Facial recognition technology in Russia:

Do the citizens of Russia accept it?

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Abstract

Background: Nowadays, one of the world's largest facial recognition systems operates in the Russian capital, Moscow. The Russian government widely used facial recognition technology to tackle the COVID-19 pandemic. New facial recognition initiatives are constantly taking place not only in Moscow but also in other Russian cities. However, very little is known about how Russian citizens perceive facial recognition technology and its active usage in Russia. As followed, this research intends to identify how the citizens of Russia perceive facial recognition technology, how much they accept its usage, and what factors might lead to this acceptance. Studies show that people's opinions on this technology are generally influenced by different factors, depending on the country where they live. This study claims that socio-demographic factors, experience with facial recognition technology, trust in the government, perceived consequences, perceived usefulness, and perceived reliability affect the perception and acceptance of facial recognition technology by Russian citizens.

Methods: The research is based on the TAM and UTAUT models and the privacy-security trade-off literature that consider certain factors (socio-demographic factors, experience with facial recognition technology, trust in the government, perceived consequences, perceived usefulness, and perceived reliability) of people's perception and acceptance of various technologies. The research is performed by means of a cross-sectional and web-based survey.

Results: The research outcome demonstrated that perceived consequences, perceived usefulness, perceived reliability, and trust in the government are the factors leading to the acceptance of facial recognition technology by Russian citizens. It also showed that socio-demographic factors (gender, age, level of education, level of income), and experience with facial recognition technology do not influence the acceptance of facial recognition technology by Russian citizens. In general, the respondents incline to not accept the usage of facial recognition technology in Russia. However, they perceive facial recognition technology as useful and reliable and think that the consequences of its usage can be positive and negative at the same time.

Conclusion: The outcome of the study reinforces current findings in the domain stating that perceived usefulness and perceived reliability have a decisive importance for the public in accepting facial recognition technology. Additionally, the new findings show that for Russia, trust in the government influences the acceptance levels of facial recognition technology. It was also found that in Russia, people who gather news from television have more support towards the usage of facial recognition technology as compared to those getting news from social media and other information sources. It gives room for further research in this area such as applying these factors to different national contexts. It can also be suggested to include other socio-demographic factors such as the areas where respondents reside or regions of Russia where respondents live if the research is to be replicated with a bigger sample. These factors could be added to see if the opinion on facial recognition technology in Russia depends on the location of the respondents since this division was not done by the current research.

Keywords: *facial recognition technology, TAM, UTAUT, public opinion, COVID-19, Russia*

Table of Contents

1. Introduction 4

2. Theoretical Framework 9

2.1. TAM and UTAUT 9

2.1.1. Perceived usefulness 12

2.1.2. Perceived consequences (benefits and risks) 13

2.1.3. Perceived reliability 15

2.1.4. Trust in the government 16

2.1.5. Socio-demographic factors 16

2.1.6. Experience with FRT 17

2.2. Acceptance and perception of FRT 17

3. Methodology 20

3.1. Research design 20

3.2. Pre-test 21

3.3. Procedure 22

3.4. Participants 23

3.5. Measures 24

3.5.1. Validity and reliability 26

4. Results 29

4.1. Descriptive 29

4.2. Correlation analysis 31

4.3. Working hypotheses testing 32

4.4. Overview of the results 34

4.5. Additional information 36

5. Discussion 37

5.1. Discussion of the results 37

5.2. Limitations and recommendations for future research 39

5.3. Theoretical and practical implications 41

6. Conclusion 44

References 45

Appendix A: Items questionnaire 53

Appendix B: Survey 59

Appendix C: Pre-test 69

Appendix D: Reliability and validity analysis 76

1. Introduction

As of July 2021, the Russian metro started testing the facial recognition payment system on four existing metro stations in the capital of Russia, Moscow. The Moscow Transport Department reported its plans on implementing this system to all metro stations in the Russian capital by the end of 2021 (The Moscow Transport Department, 2021). Over the past two years, other facial recognition technology (FRT) initiatives have taken place in Russia, covering most of the known FRT development directions as using FRT for identifying verification for financial matters or implementing video systems at schools and universities. The scale of usage of FRT in Russia makes 5% of the digital economy of Gross domestic product (GDP) in the country. However, the number of use-cases of FRT in Russia is constantly growing (Seliverstova, 2020). That is happening despite the regulatory gaps and questions about personal data security that arise with the usage of this technology ("Russia expands", 2020).

FRT is based on the neural network that is trained to determine the unique characteristics of people's faces to be able to find similar faces in the given database. Nowadays, one of the world's biggest face recognition systems already operates in the Russian capital, Moscow (Mos, 2017). According to the official website of the city, this network is based on almost 200 thousand cameras connected to a single system (Kasai, 2020; Mos, 2017). The Moscow face recognition system not only recognizes faces but also stores information about the place and time of the face's appearance in the database. The data is kept for at least 30 days and, according to some sources, is freely available on the darknet ("Роскомсвобода нашла", 2020). The Moscow City Hall reported that it plans to spend 2.91 billion rubles on facial recognition system improvement until 2025. That would include the works on video surveillance systems with the face recognition function. Moscow's expenditures on the modernization of smart video surveillance systems are constantly increasing: in 2019, the Department of Information Technologies of Moscow spent 60.8 billion rubles for these purposes; in 2020, about 68 billion rubles. By the end of 2021, the costs are expected to be at 70.8 billion rubles. Additionally, the Ministry of Internal Affairs of Russia intends to use artificial intelligence (AI) to identify criminals by voice. The tender for the corresponding program and equipment was recently posted on their official website.

As of December 2019, the world is facing the COVID-19 pandemic. The counteraction to the virus and actions of the governments remain to be the highly discussed topic in society, academics, and the business environment ("Global Research", 2021). At the beginning of the pandemic, the governments of various countries took measures aimed at containing the virus (Lotfi et al., 2020; Qian and Jiang, 2020). Most countries asked their citizens to stay at home if the person showed the symptoms of a cold or fully isolate themselves from others for up to two weeks if they had a fever (Lotfi et al., 2020). Many researchers argue that the COVID-19 pandemic ensured the technological progress and fast development of such technologies as AI. That happened because the governments of various countries worldwide started using them to monitor the spread of the virus and track people's compliance with the rules taken to stop the COVID-19 pandemic.

FRT, being the AI application, gained popularity as an instrument that was used to halt the spread of the virus worldwide. In Russia, FRT was implemented to identify those violating quarantine in order to give these patients automatic fines based on FRT results ("Coronavirus: Russia uses", 2020). During the application of this use case, the system made mistakes such as giving fines for those who took out the trash assuming that these people were not following the COVID-19 rules set by the Russian government (Bondarenko, 2020). Some public figures were given a criminal case based on FRT tracking assuming that these people violated the COVID-19 quarantine rules. People who were accused of these violations were the organizers and participants of the protests organized in Russia in a support of the Russian opposing politician, Alexey Navalny (Tzelitsheva, 2021).

In Russia, FRT is claimed to have advantages such as helping to find those who are put on the federal most wanted list. However, as of now, the system is believed to be also used for community and political activists' prosecution (Zlobina, 2020). The public backlash in Russia was recently caused by the use of FRT for identifying protest participants (Zaharov and Derguatzov, 2021). The face recognition system used by the Russian government was proved to have a special category for people that protest actively (Karaseva, 2021). Additionally, in Russia, FRT is not officially regulated by the government

which is opposed to, for instance, the European Union (EU) status of FRT that was analyzed in the previous studies (Kostka et al., 2020). In the EU, the usage of FRT is regulated by the officials.

As followed, this research is designed to examine the perception and the acceptance factors of FRT by the citizens of Russia. In Russia, FRT applications led to massive public discussions on the usage of this technology. Despite the controversies that arise with this topic, the Russian government introduces new use-cases for FRT. This study assumes that, in general, the acceptance levels of FRT by the Russian citizens might vary, and different factors might affect the acceptance of FRT in Russia as a result of these controversies. Additionally, this research suggests that with the COVID-19 pandemic the perception of the society on FRT might have changed as AI technologies were widely used to tackle the pandemic in all countries worldwide including Russia. The attention of the research is on the Internet population weighted by age, gender, the level of income and education, and nationality (the citizens of Russia).

The research question that guides this study is the following: *How do the citizens of Russia perceive facial recognition technology?* To answer this question two sub-questions will be addressed by this research: firstly, *how much do the citizens of Russia accept the usage of FRT?* Secondly, *what factors lead to this acceptance?*

This study aims to fill in the gap in the existing literature by adding up insights to the already existing research on the perception and acceptance of FRT by the Russian public. In the past, only several studies attempted to analyze how FRT is perceived by the citizens of Russia. The existing research also does not cover the differences between the perception and acceptance levels of citizens of Russia and citizens of other countries as done by other studies (e.g., Kostka, 2020).

A most recent study on FRT in Russia showed that 50% of respondents accepted the usage of FRT in the Russian capital, Moscow, and acceptance levels were influenced by age of the respondents ("Levada Center", 2020). As for other countries, a most recent cross-cultural analysis on the perception of FRT by the general public was made by Kostka et al. (2020). It showed that people's opinions and perceptions on FRT vary from state to state. The research also identified factors that add to the

acceptance of this technology. It was found that clear predictive powers of impressions (usefulness and reliability) and anticipations of possible outcomes (risks and benefits) influence the perception of FRT by the citizens of the countries that were analyzed (China, Germany, the UK, and the US). Other researchers (Zhang and Kang, 2017; Zhong et al., 2021) analyzed the acceptance and perception of the facial recognition payment technology by the Chinese public where the usage of this technology is sharply increasing. These studies showed that society is concerned about the security of the payments made with the usage of FRT. The research of Zhong et al. (2021) additionally outlined that coupon availability, facilitating conditions, personal innovativeness, and perceived enjoyment can be decisive predictors of facial recognition payment technology acceptance.

The research is based on the Technology Acceptance Model (TAM), Unified theory of acceptance and use of technology (UTAUT), and the privacy-security trade-off literature that consider certain factors of people's perception and acceptance of various technologies. Both TAM and UTAUT are used in the study as they were developed to identify the likability of the technology acceptance by people. TAM explains cognitive processes behind the technology acceptance, and what people would think about the newly introduced technology (Davis and Bagozzi, 1989). UTAUT (Venkatesch, 2003) is used to analyze the adoption and the earliest phases of implementation of technologies: why users share similar perceptions of technology's usefulness, and why these perceptions influence whether people would use this technology in the future. The privacy-security trade-off literature suggests expanding TAM and UTAUT models by adding components that are relevant when talking about the acceptance of biometric technologies. As followed, this study claims that socio-demographic factors, experience with FRT, trust in government, perceived consequences, perceived usefulness, and perceived reliability affect the perception and acceptance of FRT by the Russian public. This study also assumes that with the COVID-19 pandemic the perception of the society on FRT might have changed as this technology was widely used by the Russian government to tackle the COVID-19 pandemic. The country chosen for the analysis is Russia as the situation with FRT in this country can be claimed controversial.

Conceptually, this study intends to cover, understand and expand the concept of FRT acceptance by the public. Additionally, this research aims at adding up to the understanding of perception and acceptance factors of FRT and biometric technologies. They are proved to have similarities in people's perceptions towards them (Steinacker et al., 2020). This study also aims to identify the acceptance factors of FRT in the political context of Russia. The findings of this study might be used for further research in this area or benefit AI and communication science professionals working in this field.

The thesis is structured as follows. First, the literature review is presented. Special attention is paid to the key factors that are believed to influence the perception and acceptance of FRT by the citizens of Russia. As followed, it introduces operational concepts of the main concepts of this research. The third section describes the methodology used in the study, and Section 4 introduces the results of the study. Then these results are discussed, and conclusions are drawn in Section 5 and Section 6, respectively.

2. Theoretical Framework

This chapter describes and elaborates on the theories and concepts that were applied to this study. This section covers the concepts from TAM and UTAUT models and the privacy-security trade-off literature that were applied to the research model of the study. Additionally, these concepts are described in the following order: first, the independent variables (perceived usefulness, perceived consequences, and perceived reliability, trust in government, socio-demographic factors, and experience with FRT) are introduced and then the dependent variable (acceptance of FRT) is presented. Working hypotheses are formulated in the subsequent parts of the section.

2.1.TAM and UTAUT

For this study that was designed to examine the perception and acceptance factors of FRT by the Russian public, TAM and UTAUT models were used based on which the working hypotheses were suggested. Both models were originally developed to understand the individual adoption and use of technologies and to identify the likability of the technology acceptance by people (Davis and Bagozzi, 1989; Venkatesh et al., 2003). Both TAM and UTAUT were used by a large number of studies as a prevalent theoretical choice in explaining cognitive processes behind the technology acceptance. In other words, what people would think about the newly introduced technology.

TAM (Davis and Bagozzi, 1989) is said to show that people's intentions to use new technology can be predicted by its perceived usefulness and perceived ease of use that are influencing the intention of people to use the system resulting in actual usage behavior. UTAUT is based on the Theory of Planned Behavior (TPB), a theory explaining and predicting the behavior of individuals (Ajzen, 1991). TBP, in turn, is an extension of the Theory of Reasoned Action (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975). This extension was made because of "the original model's limitations in dealing with behaviors over which people have incomplete volitional control" (Ajzen, 1991, p. 181). By expanding the TPB, the UTAUT model considered other facilitating conditions and determined that gender, age, experience, and voluntariness of use also influence the use behavior. Both models underpin the perception

perspective and have been applied by similar studies dedicated to the analysis of the FRT payments (Zhang and Kang, 2017; Zhong et al., 2021).

TAM and UTAUT were also criticized because they were neglecting the concept of perceived reliability (Miltgen, 2013). It is suggested that perceived reliability should be considered in this study. Including this concept in the current research is necessary because it can influence the individual's perception of FRT equally with perceived consequences and perceived usefulness included in the research model (Kotska, 2020). Perceived reliability is argued to be important for people in making a choice in regards to FRT because this technology is certainly connected to the concept of privacy (Miltgen, 2013). The public is proved to be concerned about the effects that FRT may have on their lives (refers to privacy issues). The perception of FRT and factors influencing its acceptance depend on the trust in this technology. As followed, in this study, perceived reliability was included as a factor that could explain the individual's behavior towards FRT.

The concepts from TAM and UTAUT that were added to the research model of the current study are socio-demographic factors, experience, and perceived usefulness. Adding only certain concepts from TAM and UTAUT models to the research model can be proved via the research model validation that was done by the similar research of Kostka et al. (2020). Kostka et al. (2020) discussed the acceptance factors of FRT usage in four countries (China, the United States, Germany, and the United Kingdom). They tried to see how the public perceives FRT and how much it accepts FRT in different political contexts. Their conceptual framework that could be applied to a broader population included the concepts from TAM and UTAUT (socio-demographic factors, experience, and perceived usefulness) expanded by other concepts (perceived consequences, and perceived reliability) taken from security trade-off literature. Kotska et al. (2020) explained that security trade-off literature suggests including perceived consequences and perceived reliability as these concepts are relevant when talking about the adoption of biometric technologies and technologies overall. Additionally, TAM and UTAUT models are mainly applied in a variety of management techniques that explained how to introduce the new technology in the company and bring the employees of the company on board in using it and to analyze

the adoption and the earliest phases of implementation of technologies. In the case of this study and the study of Kotska et al. (2020) whose research model was partially adopted for the current research, the focus is on the already existing and implemented technology (FRT). As followed, taking only some concepts from TAM and UTAUT models (socio-demographic factors, experience, and perceived usefulness) as the base of the study seems appropriate.

The research model of Kotska et al. (2020), however, did not have the concept of trust in the government (defined as what the public thinks about the actions of the government) in their research model although they mentioned that free media and easy access to information might give citizens a better understanding of risks and benefits connected with the broader FRT application. Other studies (e.g., Belanche, Casaló, and Flavián, 2012; Milsom et al., 2020; Li, 2021) suggest that trust in a government is an essential component that can affect the perception and acceptance of various technologies. Adding this concept to TAM and UTAUT models can explain the adoption and acceptance factors of various technologies by the public. Some studies highlight that adding the concept of trust in government is especially relevant for surveillance technologies like FRT (Kotska, 2019). According to Edelman's Trust Barometer (2019) that measures the level of trust towards different public institutions, Russia stays at the last place among other countries at a scale of trust towards the public sector (with 26 participating countries). More recent studies also show that nowadays the level of trust in the government in Russia is descending (Golubaeva, 2021; Muhametschina, 2020; "The level of trust", 2020). As followed, this study assumed that trust in government should be included as a separate concept in the research model of the study. As trust levels in Russia are considered to be low, trust in the government can be a significant factor for the acceptance of FRT in Russia.

The current study measures trust in government via media freedom that is proved to be connected to trust especially if the country has private and public media (Marcinkowski and Starke, 2018; Moehler and Singh, 2011). In Russia, the leading media holdings (as a part of it, television channels) are fully owned by the government ("Who owns", 2014). According to Agenda Setting Theory (McCombs and Shaw, 1972), media influence is the realm of political news. Public opinion is shaped by media, and

what the news media present as important is then perceived by the public as of equal importance. In general, social media are claimed to have more freedom of speech among mass media (Klos, n.d.). Social media freedom in Russia is relatively low (Dixon, 2021; "Russia: Social Media", 2021; Freedom House, 2021). However, as of now, in Russia, despite the attempts of the Russian government to include content regulations at the legislative level, social media is still believed to have higher levels of freedom of speech as compared to other media ("Russia: the government makes", 2021; "New generation", 2021). Therefore, this study assumes that people who watch television might be more likely to favor FRT as compared to those getting news from social media. FRT might be portrayed somewhat positively by the Russian government and this perception is expected to be framed by Russian television. Watching the news on television is also suggested to increase the trust in the government since the Russian federal channels are proved to work towards increasing the positive perception of the actions of the Russian political parties ("How does Russian", 2017). Those with the opposing point of view are not always able to reach the audiences through mass media and they have to choose social media to express their opinion (Koltsova and Bodrunova, 2019). As followed, people who read news on social media have smaller trust levels towards the government and are more likely to perceive FRT as something negative.

As followed, the factors included in the research model are perceived usefulness, perceived consequences, perceived reliability, trust in the government, socio-demographic factors, and experience with FRT. They would be discussed separately in the following sub-sections.

2.1.1. Perceived usefulness

One of the factors determining a person's behavior in question is perceived usefulness that is mentioned both in TAM and UTAUT. It is defined as a degree of an individual's positive or negative evaluation/appraisal of technology's usefulness to them and is based on an individual's beliefs and their assessment of the possible outcome of this usage (Vikantesh et al., 2003). Kotska et al. (2020) claim that perceived usefulness is the factor that affects how citizens come to accept FRT. Similar research of Zhang and Kang (2019) also defined this factor as one that might have an influence on the people's

intent of using the facial recognition payment technology. Additionally, as claimed by Bussmann, the perceived usefulness had a significant effect on the surveillance systems' acceptance. The research of Krempel and Beyerer (2014) showed that if people believed that the system was useful, they were more willing to accept it despite the risks connected with it (in Bussmann, 2019).

UTAUT and TAM describe the positive relationship between the perceived usefulness (performance expectancy) and use behavior claiming that the positive belief of a person on a certain technology raises the chances of a person to accept this technology. That means that if the person believes that they would benefit from using FRT, they would most certainly have a positive attitude towards it and accept it. As followed, the first working hypothesis is proposed.

H1: FRT acceptance is positively influenced by the perception of the usefulness of FRT.

2.1.2. Perceived consequences (benefits and risks)

Kostka et al. (2020) use the concept of perceived consequences based on the idea that with the usage of free media and other means of information, citizens would increase their understanding of the advantages and disadvantages coming with the implementation of FRT. Additionally, they claim that it is not fully clear if citizens of authoritarian countries might have more acceptance towards FRT as they might have limited information about it. Media freedom in the country of analysis, Russia, is claimed to be limited: as of 2020, Russia was ranked 149 out of 179 countries according to Press Freedom Index with 179th place having the lowest media freedom. However, those who are not always able to reach the audiences through mass media, choose social media to express their opinion (Koltsova and Bodrunova, 2019). According to Auer (2011), social media are extremely significant in shaping the politics of the country and can be sometimes counted as more significant than traditional media. Therefore, the assumption suggested by Kotska et al. (2020) is assumed to be relevant for the Russian public, and perceived consequences are included in the research model.

Perceived consequences are also divided between perceived benefits and perceived risks since the consequences of FRT usage might have a perception of being rather positive or negative and this, in

return, would affect the acceptance levels of FRT. Perceived risks, as described by TAM and UTAUT, refer to the idea that people might think that there would be undesirable consequences of FRT usage. It was found that the perceived risks of surveillance systems have a more significant impact on the acceptance of FRT by the public as compared to the perceived usefulness that is included in the research model of the study (Bussman, 2019). Perceived risks were also influenced by the emotional attitude towards the technology as people who had personal concerns about the systems or believed that they would be highly affected by them had a negative perception of these systems. In this study, perceived risks include privacy violation, discrimination, and surveillance.

In general, the idea that FRT enhances privacy violation, discrimination, and surveillance might come from the fact that FRT algorithms have already accused people of crimes, made racist and inaccurate decisions (Gebru and Buolamvini, 2018). It happens because machine learning models examine patterns in data designed for their learning and if data is stereotyped or not diverse, models can give false outputs. Many face recognition models are based on data that contains, for instance, more white than black people. The research made by Gebru and Buolamvini (2018) found that three facial recognition tools from large technology companies were able to identify the sex of white men almost perfectly. However, black women were misidentified in 35% of cases. In real life, this leads to very serious mistakes when such technologies are used by law enforcement agencies and these mistakes might lead to a negative perception of FRT when people believe that these systems are not accurate.

As opposed to that, perceived benefits refer to the fact that the consequences of FRT usage would be positive or beneficial. In this study, perceived benefits are convenience, efficiency, and security. As opposed to a negative perception of FRT, a positive perception might come from the fact that this technology can achieve accuracy scores as high as 99.97% (RecFaces, 2020). Additionally, with the start of the pandemic, the researchers were working on improving the face recognition systems, so that now recognition is performed with those wearing a mask. The research shows that now the face recognition is made based on half of the face with the success rate at about 90% (Borak, 2020). Many people support the implementation of FRT for tackling the COVID-19 situation. People supporting the idea of using

technological advancements to tackle the COVID-19 crisis claim that technologies that work more effectively than traditional methods are not always enough to overcome the pandemic.

The study includes perceived consequences in the research model with them being divided by perceived benefits and perceived risks. This covers people's positive perception of FRT (FRT enhances convenience, efficiency, and security) and negative perception of FRT (FRT enhances privacy violation, discrimination, and surveillance) that both lead to the acceptance or non-acceptance of FRT by the Russian public. As followed, the second and third working hypotheses are suggested.

H2: *FRT acceptance is positively influenced by the perceived benefits of FRT.*

H3: FRT acceptance is negatively influenced by the perceived risks of FRT.

2.1.3. Perceived reliability

This study suggests including perceived reliability as another factor because the inaccuracies in FRT might lead to a negative perception of the public on FRT. As previously mentioned, perceived reliability is included in the research model of this study as an extension of TAM and UTAUT models that were criticized by the absence of this concept. Additionally, the concept of reliability is relevant when talking about biometric technologies. For instance, fingerprint recognition technology is widely used and accepted by the public due to its high reliability (Halal, 2006). Previous studies also showed that there is a correlation between the usage of FRT and perceived reliability (Normalini et al., 2017; Kotska et al., 2020). As followed, if the public does not perceive FRT as reliable then they would be less likely to accept it.

Therefore, suggesting the fourth factor and extending the research model would provide a complex overview of the perception and acceptance of FRT by Russian citizens.

H4: FRT acceptance is positively influenced by the perceived reliability of FRT.

2.1.4. Trust in the government

The research of Kotska et al. (2020) did not include the variable of trust in government in their research model of the study. In Russia, the main federal channels are owned by the government while social media freedom remains to be relatively high (when compared with television). This study assumes that people who watch television favor FRT more than those getting news from social media. Therefore, it might be also assumed that people who watch federal Russian channels owned by the government might also support the actions of the Russian government more than the rest of the respondents. As followed, the acceptance level of FRT might be higher as FRT would be perceived as something positive since this point of view is mainly discussed by the Russian government.

H5: FRT acceptance is positively influenced by the trust in the government.

2.1.5. Socio-demographic factors

Based on the study of Kostka et al. (2020) the socio-demographic factors are considered. These factors include age, gender, level of income, and level of education as they are suggested to affect the acceptance of FRT. The data on these factors in the context of Russia is very limited and it is not clear how these factors influence the acceptance levels of FRT in the Russian context. The research of Kotska et al. (2020) also had “ethnic minorities” and “living in urban areas” among socio-demographic factors that could potentially influence the acceptance of FRT. As opposed to Kotska et al. (2020) the current research excludes the hypotheses on ethnic minorities and living in urban areas due to the sampling process of the study and due to research limitations.

Concerning the variables socio-demographic factors, the results of a similar study of Kotska et al. (2020) showed a significant association between age and acceptance levels only for the United Kingdom and the United States. However, the association was small. Additionally, they found that gender had an impact on the acceptance of FRT within China and Germany and the level of income has an influence for all countries except for Germany. Similar associations were found in regards to the level

of education (only significant for the German sample) and the experience with FRT (again, only significant for Germany). Therefore, the following working hypotheses are suggested:

H6-a: FRT acceptance is positively influenced by the younger age.

H6-b: FRT acceptance is likely to be higher among female Russian citizens.

H6-c: FRT acceptance is likely to be higher among Russian citizens with higher income.

H6-d: FRT acceptance is likely to be higher among Russian citizens with higher education levels.

2.1.6. Experience with FRT

It is also assumed that the experience of using the FRT can lead to this technology's perception and acceptance. If people are often exposed to FRT they might be more accepting of it. It is suggested that the COVID-19 pandemic and various recent use cases of FRT in Russia might lead to the familiarity of the public on FRT affecting its acceptance levels. In Russia, the most recent public backlash was caused by the usage of FRT by the government when identifying the protestors of Navalny's case. The public was saying that it was a violation of human rights and Russian law. The Russian government is now implementing a facial payment recognition system in metro and Moscow supermarkets. FRT was also used to identify those who did not comply with the COVID-19 rules taken by the government. Therefore, the expansion of FRT use cases is ongoing and people are expected to have more familiarity with it and, as followed, a more positive perception of FRT.

H7: FRT acceptance is positively influenced by experience with FRT.

2.2.Acceptance and perception of FRT

The interest in FRT is great due to the wide range of tasks that these systems solve. Nowadays, FRT is applied in the healthcare sector but it was originally mainly developed for tracking criminals. There are also many successful use-cases of FRT implementation for finding missing children, and making the lives of people easier when using facial recognition payments and hotel check-ins. However, conflicts connected with biases and human rights protection when using FRT are not rare. The idea of mass surveillance is discussed more with the wider set of applications of FRT. Its active part in tackling

the COVID-19 crisis led to more discussions on this technology in the academics and business environment: most of these reports include addressing the negative consequences of FRT usage (Neuberger, 2021). In the US, as of 2021, FRT was already banned by some states and big cities due to the systems' numerous biases (Conger, Fausset and Kovaleski, 2019). More recently (on April 22nd, 2021), the EU officials released their plans on restricting the usage of FRT by the police and completely banning certain types of AI systems due to privacy and ethical concerns. Despite the concerns stated by the EU and the US and attempts of controlling this technology, some countries aim at expanding its usage. As previously mentioned, the Russian government has recently claimed that it would expand the use cases for FRT such as testing the new FRT payment method called "Face Pay" in the Moscow underground stations as of 2021 ("Moscow metro launches", 2021).

Cave et al. (2019) have recently claimed that "misplaced trust in AI technologies has already exposed people to a range of risks, including manipulation, privacy violation, and loss of autonomy" which had a negative social impact on the acceptance and perception of AI by the society (p.1). The research conducted before the pandemic revealed that in Russia, 50% of the respondents were against the usage of FRT in criminal practice. After the pandemic, the same amount of people agreed that FRT can be connected with mass surveillance and criminal injustice. However, only 42% of the respondents were against the full usage of FRT in Russia. According to the study of Andreeva et al. (2021), the arguments against the usage of FRT refer to the ideas of mass surveillance and manipulations of those having power. Therefore, 51% of respondents did not agree with the usage of FRT for identifying criminals and 49% stated that they do not expect FRT to make any mistakes when completing certain tasks.

To sum up, the dependent variable of the study acceptance of FRT was introduced to the research model of the study (Figure 1).

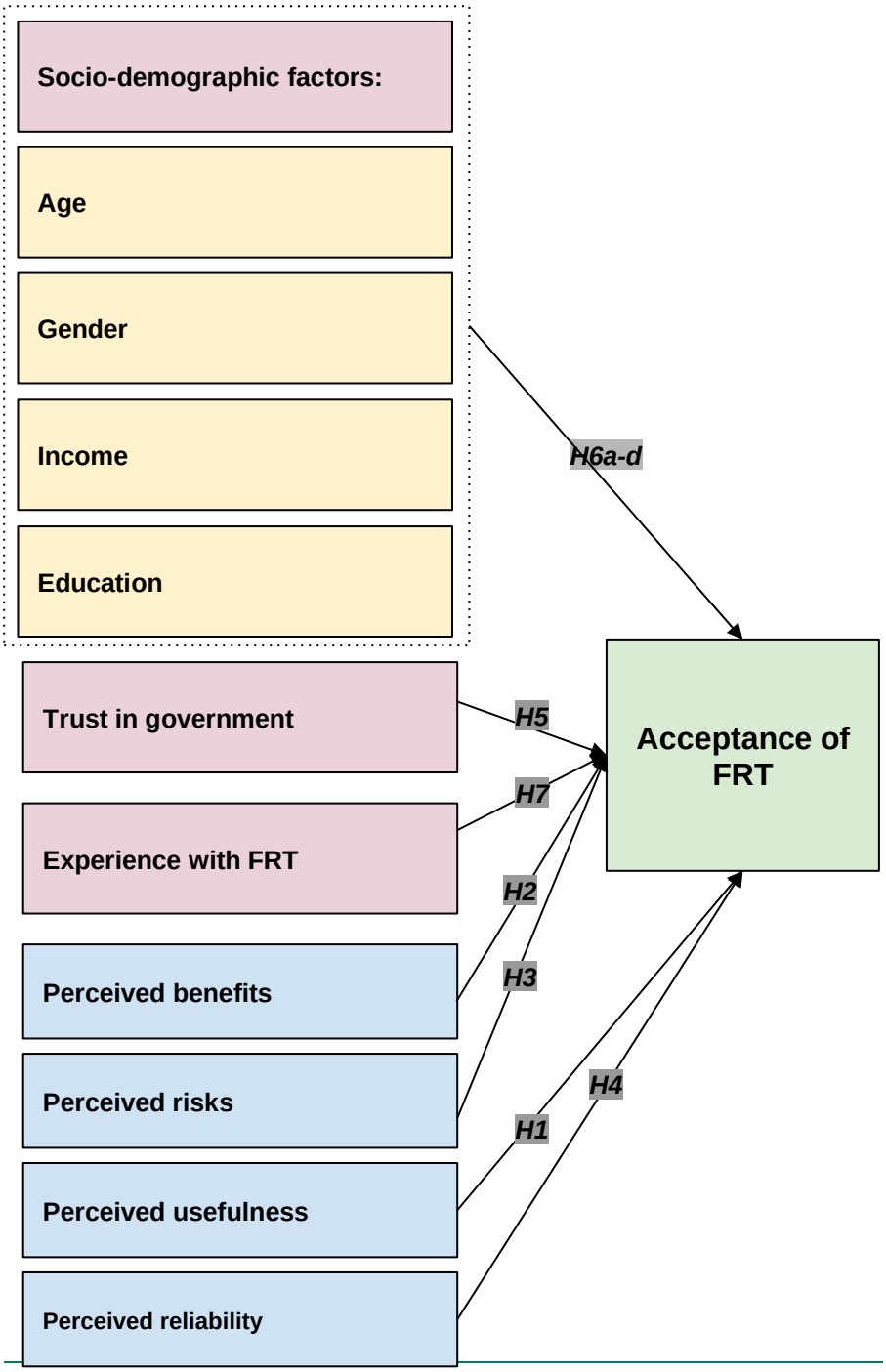

Figure 1. Research model of the study

3. Methodology

This section covers the research design, the pre-test, the procedure, participants, and the measurement. The results of the survey are illustrated in the subsequent chapter.

3.1.Research design

To test the working hypotheses formulated by this study, a cross-sectional and web-based survey was performed. This data collection method was chosen since it gives fast outcomes when studying big groups of people (Jackson, 2016). Additionally, due to the COVID-19 pandemic, the regulations taken by the Dutch and Russian governments could only be met with the online method of data collection. Conducting a survey ensured the possibility of completing the social distancing rule and collecting the information from a big group of people at the same time.

The final survey consisted of 28 items divided into 8 blocks aimed at measuring the independent and dependent variables illustrated in the proposed model (Figure 1). Those items were based on a similar research made by Kostka et al. (2020) that analyzed the perception and acceptance factors of FRT by the Chinese, British, American, and German public. Their conceptual model was claimed to have a possibility to be applied to different countries. As previously mentioned, Kotska et al. (2020) applied items from TAM and UTAUT models and privacy-security trade-off concepts to their research model. The model of the current study analyses the effects of socio-demographic factors, experience with FRT, trust in the government, perceived risks, perceived benefits, perceived usefulness, and perceived reliability on public attitudes and acceptance levels towards FRT. Five questions investigated the demographic characteristics of the sample to ensure its representativeness. The survey was conducted using snowball sampling due to the ability to find respondents that are applicable for the study. The target population was the Russian-speaking people who had or previously had Russian citizenship. A total number of 523 Russian-speaking respondents being citizens of Russia participated in the study.

3.2.Pre-test

A pre-test for a draft version of the survey was conducted from 14/06/2021 till 16/06/2021 before the general data collection. The pre-test aimed to determine whether the respondents understand the questions of the survey. The pre-test was made by dividing the survey draft into 7 blocks each of which was pre-tested separately. The total number of 7 blocks was created since it correlated with the number of constructs in the study. Every block was pre-tested on the independent group of 2 respondents that were considered to be the target group of the research. The overall number of the respondents during the pre-test was 14 with respondents being recruited through convenience sampling via contacting them by WhatsApp and Telegram. The pre-test was conducted by the plus-minus method: the respondents were asked to read each item of the block marking it with plus or minus. If the respondent found an item to be difficult to answer (or the question was not clear), they could mark an item with a minus. If an item was clear to the respondent, they could mark the item with the plus. After that, the items that were marked with minuses were reviewed together with the respondents, and the feedback was applied for further items reformulation or withdrawal.

As a result of the pre-test, no items were included from the survey and no variables were modified (N = 28). In total, 8 items needed to be rephrased or modified to make the questions or answers clearer to the respondents. From the first block referring to the socio-demographic factors the open question "What is your level of income? (monthly, in rubles)" was modified and the options for answers were added as the respondent suggested that people living in Russia would be more open to answering the given question if it had given answers. In the second block, three questions were reformulated due to translation from English to Russian. In the fourth block, only one modification was made. It was suggested to start Question 13 ("Facial recognition technology is more reliable than other identification technologies, such as fingerprint or DNA-based recognition") with the phrase "I believe" to increase the persistency of the phrasing of the block. In block 6, two statements were modified to ensure the precise translation of the phrases from English to Russian. The pre-test was conducted in Russian. The result of the pre-test can be reviewed in Appendix C.

3.3.Procedure

After the pre-test, the adjusted survey was implemented to the online tool Qualtrics. The survey was distributed via snowball sampling using the following channels of communication: e-mail, WhatsApp, Telegram, Instagram, Vkontakte, LinkedIn, Facebook, and via asking the participants directly. This technique showed its effectiveness in the process of data collection since it was possible to control the spread of demographics of the research, focus on certain age groups, and the nationality of the respondents as the researcher is part of the target population of the study. The period of recruitment was one full week starting the 17th of July 2021.

Before participating in the survey, the respondents were given information about the content and purpose of the study and were asked to give informed consent referring to the voluntary nature of participation in the survey and data collection. The survey was automatically terminated in case the respondent indicated they did not agree to participate. For the respondents who did not hold Russian nationality, the survey was also not available due to fact that the target population of the experiment was required to have Russian nationality. The survey, therefore, started with a block of questions about demographics. After the first block was presented, the respondents were given a text with an informatory nature on the FRT giving its definition and examples of use-cases. The following second block showed the items referring to the participants' experience with FRT. Perceptions of FRT were then estimated through the following presented statements divided into three blocks with one and two questions each. The participants were then demonstrated another text about the usage of FRT specifically in Russia and describing the use-cases of FRT during the COVID-19 pandemic in Russia so that the respondents could start answering the block of items dedicated to the variable trust in the government. This block consisted of nine questions. The acceptance of FRT was then measured with two questions prior to the previous block and after it since the last two questions concerned the topic of FRT usage in the post-COVID-19 world. The reading and understanding of these two questions were, therefore, easier since the respondents have read about the FRT COVID-19 use-cases before that.

3.4.Participants

A total of 523 respondents participated in the survey from which 102 participants did not complete the whole survey (equals to 421 valid responses). The answers of those who did not complete the survey were excluded from the further data analysis. A total of 37 respondents disagreed to participate in the survey. The answers of these respondents were also excluded from the data analysis. Among the number of the respondents that agreed to participate in the survey, 20 respondents were speaking Russian and living in Russia without holding Russian citizenship. They were also automatically excluded from further participation in the survey. Since some people reached out after completing the survey indicating that they lived in Russia without having Russian citizenship, this factor can be considered as one of the study limitations.

Additionally, 7% of the respondents participating in a survey have never heard about FRT prior to taking this survey while 93% noted their awareness about the given technology (N = 421). Answers of both groups of respondents were still included in the final analysis. The demographic characteristics overview can be found in Table 1.

Table 1

Demographic characteristics overview of the sample

		N	**Percentage**
Gender	Male	144	34.2%
	Female	276	65.6%
	Other	1	0.2%
Nationality	Russian	418	99.3%
	Other	3	0.7%
Income	Under 60.000	208	49.4%
	60.000 – 150.000	151	35.9%
	More than 150.000	55	13.1%
	Other	7	1.7%
Education	Среднее специальное (secondary specialized education)	28	6.7%
	Среднее (high school education)	97	23.0%
	Высшее (higher education)	250	59.4%
	Более одного высшего (more than one higher education)	45	10.7%
	Other	1	0.2%

Demographics were measured by age, gender, level of income, and educational level of the respondents. The minimum age of the respondents was 15, the maximum age was 70 (M = 28.66, SD = 10.94, N = 418). Distribution over demographical characteristics of the respondents was almost identical and the sample can be called representative for the entire population of the study. The language of the survey was Russian.

3.5.Measures

The final online version of the survey that was implemented to Qualtrics consisted of 28 items (see Appendix B). They were used to measure a total of 7 constructs, namely 6 dependent variables (socio-demographic factors, experience with FRT, trust in the government, perceived usefulness, perceived consequences (separated into perceived benefits and risks), perceived reliability), and one dependent variable acceptance of FRT. The items measuring those constructs were based on the research of Kotska et al. (2020) and a guideline for constructing TAM and UTAUT based questionnaires and were partially modified based on surveys that were used by studies investigating the perception and acceptance of technologies that were used to tackle the COVID-19 pandemic (e.g., Milsom et al., 2020). It took about 10 minutes to complete the survey. The survey was presented in Russian.

Perceived reliability and acceptance of FRT were measured on items with a seven-point polar scale. A reason for utilizing a polar scale with seven points was that it is commonly used in survey-based research and is often considered to improve the reliability and validity of data when compared to five-point polar scales (e. g. Churchill & Peter, 1984, as cited in Ogbonna & Harris, 2000). Socio-demographic factors, experience with FRT, trust in the government, perceived usefulness, and perceived consequences were measured on items with predefined response categories and items with open entry boxes (Appendix A).

Acceptance of FRT

The dependent variable acceptance of FRT was directly measured by four seven-point polar scale items asking the extent of acceptance of FRT. All items were newly created and intended to measure the acceptance of FRT in the context of Russia and the COVID-19 pandemic in Russia.

Perceived usefulness

The *perceived usefulness of FRT* was measured employing two items. In this section, the respondents had to determine the degree to which they have the feeling that FRT is useful overall and on which occasions it might be the case. One statement asked in this section is the following: "Generally, do you perceive facial recognition technology as a useful one? (Fully agree/Fully disagree"). The items used for measuring the perceived usefulness were taken from Kotska et al. (2020) and further modified. Respondents had to estimate the extent to which they agreed with the given statements based on a 7-point polar scale.

Perceived consequences

In order to measure the *perceived benefits and ris*ks a single construct of perceived consequences was created. For that, 6 scales were formulated. The study of Kotska et al. (2020) was used to develop those scales. Two examples for scales used in the survey and the corresponding statement are: "The usage of FRT in Russia enhances… (1 = Convivence); (2 = Privacy violation)". The respondents had to estimate the extent to which they agreed with the given statement based on a 7-point polar scale. For the analysis, the variable perceived consequences were divided into two different variables, namely positive consequences that referred to perceived benefits and included three items (efficiency, convenience, security) and negative consequences that refer to perceived risks (privacy violation, discrimination, surveillance).

Perceived reliability

The *perceived reliability of FRT* was measured employing two items. In this section, the respondents had to determine the degree to which they have the feeling that FRT is a reliable technology. For instance, item one is formulated as followed: "Do you think the COVID-19 pandemic influenced the frequency of FRT usage"? (Not at all/Very much)". The respondents had to estimate the extent to which they agreed with the statement based on a 7-point polar scale.

Trust in the government

Ten questions were asked at the end of the survey to measure the extent to which a respondent trust the government. The items for this block were mainly taken from Milsom et al. (2020) and partially newly created. The block was added due to the COVID-19 context of the research and regulations taken by the Russian government that were tracked with the usage of FRT.

Socio-demographic factors

The independent variable *Socio-demographic factors* was separated by five categories measured on five different items. The items measured nationality, age, gender, level of income, and level of education. The items were newly created. All items were asked at the beginning of the survey, with nationality one being the filter question. If the respondent did not hold Russian nationality, they could not proceed with the survey.

Experience with FRT

The independent variable *Experience with FRT* was measured on 4 different items. The items were taken from a study by Kotska et al. (2020) and were further modified. The items measured whether respondents were familiar with FRT and if they had any experience with it. Statements that measured the experience with FRT were, for instance: "Have you heard about FRT prior to taking this survey? (Yes/ No)", and "How often do you use FRT yourself?" (1 = Never, 2 = Several times in my life, 3 = Several times a year, 4 = Several times a month, 5 = Several times a week, 6 = Most days, 7 = Everyday). Apart from measuring if the respondents were familiar with FRT, the4 items intended to indicate if the respondents think that they were exposed to it, where that might have happened, and with what frequency to answer the proposed working hypotheses.

3.5.1. Validity and reliability

Initially, factor analysis was conducted and it was followed by the reliability analysis. In the factor analysis, it was determined whether the research instrument succeeded in measuring the constructs of the proposed research model. If the variables were only measured with one indicator or with multiple choice questions, they were excluded from the factor analysis. Therefore, the primary factor analysis

aimed at measuring four factors. The factor analysis succeeded in loading a total of four factors and all of them were identified as valid in measuring the corresponding constructs (Table 2).

Table 2: Factor Analysis

Rotated Component Matrix

Items	**Factors**			
	1	2	3	4
In general, do you perceive that the usage of FRT enhances: privacy violation	.844			
In general, do you perceive that the usage of FRT enhances: surveillance	.635			
In general, do you perceive that the usage of FRT enhances: discrimination	.797			
In general, do you perceive that the usage of FRT enhances: convenience		.869		
In general, do you perceive that the usage of FRT enhances: efficiency		.905		
In general, do you perceive that the usage of FRT enhances: security		.637		
Facial recognition technology is more reliable than other identification technologies, such as fingerprint or DNA-based recognition.			.794	
I believe my information is kept confidential when facial recognition technology is used.			.796	
I believe my privacy would not be breached when facial recognition technology is used.			.851	
I believe it is safe to use facial recognition technology.			.612	
What is the extent to which you would accept the usage of FRT when it is managed by central or local government?				.561
What is the extent to which you would accept the usage of FRT when it is managed by private companies?				.850
What is the extent to which you would accept the usage of FRT when it is managed by public-private partnerships?				.833
Overall, are you willing to accept the government decision of using facial recognition technology in complying with the COVID-19 regulations?				.503
Extraction Method: Principal Component Analysis				
Rotation Method: Oblimin with Kaiser Normalization. A rotation converged in 9 iterations.				
Eigenvalue:	**6.69**	**1.62**	**1.20**	**1.03**

Explained Variance:	**41.83**	**10.18**	**7.52**	**66.03**

By doing reliability analysis based on the factors identified in factor analysis, some statements causing low internal consistency and reliability could already be excluded. As a result, there were no excluded indicators. As numerous researchers suggest a Cronbach's alpha of around .70 or higher is a sufficient level (Taber, 2017). Therefore, it can be concluded that all indicators are internally consistent and sufficiently reliable. The detailed results of the reliability analysis for each variable can be found in Table 3. More detailed analysis can be found in Appendix D.

Table 3

Reliability Analysis

	Cronbach's Alpha	**N of items**
Perceived reliability	.838	4
Perceived benefits	.788	3
Perceived risks	.739	3
Acceptance of FRT	.737	4

Therefore, the final working hypotheses suggested by the study are the following (Table 4):

Table 4

Working hypotheses suggested by the study

H1: FRT acceptance is positively influenced by the perception of the usefulness of FRT.
H2: FRT acceptance is positively influenced by the perception of perceived benefits of FRT.
H3: FRT acceptance is negatively influenced by the perception of perceived risks of FRT.
H4: FRT acceptance is positively influenced by the perceived reliability of FRT.
H5: FRT acceptance is positively influenced by the trust in the government.
H6-a: FRT acceptance is positively influenced by the younger age.
H6-b: FRT acceptance is likely to be higher among female Russian citizens.
H6-c: FRT acceptance is likely to be higher among Russian citizens with higher income.
H6-d: FRT acceptance is likely to be higher among Russian citizens with higher education levels.
H7: FRT acceptance is positively influenced by experience with FRT.

4. Results

In the first part of this section, descriptive statistics on the dependent and independent variables are presented. It is followed by a correlation analysis that was performed to investigate the relationship between the given variables. Finally, the results of the multiple regression analysis are presented and some additional information is given.

4.1.Descriptive

The descriptive measures provide an overview of the average scores of the dependent and independent variable components. The estimates are based on a 7-point polar scale, with four being a midpoint. Mean scores on dependent and independent variable components are presented below (Table 4).

Table 4

Descriptive

	Mean	**SD**	**N**
What is the extent to which you would accept the usage of FRT when it is managed by central or local government?	3.54	1.66	385
What is the extent to which you would accept the usage of FRT when it is managed by private companies?	3.26	1.54	385
What is the extent to which you would accept the usage of FRT when it is managed by public-private partnerships?	3.29	1.49	385
Overall, are you willing to accept the government decision of using facial recognition technology in complying with the COVID-19 regulations?	3.76	1.93	385
Do you support the overall usage of facial recognition technology?	3.45	1.93	385
In general, do you perceive that the usage of FRT enhances: convenience.	5.55	1.62	420
In general, do you perceive that the usage of FRT enhances: efficiency.	5.34	1.62	408
In general, do you perceive that the usage of FRT enhances: security.	5.15	1.70	412
In general, do you perceive that the usage of FRT enhances: privacy violation.	4.66	1.94	410
In general, do you perceive that the usage of FRT enhances: surveillance.	5.21	2.01	413
In general, do you perceive that the usage of FRT enhances: discrimination.	3.38	2.14	407

Perceived usefulness	5.51	1.59	417
Perceived reliability	4.19	1.90	402
Trust in the government	3.77	2.58	402

The respondents were asked about the acceptance of FRT in Russia. The outcome indicated that in general, the respondents incline to not accept the usage of FRT in Russia (M = 3.67, SD = 1.25, N = 385). The results also showed that there is no significant difference between the level of acceptance if FRT is managed by central and local government (M = 3.54, SD = 1.66, N = 385), private companies (M = 3.26, SD = 1.54, N = 385), and public-private partnerships (M = 3.29, SD = 1.49, N = 385). Overall, the respondents incline to not accept the government decision of using FRT in complying with the COVID-19 regulations (M = 3.76, SD = 1.93, N = 385) and to not support the overall usage of FRT (M = 3.45, SD = 1.93, N = 385).

The perception of FRT by the Russian public was divided by perceived usefulness, perceived consequences, and perceived reliability. The outcome indicated that in general, the respondents perceive FRT as useful. The extent of it is rather high (M = 5.51, SD = 1.59, N = 417). Additionally, 75.3% of respondents indicated that FRT is mostly useful when used on smart devices and gadgets or smartphones, 76% on customs controls or security checks at airports, and 63.9% on identity verification for financial matters (N = 417). As for perceived consequences, the respondents were asked if they think that the usage of FRT enhances several categories. The respondents indicated that the usage of FRT enhances convenience (M = 5.55, SD = 1.62, N = 420), efficiency (M = 5.34, SD = 1.62, N = 408), security (M = 5.15, SD = 1.70, N = 412), and, along with it, mass surveillance (M = 5.21, SD = 2.01, N = 413) and privacy violation (M = 4.66, SD = 1.94, N = 410). The usage of FRT in regards to discrimination was marked as neutral (M = 3.38, SD = 2.14, N = 407). Therefore, the outcome demonstrates that people perceive that the consequences of FRT usage can be both positive and negative at the same time. The results also showed that in general, Russian citizens participating in this study define FRT as somewhat reliable. The mean overall score for reliability is neutral to high (M = 4.19, SD = 1.90, N = 402).

Some questions were asked in order to measure the trust in the government. Respondents were asked if they generally trust the government in doing what is in the best interest of its citizens. Overall, the extent to which they agree with this statement is rather average (M = 3.77, SD = 2.58, N = 402). Respondents seem to disagree with this statement but these disagreement levels are not high.

As for experience with FRT, the participants indicated that in 92.2% of cases they might have been exposed to FRT by smart devices and gadgets (N = 402). Other use occasions included customs controls or security checks at airports with 73.9% of the respondents indicating the possibility of exposure to FRT at these locations, identifying verification for financial matters with 67.2% of respondents, railway or subway stations with 59.4%, and public streets with 46.1% of the respondents (N = 402). 40% of respondents indicated that they are exposed to FRT in public every day and 46% indicated that they use FRT themselves every day. 33% of respondents said that they never used FRT themselves.

4.2.Correlation analysis

As followed, Pearson's correlation analysis was conducted to get insight into the strength of the relationships between the independent and dependent variables included in the proposed model. First of all, the results of the analysis suggest strong positive correlations between the independent variable perceived usefulness and the dependent variable acceptance of FRT (r = .638, p < .05), and the independent variable perceived reliability and the dependent variable acceptance of FRT (r = .627, p < .05). These are the strongest correlations that can be found between the variables included in the research model. Furthermore, strong correlations were found when investigating the relationship between positive consequences and acceptance of FRT (r = .560, p < .05), trust and acceptance of FRT (r = .435, p < .001), and negative consequences and acceptance of FRT (r = .420, p < .05). A very weak correlation was identified when investigating the relationship between the frequency of personal use of and acceptance of FRT (r = .208, p < .05), and between the frequency of exposure to FRT and its acceptance. Here, the analysis resulted in a correlation coefficient of only r = .118 (p = .020).

Finally, there is no significant correlation between the variables age and acceptance of FRT (r = -.092, p = .072), variables level of income and acceptance of FRT (r = .012, p = .815), level of education and acceptance of FRT (r = -.075, p = .142), and gender and acceptance of FRT (r = .103, p = .043). The results of the correlation analysis are presented in Table 5.

Table 5

Correlations

	Accept.	**Age**	**Gender**	**Income**	**Educ.**	**Freq per.**	**Freq pub.**	**Trust**	**Useful.**	**Benefit**	**Risks**	**Rel**
Acceptance	1											
Age	-.092	1										
Gender	.103	.091	1									
Income	.012	.211**	-.151**	1								
Education	-.075	.331**	.130**	.245**	1							
Freq. personal	.208*	-.326**	-.110*	.145**	.114*	1						
Freq. public	.118*	-.315**	-.075	.129**	-.003	.645**	1					
Trust in gov.	.435**	.035	.047	-.028	-.004	-.057	-.090	1				
Usefulness	.638**	-.135**	.022	.075	-.089	.358**	.186**	.186**	1			
Benefits	.560**	.010	.068	.027	-.033	.161**	.086	.204**	-.223**	1		
Risks	.420**	.138**	-.079	.095	.123*	-.110**	.025	-.227*	.408**	-.313**	1	
Reliability	.627**	.007	.137**	.047	-.077	.183**	.018	.371**	.560**	-.420**	.627**	1

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

4.3.Working hypotheses testing

A regression analysis was applied for the given research model. An overview of the results of the regression analysis of the model is shown in Table 6.

Table 6

Regression Analysis

Model Statistics

	Adjusted R Square	F	Sig. (two-tailed)
Research Model	.627	55.171	<.001

Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig. (two-tailed)
	B	**Std. Error**	**Beta**		
(Constant)	.754	.354		2.128	.034
Age	-.002	.005	-.019	-.479	.632
Gender	.042	.089	.016	.471	.638
Level of income	-.039	.064	-.022	-.615	.539
Level of education	-.034	.062	-.020	-.550	.583
Experience with FRT: public use	.062	.029	.094	2.180	.030
Experience with FRT: private use	-.031	.022	-.066	-1.413	.159
Trust in government	.088	.018	.179	4.933	<.001
Perceived usefulness	.266	.038	.333	6.975	<.001
Perceived reliability	.201	.027	.300	7.432	<.001
Perceived benefits	.155	.041	.165	3.798	<.001
Perceived risks	-.126	.032	-.142	-.3.981	<.001

The research model resulted in an explained variance-level of 62.7% (adjusted r^2), which suggests that roughly 62% of the variance in the dependent variable acceptance of FRT can be explained by the model based on the independent variables socio-demographic factors (age, gender, level of income and education), experience with FRT, trust in the government, perceived consequences, perceived usefulness, and perceived reliability.

The results of the multiple regression analysis suggest that five out of eleven variables of the research model are significant predictors of the acceptance of FRT (based on one-sided t-tests with $\alpha = 0.05$). The statistical results indicate that there is a positive effect of perceived usefulness on acceptance of FRT ($ß = .266$, $p < .05$). It can also be stated that there is a positive effect of perceived positive consequences on acceptance of FRT ($ß = .155$, $p < .05$), perceived reliability on acceptance of FRT ($ß =$

.201, $p < .05$), and trust in the government on acceptance of FRT (ß = .088, $p < .05$). There is also a negative effect of perceived negative consequences on acceptance of FRT (ß = -.126, $p < .05$).

The results, however, do not support a significant positive relationship between the variables age and acceptance (ß = -.002, p =.632), gender and acceptance (ß = .042, p =.638) , level of income and acceptance (ß = -.039, p =.539), level of education and acceptance (ß = -.034, p =.538), exposure to FRT and acceptance (ß = .062, p =.030), and frequency of FRT usage and acceptance (ß = -.031, p =.159).

4.4.Overview of the results

Overview table with the working hypotheses can be found in Table 7.

Table 7

Overview of the working hypotheses testing:

H1: FRT acceptance is positively influenced by the perception of the usefulness of FRT – supported.
H2: FRT acceptance is positively influenced by the perceived benefits of FRT – supported.
H3: FRT acceptance is negatively influenced by the perceived risks of FRT – supported.
H4: FRT acceptance is positively influenced by the perceived reliability of FRT – supported.
H5: FRT acceptance is positively influenced by the trust in the government – supported.
H6-a: FRT acceptance is positively influenced by the younger age – not supported.
H6-b: FRT acceptance is likely to be higher among female Russian citizens – not supported.
H6-c: FRT acceptance is likely to be higher among Russian citizens with higher income – not supported.
H6-d: FRT acceptance is likely to be higher among Russian citizens with higher education levels – not supported.
H7: FRT acceptance is positively influenced by experience with FRT – not supported.

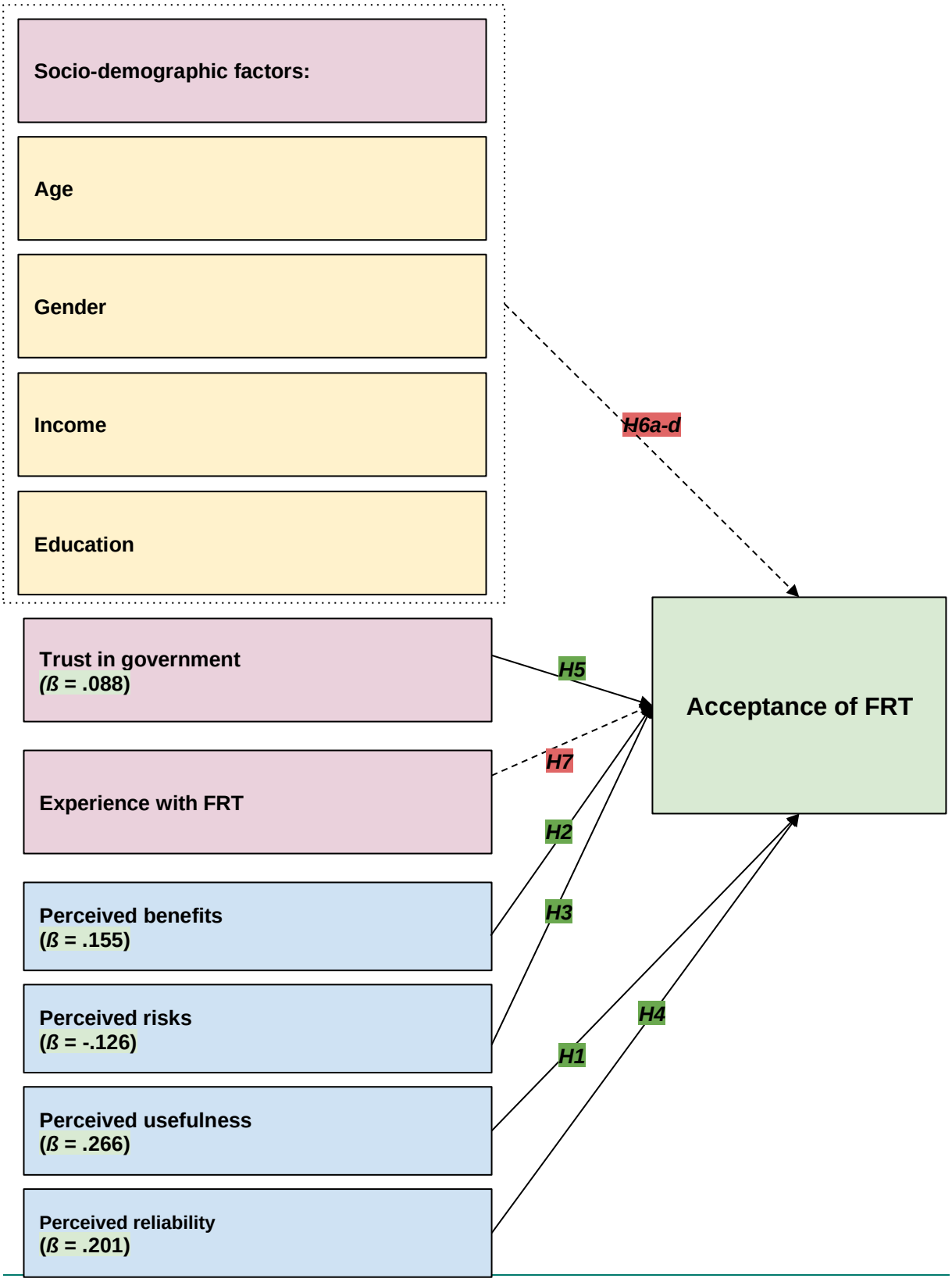

Figure 2. Research model with the significant beta values

4.5.Additional information

Covering the assumption that COVID-19 might have raised the awareness of the Russian public on FRT, the respondents were asked about their perception of the application of FRT when it was used to monitor whether people were complying with COVID-19 regulations. The outcome showed that 65% of respondents were likely to comply with the recommendation of the government to self-isolate at home for 14 days if they had been in close contact with an infected person (N = 388). However, the extent to which respondents agreed to the fact that FRT was used to check whether they were complying with this recommendation was slightly low (M = 4.02, SD = 2.046, N = 388). The main reason for being against FRT being used to monitor whether people were complying with quarantine rules was the feeling that it could cause abuses by law enforcement officers with 62% of respondents indicating this reason and the reason that it leads to surveillance with 53.4% of respondents indicating this reason. Other reasons included the leak of confidential data, transferring data to third parties, and the absence of a legal basis of FRT usage. Respondents were also asked to choose their main reasons for agreeing that FRT was being used to monitor whether people were complying with quarantine rules. Most people indicated that it leads to a sense of responsibility to the wider community (51.5%). When answering this question, 29 respondents still claimed that they would not support the usage of FRT under any conditions.

Following that, the trust in the government was also measured. The respondents were asked to identify where they get most of their news from. Answers showed that 80.8% of respondents read news on social media, 68.9% on websites and newspapers, 39.9% from family and friends, 20.9% from television, and 9% from radio. Among 88 of those who chose television as their main news source, some indicated that they take news from the state-owned Russian television channels such First Chanel (Pervy Kanal), Russia-1 (Rossia-1), and from Russia-24 (Rossia-24). As for social networks chosen by 340 respondents, 54.2% preferred to get news from Instagram and 51.5% from Russian messenger Telegram. 41.1% indicated YouTube, 31.8% Russian social network VK, 16.9% WhatsApp, 15.7% Facebook, and 10.5% Twitter. This information will be analyzed in the following section.

5. Discussion

This study aimed at examining how the variables perceived usefulness, perceived consequences, perceived reliability, trust in the government, socio-demographic factors, and experience with FRT can be moderating factors for the acceptance levels of FRT in Russia. To investigate this, seven working hypotheses were formulated. Based on the results of the research, conclusions were stated. In this section conclusions and limitations are discussed, recommendations for future research are given. The following sub-section will present the significance and implications of the statistical results.

5.1.Discussion of the results

The outcome of the study reinforces current findings in the domain stating that perceived usefulness and perceived reliability have a decisive importance for the public in accepting FRT (Kotska et al., 2020). The majority of respondents indicated that FRT is useful when used on smart devices and gadgets or smartphones. The exposure levels for these use occasions of FRT are also the highest among other use occasions. It is not surprising because nowadays, using biometric technologies on smartphones is popular and by 2024, roughly 90% of phones are expected to have FRT (Kelly, 2019; Pascu, 2020). Thus, it can be hypothesized that if people use FRT almost every day and they are very familiar with this technology, they would perceive it as useful and reliable. This is also supported by the correlation that was found between the low levels of FRT exposure and the perception of its usefulness and reliability. Lower exposure levels of the use occasion of FRT were giving lower perceptions of usefulness or reliability of FRT on this occasion.

Another factor that was proved to have a significant effect on acceptance of FRT was perceived consequences. Notably, respondents tend to think that usage of FRT leads to more positive consequences rather than negative ones. This is interesting as in general, the respondents are more likely to not accept the usage of FRT in Russia. It can be hypothesized that Russian citizens are not aware that the usage of FRT can lead to discrimination. The outcome of the study showed that FRT leads to more positive consequences because a relatively low number of respondents indicated that FRT enhances

discrimination. Although the research shows that ethnic minorities in Russia can be discriminated against, these cases are rare in regard to FRT. As an example, FRT was banned in some cities in the United States due to discrimination issues ("Ban dangerous", 2021). In Russia, the cases when FRT misidentified the person as a case of discrimination are not widely known. As followed, the discourse on this topic in Russia is not there yet and it can be supposed that the outcome of the study is a result of a certain perspective of the respondents. The respondents did not recall all cases of FRT's negative consequences like discrimination or chose to not focus on it as the focus of the research was on Russia.

Other factors that were considered as influencing the acceptance of FRT in Russia are socio-demographic factors and experience with FRT. The results showed no significant relationship between either of these variables and acceptance of FRT by the Russian citizens. This is an interesting finding because previous results for other countries (Kotska et al., 2020) and Russia ("Levada Center", 2020) showed that the acceptance of FRT is influenced at least by the age of the respondents. It can be suggested that the focus of this research was on the Internet population meaning that the participants of this research had access to different opinions on FRT voiced by various groups of people. As followed, the respondents might have similar opinions on FRT due to information they could have gathered about FRT on the Internet, from friends and relatives, or by watching television without taking into consideration gender, age, level of income, and education of the respondents.

As exposed by The Pew Center Survey, people show more acceptance when FRT is used by public law enforcement agencies rather than by private companies (Kostka et al. 2020). The main reason mentioned by Russian citizens who were against the usage of FRT was the feeling that it could be the cause of abuses by law enforcement officers. This result goes in line with the outcome of this study that showed that trust in the government influences the acceptance of FRT in Russia. According to some sources, Russians have the lowest level of trust towards public institutions, and high levels of police distrust and dissatisfaction (Goble, 2021; Semukhina, 2014; Shlapentokh, 2006). It can be hypothesized that the connection of trust in government and acceptance levels of FRT in Russia comes from trust levels in Russia as people might believe that facial recognition systems can be misused by the

government and police forces. As opposed to that, FRT was also used to tackle the COVID-19 pandemic in Russia and this initiative was positively met by some people. Additionally, supporters of FRT in Russia say that FRT can help to catch criminals and ensure the security of society ("Levada Center", 2020).

Finally, it needs to be highlighted that most respondents indicated that they read news on social media, on websites, or get it from family and friends. The results showed that people who get news from social media do not have high trust levels as compared to those getting news from television. As followed, the assumption that people who gather news from television have more support towards the usage of FRT as compared to those getting news from social media and other information sources was supported. This can be explained through the previously discussed assumptions that Russian federal channels are owned by the government. Therefore, people watching it might accept a positive perception towards FRT which is stated by the Russian government.

5.2.Limitations and recommendations for future research

This research was confronted with several important limitations. The first limitation corresponds with the sample population of the study which is limited to Russian citizens that have Internet access with the availability of using the online tool for surveys named Qualtrics. A suggestion for future research is to hire a bigger and more heterogeneous sample as compared to the one that only has Internet access or Russian citizenship. More general conclusions might be drawn that could be applied to a broader population. This comes from the fact that roughly 70% of Russian people use the Internet. Although this number is high, 30% of the population are not Internet users and they could be reached through the modes of hiring the respondents used in the current research. There are also demographic differences between those using the Internet in Russia and those who do not. The mean age of Internet users in Russia is estimated at 12-24 years, and around 70% of Russian citizens using the Internet live in urban areas. That means that modes of finding the respondents might be of use in the case of Russia for a more representative sample that would involve all age groups and non-Internet users as well as

Internet users (Internet usage in Russia, 2021). For instance, the target groups could be randomly sampled through the mail, telephone, or face-to-face meetings. The current research also excluded answers of those speaking Russian and living in Russia but not having Russian citizenship. It is suggested that in future research this limitation should be lifted as some people live in Russia and speak Russian but do not have Russian citizenship.

The results of the study are only valid for the Russian population. It can be argued that different factors might be influencing the acceptance and perception of FRT in other countries. Thus, it is suggested that in the future, the research model presented in the study can be tested in other countries. These results can also be further compared with the Russian context. The cross-cultural analysis might give more understanding of the Russian context of acceptance and perception of FRT and factors that are exclusively valid for the Russian citizens in accepting this technology.

Additionally, the research model proposed in this study succeeded in explaining 62.2% of the variance in intention. This means, on the other hand, that 37.7% of the variance is still unknown, which provides sufficient room for future research. It can be suggested to design other versions of a research model to have deeper insights into the possible factors that affect people's acceptance of FRT in Russia. Although the current model was already an extended model of the study of Kotska et al. (2020), other factors influencing the acceptance of FRT in Russia could be considered. Among the factors that could be considered, there are the areas (urban and rural areas) where respondents reside or regions of Russia where respondents live. These factors could be added to see if the opinion on FRT in Russia depends on the location of the respondents since this separation was not done by the current research as opposed to the research of Kotska et al. (2020).

As also mentioned by Kotska et al. (2020), the political context in China could result in certain attitudes that respondents wanted to reflect by answering the given survey. It needs to be considered the same limitation is valid for Russia although the respondents were sufficiently informed that all data would be kept anonymous and confidential. It can be assumed that due to this context some respondents were reluctant to answer certain questions and some answers were missing. The answers to incomplete

questions were also included in the analysis which might affect the reliability of the results. Finally, the context of the current research was the COVID-19 pandemic and this context can be better studied in future research as COVID-19 might have given important implications on the situation with FRT in Russia. Although this context was partially involved in the current study and some assumptions were drawn, more general assumptions could be made with COVID-19 being added as a moderator variable of the study.

Lastly, if the same model would be used in future research, it can be more insightful to add a qualitative method such as conducting an interview. The interview could help in examining views, opinions, and personal experiences with FRT and gain more insight on the connection of the variables of the study and the thinking processes behind the quantitative results of the study.

5.3.Theoretical and practical implications

In this study, TAM, UTAUT, and privacy-security trade-off literature were used to determine factors that predict Russian citizens' acceptance of FRT. Until now, there is only very little research done in which these concepts were utilized to examine the perception and acceptance of FRT. Hence, this research holds implications for any type of TAM, UTAUT, and privacy-security trade-off literature-related research, but also other studies that focus on acceptance of technologies in the field of communication science, especially when the research deals with different nationalities. The final model presented in the paper is a comprehensive one, building on the previous scientific literature, and including new variables such as trust in government. Thus, it offers a better understanding of the perception and acceptance of FRT in Russia because research on this topic in Russia is limited. The study would be especially interesting for research in the field of technologies and their acceptance considering the national context.

The results of this study provide several practical implications for companies and other organizations which are active in the field of technologies and perception of technologies. The results of this research suggest that perceived usefulness, perceived consequences, perceived reliability, and

trust in the government affect the acceptance of FRT usage in Russia. Marketers and communication professionals should, therefore, aim at considering these factors when promoting FRT or implementing new FRT tools for various use-cases. This can be done by developing campaigns, infomercials, and promotions in which positive consequences and other factors about FRT are emphasized.

The outcome showed that acceptance of FRT is connected with trust in government. Russia is constantly introducing new initiatives connected with FRT such as implementing FRT at metro stations or different public institutions. To ensure a positive perception of these initiatives and boost their acceptance levels, it would be recommended to increase the trust in the government using strategies aimed at it. Some studies claim that the president of Russia remains to be the most trusted politician among Russians while the level of trust towards him is decreasing ("И некому", 2019). Some researchers claim that it would be recommended for Russian politicians to do some one-time popular actions to make their rankings higher (among which are firing someone who did something negative or announce changes in their personal lives). A bigger number of researchers recommend working on the trust in government constantly through reducing inequality between people, eliminating misinformation and fake news in media when creating an information field that would let the citizens be informed about the actions of the government (Eggers et al., 2021; Otvagina, 2020).

It was also proved that people who watch television have higher trust levels and, as followed, they are more likely to accept FRT in Russia. It contradicts with people who get news from social media. However, social media is proved to influence the social and political agenda of the country. It can be recommended to include increase the activity of the involved parties on social media where people can read about successful use-cases on FRT or gather more information on the safety of its usage. With people reading positive news about FRT, their perception of the positive consequences of FRT in Russia would increase along with the acceptance levels of this technology. Additionally, more information on FRT can be given on different news sources. The positive consequences of FRT usage should be highlighted in case the Russian government or other companies would want to increase the acceptance levels of FRT in Russia. The same is valid for a narrative about the reliability and usefulness of this

technology. If people read more information about positive aspects of FRT such as the reliability and usefulness of this technology, they would be more likely to accept it in the future.

6. Conclusion

This research identified some factors that are positively related to the acceptance levels of FRT by Russian citizens living in Russia. Besides perceived usefulness, perceived consequences, and perceived reliability, trust in the government affect the acceptance of FRT usage in Russia. Moreover, the results suggest that age, gender, level of education, level of income, and experience with FRT are not significant factors influencing the acceptance levels of FRT in Russia. It can also be concluded that the COVID-19 pandemic raised awareness of Russian citizens on FRT. The study also showed that people who agreed to the fact that FRT was used to monitor whether people were complying with quarantine rules showed higher levels of FRT acceptance.

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Appendix A: Items questionnaire

Dependent variables	Category	Independent variables	Variable name	Item	References
Acceptance	Socio-demographic factors	Nationality	Nationality	Are you the citizen of Russia? (Yes/no)	Newly created. Filter question.
		Age	Age	What is your age?	Adapted from Kostka, Steinacker and Meckel (2020)
		Gender	Gender	What is your gender? (female/male/other)	
		Level of income	Level of income	What is your level of income? (monthly, in rubles)	
		Level of education	Level of education	What is your level of education? (I don't have formal education/ High school diploma or equivalent/ Bachelor's degree/ Master's degree/ PhD (postgraduate studies for Russia)/ Other)	Based on Kostka, Steinacker and Meckel (2020)
		Trust in government	Text 2	How likely would you be to comply with the recommendation of the government to self-isolate at home for 14 days if you had been in close contact with an infected person? (1 = definitely comply, 2 = probably comply, 3 = may or may not comply, 4 = probably won't	Based on Milsom et al. (2020)

				comply, 5 = definitely won't comply, 6 = don't know)	
			Text 3	To what extent would you agree to the fact that FRT are used to monitor whether people are complying with quarantine rules? (Fully agree/ Fully disagree)	
			Text 4	What would be your main reasons for being against FRT being used to monitor whether people are complying with quarantine rules? (I feel like it is a violation of privacy/ I feel like I'm being discriminated by it/ I feel like it leads to surveillance/ Other)	
			Text 5	What would be your main reasons for agreeing that FRT are being used to monitor whether people are complying with quarantine rules? (It would help me stay healthy/ It would let me know my risk of being infected/ It would protect my family and friends/ It would help reduce	

				the number of deaths among people/ A sense of responsibility to the wider community/ It might stop the pandemic/ Other)	
			Ac 1	Do you accept the usage of FRT? (Strongly favor/ Strongly oppose)	
			Ac 2	What is the extent to which you would accept the usage of FRT when it is managed by... a) central or local government? b)private companies? c)public-private partnerships? (Strongly favor/ Somewhat favor/ Neutral/ Somewhat oppose/ Strongly oppose)	
			Politics 1	Where do you get most of your news from? (TV/ radio/ family and friends/ social media/ websites and newspapers)	
			Politics 2	What television channel do you watch frequently for the news? (First Channel/ Russia/ Russia 24/ NTV/ RBK/ Rain/ None of the above/ Other)	

			Politics 3	What social media platform do you get most of your news from? (YouTube/ Instagram/ Vkontakte/ Facebook/ Twitter/ Telegram/ WhatsApp/ Other)	
			Politics 4	I generally trust the government in what is right (Fully agree/ Fully disagree)	
	Experience with FRT	Experience with FRT	Exposure to FRT 1	Have you heard about FRT prior to taking this survey? (Yes/ No)	Newly created.
			Exposure to FRT 2	Where do you think you might have been exposed to FRT? (Use occasions) (1 = smartphone use, 2 = smart devices or gadgets, 3 = public streets, 4 = railway, subway stations, 5 = customs control or security check at airports, 6 = tourist attractions, 7 = identity verification for financial matters, 8 = shopping malls, private shops, 9 = schools or universities, 10 = private households, 11 = others, 12 = none of the above)	Adapted from Kostka, Steinacker and Meckel (2020)
			Frequency 1	How often do you think you are	

				exposed to FRT in public? (1 = Never, 2 = Several times in my life, 3 = Several times a year, 4 = Several times a month, 5 = Several times a week, 6 = Most days, 7 = Everyday)	
			Frequency 2	How often do you use FRT yourself? (1 = Never, 2 = Several times in my life, 3 = Several times a year, 4 = Several times a month, 5 = Several times a week, 6 = Most days, 7 = Everyday)	
Perception	Perceived usefulness	Usefulness	Usefulness 1	Do you think that FRT is useful when used in the following cases? Choose occasions where you think that the application of FRT is useful. (1 = smartphone use, 2 = smart devices or gadgets, 3 = public streets, 4 = railway, subway stations, 5 = customs control or security check at airports, 6 = tourist attractions, 7 = identity verification for financial matters, 8 = shopping malls, private shops, 9 =	

				schools or universities, 10 = private households, 11 = others, 12 = none of the above)	
			Usefulness 2	Generally, do you perceive facial recognition technology as a useful one? (Fully agree/ Fully disagree)	Newly created.
	Perceived consequences	Consequences	Consequences	The usage of FRT in Russia enhances... (strongly agree/strongly disagree) (1 = Convenience, 2 = Privacy violation, 3= Efficiency, 4 = Discrimination, 5 = Security, 6 = Surveillance, 7 = None of the above)	Adapted from Kostka, Steinacker and Meckel (2020)
	Perceived reliability	Reliability	Reliability 1	Do you think that FRT is more reliable than other identification technologies such as, for example, fingerprint or DNA-based recognition? (1 = Less reliable, 2 = Neither more nor less, 3 = More reliable, 4 = Don't know)	Newly created.
			Reliability 2	g (Not at all/very much)	Newly created.

Appendix B: Survey

The rise of facial recognition technology (FRT) in Russia. Do the citizens of Russia accept FRT?

Start of Block: INTRODUCTION AND PERSONAL DATA

Hi, thank you for participating in this survey.

My name is Anna Chernenkova, and this study is a part of my master's thesis in Communication Science at the University of Twente. The goal of this study is to investigate the perception and acceptance of facial recognition technology in Russia.

Your participation in this survey is voluntary and will only take about 10 minutes. Be assured that all your responses remain anonymous and confidential. All data will be stored in an electronic format protected with a password and will be deleted within six weeks.

You can send questions and suggestions via email: a.chernenkova@student.utwente.nl. Please click >> to begin.

Do you agree to participate in this survey?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Do you agree to participate in this survey? = No

End of Block: INTRODUCTION AND PERSONAL DATA

Start of Block: SOCIO-DEMOGRAPHIC FACTORS

Are you a citizen of Russia?

- ○ Yes (1)
- ○ No (2)

Skip To: End of Survey If Are you a citizen of Russia? =

What is your age?

_____

What is your gender?

- Male (1)
- Female (2)
- Other: (3) _____

What is your level of income? (monthly, in rubles)

_____

What is your level of education?

- I don't have formal education (1)
- High school diploma or equivalent (2)
- Bachelor's degree (3)
- Master's degree (4)
- PhD (postgraduate studies for Russia) (5)
- Other, please specify: (7) _____

End of Block: SOCIO-DEMOGRAPHIC FACTORS

Start of Block: FRT

Facial recognition systems are built on computer programs that analyze images of human faces for the purpose of identifying them. They are used to find missing people identify and track criminals, support investigations. They are also used in different sectors such as banking or healthcare. They might be represented by cameras that detect a face and match the face with the existing database (you might have facial recognition technology on your smartphone).

End of Block: FRT

Start of Block: EXPERIENCE FRT

Have you heard about facial recognition technology prior to taking this survey?

- ○ Yes (1)
- ○ No (2)

Where do you think you might have been exposed to facial recognition technology? Please select one or several occasions.

- ☐ Smartphone use (1)
- ☐ On smart devices and gadgets (2)
- ☐ Public streets (3)
- ☐ Railway or subway stations (4)
- ☐ Customs control or security check at airports (5)
- ☐ Tourist attractions (6)
- ☐ Identify verification for financial matters (7)
- ☐ Shopping malls or shops (8)
- ☐ Schools or universities (9)
- ☐ Private households (10)
- ☐ None of the above (11)
- ☐ Other, please specify: (12) _____

How often do you think you are exposed to facial recognition technology in public?

- ○ Everyday (1)
- ○ Most days (2)
- ○ Several times a week (3)
- ○ Several times a month (4)
- ○ Several times a year (5)
- ○ Several times in my life (6)
- ○ Never (7)

How often do you use facial recognition technology yourself?

- ○ Everyday (1)
- ○ Most days (2)
- ○ Several times a week (3)
- ○ Several times a month (4)
- ○ Several times a year (5)
- ○ Several times in my life (6)
- ○ Never (7)

End of Block: EXPERIENCE FRT

Start of Block: PERCEPTIONS (USEFULNESS)

Do you think that facial recognition technology is useful when used in the following cases? Choose occasions where you think that the application of FRT is useful. Please select one or several occasions.

- ☐ Smartphone use (1)
- ☐ On smart devices and gadgets (2)
- ☐ Public streets (3)
- ☐ Railway or subway stations (4)
- ☐ Customs control or security check at airports (5)
- ☐ Tourist attractions (6)
- ☐ Identify verification for financial matters (7)
- ☐ Shopping malls or shops (8)
- ☐ Schools or universities (9)
- ☐ Private households (10)
- ☐ None of the above (11)
- ☐ Others (12) _____

Generally, I think that facial recognition technology is useful. Please select the best answer describing the extent to which you agree.

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Fully agree	○	○	○	○	○	○	○	Fully disagree

End of Block: PERCEPTIONS (USEFULNESS)

Start of Block: PERCEPTIONS (CONSEQUENCES)

In general, do you perceive that the usage of FRT enhances:

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
1. ...convenience (1)	○	○	○	○	○	○	○
2. ...privacy violation (2)	○	○	○	○	○	○	○
3. ...efficiency (3)	○	○	○	○	○	○	○
4. ...discrimination (4)	○	○	○	○	○	○	○
5. ...security (5)	○	○	○	○	○	○	○
6. ...surveillance (6)	○	○	○	○	○	○	○
7. ...none of the above (7)	○	○	○	○	○	○	○

End of Block: PERCEPTIONS (CONSEQUENCES)

Start of Block: PERCEPTIONS (RELIABILITY)

Do you think that facial recognition technology is more reliable than other identification technologies, such as fingerprint or DNA-based recognition?

- ○ More reliable (1)
- ○ Neither more or less reliable (2)
- ○ Less reliable (3)
- ○ I don't know (4)

Do you think the COVID-19 pandemic influenced the frequency of facial recognition technology being used? Please select the best answer describing the extent to which you agree.

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Very much	○	○	○	○	○	○	○	Not at all

End of Block: PERCEPTIONS (RELIABILITY)

Start of Block: SOCIO-DEMOGRAPHIC FACTORS TRUST

The city of Moscow is using facial recognition technology to monitor whether people are complying with quarantine rules during COVID-19. Algorithms have been programmed to recognize people wearing masks, and report anyone with a fever. Overall, facial recognition technology was widely used to stop the spread of the coronavirus.

How likely would you comply with the recommendation of the government to self-isolate at home for 14 days if you had been in close contact with an infected person? Please select one answer.

- ○ Definitely comply (1)
- ○ Probably comply (2)
- ○ May or may not comply (3)
- ○ Probably won't comply (4)
- ○ Definitely won't comply (5)
- ○ Don't know (6)

To what extent would you agree to the fact that facial recognition technology are used to monitor whether people are complying with quarantine rules? Please select the best answer describing the extent to which you agree.

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Fully agree	○	○	○	○	○	○	○	Fully disagree

What would be your main reasons for being against facial recognition technology being used to monitor whether people are complying with quarantine rules? Please select one or several options.

- ☐ I feel like it is a violation of privacy (1)
- ☐ I feel like I'm being discriminated by it (2)
- ☐ I feel like it leads to surveillance (3)
- ☐ Other, please specify: (4) _____

What would be your main reasons for agreeing that facial recognition technology are being used to monitor whether people are complying with quarantine rules? Please select one or several answers.

- ☐ It would help me stay healthy (1)
- ☐ It would let me know my risk of being infected (2)
- ☐ It would protect my family and friends (3)
- ☐ It would help reduce the number of deaths among people (4)
- ☐ A sense of responsibility to the wider community (5)
- ☐ It might stop the pandemic (6)
- ☐ Other, please specify: (7) _____

Do you accept the usage of facial recognition technology? Please select the best answer describing the extent to which you agree.

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Strongly favour	○	○	○	○	○	○	○	Strongly oppose

What is the extent to which you would accept the usage of FRT when it is managed by...

	Strongly favor (1)	Somewhat favor (2)	Neutral (3)	Somewhat oppose (4)	Strongly oppose (8)
1. central or local government? (1)	○	○	○	○	○
2. private companies? (5)	○	○	○	○	○
3. public-private partnerships? (6)	○	○	○	○	○

Page Break

Where do you get most of your news from? Please select one or several answers.

- [ ] Television (1)
- [ ] Radio (2)
- [ ] Family and friends (3)
- [ ] Social media (4)
- [ ] Websites and newspapers (5)
- [ ] None of the above (6)

Display This Question:

If Where do you get most of your news from? Please select one or several answers. = Television

What television channel do you frequently use to watch the news? Please select one or several answers.

- [ ] Первый канал (1)
- [ ] Russia (2)
- [ ] Россия 24 (3)
- [ ] НТВ (4)
- [ ] РБК (5)
- [ ] Дождь (6)
- [ ] None of the above (7)
- [ ] Other (8)

Display This Question:

If Where do you get most of your news from? Please select one or several answers. = Social media

What social media platforms do you use the most as a news source? Please select one or several answers.

- ☐ YouTube (1)
- ☐ Instagram (2)
- ☐ VK (Vkontakte) (3)
- ☐ Facebook (4)
- ☐ Twitter (5)
- ☐ Telegram (6)
- ☐ WhatsApp (7)
- ☐ Other (8)

Do you generally trust the government in doing what is in the best interest for its citizens? Please select the best answer describing the extent to which you agree.

	1 (1)	(2)	(3)	4 (4)	5 (5)	6 (6)	7 (7)	
Fully agree	○	○	○	○	○	○	○	Fully disagree

End of Block: SOCIO-DEMOGRAPHIC FACTORS TRUST

Appendix C: Pre-test

	Original Question (English)	Translation (Russian)	Feedback	Final Question
Q1	Are you a citizen of Russia?	Являетесь ли Вы гражданином Российской Федерации?	None.	Являетесь ли Вы гражданином Российской Федерации?
Q2	What is your age?	Пожалуйста, укажите Ваш возраст.	None.	Пожалуйста, укажите Ваш возраст.
Q3	What is your gender?	Пожалуйста, укажите Ваш пол.	None.	Пожалуйста, укажите Ваш пол.
Q4	What is your level of income? (monthly, in rubles)	Каков Ваш уровень дохода? (ежемесячно, в рублях)	Might give various options in the answer tab as people living in Russia would be more open to answering the given question.	Каков Ваш уровень дохода? (ежемесячно, в рублях) *(answer options were added (option 1 – up to 60k; option 2 – from 60k to 150k; option 3 – more than 150k) after the research on average wage in Russian capital, Moscow)*
Q5	What is your level of education?	Какое у Вас образование?	None.	Какое у Вас образование?
Q6	Have you heard about facial recognition technology prior to taking this survey?	Слышали ли Вы о технологии распознавания лиц до прохождения данного опроса?	None.	Слышали ли Вы о технологии распознавания лиц до прохождения данного опроса?
Q7	Where do you think you might have been exposed to facial recognition technology? Please select one or several occasions.	Как Вы считаете, где Вы могли столкнуться с применением технологии распознавания лиц? Пожалуйста, выберите одну или несколько ситуаций, при которых Вы могли столкнуться с применением технологии распознавания лиц.	Might give less options in answers that appeared due to translation from English to Russian. The second part of the question (“при которых Вы могли столкнуться с применением технологии распознавания лиц”) sounds too wordy.	Как Вы считаете, где Вы могли столкнуться с применением технологии распознавания лиц? Пожалуйста, выберите одну или несколько ситуаций. *(The second part of the question was removed and the answer options were contracted: “mobile phones” and “other gadgets” were put in one category due to their connotations in Russian)*
Q8	How often do you think you are	Как Вы считаете, как часто Вы сталкивались с	None.	Как Вы считаете, как часто Вы

	exposed to facial recognition technology in public?	применением технологии распознавания лиц?		сталкивались с применением технологии распознавания лиц?
Q9	How often do you use facial recognition technology yourself?	Как часто Вы применяете технологию распознавания лиц для частного пользования?	“Yourself” or “for private use” sound too wordy.	Как часто Вы применяете технологию распознавания лиц самостоятельно?
Q10	Do you think that facial recognition technology is useful when used in the following cases? Choose occasions where you think that the application of FRT is useful. Please select one or several occasions.	Как Вы считаете, в каких ситуациях технология распознавания лиц приносит пользу? Выберите одну или несколько ситуаций из перечисленного ниже списка, при которых, на Ваш взгляд, технология распознавания лиц является полезной.	None.	Как Вы считаете, в каких ситуациях технология распознавания лиц приносит пользу? Выберите одну или несколько ситуаций из перечисленного ниже списка, при которых, на Ваш взгляд, технология распознавания лиц является полезной.
Q11	Generally, I think that facial recognition technology is useful. Please select the best answer describing the extent to which you agree.	В целом я считаю, что технология распознавания лиц полезна. Пожалуйста выберите вариант, наиболее точно описывающий степень вашего согласия.	Improve the translation and put “generally” in the middle of the sentence.	Я считаю, что технология распознавания лиц в целом полезна. Пожалуйста выберите вариант, наиболее точно описывающий степень вашего согласия.

Q12	In general, do you perceive that the usage of FRT enhances: convenience, privacy violation, efficiency, discrimination, security, surveillance	Считаете ли Вы, что использование технологии распознавания лиц в целом: удобно для решения целого ряда проблем, ведет к правовым проблемам, эффективно для достижения многих целей, ведет к дискриминации, обеспечивает безопасность граждан, ведет к тотальной слежке за населением	None.	Считаете ли Вы, что использование технологии распознавания лиц в целом: удобно для решения целого ряда проблем ведет к правовым проблемам

Q13	Facial recognition technology is more	Считаете ли Вы, что технология	Start the sentence with	Я считаю, что технология

	reliable than other identification technologies, such as fingerprint or DNA-based recognition.	распознавания лиц более надежна, чем другие методы идентификации человека, такие как распознавание отпечатков пальцев или технология распознавания по ДНК.	“I believe” as with the rest of the sentences for more consistency.	распознавания лиц более надежна, чем другие методы идентификации человека, такие как распознавание отпечатков пальцев или технология распознавания по ДНК.
Q14	I believe my information is kept confidential, when facial recognition technology is used.	Я считаю, что при применении технологии распознавания лиц, конфиденциальность моих данных соблюдается. Пожалуйста выберите степень вашего согласия с данным утверждением.	None.	Я считаю, что при применении технологии распознавания лиц, конфиденциальность моих данных соблюдается. Пожалуйста выберите степень вашего согласия с данным утверждением.
Q15	I believe my privacy would not be breached, when facial recognition technology is used.	Я считаю, что моя анонимность не будет нарушена при использовании технологии распознавания лиц.	None.	Я считаю, что моя анонимность не будет нарушена при использовании технологии распознавания лиц.
Q16	I believe it is safe to use facial recognition technology.	Я считаю, что использование технологии распознавания лиц в целом никому не вредит и является абсолютно безопасным.	None.	Я считаю, что использование технологии распознавания лиц в целом никому не вредит и является абсолютно безопасным.

Q17	Do you accept the usage of facial recognition technology? Please select the best answer describing the extent to which you agree.	Одобряете ли Вы в целом применение технологии распознавания лиц? Выберите ответ, наиболее точно описывающий степень вашего согласия с данным утверждением.	None.	Одобряете ли Вы в целом применение технологии распознавания лиц? Выберите ответ, наиболее точно описывающий степень вашего согласия с данным утверждением.

Q18	What is the extent to which you would accept the usage of	Какова степень Вашего одобрения применения технологии распознавания при	Public-private partnerships can be replaced with partners.	Какова степень Вашего одобрения применения технологии

	FRT when it is managed by... central or local government? private companies? public-private partnerships?	условии того, что эти технологии контролируются... правительством? частными организациями? государственно-частными партнерствами?		распознавания при условии того, что эти технологии контролируются... правительством? частными организациями? государственно-частными партнерствами? *(Was checked in a dictionary and was left unchanged).*
Q19	How likely would you comply with the recommendation of the government to self-isolate at home for 14 days if you had been in close contact with an infected person? Please select one answer.	Какова вероятность того, что Вы лично оставались бы дома в течение 14 дней при условии того, что у Вас был контакт с инфицированным человеком?	None.	Какова вероятность того, что Вы лично оставались бы дома в течение 14 дней при условии того, что у Вас был контакт с инфицированным человеком?
Q20	To what extent would you agree to the fact that facial recognition technology is used to monitor whether people are complying with quarantine rules? Please select the best answer describing the extent to which you agree.	Насколько Вы согласны с тем, что технологии распознавания лиц применялись для того, чтобы отследить соблюдение коронавирусных мер? Пожалуйста выберите ответ, который лучше всего описывает степень Вашего согласия с таким применением технологии распознавания лиц.	None.	Насколько Вы согласны с тем, что технологии распознавания лиц применялись для того, чтобы отследить соблюдение коронавирусных мер? Пожалуйста выберите ответ, который лучше всего описывает степень Вашего согласия с таким применением технологии распознавания лиц.
Q21	What would be your main reasons for being against facial recognition technology being used to monitor whether people are complying with quarantine rules?	Каковы основные причины того, что Вы были бы против применения технологии распознавания лиц для наблюдения за соблюдением коронавирусных мер? Отметьте одну или	How likely could be translated differently: “какова” change for “в чем”. Rephrase “наблюдения за соблюдением”.	Отметьте одну или несколько причин, по которым Вы были бы против использования технологии распознавания лиц для контроля за соблюдением карантинных мер в

	Please select one or several options.	несколько причин, если такие имеются.		период пандемии COVID-19.
Q22	What would be your main reasons for agreeing that facial recognition technology is being used to monitor whether people are complying with quarantine rules? Please select one or several answers.	Каковы основные причины того, что Вы были бы за использование технологии распознавания лиц для наблюдения за соблюдением коронавирусных мер? Отметьте одну или несколько причин, если такие имеются.	How likely could be translated differently: “какова” change for “в чем”. Rephrase “наблюдения за соблюдением”.	Отметьте одну или несколько причин, по которым Вы поддержали бы использование технологии распознавания лиц для контроля за соблюдением карантинных мер в период пандемии COVID-19.
Q23	Where do you get most of your news from? Please select one or several answers.	Где Вы читаете (узнаете) новости? Выберите один или несколько вариантов ответа.	Not “where” but from “what sources” sounds better and clearer.	Из каких источников Вы получаете (узнаете) новости? Выберите один или несколько вариантов ответа.
Q24	What television channel do you frequently use to watch the news? Please select one or several answers.	Какой телеканал вы чаще всего используете для просмотра новостей? Выберите один или несколько вариантов ответа.	None.	Какой телеканал вы чаще всего используете для просмотра новостей? Выберите один или несколько вариантов ответа.
Q25	What social media platforms do you use the most as a news source? Please select one or several answers.	Какие социальные сети вы чаще всего используете в качестве источника новостей? Выберите один или несколько вариантов ответа.	None.	Какие социальные сети вы чаще всего используете в качестве источника новостей? Выберите один или несколько вариантов ответа.
Q26	Do you generally trust the government in doing what is in the best interest for its citizens? Please select the best answer describing the extent to which you agree.	Считаете ли Вы, что деятельность правительства осуществляется исключительно в интересах своих граждан?	None.	Считаете ли Вы, что деятельность правительства осуществляется исключительно в интересах своих граждан?
Q27	Overall, are you willing to accept the governmental decision of using facial recognition technology in complying with the	В целом, согласны ли Вы с решением правительства об использовании технологии распознавания лиц для соблюдения правил,	None.	В целом, согласны ли Вы с решением правительства об использовании технологии распознавания лиц для соблюдения

	COVID-19 regulations?	связанных с коронавирусом?		правил, связанных с коронавирусом?
Q28	Do you support the overall usage of facial recognition technology?	Поддерживаете ли вы повсеместное использование технологии распознавания лиц?	None.	Поддерживаете ли вы повсеместное использование технологии распознавания лиц?

Appendix D: Reliability and validity analysis

Table 1: Factor Analysis

Rotated Component Matrix

Items	Factors			
	1	2	3	4
In general, do you perceive that the usage of FRT enhances: privacy violation	.844			
In general, do you perceive that the usage of FRT enhances: surveillance	.635			
In general, do you perceive that the usage of FRT enhances: discrimination	.797			
In general, do you perceive that the usage of FRT enhances: convenience		.869		
In general, do you perceive that the usage of FRT enhances: efficiency		.905		
In general, do you perceive that the usage of FRT enhances: security		.637		
Facial recognition technology is more reliable than other identification technologies, such as fingerprint or DNA-based recognition.			.794	
I believe my information is kept confidential, when facial recognition technology is used.			.796	
I believe my privacy would not be breached, when facial recognition technology is used.			.851	
I believe it is safe to use facial recognition technology.			.612	
What is the extent to which you would accept the usage of FRT when it is managed by central or local government?				.561
What is the extent to which you would accept the usage of FRT when it is managed by private companies?				.850
What is the extent to which you would accept the usage of FRT when it is managed by public-private partnerships?				.833
Overall, are you willing to accept the governmental decision of using facial recognition technology in complying with the COVID-19 regulations?				.503
Extraction Method: Principal Component Analysis				
Rotation Method: Oblimin with Kaiser Normalization. A rotation converged in 9 iterations.				
Eigenvalue:	**6.69**	**1.62**	**1.20**	**1.03**
Explained Variance:	**41.83**	**10.18**	**7.52**	**66.03**

Table 2: Reliability Analysis

	Cronbach's Alpha	N of items
Perceived reliability	.838	4

Perceived benefits	.788	3
Perceived risks	.739	3
Acceptance of FRT	.737	4

Perceived reliability

Reliability Statistics

	Cronbach's Alpha	N of items
Perceived reliability	.838	4

Item Statistics

	Mean	SD	N
Facial recognition technology is more reliable than other identification technologies, such as fingerprint or DNA-based recognition.	3.46	1.84	421
I believe my information is kept confidential, when facial recognition technology is used.	5.03	2.58	421
I believe my privacy would not be breached, when facial recognition technology is used.	4.63	2.78	421
I believe it is safe to use facial recognition technology.	3.67	1.90	421

Perceived benefits

Reliability Statistics

	Cronbach's Alpha	N of items
Perceived benefits	.788	3

Items Statistics

	Mean	SD	N
In general, do you perceive that the usage of FRT enhances: convenience.	5.59	1.56	407
In general, do you perceive that the usage of FRT enhances: efficiency.	5.35	1.62	407
In general, do you perceive that the usage of FRT enhances: security.	5.15	1.80	407

Perceived risks

Reliability Statistics

	Cronbach's Alpha	N of items
Perceived risks	.739	3

Items Statistics

	Mean	SD	N

In general, do you perceive that the usage of FRT enhances: privacy violation.	4.64	1.94	406
In general, do you perceive that the usage of FRT enhances: surveillance.	3.38	2.15	406
In general, do you perceive that the usage of FRT enhances: discrimination.	5.22	2.04	406

Acceptance of FRT

Reliability Statistics

	Cronbach's Alpha	**N of items**
Acceptance of FRT	.739	3

Items Statistics

	Mean	**SD**	**N**
What is the extent to which you would accept the usage of FRT when it is managed by central or local government?	4.54	1.66	388
What is the extent to which you would accept the usage of FRT when it is managed by private companies?	3.26	1.54	388
What is the extent to which you would accept the usage of FRT when it is managed by public-private partnerships?	3.29	1.49	388
Overall, are you willing to accept the governmental decision of using facial recognition technology in complying with the COVID-19 regulations?	3.76	1.93	388