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**To what extent do Instagram users take active measures to
protect their privacy?**

Name: Maria Volegova

Student Number: 478279

Supervisor: Dr. A.T. Barendregt

Second assessor: Drs. C. Janeckova

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EXECUTIVE SUMMARY

The emergence of the internet has made people all over the world more connected than ever, however, it posed certain problems related to data privacy. Instagram is the second most logged in social platform for daily use and is used by businesses for personalized advertising. The data collected on the platform may be misused by third parties. The main objective of this research is to examine the actions that users take to protect their privacy and whether factors such as certain demographic characteristics and personal experiences affect this behavior. Past research mostly focused on intended behavior rather than actual behavior and studied internet users in general. This paper considers stated privacy protection behaviors of Instagram users. Therefore, the central research question of this paper is:

To what extent do Instagram users take active measures to protect their privacy?

Theoretical sub-questions:

1. What is consumer behavior?
2. What is digital privacy?
3. What are the ways to protect user privacy online?
4. What factors can affect the privacy protection behavior?

Empirical sub-questions:

1. How conscious are Instagram users with regards to data protection?
2. Is there any association between demographic indicators and user behavior?
3. Do personal experiences with data privacy affect user behavior?

The literature review has identified three groups of privacy protection behaviors that could be used by Instagram users for privacy protection. These behaviors related to their decision-making regarding the amount of personal data shared, the number of technological measures taken and their willingness to share. Furthermore, the theory suggested certain demographic factors and personal experiences that may directly affect how internet users protect their privacy. Hence, the following set of hypotheses was formulated (each had three sub-hypotheses for every group of protection behavior):

H1. Instagram users engage in privacy protection behaviors.

H2. There is a positive association between gender (female) and privacy protection behaviors of Instagram users.

H3: There is a positive association between education and privacy protection behaviors of Instagram users.

H4: There is a positive association between age and privacy protection behaviors of Instagram users.

H5: There is a positive association between past experiences with use of personal data by third parties and privacy protection behaviors of Instagram users.

H6: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and privacy protection behaviors of Instagram users.

The literature review was followed by a quantitative data collection through an online survey. The final research sample consisted of 356 respondents, and the collected data was analyzed using Stata. The results of the analysis have shown that Instagram users do engage in all the three groups of behaviors to protect their privacy. A positive association with privacy protection behaviors was concluded for being a female and one's knowledge of others' past experiences with violation of personal data by third parties. Moreover, the results did not show that being more educated, older or having had a personal experience with data violation have a positive association with privacy protection behaviors of Instagram users.

The analysis of this paper provides insights into consumer behavior of Instagram users, that could be beneficial for the Instagram itself and the businesses that use it for advertising purposes. To protect the user base and ensure content sharing, user trust needs to be increased. One suggestion is to educate users about why they could benefit from taking active measures for privacy protection. The insights into the factors that could affect the privacy protection behavior could be used by Instagram stakeholders to decrease the concern among the specific groups. The users themselves need to look into the data that they share with Instagram to be more aware of potential threats. Future research needs to examine the issue in more detail, studying a more representative sample and also conducting an in-depth qualitative research. One suggestion is to also consider the relationship between the behavior and nationality. The privacy paradox needs to be considered as well since it is likely that the results of this study have been affected by it.

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Chapter 1. Introduction

1.1 Background information.

The emergence of the internet has made people all over the world more connected than ever. Technological developments are not only influencing the structure of businesses and markets but also have a noticeable impact on society. One of the main drivers of this societal change is the rise of social media, which has affected the ways in which people communicate with each other (Szmigin and Piacentini, 2015). There are now more than 2.5 billion people using the internet worldwide with more than 64% of them accessing social media services, which makes social networking one of the most popular ways to spend time online (Statista, 2020). Over the past decade, social media has become a part of the daily routines of many people, who use such platforms to maintain their social relationships. This means sharing personal information on the user's online profiles as well as posting updates about their private life. However, doing so leaves trails of personally identifiable information, which is constantly collected and stored by social media platforms (Hajli and Lin, 2016). Trading the personal data collected from the users as well as the user-generated content to marketers is central to the economic viability of social media platforms (Mosteller and Poddar, 2017). Such information can provide companies with valuable insights about their consumers, and can thus guide marketers in their strategic decisions and execution of marketing campaigns.

However, the data collected online can be misused by third parties without the consent of the user. A report from the Pew Research Center (2019) has shown that data privacy has become one of the major public concerns of the decade. Mishandling of consumer data has become more frequent in recent years with the two largest data exposures of all time happening in 2019, including theft of login credentials, financial and personal data of hundreds of millions of records (Business Insider, 2019). In 2018, personal data of millions of Facebook users was used for political advertising without their consent by Cambridge Analytica. The scandal was widely covered by media all over the world and has changed the attitudes and behavior of people in the US in regard to online privacy (eMarketer, 2019). Statistics also show that internet users often experience data theft personally with almost 64% of Americans surveyed in 2016 reporting some form of data theft (Pew Research Center, 2017). Such trends have caused many social media users to reduce personal sharing, change the privacy of their accounts from public to private or even stop using social media platforms (GlobalWebIndex, 2020).

However, not everyone who is aware of the privacy risks is taking privacy-management actions. Research has shown that there are discrepancies between individual's intentions to protect their digital privacy and their actual privacy-management behavior (i.e. Barth and de Jong, 2017; Smith et al., 2011). This phenomenon is known as the privacy paradox and there has not been a conclusive theory of why certain people overlook their privacy concerns in favor of data compromising activities (Barth and de

Jong, 2017). As more people are joining social media and new content is created daily, data protection becomes increasingly important. Rather than studying the motives behind social media posts, the main objective of this paper is to examine the factors that cause people to engage in privacy-management behavior based on a sample of Instagram users.

Instagram is a platform that allows its users to share both photos and videos. There are around one billion active monthly users globally with the majority being younger than 35 (Statista, 2020). Instagram is the second most logged in social platform for daily use after Facebook with 63% of users logging in at least once per day (Pew Research Center, 2019). The platform is widely used for advertising and it is predicted that 75.3% of US businesses will adopt it in 2020 (Emarketer, 2019). The data policy of Instagram mentions many ways in which data is collected from its users including the personal information and content metadata (i.e. location, face-recognition), app usage logs and data from one's network (Instagram INC, 2020). The large amounts of information collected are analyzed and used to suggest the content that users see including the advertisements from business accounts.

1.2 Scientific and social relevance.

This study is scientifically relevant as it combines different pieces of literature on data protection and attempts to fill in the gaps of previous research. It provides an alternative perspective on the topic by studying the user behavior of a specific market segment of Instagram users. The research is also relevant socially since understanding what influences privacy-management behavior of Instagram users may be beneficial to different stakeholders. Firstly, the study is relevant for Instagram Inc. because many users may be refraining from using its services due to the privacy concerns. The insights into behavior of its consumers may suggest ways to increase user trust and thus protect the user base essential for the economic viability of the platform. Such insights may also be valuable to businesses that use Instagram for advertising purposes or to connect with their consumers. Understanding why certain people engage in data protection behavior may be useful for co-creation with the consumers when developing personalized campaigns. Finally, this research can also be useful for the Instagram users themselves to increase awareness of the problem and their user behavior.

1.3 Problem statement.

Data protection is one of the biggest concerns for many people around the world, but not everyone is taking active measures to protect their privacy. The main objective of this research is to analyze what factors influence the behavior of Instagram users in relation to their privacy protection. More specifically, this study examines the actions that users take to protect their privacy and whether factors such as certain demographic characteristics and personal experiences affect this behavior. Therefore, the central research question of this paper is:

To what extent do Instagram users take active measures to protect their privacy?

Theoretical sub-questions:

5. What is consumer behavior?
6. What is digital privacy?
7. What are the ways to protect user privacy online?
8. What factors can affect the privacy protection behavior?

Empirical sub-questions:

4. How conscious are Instagram users with regards to data protection?
5. Is there any association between demographic indicators and user behavior?
6. Do personal experiences with data privacy affect user behavior?

1.4 Research structure.

The structure of this paper is as follows. Chapter 1 covers the introduction into the subject as well as the formulation of the central research questions and theoretical and empirical sub-questions. It is followed by a literature study outlining the theoretical foundations related to the subject and a framework with hypotheses. Chapter 3 discusses the research methodology and data collection methods. Then Chapter 4 presents the research outcome and its analysis. This is followed by a conclusion on the main findings and the insights are discussed in Chapter 5. It also presents the recommendations to key beneficiaries, research limitations and suggestions for future research.

Chapter 2. Literature study

2.1 Consumer Behavior.

As defined by Solomon (2017), consumer behavior as a field studies the processes involved when people select, purchase, use or dispose of products, services, ideas or experiences to satisfy needs and desires. This paper is focusing on the behavior of Instagram consumers with regard to their privacy. When there is any problem that needs to be solved or a choice to be made consumers inevitably engage in a decision-making process. Depending on the problem and the nature and context of the person deciding, there will be significant differences in the decision outcome (Szmigin and Piacentini, 2015). Figure 1 presents the model for decision-making developed by Engel et al. (1978), called the EKB model. This model consists of five stages. The first stage is problem recognition, which can be caused both internally or externally, whenever a difference between one's actual and ideal state occurs (Szmigin and Piacentini, 2015). In the second stage individual searches for information from both internal and external environment as well as internal self (i.e. memory and experiences), which is followed by evaluation of alternatives based on personal criterion. The last two stages are the choice of the preferred alternative (or purchase decision) and the outcome of choice (Engel et al, 1978).

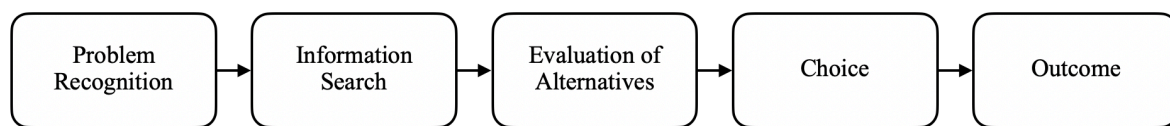


Figure 1. EKB model of consumer decision-making.

However, not all consumers engage in all the stages, and there are many factors that can influence the whole process of choice, including contextual effects (Solomon, 2017). These factors may include individual differences and experiences as well as environmental influences. Petronio (2002) states that “revealing private information is never a straightforward decision”, but rather dynamic and situational process. This paper aims to study the personal factors affecting the decisions that individuals make about their privacy protection.

In 2002, Petronio has presented a Communication Privacy Management (CPM) theory, that proposes that people make choices about revealing or concealing information based on certain criteria and conditions. This is done through rule management processes. Privacy rules are used to determine who receives a disclosure, when, how much, where and how the other person will conceal the information. To establish such rules, individuals use decision criteria based on culture, gender, motivations, situational context and individual risk-benefit ratio. Cultural criteria address that norms for privacy and openness in a given culture will influence the disclosure decision. Moreover, the privacy boundaries are different for men and women, the physical and social environments define the context, motivations to

share and individual assessment of risks also play a role. Therefore, according to the CPM theory these criteria will affect the decisions people make regarding their information protection and hence, their behavior (Petronio, 2002).

2.2 Digital Privacy.

The construct of privacy has a broad scope and has connections to many different disciplines. A single definition that would encompass the whole variety of this concept has not yet been found. Warren and Brandeis (1890) have considered privacy to be synonymous with the right to be left alone. Later, Westin (1968) focused on “information privacy” and defined it as the right of “individuals, groups, or institutions to determine for themselves when, how, and to what extent information about them is communicated to others”. The personal (or private) information in that case is anything that can lead to identification of the individual. The concept of information privacy is central in digital context, especially in case of social media platforms, where people share their content, knowledge and experiences with others (Hajli and Lin, 2016). This information can be collected, disclosed and used by third parties without users’ knowledge and consent. The individual level of privacy is nearly impossible to measure due to the complex nature of the construct and because it highly depends on perceptions. Several studies have focused on measuring individual privacy concern as a proxy for one’s privacy (Smith et al., 2011; Malhotra, Kim and Agarwal, 2004). However, when the concept of privacy as a right was applied to consumer behavior, a discrepancy between the privacy concerns and information-sharing behavior was found (Barth and de Jong, 2017; Smith et al., 2011). On various occasions consumers readily submit their personal information despite their privacy concerns, which creates the privacy paradox. Therefore, using privacy concern as a predictor for one’s privacy may not be accurate.

2.2.1 Instagram Data Policy.

Instagram describes the types of data collected and what it is used for in its data policy (Instagram Inc., 2020). The information Instagram collects includes users’ personal information, their published content and its metadata (i.e. location tags), information from users’ network and connections, usage of company products (including the content users engage with) and the information about an individual provided by other users. Moreover, it also gathers information from the devices of its users, such as their settings, attributes and identifiers. All this information is used for various purposes, mainly personalization and advertising and is shared with third parties (i.e. advertisers and company partners). Content that users share on Instagram can also be reshared by individuals and businesses to others both online and in person. The data policy states that “when you share a post or send a message to specific friends or accounts, they can download, screenshot, or reshare that content to others”. People can also create content about other users and share it with the audience they choose without requesting any consent. This means that individuals cannot fully control when, how and to what extent information about them is communicated to others, which could pose threat to one’s privacy (Malhotra et al., 2004).

2.3 Privacy protection behaviors.

The privacy protection behaviors on social media platforms have not been extensively studied in the literature. Smith et al. (2011) noted that research commonly focused on measuring behavioral intentions, although they may not accurately reflect actual behaviors related to protecting one's digital privacy. Many studies have examined attitudes and intentions rather than actual behavioral measures taken by individuals online (i.e. Baruh et al., 2017; Hajli and Lin, 2016; Lwin, Wirtz and Williams, 2007). The way in which people protect their privacy when using internet in general may not be fully applicable to the case of social media, specifically Instagram. This study first presents behaviors that have been suggested by the theory and then attempts to apply them to the specific case of Instagram.

2.3.1 Privacy protection behavior on the Internet.

Lwin, Wirtz and Williams (2007) have examined the coping behaviors that internet users intend to employ for privacy protection online. They identified three groups of such intended behaviors: to fabricate, to protect and to withhold. Fabrication behaviors referred to any efforts taken to falsify information or provide incomplete information. The second group of behaviors included any use of privacy-enhancing technologies or technical protection measures (i.e. managing privacy settings). Any avoidance strategies were represented by withholding behaviors, where individuals refuse to use the website or provide any information at all (Lwin et al., 2007). These three groups of coping behaviors can be traced throughout the literature on privacy protection online. For example, Sheehan and Hoy (1999) have studied the ways in which consumers responded to their privacy concerns online, before social media became widely used. The most frequently adopted behaviors were providing inaccurate personal information, adopting voicing behavior (i.e. complaints) and abstaining from using certain websites. A later study identified two groups of privacy-related behaviors: general caution and technical protection (Buchanan et al., 2007). The first group addressed any common-sense privacy protection measures (i.e. reading the privacy policy). The second considered more sophisticated use of technology (i.e. clearing browser history). This study has not considered the internet users that choose to withdraw from using the website, however, it also did not deny such behavior.

2.3.2 Privacy protection behavior on social media.

In the context of social media, Mosteller and Poddar (2017) have suggested that individuals may avoid invasions of privacy by increasing privacy-protection settings or restrict one's profile to the audience of choice. Moreover, some social media users only partially engage on such platforms through selective sharing of information (Schlosser, 2005). In that case, social media users are conscious about the content they share on the platform. Mosteller and Poddar (2017) also acknowledge that consumers may have different levels of both sharing and protection behaviors on social media, where limited engagement can be mixed with technological measures (Mosteller and Poddar, 2017). In fact, Instagram allows its users to set their profile to "private", such as only people that the user approves can see their content

(Instagram Inc., 2020). Other technological measures allowed by Instagram are blocking any other user from seeing posts, turning on the two-factor authentication (sends a text message with a code to log in), revoking access to data by other apps, and checking one's account activity. Furthermore, Schlosser (2005) finds that in some cases, social media users choose to only view others' posts without contributing own content or completely disengage from the platform to prevent any possible privacy violation. A recent social media report by GlobalWebIndex (2020) showed that 38% of social media users in the US and the UK have reduced personal sharing, 35% have switched to private accounts and 9% have stopped using a social media platform to protect their privacy.

2.3 Factors affecting privacy protection behaviors.

A large part of the privacy studies has focused on the role of privacy concerns in privacy decision-making (i.e. Sheehan and Hoy, 2000; Mosteller and Poddar, 2017). It was shown by multiple studies that a higher privacy concern increases the intentions for privacy protection among internet users. Malhotra, Kim and Agarwal (2004) have proposed an Internet Users' Information Privacy Concerns (IUIPC) model, that tested the causal relationship between privacy concerns and behavioral intention to provide personal information. In their model privacy concern influenced trust and risk beliefs, which in turn affected the intended behavior. The study has also mentioned that other factors may affect the ways in which internet users protect their privacy. The IUIPC model suggested gender, age, education, internet experience, identity misrepresentation, invasion of privacy in the past and media exposure as such factors. However, the model used those as covariates to control for the unknown effects of these factors and the direct effect of those has not been studied (Malhotra et al., 2004). Hence, this paper tests the direct effect of the demographic factors and personal experiences with privacy violation on Instagram users' privacy-protection behaviors.

2.3.1 Demographic factors

As suggested by the IUIPC model there is a relationship between demographic characteristics and privacy behaviors of internet users (Malhotra et al., 2004). There are various studies relating demographic factors to privacy concerns and behaviors. Milne and Rohm (2000) have shown that gender, education and age have an impact on individual privacy concerns. In line with the CPM theory (Petronio, 2002), women are found to be more concerned about privacy than men across many studies and settings (Sheehan and Hoy, 1999; Smith et al., 2011). Furthermore, while women tend to have less technical knowledge than men, they are more likely to engage in privacy protection behavior (Baruh et al., 2017). Moreover, according to Culnan (1995) individuals with more education may be more likely to engage in privacy protection behaviors, because they are more likely to have the needed knowledge about privacy issues (Milne and Rohm, 2000). It was also found that young consumers tend to have lower privacy concerns and more trust in social media than older individuals (Culnan, 1995; Milne and Rohm, 2000; Smith et al., 2011). Research shows that the attitudes towards data collection for

commercial purposes differs between age groups, suggesting that millennials are the most likely to be positive about their data being used (Ridley-Siegert, 2015).

2.3.2 Personal experiences

Multiple studies have shown that previous violation experiences have a positive effect on privacy concerns of social media users (Mosteller and Poddar, 2017; Milne and Rohm, 2000). Such personal experiences with privacy violation are likely to increase user knowledge about privacy issues and increase their concern. Invasion of privacy in the past can affect trust and induce individuals to engage in privacy protection behaviors (Bansal, Zahedi and Gefen, 2010). Smith, Milberg and Burke (1996) found that people who have been the victim or were exposed to privacy invasion cases should have stronger privacy concerns. Hence, media coverage of such cases may also have an effect on privacy protection behavior. Recent research has found that seeing the news about data violation changed the privacy attitudes and behavior of people in the US (eMarketer, 2019). Based on the above, personal privacy invasion experiences and exposure to other's privacy violation on media can both predict individual privacy behaviors.

2.4 Hypotheses and the conceptual model.

2.3.1 Privacy protection behavior.

Instagram collects a large amount of data from its users. Individuals cannot fully control when, how and to what extent information they share on the platform is communicated to others, which could threaten one's privacy (Malhotra et al., 2004). When making a choice of whether to take measures for privacy protection, people inevitably engage in a decision-making process (Engel et al, 1978). As suggested by Solomon (2017) and Petronio (2002) the outcomes of this process are different between people and are affected by various factors. The three groups of privacy protection behavior on the internet examined by Lwin, Wirtz and Williams (2007) were also traced in other studies. These groups, namely fabrication, protection and to withholding, can also be applied to the possible actions that Instagram users take for privacy protection. As such, the users may be protecting their privacy by limiting the informativeness of content they share (Schlosser, 2005), adjusting the settings (Mosteller and Poddar, 2017) or completely abstaining from using the platform (Schlosser, 2005). This study aims to investigate whether Instagram users actually engage in privacy protection behaviors. The following hypothesis is thus formulated:

H1. Instagram users engage in privacy protection behaviors.

H1A. Instagram users limit their sharing for privacy protection.

H1B. Instagram users adopt protection technologies.

H1C. Instagram users withhold from interacting on the platform for privacy protection.

2.3.2 Demographic factors and personal experiences.

Moreover, the IUIPC model (Malhotra et al., 2004) suggested factors that may directly affect how internet users protect their privacy. The two sets of such factors considered by this study are demographic factors and personal experiences. It was shown that women, more educated and older people are more likely to be concerned about privacy and/or to take measures to protect it (Milne and Rohm, 2000). Although many studies showed the notion of privacy paradox, it is still likely that people who do engage in protection behavior are concerned about their privacy. The following hypotheses are thus determined:

H2. There is a positive association between gender (female) and privacy protection behaviors of Instagram users.

H2A. There is a positive association between gender (female) and consumer decision-making regarding sharing of the amount of personal data.

H2B. There is a positive association between gender (female) and consumer decision-making regarding the protection of personal data.

H2C. There is a positive association between gender (female) and consumer decision-making regarding willingness to share personal data.

H3: There is a positive association between education and privacy protection behaviors of Instagram users.

H3A: There is a positive association between education and consumer decision-making regarding sharing of the amount of personal data.

H3B: There is a positive association between education and consumer decision-making regarding the protection of personal data.

H3C: There is a positive association between education and consumer decision-making regarding willingness to share personal data.

H4: There is a positive association between age and privacy protection behaviors of Instagram users.

H4A: There is a positive association between age and consumer decision-making regarding sharing of the amount of personal data.

H4B: There is a positive association between age and consumer decision-making regarding the protection of personal data.

H4C: There is a positive association between age and consumer decision-making regarding willingness to share personal data.

The second set of factors studied are the experiences that individuals have had with privacy violation. People who became the victim or were exposed to privacy invasion cases on media are likely to be more concerned about their privacy (Smith et al., 1996). Hence, the two sets of hypotheses follow:

H5: There is a positive association between past experiences with use of personal data by third parties and privacy protection behaviors of Instagram users.

H5A: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding sharing of the amount of personal data.

H5B: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding the protection of personal data.

H5C: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding willingness to share personal data.

H6: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and privacy protection behaviors of Instagram users.

H6A: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding sharing of the amount of personal data.

H6B: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding the protection of personal data.

H6C: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding willingness to share personal data.

A conceptual model linking all the concepts together is as follows:

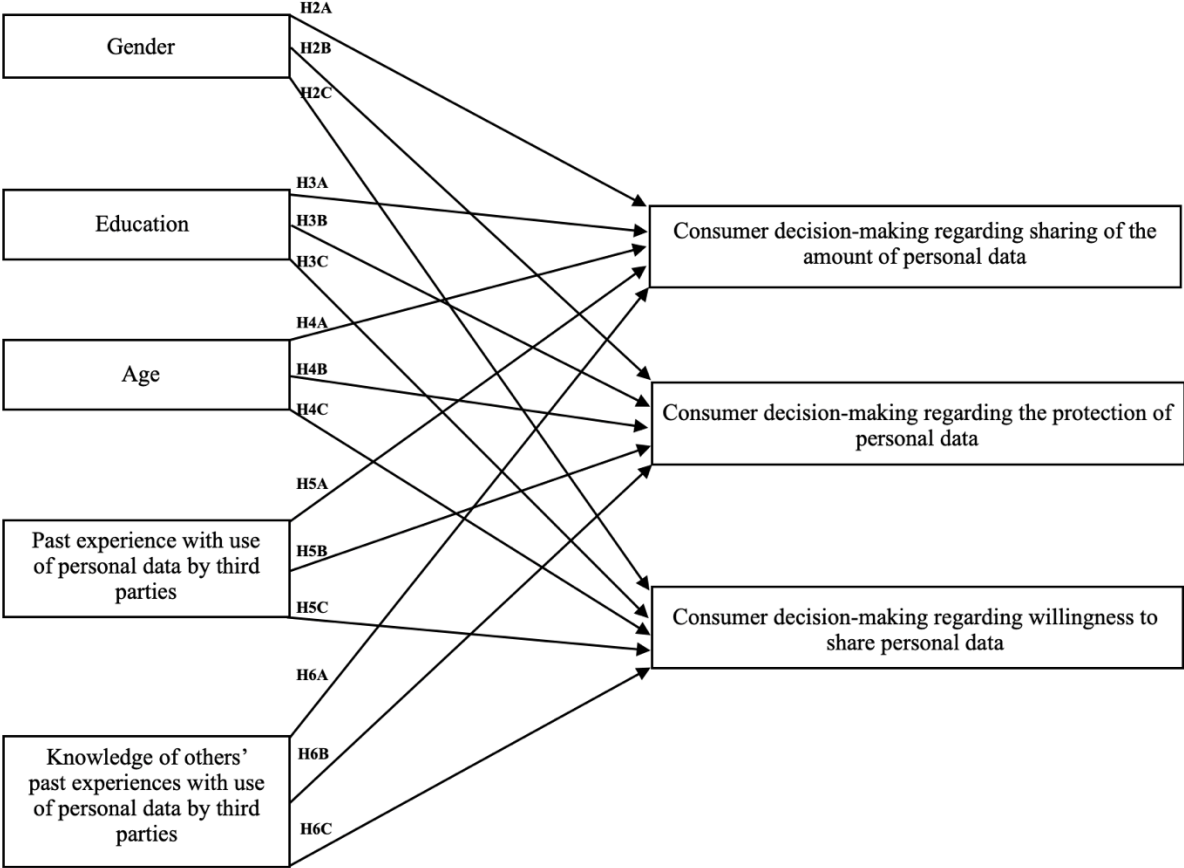


Figure 2. Conceptual model.

Chapter 3. Research Methodology

3.1 Quantitative and qualitative research.

There are two types of research methodologies: quantitative and qualitative. As defined by Malhotra and Birks (2007), qualitative research is unstructured, mainly exploratory design intended to give insight and understanding based on small samples. Quantitative on the other hand, consists of research techniques that intended to quantify data and tend to use a form of statistical analysis (Malhotra and Birks, 2007). Qualitative research used to present thoughts and opinions of a small number of people, whereas quantitative collects numerical data from a larger sample to look for patterns. Quantitative research is usually performed by collecting data for a specific hypothesis or question, which can be used to identify relationships between variables.

This paper aims to find the factors that influence the behavior of Instagram users in relation to their privacy protection. It uses the quantitative type of research as it meets the objective to find patterns in behaviors and their relationship with demographic factors and experiences of Instagram users. Furthermore, these behaviors can be shown in the form of statistical analysis.

3.2 Data collection.

The possible methods of data collection for a quantitative study are survey and observation techniques (Malhotra and Birks, 2007). There are various ways of the mode of administration of surveys, including online, telephone surveys, personal (face-to-face) surveys and postal surveys. Each way has its advantages and disadvantages and are used depending on the research needs. This study is using an online survey to collect data from a large sample of Instagram users due to the convenience of such a method. Due to the limited resources such as time constraints and finances available to the researcher, an online questionnaire was found to be the most cost-effective to reach a random sample of Instagram users in a short time period.

3.2.1 Survey design.

The survey was made using the Qualtrics platform and was distributed online on social media (such as Instagram, Facebook and WhatsApp) and through personal connections of the researcher. When distributing the link to the survey, the researcher made sure to state that the questionnaire was to be filled in by people who are Instagram users now or have used it in the past. This was also mentioned in the first part of the survey. The survey was fully anonymous and took most people about 2 minutes to complete. The respondents were informed about the research objectives and how their data was used. The whole survey was in English. The data collection took place between 30 June 2020 and 7 July 2020.

A funnel approach was used to design the questionnaire, such as the more general questions were asked first, followed by more specific ones. This was done to build trust with the respondents and decrease the possible bias that could arise if more specific questions were asked first (Malhotra and Birks, 2007). The questions of the survey were based on the conceptual model presented in the literature study (see figure 2). The full survey can be found in the Appendix A.

The first part of the survey consisted of the questions about respondents' demographic factors (age, gender and education level). It was decided to use the same age categories as are used to describe Instagram users' distribution worldwide (Statista, 2020) to facilitate comparison and to avoid potential non-response when individuals are not comfortable disclosing their actual age. The second part asked about the personal experiences related to experiences with the data use by third parties. It consisted of two dichotomous (yes/no) questions, first asked about the individuals' past experiences and the second one about knowing of others' experiences.

Then, a branching question was used in order to make the questionnaire experience more relevant to individual participants and to direct them to different questions based on their sharing behavior. The literature study has found three groups of protective behaviors. While the individual behaviors regarding the amount of personal data shared and its protection could occur simultaneously, completely abstaining from using Instagram suggests that no data is shared. Therefore, the group of people unwilling to share had to be examined separately. This sub-sample was then asked to give an extent to which they agree to a statement related to the importance of privacy in their willingness to share based on a 7-point Likert scale (1 – “strongly disagree” to 7 – “strongly agree”). Such scale was used to give respondents wider choice of options to express their opinion, since there was a “Neutral” option and they were not forced to choose the extremes.

The last part of the survey targeted people that do currently share personal content on Instagram. Respondents were asked to rate the degree (7-point Likert scale) to which they agreed with two statements related to the amount of personal data shared. The last question presented a list of 6 possible measures that one could take to protect their data on Instagram and asked how many the respondent has taken.

3.3 Research Sample.

The survey was only meant for people who use Instagram currently or have used it in the past, which the respondents were sufficiently informed about. After the initial distribution through connections of the researcher, the respondents were recruited through snowball sampling by encouraging the participants to share the link to the survey. Instagram can be used by anyone irrespective of their age, nationality or residence. Hence, such factors were not mentioned as conditions for participation. Due to

a highly international network available to the researcher, it is likely that the actual participants of the research sample come from around the world.

3.4 Pilot test.

Before distributing the survey to a wide audience, two pilot tests were performed. Both tests included the same 8 participants of both genders, who completed the survey and commented on its contents. The test was performed twice to make sure the researcher has taken the comments of the participants into consideration as well as to test whether the measurement was reliable. After the second pilot test, the survey was considered understandable, clear and easy to complete. The participants have found the scales to be straightforward and appropriate. The answers of the respondents were consistent and yielded similar outcomes after the second test.

3.5 Data Analysis.

The results of the survey were examined using statistical analysis. The statistical software chosen by this study is Stata due to its accessibility to the researcher. To find out whether Instagram users engage in privacy protection behaviors, the means of the three behavior variables are studied. For testing associations between the factors of interest (demographic and personal factors) and decision-making related to privacy protection of those who share on Instagram, a regression analysis is used. Such factors (namely gender, education, age, past experiences and others' experiences) are regressed on the average of the extent to which users engage in limiting behaviors and on the number of protective measures taken. The regression outcome represents relationships between the explanatory variables and the behaviors. To test whether there are differences between different groups of Instagram users who are not willing to share on Instagram, ANOVA analysis is chosen. It is considered suitable since it allows for testing differences between two or more groups.

3.6 Researcher's Bias.

In order to prevent researcher's bias various precautions were taken both when creating the survey and when it was distributed. The questionnaire was created with full attention to the possible bias; hence the questions were phrased in a manner that would not influence responses of the participants. The feedback collected from the pilot tests was useful to make sure the researcher's bias is reduced. Mainly distributing the survey by posting its link on various platforms accessible by a broad audience, rather than sending it personally was also done to reduce the bias in participant selection. Moreover, the participants were asked to share the link with others in the same manner. The data collected was processed and analyzed without any manipulation.

Chapter 4. Research Outcome

4.1 Survey Results.

There were 356 responses in total after disregarding another 62 responses due to incomplete answers. Most of the 62 invalid responses were left at the first part (the explanation of the meaning that those people were likely not in the sample of interest (are not Instagram users)). Table 1 presents a comparison between the characteristics of the final sample and Instagram users around the world. The final sample of this study consists of 254 (71.35%) females and 102 (28.65%) males. In the worldwide population of Instagram users, the distribution is almost even with 49% male to 51% female. The largest age group in the sample of the respondents is 18 to 24 being 47.19%, whereas in the worldwide population the percentage is only 29% and the majority (35%) being 25 to 34 years old. The respondents between 25 and 34 took only 15.45% of total respondents. Such differences in distributions can be explained by the limitations in conducting the survey, which are further explained later. This could also limit the representativeness of the sample for the entire population of Instagram users.

Table 1. Sample descriptive statistics.

Characteristics	Survey Result	Instagram Users (Statista, 2020)
Age		
Under 18	2.53%	6.6%
18 – 24	47.19%	29%
25 – 34	15.45%	35%
35 – 44	20.79%	16.6%
45 – 54	11.52%	8.2%
55 – 64	1.97%	3.4%
65 +	0.56%	1.9%
Gender		
Male	28.65%	49%
Female	71.35%	51%
Education		
Primary	0.84%	
Secondary/ High school	10.11%	
Vocational	3.93%	
Bachelor's	48.6%	
Master's	33.43%	
Doctorate or higher	3.09%	

Notes: The number of respondents n=356. The total population of Instagram users is more than 1 billion (Statista, 2020).

The majority (48.6%) of the respondents have completed or are completing a bachelor's degree, followed by 33.43% with a master's degree. Moreover, 75.56% of the respondents are currently using Instagram for sharing, 15.73% use the platform for viewing other's content without contributing their own and the other 8.71% have quit using Instagram completely (i.e. deleted the app). This study considers those who share on Instagram to analyze consumer decision-making regarding the amount of personal data shared and its protection, while the others are examined to analyze decision-making regarding willingness to share personal data.

4.2 Reliability of survey items.

The consumer decision-making regarding sharing of the amount of personal data is measured with two behaviors, namely being selective of the content shared and limiting one's personal information shared. It is necessary to test the reliability of survey items when measuring different aspects of a multidimensional construct. Cronbach's alpha with values above 0.6 indicates satisfactory reliability. The Cronbach's alpha found for the decision-making regarding sharing of the amount of personal data is 0.66, meaning the two items were reliable. The test results can be found in Appendix F.

4.3 Hypothesis testing.

4.3.1 Hypothesis 1.

H1. Instagram users engage in privacy protection behaviors.

H1A. Instagram users limit their sharing for privacy protection.

H1B. Instagram users adopt protection technologies.

H1C. Instagram users withhold from interacting on the platform for privacy protection.

Table 2. Descriptive statistics of protection behaviors.

Variable	N	Minimum	Maximum	Mean
Limit sharing	269	1	7	5.07
Protection	269	0	6	2.38
Withholding	87	1	7	4.75

Notes: Limit sharing is an average of being selective with content shared and limiting personal data shared. All figures are rounded to two decimal places.

This study has considered two possible ways in which Instagram users are limiting their sharing to protect their privacy: being selective with content shared and limiting personal data shared. The two behaviors were measured on a Likert scale from 1 to 7, where respondents indicated to what extent they agree to be taking those measures. For this analysis, the values of 1 to 3 are considered low, 3 to 5 are average and 5 to 7 are high. The mean value of being selective with content shared was 5.32 and 4.82 for limiting personal data (Appendix B, table 4). Hence, for the two measures combined the mean was 5.07 (table 2). It follows that there is not enough evidence to reject H1A. Hence, **H1A is accepted.**

Moreover, the average number of technological measures for privacy protection taken by respondents was 2 (table 2), where the minimum was 0 and the maximum was 6 measures. Therefore, although the number of measures taken on average is not high, the results show that at least 1 measure is taken by 88.10% of the respondents (Appendix B, table 5), meaning that **H1B is accepted.**

Lastly, 24% of the respondents have indicated that they are not currently using Instagram for sharing. It was found that the mean value of the extent to which privacy protection is decisive in their willingness to share was 4.75 (table 2), which is considered average and thus **H1C is accepted.**

Overall, the results showed that Instagram users do engage in privacy protection behaviors to a certain extent. Therefore, **H1 is accepted**. The findings have shown, that Instagram users mainly limit their sharing to protect their privacy and take a few technological measures, rather than completely withholding from using the platform.

4.3.2 Hypothesis 2.

H2. There is a positive association between gender (female) and privacy protection behaviors of Instagram users.

H2A. There is a positive association between gender (female) and consumer decision-making regarding sharing of the amount of personal data.

H2B. There is a positive association between gender (female) and consumer decision-making regarding the protection of personal data.

H2C. There is a positive association between gender (female) and consumer decision-making regarding willingness to share personal data.

The coefficient that corresponds to gender when regressing it on the limiting of the amount of data shared is close to 0.5 (Appendix C, table 6). Since the extent to which respondents agree to be limiting their sharing was measured from 1 (Strongly disagree) to 7 (Strongly agree), and coefficient suggests that being a female increases the extent of limiting behavior. The result is significant at the 5% level, supporting the H2A. Hence, **H2A is accepted**.

Similarly, when regressing gender on the number of technological measures taken, the coefficient is 0.46, which is significant at the 5% level (Appendix C, table 7). This means that for females the number of measures taken is higher than for males, which **supports H2B that is thus accepted**.

Table 3. One-way ANOVA p-values of all the tests performed on withholding.

Withholding	Prob. > F
Gender	0.25
Education	0.23
Age	0.11
Past experiences	0.22
Others' experiences	0.04**

*Notes: * p-value < 0.1, **p-value < 0.05, *** p-value < 0.01. For full results please refer to Appendix D. All figures are rounded to two decimal places.*

A one-way ANOVA was performed to check whether there are differences between genders for withholding of personal data for privacy reasons. The means of the two groups are 4.35 for males and 4.89 for females (Appendix D, table 8). However, the outcome presented in table 3 shows no statistically significant difference between the groups and H2C cannot be accepted. Therefore, **H2C is rejected**.

Hence, the findings suggest a positive association between being a female and limiting the amount of one's personal data as well as taking measures to protect it. For those who decide to stop sharing on Instagram the difference between genders is insignificant, however, the mean value for females was higher. Therefore, overall, the **H2 is accepted**, meaning that being a female may increase privacy protection behaviors of Instagram users.

4.3.3 Hypothesis 3.

H3: There is a positive association between education and privacy protection behaviors of Instagram users.

H3A: There is a positive association between education and consumer decision-making regarding sharing of the amount of personal data.

H3B: There is a positive association between education and consumer decision-making regarding the protection of personal data.

H3C: There is a positive association between education and consumer decision-making regarding willingness to share personal data.

The results of the regression of education levels on the extent of limiting the amount of data shared are not significant at 5% for any of the levels (Appendix C, table 6). Hence, the **H3A is rejected**, meaning that being more educated does not increase the extent of limiting behavior.

Regressing education levels on the number of protective measures taken showed ambiguous results. The coefficients of different levels do not increase with the level of education and are not significant at 5% for the vocational education and master's degree (Appendix C, table 7). The coefficients are 1.36 for secondary education, 0.92 for a bachelor's degree and 2.05 for a doctorate and higher, showing how much completing those levels increases the number of measures taken as compared to the reference category of primary education. There is not enough evidence for education level increasing the number of measures taken, therefore, **H3B is rejected**.

When testing for differences between different levels of education of those who choose not to share on Instagram, the results are not significant, since the p-value is more than 0.05 (table 3). **H3C is rejected**.

Overall, the results do not suggest any significant relationship between education level and privacy protection behaviors of Instagram users. Therefore, the **H3 is rejected** and being more educated does not increase individual privacy protection behaviors.

4.3.4 Hypothesis 4.

H4: There is a positive association between age and privacy protection behaviors of Instagram users.

H4A: There is a positive association between age and consumer decision-making regarding sharing of the amount of personal data.

H4B: There is a positive association between age and consumer decision-making regarding the protection of personal data.

H4C: There is a positive association between age and consumer decision-making regarding willingness to share personal data.

The results from regressing age groups on the extent of limiting behavior are only significant for those who are between 54 and 65 years old (Appendix C, table 6). The coefficient of 1.53 suggests that being in that age group increases the extent of limiting behavior as compared to the reference category of under 18 years old. The coefficients of other age groups are not significant at 5% and are not increasing with age, meaning that there is not enough evidence to accept H4A. Therefore, **H4A is rejected**.

Nevertheless, for the number of measures taken, the coefficients are significant at 5% for all age groups. Table 7 (Appendix C) shows that while the number of measures taken is higher for all age groups as compared to the Instagram users under 18 years old, it does not increase with age. It follows that being in a higher age group does not increase the number of measures taken, hence **H4B is rejected**.

Similarly, the test of differences between different age groups of those who choose not to share on Instagram did not return significant results (table 3), meaning that **H4C is also rejected**. This research does not show any significant differences between the age groups of Instagram users when it comes to withholding personal data.

Overall, **H4 is rejected** as the analysis did not show any significant relationship between age groups and privacy protection behaviors of Instagram users. Therefore, being in a higher age group does not positively affect privacy protection behaviors.

4.3.5 Hypothesis 5.

H5: There is a positive association between past experiences with use of personal data by third parties and privacy protection behaviors of Instagram users.

H5A: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding sharing of the amount of personal data.

H5B: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding the protection of personal data.

H5C: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding willingness to share personal data.

There was no significant relationship found between having had past experience with the use of personal data by third parties and the extent of limiting personal data by Instagram users (Appendix C, table 6). Therefore, **H5A is rejected**.

The coefficient of the past experiences, when regressed on the number of measures taken, is 0.49 and is significant at 5% level (Appendix C, table 7). This means that having had an experience with the use of personal data by third parties increases the number of protective measures taken by the Instagram users, which supports **H5B that is accepted**.

No significant differences were found between those who have had past experience with the use of personal data and those who have not, meaning that **H5C is rejected** (table 3).

Therefore, there is not enough evidence to accept H5, meaning that having experienced unauthorized use of personal data by third parties does not lead to more privacy protection behaviors of Instagram users. Thus, **H5 is rejected**.

4.3.6 Hypothesis 6.

H6: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and privacy protection behaviors of Instagram users.

H6A: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding sharing of the amount of personal data.

H6B: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding the protection of personal data.

H6C: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding willingness to share personal data.

The coefficient of one's knowledge of others' past experiences with use of personal data by third parties when regressed on the sharing of the amount of personal data was 0.21 (Appendix C, table 6). It was, however, not significant at the 5% level and the **H6A is rejected**.

In a regression on the number of measures, the coefficient was 0.4 and it was significant at 5% level (Appendix C, table 7) suggesting a positive association between knowing of others' past experiences with use of personal data by third parties and more protective measures taken by Instagram users. Hence, **H6B is accepted**.

The results of the ANOVA test of differences between those who know of others experiencing unauthorized data use by third parties and those who do not are significant at 5% (table 3). This means that for those who do know of others' experiences privacy issues are more likely to abstain from sharing on Instagram because of privacy. Therefore, **H6C is accepted**.

Overall, the findings suggest that knowledge of others' experiences with use of their personal data by third parties is likely to affect the number of protective measures taken and can lead to some withholding from sharing on Instagram completely. While the coefficient in a regression on the limiting behavior is not significant, it is still positive. Therefore, despite the partial significance of results, **H6 is accepted**.

4.4 Results' summary.

The outcome of this research shows that Instagram users do engage in privacy protection behaviours and do take active measures for privacy protection. The most popular behavior among the respondents was limiting their sharing, followed by taking some technological measures for privacy protection. Moreover, being selective with content shared was more common with Instagram users than limiting personal data shared. It was also shown that privacy issues were decisive for many users who are currently not willing to share on Instagram. This study found ambiguous results related to the factors that literature suggested to influence the extent to which one engages in privacy. A positive association with privacy protection behaviors was concluded for being a female and one's knowledge of others' past experiences with violation of personal data by third parties. Instagram users with such characteristics tend to engage in more privacy protection than those who are male or do not know of others' experiences. Moreover, the results did not show that being more educated, older or having had a personal experience with data violation have a positive association with privacy protection behaviors of Instagram users. However, the analysis showed a significant positive relationship between having had past experience with the use of personal data by third parties and the number of technological measures taken by the user. The full summary of the hypothesis testing can be found in Appendix E. For the outcomes of Stata analysis, refer to Appendix F.

Chapter 5. Conclusions and Recommendations.

5.1 Discussion and conclusion.

The main objective of this paper is to examine various factors affecting the decisions that individuals make about their privacy protection on Instagram. Firstly, a literature study was performed to develop a theoretical framework. The literature review has identified three groups of privacy protection behaviors that internet users intend to employ, namely fabricating, protecting and withholding personal data (Lwin et al., 2007). These concepts were adapted based on what behaviors could be used by Instagram users related to their decision-making regarding the amount of personal data shared, the number of technological measures taken and the willingness to share. Furthermore, as suggested by the IUIPC model (Malhotra et al., 2004), certain demographic factors and personal experiences may directly affect how internet users protect their privacy. Various studies have shown that women, more educated and older people are more likely to be concerned about privacy and, therefore, take measures to protect it. Moreover, it was shown that people who experienced the use of their personal data by third parties or know of others' data being used are also likely have higher concerns (Smith et al., 1996).

The literature review was followed by a quantitative data collection through an online survey. The final research sample consisted of 356 respondents, and the collected data was analyzed using Stata. The results of the analysis have shown that Instagram users do engage in all the three groups of behaviors to protect their privacy. It was found that users of Instagram limit the amount of personal data shared and take on average at least 2 technological measures to protect it. Being selective of content shared was the most popular way to limit the amount of data shared. That may be the most convenient way for Instagram users since it does not require as much effort as, for example, taking protective measures. For those unwilling to share their data, privacy issues played a decisive role in their choice.

Furthermore, the findings of this study have shown that there is a positive association between being a female and limiting the amount of one's personal data as well as taking measures to protect it. However, for those who decide to stop sharing on Instagram no significant differences between genders are found, although the mean was higher for females. The analysis did not show any significant relationship between being more educated and engaging in any of the privacy protection behaviors on Instagram. Similarly, being older also did not show a significant change in privacy protection of Instagram users. The analysis of this paper found that there is no significant relationship between having had such personal experience and the extent of limiting behavior on Instagram nor with withholding of the personal data. However, a positive association was found between having had a personal experience and the number of technological measures taken. On the other hand, knowing of others' experiences with their data being used by third parties did show a positive association with the number of protective measures taken as well as with withholding behavior on Instagram. However, although the coefficient

of others' experiences was positive, it was not significant. Overall, the results do show that there may be a positive association between knowing of others' experiences with their data being used by third parties and engaging in privacy protection behaviors on Instagram.

When comparing the findings of the literature and of this study, the main inference is that Instagram users do engage in all three types of privacy protection behaviors as suggested by the theory. The outcome of this study related to gender and others' experiences resembled those of the literature. Hence, this paper has shown evidence that Instagram users with those characteristics do engage in privacy protection more as it was found previously for internet users in general. On the other hand, the outcomes of education, age and individual past experiences opposed those presented in the theoretical framework. There was no significant relationship between those factors and privacy protection behaviors on Instagram.

Going back to the central research question of this study, which is:

To what extent do Instagram users take active measures to protect their privacy?

This research comes to the conclusion is that the users of Instagram do take active measures to protect their privacy to a certain extent. As discussed earlier, there was evidence for all three groups of protective behaviors on Instagram, which led to H1 being accepted. Furthermore, H2 was accepted because being a female showed an increase in privacy protection behaviors. The other demographic factors considered in this research did not show such result and, therefore, H3 and H4 were rejected. Although there was evidence for H5B, overall H5 was rejected, meaning that having experienced the use of personal data by third parties does not necessarily increase the privacy protection behaviors of Instagram users. On the other hand, the H6 was accepted despite H6A being rejected and this research concludes that others' experiences would lead to more protection.

In conclusion, this study has found that Instagram users do engage in privacy protection behaviors that were suggested by the literature review. Therefore, data protection issues must play a role in their decision-making when it comes to sharing. However, the results showed only a moderate level of privacy protection on Instagram, meaning that the users might not be highly conscious about their data sharing. Moreover, the only demographic indicator that had association with user behavior was gender, age and education did not show any significant effect. Interestingly, for personal experiences, one's past experiences did not have an effect on user behavior as opposed to knowing of others' experiences with the data use by third parties. The results opposing what was found in the past could be due to the privacy paradox, such as although people with those characteristics might be more concerned, they do not necessarily take measures to protect their privacy. This, however, is beyond of the scope of this paper.

5.2 Recommendations to Instagram stakeholders.

The analysis of this paper provides insights into consumer behavior of Instagram users. It was shown that Instagram users do engage in privacy protection. The most popular behavior among the respondents was to limit their sharing through being selective of their content. The average number of technological measures that Instagram users take to protect their privacy was 2, which is not high given that Instagram allows for at least 6 possible measures. Moreover, 24% of the respondents are refraining from sharing on Instagram and privacy issues play an important role in this decision. Since for Instagram and the businesses that use it for advertising and communication purposes the user base and their content is essential, it could be beneficial to increase the user awareness about privacy protection. To foster trust among users, it is necessary to educate them about why they could benefit from taking measures for privacy protection. This research has also given insights into characteristics that could predict whether the user will engage in a certain privacy protection behavior. Such information could be used by Instagram stakeholders to decrease the concern among the specific users. For the users themselves, it is necessary to look into the data that they are sharing with Instagram to increase their understanding of potential threats.

5.3 Recommendations to future researchers.

Privacy issues gain more and more importance every year and it is necessary to study consumer behavior to educate and protect internet users. Future research could focus on studying the problem of informational privacy on Instagram in more detail since this paper considered only a limited number of behaviors. For instance, a qualitative study could be performed to see more in-depth what the Instagram users do to protect their privacy. Moreover, a quantitative study of a larger sample with more variation in demographic characteristic could give a more accurate result and better representation of the population of Instagram users. Such study could also look into the effects that nationality has on behavior as certain studies have suggested a relationship between culture and privacy concern. Future research could also look into the issues related to the privacy paradox and use more metrics to measure both consumer behavior as well as the privacy concern by itself to see the mediation effects.

5.4 Research limitations.

This research comes with a number of limitations. Firstly, the sample considered by this study may not be fully representative of the population of the Instagram users. The limited resources available to the researcher, such as time and financial constraints led to a relatively small sample of respondents with an uneven distribution of demographic characteristics among them. Consumer behavior involves many different aspects and is a broad and dynamic subject. Measuring consumer behavior accurately requires thorough examination of patterns of individuals, which was not possible given the resources. Hence, the measures chosen by this study may not be fully valid when determining behavior of Instagram users. A more comprehensive analysis consisting of various metrics would be needed to increase the validity of the measurement. Furthermore, due to the constraints mentioned earlier, the analysis treated the Likert

scale variables as continuous. This may not be fully accurate since the distance between different scale points is not necessarily equal.

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Appendix A. Survey.

Dear Respondents,

My name is Maria, and this survey is for my bachelor thesis, which is about privacy decision-making on Instagram.

This survey is meant for Instagram users. However, if you don't currently use Instagram for sharing any content, you can still participate. All responses are fully anonymous and will only be used for my research. It consists of several demographic questions and questions regarding personal experiences and opinions related to privacy protection on Instagram. It will take about 2 minutes to complete.

If you have any questions or comments, feel free to email me at 478279mv@student.eur.nl
Thank you for participating!

(Part 1)

What is your age?

- Under 18
- 18 - 24
- 25 - 34
- 35 - 44
- 45 - 54
- 55 - 64
- 65+

What is your gender?

- Male
- Female

What is the highest level of education you have completed? If you are a student, the one you are currently in.

- Primary education
- Secondary education or high school
- Vocational education (i.e. technical training)
- Bachelor's degree
- Master's degree
- Doctorate degree (or higher)

(Part 2)

Have you experienced third parties using your personal data (including content you shared) without your consent?

Personal information refers to any information that can be traced back to you (e.g full name, date of birth, location).

Content is anything you share on your profile, including stories and IGTV.

- Yes
- No

Do you know of others' experiences with unauthorised use of their personal data (including content they shared) by third parties?

- Yes
- No

(Part 3)

Do you currently use Instagram?

- Yes (Part 5)
- Yes, but I do not share any content (only view others' posts) (Part 5A)
- No (Part 5A)

(Part 4A)

To what extent do you agree with the following statement:

Privacy issues play a decisive role in my willingness to share on Instagram.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

(Part 4)

To what extent do you agree with the following statement:

I limit the personal information I share with Instagram.

Personal information refers to any information that can be traced back to you (e.g full name, date of birth, location).

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral
- Somewhat agree
- Agree
- Strongly agree

To what extent do you agree with the following statement:

I am highly selective of the content I share on Instagram.

Content is anything you share on your profile, including stories and IGTV.

- Strongly disagree
- Disagree
- Somewhat disagree
- Neutral

- Somewhat agree
- Agree
- Strongly agree

Please select how many of the following 6 measures you have taken to protect your privacy on Instagram.

- *Private profile***
- *Blocked users from seeing posts***
- *Two-factor authentication setting***
- *Revoked access to Instagram data by other apps***
- *Regularly checking account activity in settings***
- *Use other software for privacy protection on Instagram***

- 0
- 1
- 2
- 3
- 4
- 5
- 6

Appendix B. Descriptive statistics of protection behaviors.

Table 4. Descriptive statistics of limiting the amount of data shared.

Variable	N	Minimum	Maximum	Mean
Selective of content shared	269	1	7	4.82
Limit personal data shared	269	1	7	5.32
Total	269	1	7	5.07

Notes: All figures are rounded to two decimal places.

Table 5. Frequencies of the number of measures taken.

Number of measures	Frequency	Percent	Cumulative
0	32	11.90	11.90
1	48	17.84	29.74
2	64	23.79	53.53
3	66	24.54	78.07
4	35	13.01	91.08
5	18	6.69	97.77
6	6	2.23	100
Total	269	100	

Notes: All figures are rounded to two decimal places.

Appendix C. Regressions.

Table 6. Regressing demographic and personal factors on limiting sharing.

Limiting sharing	Coefficient (St. Error)
Gender (Female)	0.50*** (0.18)
Secondary	1.54 (1.08)
Vocational	0.68 (1.17)
Bachelor's	1.36 (1.10)
Master's	1.35 (1.11)
Doctorate and higher	2.11* (1.16)
18-24	0.80 (0.51)
25-34	0.87 (0.54)
35-44	1.05* (0.55)
45-54	0.94 (0.66)
55-64	1.53** (0.63)
65+	-
Past experiences	0.08 (0.16)
Others' experiences	0.21 (0.18)
Cons.	2.35** (1.00)

*Notes: * p-value < 0.1, **p-value < 0.05, *** p-value < 0.01. All figures are rounded to two decimal places.*

Table 7. Regressing demographic and personal factors on the number of protection measures.

Measures	Coefficient (St. Error)
Gender (Female)	0.46** (0.19)
Secondary	1.36*** (0.4)
Vocational	0.44 (0.64)
Bachelor's	0.92** (0.39)
Master's	0.55 (0.38)
Doctorate and higher	2.05*** (0.61)
18-24	1.39*** (0.40)
25-34	1.33*** (0.44)
35-44	1.43***

	(0.48)
45-54	1.75***
	(0.53)
55-64	1.74**
	(0.68)
65+	-
Past experiences	0.49***
	(0.18)
Others' experiences	0.40**
	(0.19)
Cons.	-0.66
	(0.41)

*Notes: * p-value < 0.1, **p-value < 0.05, *** p-value < 0.01. All figures are rounded to two decimal places.*

Appendix D. ANOVA tests.

Table 8. Descriptive statistics of demographic and personal factors and withholding.

Variable	Mean	Stand. Dev.	Frequency
<i>Gender</i>			
Male	4.35	2.17	23
Female	4.89	1.81	64
Total	4.75	1.91	87
<i>Education</i>			
Primary	-	-	-
Secondary	4.20	2.05	5
Vocational	4.33	0.58	3
Bachelor's	4.40	2.09	35
Master's	4.98	1.80	40
Doctorate	6.50	0.58	4
Total	4.75	1.91	87
<i>Age</i>			
Under 18	-	-	-
18-24	4.04	2.29	23
25-34	4.78	2.22	9
35-44	5.30	1.53	30
45-54	4.45	1.73	20
55-64	5	1	3
65+	7	0	2
Total	4.75	1.91	87
<i>Past experiences</i>			
No	4.52	2.04	48
Yes	5.03	1.72	39
Total	4.75	1.91	87
<i>Others' experiences</i>			
No	4.22	2.12	35
Yes	5.09	1.69	52
Total	4.75	1.91	87

Notes: All figures are rounded to two decimal places.

Table 9. One-way ANOVA output (gender and withholding).

	Sum of Squares	df	Mean Square	F	Prob > F
Between groups	4.99	1	4.99	1.37	0.25
Within groups	309.45	85	3.64		
Total	314.44	86	3.66		

*Notes: * p-value < 0.1, **p-value < 0.05, *** p-value < 0.01. All figures are rounded to two decimal places. Bartlett's test for equal variances: $\chi^2(1) = 1.0969$ Prob> $\chi^2 = 0.295$*

Table 10. One-way ANOVA output (education and withholding).

	Sum of Squares	df	Mean Square	F	Prob > F
Between groups	20.59	4	5.15	1.44	0.23
Within groups	293.84	82	3.58		
Total	314.44	86	3.66		

*Notes: * p-value < 0.1, **p-value < 0.05, *** p-value < 0.01. All figures are rounded to two decimal places. Bartlett's test for equal variances: $\chi^2(4) = 7.5638$ Prob> $\chi^2 = 0.109$*

Table 11. One-way ANOVA output (age and withholding).

	Sum of Squares	df	Mean Square	F	Prob > F
Between groups	32.67	5	6.53	1.88	0.11
Within groups	281.76	81	3.48		
Total	314.44	86	3.66		

*Notes: * p-value < 0.1, **p-value < 0.05, *** p-value < 0.01. All figures are rounded to two decimal places. Bartlett's test for equal variances: $\chi^2(4) = 5.5182$ Prob> $\chi^2 = 0.238$*

Table 12. One-way ANOVA output (past experiences and withholding).

	Sum of Squares	df	Mean Square	F	Prob > F
Between groups	5.48	1	5.48	1.51	0.22
Within groups	308.95	85	3.63		
Total	314.44	86	3.66		

*Notes: * p-value < 0.1, **p-value < 0.05, *** p-value < 0.01. All figures are rounded to two decimal places. Bartlett's test for equal variances: $\chi^2(1) = 1.1686$ Prob> $\chi^2 = 0.280$*

Table 13. One-way ANOVA output (other's experiences and withholding).

	Sum of Squares	df	Mean Square	F	Prob > F
Between groups	15.75	1	15.75	4.48	0.04**
Within groups	298.69	85	3.51		
Total	314.44	86	3.66		

*Notes: * p-value < 0.1, **p-value < 0.05, *** p-value < 0.01. All figures are rounded to two decimal places. Bartlett's test for equal variances: $\chi^2(1) = 2.0233$ Prob> $\chi^2 = 0.155$*

Appendix E. Results' summary.

Table 14. Results of hypothesis testing.

Hypothesis	Result
H1. Instagram users engage in privacy protection behaviors.	Accepted
<i>H1A. Instagram users limit their sharing for privacy protection.</i>	Accepted
<i>H1B. Instagram users adopt protection technologies.</i>	Accepted
<i>H1C. Instagram users withhold from interacting on the platform for privacy protection.</i>	Accepted
H2. There is a positive association between gender (female) and privacy protection behaviors of Instagram users.	Accepted*
<i>H2A. There is a positive association between gender (female) and consumer decision-making regarding sharing of the amount of personal data.</i>	Accepted
<i>H2B. There is a positive association between gender (female) and consumer decision-making regarding the protection of personal data.</i>	Accepted
<i>H2C. There is a positive association between gender (female) and consumer decision-making regarding willingness to share personal data.</i>	Rejected
H3: There is a positive association between education and privacy protection behaviors of Instagram users.	Rejected
<i>H3A: There is a positive association between education and consumer decision-making regarding sharing of the amount of personal data.</i>	Rejected
<i>H3B: There is a positive association between education and consumer decision-making regarding the protection of personal data.</i>	Rejected
<i>H3C: There is a positive association between education and consumer decision-making regarding willingness to share personal data.</i>	Rejected
H4: There is a positive association between age and privacy protection behaviors of Instagram users.	Rejected
<i>H4A: There is a positive association between age and consumer decision-making regarding sharing of the amount of personal data.</i>	Rejected
<i>H4B: There is a positive association between age and consumer decision-making regarding the protection of personal data.</i>	Rejected
<i>H4C: There is a positive association between age and consumer decision-making regarding willingness to share personal data.</i>	Rejected
H5: There is a positive association between past experiences with use of personal data by third parties and privacy protection behaviors of Instagram users.	Rejected*
<i>H5A: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding sharing of the amount of personal data.</i>	Rejected

H5B: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding the protection of personal data. Accepted

H5C: There is a positive association between past experiences with use of personal data by third parties and consumer decision-making regarding willingness to share personal data. Rejected

H6: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and privacy protection behaviors of Instagram users. Accepted*

H6A: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding sharing of the amount of personal data. Rejected

H6B: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding the protection of personal data. Accepted

H6C: There is a positive association between one's knowledge of others' past experiences with use of personal data by third parties and consumer decision-making regarding willingness to share personal data. Accepted

*Notes: * partial result*

Appendix F. Stata analysis outcomes.

Test scale = mean(unstandardized items)

Average interitem covariance: **1.091508**
 Number of items in the scale: **2**
 Scale reliability coefficient: **0.6628**

Figure 3. Chronbach's Alpha of limiting personal data and selective sharing.

Variable	Obs	Mean	Std. Dev.	Min	Max
Gender	269	.7063197	.4562962	0	1
UnderEight~n	269	.0334572	.1801625	0	1
Eightteen~r	269	.5390335	.4994032	0	1
TwentyFive~r	269	.1710037	.377214	0	1
ThirtyFive~r	269	.1635688	.3705732	0	1
FourtyFive~r	269	.0780669	.2687769	0	1
FiftyFive~r	269	.0148699	.1212577	0	1
primary	269	.0111524	.1052102	0	1
secondary	269	.1152416	.3199085	0	1
vocational	269	.0408922	.1984096	0	1
bachelor	269	.5130112	.5007623	0	1
masters	269	.2936803	.4562962	0	1
doctorate	269	.0260223	.1594983	0	1
Past_Exper~s	269	.4907063	.5008454	0	1
Others_Exp~s	269	.605948	.4895569	0	1
limit	269	4.821561	1.542235	1	7
selective	269	5.32342	1.423238	1	7
Limit_shar~g	269	5.072491	1.283268	1	7
Measures_t~n	269	2.379182	1.497913	0	6

Figure 4. Summary of the descriptive statistics of variables for people who use Instagram for sharing.

Variable	Obs	Mean	Std. Dev.	Min	Max
Age_catego~l	87	3.735632	1.298118	2	7
Eighteen_T~r	87	.2643678	.4435525	0	1
TwentyFive~r	87	.1034483	.306309	0	1
ThirtyFive~r	87	.3448276	.4780675	0	1
FourtyFive~r	87	.2298851	.4231979	0	1
FiftyFour~r	87	.0344828	.1835234	0	1
SixtyFive	87	.0229885	.1507355	0	1
Education_~l	87	4.402299	.8688374	2	6
Secondary	87	.0574713	.2340901	0	1
Vocational	87	.0344828	.1835234	0	1
Bachelor	87	.4022989	.4932043	0	1
Masters	87	.4597701	.5012681	0	1
Doctorate	87	.045977	.2106494	0	1
gender	87	.7356322	.4435525	0	1
Past_Exper~s	87	.4482759	.5002004	0	1
Others_Exp~s	87	.5977011	.4932043	0	1
Withholding	87	4.747126	1.91213	1	7

Figure 5. Summary of the descriptive statistics of variables for people who do not use Instagram for sharing.

Source	SS	df	MS	Number of obs	=	269
Model	46.639488	12	3.886624	F(12, 256)	=	2.52
Residual	394.696943	256	1.54178493	Prob > F	=	0.0038
				R-squared	=	0.1057
				Adj R-squared	=	0.0638
Total	441.336431	268	1.64677773	Root MSE	=	1.2417

Limit_sharing	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Gender	.4978543	.1706496	2.92	0.004	.1617984	.8339101
secondary	1.646881	.7672257	2.15	0.033	.1360031	3.157758
vocational	.9506722	.8256803	1.15	0.251	-.6753185	2.576663
bachelor	1.642406	.7396996	2.22	0.027	.1857351	3.099077
masters	1.610268	.7424916	2.17	0.031	.1480987	3.072437
doctorate	2.354201	.8916072	2.64	0.009	.5983827	4.11002
TwentyFive_ThirtyFour	.111009	.2362748	0.47	0.639	-.3542807	.5762988
ThirtyFive_FourtyFour	.2843311	.2467128	1.15	0.250	-.2015139	.7701762
FourtyFive_FiftyFour	.1756616	.3147659	0.56	0.577	-.4441987	.7955218
FiftyFive_SixtyFour	.7519012	.6613495	1.14	0.257	-.5504771	2.054279
Past_Experiences	.0573275	.1711685	0.33	0.738	-.2797502	.3944052
Others_Experiences	.2549516	.1785215	1.43	0.154	-.0966061	.6065093
_cons	2.842441	.7438762	3.82	0.000	1.377545	4.307337

Figure 6. Regression outcome on limit sharing.

Source	SS	df	MS	Number of obs	=	269
Model	95.7816542	12	7.98180452	F(12, 256)	=	4.04
Residual	505.541766	256	1.97477252	Prob > F	=	0.0000
				R-squared	=	0.1593
				Adj R-squared	=	0.1199
Total	601.32342	268	2.2437441	Root MSE	=	1.4053

Measures_taken	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Gender	.4593965	.193131	2.38	0.018	.0790686	.8397243
secondary	1.551091	.8683	1.79	0.075	-.1588298	3.261011
vocational	.9146276	.9344553	0.98	0.329	-.9255709	2.754826
bachelor	1.407428	.8371476	1.68	0.094	-.2411451	3.056001
masters	1.001394	.8403074	1.19	0.234	-.6534018	2.656189
doctorate	2.467613	1.009067	2.45	0.015	.4804827	4.454743
TwentyFive_ThirtyFour	.0192007	.2674016	0.07	0.943	-.5073863	.5457877
ThirtyFive_FourtyFour	.1023035	.2792147	0.37	0.714	-.4475467	.6521538
FourtyFive_FiftyFour	.4368279	.3562331	1.23	0.221	-.2646927	1.138348
FiftyFive_SixtyFour	.3978198	.7484756	0.53	0.596	-1.076134	1.871773
Past_Experiences	.4474247	.1937183	2.31	0.022	.0659404	.828909
Others_Experiences	.4806452	.2020399	2.38	0.018	.0827733	.878517
_cons	.1873868	.8418744	0.22	0.824	-1.470494	1.845268

Figure 7. Regression outcome on measures taken.