efforts.	
Customer empowerment	CE1	In my dealings with this retailer, I feel I am in control	In my dealings with grocery retail chains, I feel I am in control	Cheah et al. (2022)
	CE2	The ability to influence the goods and services of this retailer is beneficial to me	The ability to influence the services (e.g. self-checkout, manned checkout) of grocery retailers is beneficial to me	
	CE3	I feel good because of my ability to influence the choice set offered to me by this retailer	I feel good because of my ability to influence the choice set of services (e.g. self-checkout, manned checkout) offered to me by grocery retailers	
	CE4	During the shopping process, I can select product and service freely	During the shopping process, I can select products (e.g. tobacco, paracet) freely	
	CE5	My influence over this retailer has increased relative to the past	My influence over grocery retailers has increased relative to the past	
Fear and anxiety of covid-19	FAC1	I felt dizzy, lightheaded, or faint when I read or listened to news about the coronavirus	I felt worried when I read or listened to news about the covid-19 pandemic	Duong (2021)
	FAC2	I had trouble falling or staying asleep because I was thinking about the coronavirus	I had trouble sleeping because I was thinking about the covid-19 pandemic	
	FAC3	I felt paralyzed or frozen when I thought about or was exposed to information about the coronavirus	I felt powerless when I was exposed to information about the covid-19 pandemic	
	FAC4	I lost interest in eating when I thought about or was exposed to information about the coronavirus	I lost my appetite when I was exposed to information about the covid-19 pandemic	
	FAC5	I felt nauseous or had stomach problems when I thought about or was exposed to information about the coronavirus	I felt nauseous (e.g. stomach problems) when I was exposed to information about the covid-19 pandemic	
Perceived relative advantage	RAD1	Using APS would improve my overall parcel reception experience compared to home delivery	Using self-service checkout would improve my overall grocery shopping experience compared other options (e.g. manned checkout)	Wang et al. (2018)
	RAD2	Using APS would make it easier to receive my parcels compared with my needs	Using self-service checkout would make it easier to shop for my groceries compared to other options (e.g. manned checkout)	
	RAD3	Using APS would enable me to receive my parcels more quick compared to home delivery	Using self-service checkout would enable me to speed up my grocery shopping	

			compared to other options (e.g. manned checkout)	
	RAD4	Using APS would be advantageous compared to home delivery	Using self-service checkout would be advantageous compared to other options (e.g. manned checkout)	
	RAD5	Using APS is the best way receive my parcels	Using self-service checkout is the best way to shop groceries	
Psychological distress	PD1	I often feel nervous	Generally, I often feel nervous	Duong (2021)
	PD2	I often feel so nervous that nothing could calm me down	I often feel so nervous that nothing could calm me down	
	PD3	I often feel hopeless	I often feel hopeless	
	PD4	I often feel restless or fidgety	I often feel restless	
	PD5	I often feel depressed	I often feel depressed	
	PD6	I often feel so sad that nothing could cheer me up	Sometimes, I feel so sad that nothing could cheer me up	
Attitude	ATT1	Using m-banking would be a good/bad idea	Using self-service checkout would be a bad/good idea	Glavee-Geo, Shaikh, & Karjaluo (2017)
	ATT2	Using m-banking would be a foolish/wise idea	Using self-service checkout would be foolish/wise idea	
	ATT3	I dislike/like the idea of using m-banking	I dislike/like the idea of using self-service checkouts	
	ATT4	Using m-banking would be unpleasant/pleasant	Using self-service checkout would be unpleasant/pleasant	
Adoption intention	INT1	I would use m-banking for my banking needs	I will consider using self-service checkout for my grocery shopping needs	Glavee-Geo, Shaikh, & Karjaluo (2017)
	INT2	Using m-banking for handling my banking transactions is something I would do	Using self-service checkout for my grocery shopping is something I would do	
	INT3	I can see myself using m-banking for handling my banking transactions	I can see myself using self-service checkout when shopping for groceries	

8.3 DESCRIPTIVES – KEY CONCEPTS

SPSS Name	Description	Mean	SD	Skewness	Kurtosis	Factor				
						1	2	3	4	5
CPA1	Using self-service-checkouts would be compatible with my lifestyle	5,22	1,943	-1,055	-0,060	0,881				
CPA2	Using self-service-checkouts would be compatible with my needs	5,25	1,905	-1,141	0,207	0,871				
CPA3	Using self-service-checkouts would be compatible with the way I like to shop for groceries	5,19	1,952	-1,073	-0,014	0,861				
CPA4	Using self-service-checkouts would be compatible with my current life situation	5,07	1,927	-0,891	-0,318	0,861				
CPL1	Using self-service-checkouts to shop for my groceries would be difficult	2,12	1,459	1,599	1,935			0,753		
CPL2	I believe self-service-checkout would be difficult to learn how to use	1,76	1,206	2,340	5,882			0,825		
CPL3	Using self-service-checkout to shop for my groceries would be frustrating	2,20	1,554	1,539	1,703			0,758		
CPL4	I believe self-service-checkout would be troublesome to use	2,09	1,526	1,737	2,350			0,785		
CPL5	Using self-service-checkout to shop for my groceries would require a lot of efforts	2,15	1,452	1,440	1,336			0,824		
RAD1	Using self-service-checkout would improve my overall my overall grocery shopping experience compared to other options (e.g. manned checkout)	4,62	1,845	-0,465	-0,734	0,817				
RAD2	Using self-service-checkout would make it easier top shop for my groceries compared to other options (e.g. manned checkout)	4,82	1,894	-0,560	-0,777	0,826				
RAD3	Using self-service checkout would enable me to speed up my grocery shopping compared to other options (e.g. manned checkout)	5,34	1,709	-1,167	0,581	0,836				
RAD4	Using self-service-checkout would be advantageous compared to other options (e.g. manned checkout)	4,99	1,763	-0,729	-0,256	0,876				
RAD5	Using self-service-checkout is the best way to shop	4,62	1,817	-0,466	-0,617	0,847				
ATT1	Using self-service checkout would be a bad/good idea	5,49	1,808	-1,314	0,879	0,905				
ATT2	Using self-service checkout would be foolish/wise idea	5,37	1,890	-1,172	0,329	0,834				
ATT3	I dislike/like the idea of using self-service checkouts	5,46	1,912	-1,218	0,373	0,861				
ATT4	Using self-service checkout would be unpleasant/pleasant	5,61	1,663	-1,341	1,166	0,807				
INT1	I will consider using self-service checkout for my grocery shopping needs	5,55	1,817	-1,417	1,003	0,897				
INT2	Using self-service checkout for my grocery shopping is something I would do	5,56	1,826	-1,435	0,996	0,904				
INT3	I can see myself using self-service checkout when shopping for groceries	5,67	1,800	-1,589	1,491	0,891				
CE1	In my dealings with grocery retail chains, I feel I am in control	5,00	1,454	-0,564	-0,054					0,592
CE2	The ability to influence the services (e.g. self-checkout, manned checkout) of grocery retailers is beneficial to me	5,01	1,458	-0,613	0,140					0,643
CE3	I feel good because of my ability to influence the choice set of services (e.g. self-checkout, manned checkout) offered to me by grocery retailers	4,78	1,535	-0,388	-0,074					0,764
CE4	During the shopping process, I can select products (e.g. tobacco, paracet) freely	5,14	1,745	-0,819	-0,227					0,692
CE5	My influence over grocery retailers has increased relative to the past	4,24	1,674	-0,230	-0,484					0,674
PD1	Generally, I often feel nervous	2,70	1,762	0,760	-0,635		0,863			
PD2	I often feel so nervous that nothing could calm me down	2,08	1,487	1,645	2,165		0,83			
PD3	I often feel hopeless	2,70	1,862	0,872	-0,498		0,861			
PD4	I often feel restless	3,32	1,952	0,255	-1,298		0,794			
PD5	I often feel depressed	3,02	1,861	0,505	-0,992		0,849			
PD6	Sometimes, I feel so sad that nothing could cheer me up	2,45	1,772	1,020	-0,098		0,835			
FAC1	I felt worried when I read or listened to news about the covid-19 pandemic	4,48	1,861	-0,618	-0,811				0,635	
FAC2	I had trouble sleeping because I was thinking about the covid-19 pandemic	2,23	1,584	1,366	0,883				0,835	
FAC3	I felt powerless when I was exposed to information about the covid-19 pandemic	3,23	1,893	0,399	-1,148				0,794	
FAC4	I lost my appetite when I was exposed to information about the covid-19 pandemic	1,91	1,383	1,792	2,801				0,829	
FAC5	I felt nauseous (e.g. stomach problems) when I was exposed to information about the covid-19 pandemic	2,15	1,554	1,348	0,786				0,839	
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy					0,920					
Sig. (Bartlett's test of sphericity)					0,000					

8.4 CONCEPTUAL MODEL – RESPECIFIED



8.5 FACTOR ANALYSES

MODEL 1 Rotated Component Matrix						MODEL 2 Rotated Component Matrix						MODEL 3 Rotated Component Matrix					
	Component						Component						Component				
	1	2	3	4	5		1	2	3	4	5		1	2	3	4	5
CPA1	0,916					CPA1	0,890					CPA1	0,909				
CPA1	0,914					CPA2	0,883					CPA2	0,899				
CPA4	0,887					CPA4	0,879					CPA3	0,874				
CPA3	0,879					CPA3	0,879					ATT1	0,873				
INT2	0,866					RAD4	0,871					CPA4	0,872				
INT3	0,858					RAD5	0,844					ATT3	0,843				
INT1	0,855					RAD2	0,830					ATT2	0,803				
PD1		0,864				RAD1	0,820					ATT4	0,770				
PD3		0,861				RAD3	0,817					PD3		0,864			
PD5		0,850				PD3		0,862				PD1		0,863			
PD6		0,838				PD1		0,861				PD5		0,849			
PD2		0,832				PD5		0,850				PD6		0,838			
PD4		0,797				PD6		0,837				PD2		0,830			
CPL5			0,840			PD2		0,828				PD4		0,797			
CPL2			0,836			PD4		0,792				CPL5			0,838		
CPL4			0,821			CPL2		0,840				CPL2			0,832		
CPL3			0,790			CPL5		0,839				CPL4			0,814		
CPL1			0,785			CPL4		0,817				CPL3			0,784		
FAC5				0,839		CPL3		0,790				CPL1			0,780		
FAC2				0,834		CPL1		0,776				FAC5				0,839	
FAC4				0,830		FAC5			0,840			FAC2				0,834	
FAC3				0,795		FAC2			0,836			FAC4				0,830	
FAC1				0,635		FAC4			0,831			FAC3				0,795	
CE3					0,789	FAC3			0,793			FAC1				0,635	
CE5					0,698	FAC1			0,632			CE3					0,777
CE4					0,693	CE3				0,766		CE4					0,680
CE2					0,669	CE4				0,691		CE5					0,679
CE1					0,613	CE5				0,675		CE2					0,671
						CE2				0,653		CE1					0,625
						CE1				0,612							
KMO measure of sampling adequacy:					0,881	KMO measure of sampling adequacy:					0,887	KMO measure of sampling adequacy:					0,881
Sig. (Bartlett's test of sphericity):					0,000	Sig. (Bartlett's test of sphericity):					0,000	Sig. (Bartlett's test of sphericity):					0,000

8.6 REGRESSION MODEL 1 – CORRELATION MATRIX

		Correlations													
		INT_MEAN	CPA_MEAN	CPL_MEAN	PD_MEAN	FAC_MEAN	CE_MEAN	GENDER	AGE_GROU P	MAR_STAT_ DUMMY	LEV_EDUC	INC	SP1	SP3	SP2_NEW
Pearson Correlation	INT_MEAN	1,000	0,829	-0,578	0,094	0,039	0,444	0,028	-0,416	-0,034	0,125	-0,092	-0,032	-0,085	0,111
	CPA_MEAN	0,829	1,000	-0,504	0,131	0,054	0,481	-0,023	-0,419	0,045	0,124	-0,093	0,045	-0,075	0,083
	CPL_MEAN	-0,578	-0,504	1,000	0,029	0,111	-0,269	-0,049	0,201	0,040	-0,119	0,030	0,072	0,076	-0,148
	PD_MEAN	0,094	0,131	0,029	1,000	0,377	0,072	0,114	-0,303	0,057	-0,269	-0,357	0,066	0,008	-0,087
	FAC_MEAN	0,039	0,054	0,111	0,377	1,000	0,115	0,252	-0,041	0,055	-0,120	-0,204	0,093	0,140	-0,093
	CE_MEAN	0,444	0,481	-0,269	0,072	0,115	1,000	0,065	-0,259	0,029	0,018	0,039	0,069	0,019	0,009
	GENDER	0,028	-0,023	-0,049	0,114	0,252	0,065	1,000	-0,061	-0,003	0,028	-0,248	0,203	0,091	-0,184
	AGE_GROUP	-0,416	-0,419	0,201	-0,303	-0,041	-0,259	-0,061	1,000	0,183	-0,133	0,342	0,210	0,226	-0,137
	MAR_STAT_DUMMY	-0,034	0,045	0,040	0,057	0,055	0,029	-0,003	0,183	1,000	0,060	0,312	0,675	0,210	0,030
	LEV_EDUC	0,125	0,124	-0,119	-0,269	-0,120	0,018	0,028	-0,133	0,060	1,000	0,333	0,025	0,059	-0,019
	INC	-0,092	-0,093	0,030	-0,357	-0,204	0,039	-0,248	0,342	0,312	0,333	1,000	0,328	0,005	0,126
	SP1	-0,032	0,045	0,072	0,066	0,093	0,069	0,023	0,210	0,675	0,025	0,328	1,000	0,255	0,021
	SP3	-0,085	-0,075	0,076	0,008	0,140	0,019	0,091	0,226	0,210	0,059	0,005	0,255	1,000	-0,312
	SP2_NEW	0,111	0,083	-0,148	-0,087	-0,093	0,009	-0,184	-0,137	0,030	-0,019	0,126	0,021	-0,312	1,000
Sig. (1-tailed)	INT_MEAN		0,000	0,000	0,108	0,302	0,000	0,355	0,000	0,327	0,049	0,113	0,336	0,131	0,072
	CPA_MEAN	0,000		0,000	0,041	0,237	0,000	0,379	0,000	0,278	0,051	0,110	0,274	0,160	0,137
	CPL_MEAN	0,000	0,000		0,350	0,071	0,000	0,259	0,004	0,299	0,058	0,345	0,172	0,157	0,025
	PD_MEAN	0,108	0,041	0,350		0,000	0,173	0,066	0,000	0,227	0,000	0,000	0,191	0,456	0,124
	FAC_MEAN	0,302	0,237	0,071	0,000		0,065	0,000	0,293	0,236	0,056	0,003	0,110	0,032	0,109
	CE_MEAN	0,000	0,000	0,000	0,173	0,065		0,196	0,000	0,353	0,406	0,304	0,181	0,399	0,451
	GENDER	0,355	0,379	0,259	0,066	0,000	0,196		0,212	0,483	0,355	0,000	0,381	0,115	0,007
	AGE_GROUP	0,000	0,000	0,004	0,000	0,293	0,000	0,212		0,008	0,040	0,000	0,003	0,001	0,034
	MAR_STAT_DUMMY	0,327	0,278	0,299	0,227	0,236	0,353	0,483	0,008		0,215	0,000	0,000	0,003	0,346
	LEV_EDUC	0,049	0,051	0,058	0,000	0,056	0,406	0,355	0,040	0,215		0,000	0,371	0,218	0,402
	INC	0,113	0,110	0,345	0,000	0,003	0,304	0,000	0,000	0,000	0,000		0,000	0,474	0,048
	SP1	0,336	0,274	0,172	0,191	0,110	0,181	0,381	0,003	0,000	0,371	0,000		0,000	0,389
	SP3	0,131	0,160	0,157	0,456	0,032	0,399	0,115	0,001	0,003	0,218	0,474	0,000		0,000
	SP2_NEW	0,072	0,137	0,025	0,124	0,109	0,451	0,007	0,034	0,346	0,402	0,048	0,389	0,000	

8.7 REGRESSION MODEL 1 – ANOVA

ANOVA - Model 1						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	411,687	13	31,668	34,237	0,000
	Residual	149,845	162	0,925		
	Total	561,533	175			

8.8 REGRESSION MODEL 2 – ANOVA

ANOVA - Model 2						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	344,017	13	26,463	27,756	0,000
	Residual	154,452	162	0,953		
	Total	498,469	175			

8.9 REGRESSION MODEL 3 – ANOVA

ANOVA - Model 3						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	352,802	13	27,139	28,604	0,000
	Residual	153,700	162	0,949		
	Total	506,502	175			

8.10 REGRESSION MODEL 4 – ANOVA

ANOVA - Model 4						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	459,403	10	45,940	74,221	,000 ^b
	Residual	102,130	165	0,619		
	Total	561,533	175			

8.11 REGRESSION MODEL 5 – ANOVA

ANOVA - Model 5						
Model	Sum of Squares	df	Mean Square	F	Sig.	
1	Regression	371,036	9	41,226	50,519	,000 ^b
	Residual	135,466	166	0,816		
	Total	506,502	175			

