Determining the influence of information privacy concerns and trust of citizens on the attitude towards the Dutch COVID passport using PLS-SEM.

Gulet Barre, Erik van Geldere, Filip Sanders, Andrei Talaba and Patrick Bedaf

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ABSTRACT

The covid passport is a new phenomenon introduced in 2021 and used as a tool to curb the spread of COVID-19 virus.This quantitative, confirmatory study aims to test the privacy and trust concerns of individuals in relationship to the attitude towards a COVID passport. The privacy calculus framework forms the foundation of the conceptual model in order to get a grasp of the privacy concerns of individuals. The seven constructs of this model were: perceived effectiveness of technological mechanism, perceived effectiveness of regulatory mechanism, individuals trust, perceived benefits, information privacy concerns, convenience and attitude towards COVID passport.
Data was collected through an online survey and spread through convenience sampling. The Partial Least Squares Structural Equation Modeling method is applied to draw inferences from the gathered data. This study concludes that all relationships between the constructs are found to be statistically significant, with the only exception being the relationship between convenience and attitude towards a COVID passport.
New research could shed light to further investigate attitudes towards a COVID passport, considering an adequate sample of the population to determine causality. As this study focuses mainly on the Netherlands, it would be important to investigate whether the results in the other countries differ from those in the Netherlands. In short, this would make it possible to see whether attitudes towards a COVID passport are significantly different in other countries.

1 Introduction and problem statement

One of the more recent measures against the spread of the covid-19 virus implemented in countries across Europe is the EU digital covid certificate (European-Commission, 2021). This digital covid certificate facilitates traveling inside the European Union by allowing countries to evaluate which travelers have a lower risk of spreading the virus and potentially limiting travel restrictions for that group (European-Commission, 2021). In the Netherlands this digital certificate is commonly referred to as the covid pass (Government of the Netherlands, N.D.). The covid pass also serves, at the time of writing, as a prerequisite for entering a bar, restaurant, event, cinema, theatre, or sports match (Government of the Netherlands, N.D.). This makes the covid pass a crucial tool for participating in relatively ordinary social events. The aim of this measure is to re-open the parts of society that had to be closed due to the covid-19 virus in a safe way (Rutte & de Jonge, n.d.).

However, there have been some concerns about discrimination and violations of human rights (voor-de-Rechten-van-de Mens, n.d.). The support for this measure and vaccinations in general have dropped as the trust in the Dutch government has diminished in the last year (Erasmus university Rotterdam, 1-11-2021).

Extant research has analysed the factors that influence the attitude of citizens towards electronic health records (EHR) extensively (Dinev, Albano, Xu, D'Atri, & Hart, 2016). Although the covidpass is not a clear-cut example of an ERH, it does bear some similarities, especially since the covidpass is a digital system containing data related to the medical status of the data subject.

The current literature however, has not looked at the relationship between the attitude towards the COVID pass and privacy and trust concerns citizens might have. The research on the attitudes towards the covidpass that has already been conducted discussed how the attitude towards the covidpass would change if people learned vaccine passports have been around for quite some time now Guidi, Romano, and Sotis (2021); Sotis, Allena, Reyes, and Romano (2021), and the effect of people learning that most people support vaccine passports (Sotis et al., 2021).

This clearly differs from the scope of this paper in that here, the focus lies the effect of trust and privacy concerns and the attitude towards the covidpass. We are adding to the current literature by identifying potential issues with the covidpass and how it can be improved to negate those issues.

The aim of this paper is to examine the factors that influence the trust and support for the covidpass. More specifically, we will be trying to answer the following main research question:

How do privacy concerns and trust in the government influence the attitude towards a covidpass in the Netherlands?

To provide a solid analysis of this question, this paper will start by examining the current literature on how trust, perceived benefits and privacy concerns relate to EHRs in general. Then, by using PLS-SEM to analyse the results of a survey, this paper examines the hypotheses further specified in the literature review section. This paper will finish by discussing the outcomes of the analysis.

2 Literature review

2.1 Conceptual model

In order to address the research questions focussed on information privacy concerns of citizens, a conceptual model is chosen that is based on the foundations of the Privacy Calculus theory (Dinev et al., 2016). This framework is however adjusted to fit the limited scope and the topic of this research paper. The privacy calculus framework was initially developed in the paper of Laufer and Wolfe (1977) and furtherly been extended and revised by others such as Culnan and Armstrong (1999) and more recently by Dinev and Hart (2006).

Culnan and Bies (2003) portray the calculus theory as the most adequate framework to analyze privacy concerns of individuals. This framework assumes that individuals weigh off the benefits and costs (risks) in a personalized analysis in order to predict the privacy concerns. In fact, there is always a trade-off between those variables. This implies that individuals receive benefits (e.g. personalized services) when they decide to disclose their personal information, such as current GPS-location (Xu, Teo, Tan, & Agarwal, 2009). This has been captured in the definition "second exchange", in contrast to the 'first exchange' where physical goods are traded for money (Culnan & Bies, 2003).

As previously mentioned, the paramount concept in this theory is the influence of the barriers and enablers, jointly establishing the so- called 'privacy calculus' . Culnan and Armstrong (1999) describes it as " the mental calculation as to which beliefs are strong enough to override the contradictory ones".

Each barrier or enabler can outweigh the other, hence this fuels the input for an individual to either execute or to not execute a certain behaviour. For example, if the barriers added up together exceed the sum of all enablers, then the individual highly likely won't execute a certain behavior and vice versa (Chellappa & Sin, 2005).

The independent and dependent variables (construct) of the conceptual model are captured in figure 1 below and will be further defined in the following paragraphs.

2.2 The construct: Trust

The definition of trust has been studied thoroughly in the literature of information management and originates from the field of social psychology. The notion is multidimensional and several frameworks exist to attempt to explain the holistic definition of trust (McKnight & Choudhury, n.d.; Vance, Elie-Dit-Cosaque, & Straub, 2008)

Due to the limited scope of this paper the following, the following shared definition will be used:" "the willingness of an individual to depend on an institution based on the belief in the integrity, ability, and benevolence of this other" (Dinev et al., 2016) (Mayer et al. 1995) (McKnight & Choudhury, n.d.).

The predictors of trust in this study are perceived effectiveness of technological mechanisms and perceived effectiveness of regulatory mechanisms (Dinev et al., 2016).

2.2.1 Perceived effectiveness of privacy technological mechanisms

Privacy Technological mechanisms encompasses the usage of technology and tools to enhance information privacy by addressing possible threats (Bélanger & Crossler, 2011). A clear example would be the use of user access control systems, such as Role Based Access Control and Attribute Based Access control model (Sicuranza, Esposito, & Ciampi, 2015). More recently, new blockchain-based frameworks are being developed that enhance privacy and security benefits of individuals personal data (Magyar, 2017; Shi et al., 2020; Wang, Zhang, Zhang, & Wang, 2019).

Hence, the first hypothesis is: *Perceived effectiveness of technological mechanisms has an influence on the trust of an individual.*

2.2.2 Perceived effectiveness of privacy regulatory mechanisms.

Regulatory mechanisms, such as the GDPR (General Data Protection Regulation) imposes strict laws on organizations that process or collect data from citizens in the European Union. The goal of this regulation also includes the safeguarding of privacy . If violations take place, such as data breaches, then a data protection authority has the mandate to punish an organization (Li, Yu & He, 2019). This creates an incentive for an organization to design privacy-respecting systems. By implementing these measures, citizens could perceive this as effective.

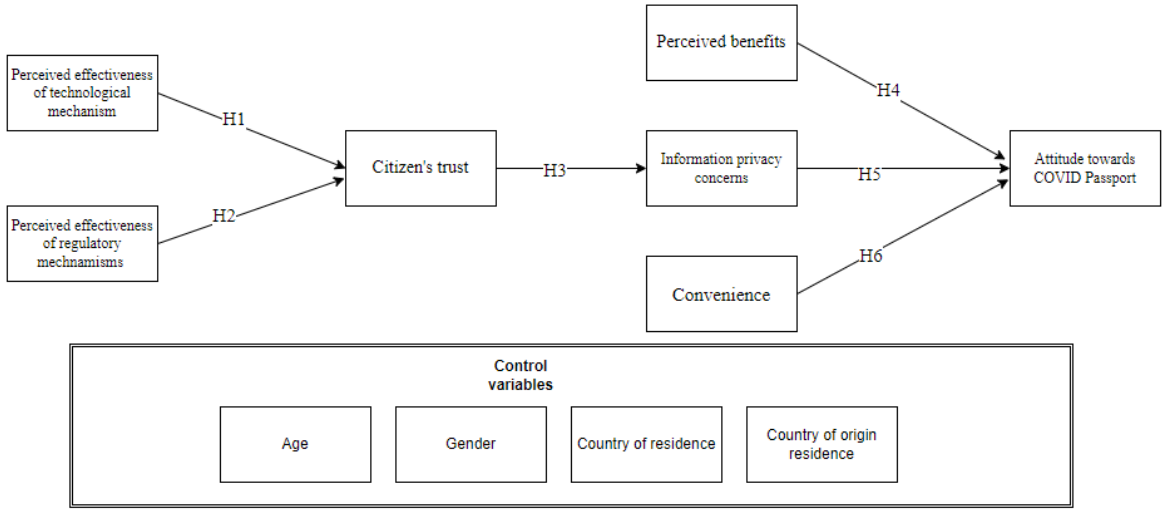

Figure 1: Conceptual model, derived from (Dinev et al., 2016).

Thus, the second hypothesis is: *Perceived effectiveness of regulatory mechanisms has an influence on the trust of an individual.*

2.3 The construct: attitude towards EHR

As inspired by the work of (Dinev et al., 2016), people's attitude towards EHR are influenced by three variables, namely perceived benefits, privacy concerns, and convenience, therefore, this research will adapt the proposed variables to suit the covid pass domain. The purpose of this study is to determine the extent to which these variables influence the attitudes that privacy concerns elicit among citizens.

The work of Dinev et al. (2016) has proposed a series of drivers and inhibitors for people's attitude towards electronic health records, such as: perceived benefit of EHR, information privacy concerns, convenience and internet experience.

Dinev et al. (2016) and Bansal, Gefen, et al. (2010). state that if individuals trust an information system to be reliable and is designed to minimize the risks of data breaches, it will form the ground to reduce the information privacy concerns.

Therefore, the third hypothesis is: *Trust of an individual has an influence on the information privacy concerns of an individual.*

2.3.1 Perceived benefits of EHR

This study identifies the characteristics of citizens' privacy concerns and examines their influence on the perceived benefits of EHRs that affect attitudes. Tung, Chang, and Chou (2008) show that the perceived benefits of an EHR have a large positive influence on the attitude towards it. Numerous studies have shown that the perceived benefits of an EHR is an important belief associated with a person's attitude toward covid pass (Venkatesh & Davis, 2000). IS researchers have concluded that perceived benefits as an independent variable influences attitudes toward EHRs (Beatty et al. 2001; Forsythe et al. 2006; MacKay et al. 2004; Teo and Yeong 2003). The literature on perceived benefits focuses on the important role of this construct in rational decision making (Gupta et al., 2015).

Hence, the fourth hypothesis is: *H4: Perceived benefits of EHR affects the attitude towards covid pass.*

2.3.2 Information privacy concerns

Researchers have debated the conceptualization of privacy as a social and/or psychological construct. Nowadays, privacy is described as a stretching concept. With the advent of electronic health records and increased awareness of personal data breaches, privacy and security of health data has come to the forefront. "In research (Culnan 1993; Smith et al. 1996; Stewart and Segars (2002)), information privacy concerns are viewed as an expression of the extent to which individuals are concerned about the information collection practices of others and how the information they acquire is used (Angst & Agarwal, 2009)."

The fifth hypothesis is therefore formulated as follows: *H5: Citizen' level of concern regarding information privacy of a covid pass influences their attitude towards a covid pass.*

2.3.3 Convenience

Convenience could be defined as one's perception over the likelihood/ ability to accomplish a certain task, while also making the process of doing so more appealing. Kohli and Tan (2016) shows that convenience could be defined as one's perception over the likelihood/ ability to accomplish a certain task, while also making the process of doing so more appealing (Cherif, Bezaz, &

Mzoughi, 2021). The convenience with regards to interacting with EHR increases search efficiency by cutting down waiting times at medical offices for gathering recent test results or for simple documentation handling. In the case of the COVID pass, convenience could potentially play a role in the adoption of such a method by people. It could be possible that a ease of use and reliable and convenient access of the covid pass, might positively impact adoption (Angst & Agarwal, 2009).

The sixth hypothesis is therefore formulated as follows: *H6: Convenience influences the behavioral attitude towards the Covid Pass.*

2.4 Control variables

The following control variables are included in this conceptual model because they could affect the outcome of the conducted research: age, gender, country of origin and country of residence. These variables will also help provide more insights into the respondents and they will be further elaborated in the results sections of the paper.

3 Methodology

3.1 The data collection format

Due to the previously discussed similarities between the COVID passport and electronic health records, the hypotheses provided in this paper will be examined using techniques similar to existing literature. In their research about the attitudes towards EHR, Dinev et al. (2016) used a survey as a data collection tool. Moreover, Guidi et al. (2021) and Sotis et al. (2021) used surveys in their research about the attitudes citizens might have towards the covidpass. Based on this, the authors concluded that the use of surveys as a data collection tool is valid in this context. The survey was spread exclusively in the Netherlands, responses originating from people currently not living in the Netherlands were not included in the final analysis.

The research brings a highly popular problem domain into questions and although abundant in sources of information, the nature of carrying such a research is met with a number of constraints. Similar to other studies, this research paper is as well affected by the scarcity of time and resources. However, with academic relevancy as one of the main goals of this research, this paper employed a wide range of methods and strategies that ultimately help improve the overall quality and research processes that go along with this study.

3.2 Creating the survey

A triangulation of primary data sources would have contributed to the improvement of validity and reliability of our data, but due to constraints mentioned above, the choice for the right tool has been limited. Primary data has been collected through the use of an online questionnaire tool as a result of the cross-sectional research strategy used.

With regards to the unit of analysis, this questionnaire mainly tries to gain insights into people's perceptions and attitudes towards certain constructs or domains, therefore the unit of analysis here is individuals from The Netherlands. In order to ensure validity, this research makes use of off-the-shelf measurement scales for the variables used in the study. All the questions used have been inspired by reputable papers and have been adapted in various degrees to fit the purpose and scope of this research.

The questionnaire will be live for 4 days. After the 4 days, the data collection will be stopped and the questionnaire will be unpublished.

The answers to all the questions measuring the variables are done on a 7-point likert scale where 1 = 'Strongly disagree' and 7 = 'Strongly Agree' - because of this an interval scale will be used. Other questions related to gender, age, location have been used in order to better control the sample and to gain more insights about it.

Before publishing and spreading out the questionnaire, a pretest was carried out in order to ensure that questions are clear for the reader, that there are no errors and to gain feedback.

3.3 The sampling method and data cleaning

The sampling technique used is non-probability sampling tied with snowball sampling. The questionnaire was shared in Whatsapp Group chats, Instagram as well as with people from the researchers' inner circle. Hence, the conclusions drawn based on the data collected in this particular survey may not be representative of the population, being the people currently living in The Netherlands. A proper random sampling of the population while controlling for sampling bias through weighing of some response groups would be the most appropriate sampling method though.

A rule of thumb of 75 to 500 subjects, as described by (Roscoe, 1964) will be used to determine the sample size for this study.

Data will be exported from the questionnaire provider dashboard in a CSV format. Data cleaning and coding will be carried out before running the analysis. Only fully completed surveys will be taken into account. Empty rows and columns will be removed in an attempt to reduce redundancy. Furthermore, only responses from respondents currently living in The Netherlands will be included.

3.4 Survey questions

For the constructs lifted from the privacy calculus model by (Dinev et al., 2016) were only adapted to fit the covid pass context, other than that these items were

not changed in any way, ensuring empirical support for their reliability and validity.

For the construct of perceived benefits of a covid pass relatively little empirical research has been conducted compared to an EHR system, since the concept of a covid pass while widely known has not been around for that long as well as it only having been widely used in practice in The Netherlands as of the summer of 2021 (van Koophandel, n.d.). Hence the measure for this construct was heavily adapted from a sub-optimal source that heavily focused on the US with the original question also being relatively leading, incurring a leading bias. Therefore the items lifted from the paper by Guidi et al. (in press) were adapted to fit the Dutch context as well as try to reduce or completely eliminate the leading nature of the questions.

When measuring the "convenience" construct, this research has made use of several references. These provided off-the-self measurement scales which aim to improve the validity of the questions asked. Question 1 has been derived from the privacy calculus model, while Q2 and Q3 have been derived from the (Colwell, Aung, Kanetkar & Holden, 2008) study on service convenience.

3.5 Respondents

The sample size should be, in multivariate research, ten or more times as large as the amount of variables in the conceptual model in multivariate research (Roscoe, 1964). Therefore, the minimum sample size is capped at 70 respondents.

3.6 Method of analysis

The Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to analyse the results from the quantitative survey. There are three reasons why this method was selected. Firstly, it is aligned with the chosen approach, confirmatory research. Besides that, it works with relatively small sample sizes. Lasty, it allows researchers to test the conceptual method from a prediction perspective. This conceptual model consists of many constructs and relationships. PLS-SEM enables hands-on and intuitive analysing of these variables (Hair, Risher, Sarstedt, & Ringle, 2019)

4 Results

The total of 86 survey responses (n= 86) were received. Therefore, the final sample size is 86 (n = 86). However, two of those were removed since they came from subjects who did not live in the Netherlands at the time. To conduct the analysis a 30-days trial of the software "SmartPLS" was used.

With regards to the respondents age, 1 person was younger than 18, one was over 50, 2 people were between 41 and 50, 3 people were between 31 and 40 and the vast majority of 78 people were between 18 and 30 years old. With regards to gender, this research has a good amount of both females and males with 48 respondents identifying as males, 35 as females and 2 respondents preferred not to say.

According to the loadings following from the analysis, there were two survey questions who were not reliable enough to explain the construct. As is shown in table 1 (appendix), the questions:

- Feeling secure that personal information is kept private would make it easier for me to use a COVID-19 pass app. (Q15)
- I'm tired of playing 'telephone tag' with test centers and filling out the same forms. Why can't I use an app? (Q23)

had loadings lower than the 0.708 recommended by Hair et al. (2019) which means they do not reliably represent the construct they were assigned to. To assess the internal consistency reliability of the model composite reliability was used as recommended by Hair et al. (2019), the composite reliability values ranged from 0.70 to 0.90, which means that it is in the satisfactory to good range (Hair et al., 2019). For all of the constructs defined in the model the composite reliability value was between 0.70 and 0.90, as shown in table 1, To assess the discriminant validity we used the heterotrait-monotrait (HTMT) ratio to check if the constructs were empirically distinct from each other (Hair et al., 2019). This produced some worrisome results. Hair et al. noted that the HTMT should not be greater than or equal to 0.9. However, the HTMT ratio between constructs 2 and 5, and 4 and 7, exceeds 0.9 as you can see in table 2. Moreover, the HTMT ratio between constructs 4 and 7 equals 0.986, this means that those constructs measure very similar things. As recommended by Hair et al. (2019) the average variance extracted (AVE) was used to test to what extent the construct explains the variance in its items. For all of the constructs in our model the AVE was higher than 0.5 which means the AVE is adequate.

Due to the low loadings of Q15 and Q23 discussed earlier, these questions were not included in the following analysis. After removing Q15 and Q23 the loadings, composite reliability, AVE and HTMT were calculated again to check for potential deviations from the original analysis. The loadings of the new analysis, shown in table 3 , did not deviate from the previous one in any significant way, except for the constructs "Information privacy concerns" and "convenience", which were related to Q15 and Q23. The composite reliability and AVE remained the same for all constructs except "Information privacy concerns" and "convenience". For these two constructs both the AVE and composite reliability improved compared to the old analysis. Removing the aforementioned questions had a positive impact on the HTMT, shown in table 4, between the constructs "information privacy concerns" and "Perceived effectiveness

of regulatory mechanisms", this value is no longer in the proximity of 0.9 which Hair et al. (2019) noted to make the construct invalid.

Looking at the adjusted R square for the second analysis, as shown in table 5, provides mixed results. The adjusted R square for the dependent variable, attitude towards covid pass, is quite high at 0.827. Whereas the adjusted R square for the independent variable, information privacy concerns, is quite low at 0.391. This shows that the model's in-sample predictive power is inconsistent between various constructs (Hair et al., 2019). Collinearity does not seem to pose a big issue in this model. Looking at the VIF values as recommended by Hair et al. (2019) and shown in table 6, indicate that none of the items reach the critical VIF value of 5 explained by Hair et al. (2019). The VIF value of item: "Q25" is higher than what would be ideal at 4.545, but it does not invalidate the analysis.

To test the significance of the relationships between the constructs a bootstrapping procedure with 500 subsamples was used, this was tested using a two tailed test and a 0.05 significance level.

5 Discussion

To collect data on the population,snowball- and convenience sampling are first used to get an indication of attitudes toward Covid pass. These sampling methods are usually inexpensive and not very time consuming. However, a major disadvantage of these non-probability samples is that the participants are not representative of the entire population. The requirement for a survey is that the sample must include more than 70 respondents, which is also mentioned in the methodology.

In the end, this survey collected 86 responses. Therefore, this requirement is met. In addition, the six constructs included in the survey are hypothesized. Sekaran and Bougie (2016) argue that a significance level of 0.05 is acceptable. For the first construct (perceived effectiveness of technological mechanism), we examined the relationship that this variable has with the citizen trust variable: The hypothesis that belongs to these variables is *"Perceived effectiveness of technological mechanism has an influence on the trust of an individual"*. A P-value of 0.000 was obtained, as shown in table 7, there is sufficient evidence to support the hypothesis.

For the second construct, the relationship between perceived effectiveness of regulatory mechanisms and citizen trust was examined. The hypothesis stated is *"Perceived effectiveness of regulatory mechanisms has an influence on the trust of an individual"*. The P-value calculated is also 0.000 which means that the hypothesis is supported by enough evidence, as it is also below the standard value of 0.005.

In addition there is the third construct which focuses on the relationship between citizen trust and information privacy concerns. Just like the two hypotheses explained above, the third hypothesis *"Trust of an individual has an influence on the information privacy concerns of an individual"* is also supported by sufficient evidence due to the p-value of 0.000.

For the fourth construct, the relationship between perceived benefits and attitude towards the covid pass is addressed. The hypothesis for this construct was *"Perceived benefits of EHR affects the attitude towards covid pass"*. The p-value is 0.000, thus there is enough evidence to support the hypothesis.

On the other hand, the fifth construct information privacy concerns is related to the construct attitude towards covid pass. For this construct, the hypothesis: *"Citizen's level of concern regarding information privacy of a covid pass influences their attitude towards a covid pass"*. However, the p-value for this hypothesis is 0.009, which is lower than the significance level of 0.05. Therefore, there is enough evidence to support the hypothesis.

The last construct is convenience. This construct also focuses on the construct attitude towards covid pass. The hypothesis tested is *"Convenience influences the behavioral attitude towards the Covid Pass"*. The p-value for this hypothesis is 0.374. Therefore, there is insufficient evidence to support the claim.

6 Conclusion

This chapter discusses the conclusion of this study. It answers the following main question: *How do privacy concerns and trust in the government influence the attitude towards a covidpass in the Netherlands?* In addition, this chapter also addresses the limitations identified and finally looks at further research that can be conducted on the attitude towards a covid pass.

6.1 Conclusion

This study examined the predictors of attitude toward a covid pass. However, the results are statistically significant except for the variable 'convenience'.

"How do privacy concerns and trust in the government influence the attitude towards a covidpass in the Netherlands?"

According to the findings of this paper, The image above shows the results of the analysis as the P-values for the items used to measure the constructs as well as through the relationships between the constructs. Simply put, the conceptual model theorized in figure 1 has statistically significant support for the hypotheses in it, bar some limitations outlined further in this paper.

It may then be concluded that all relationships between the constructs are found to be statistically significant, with the only exception being the relationship between convenience and attitude towards a covid pass.

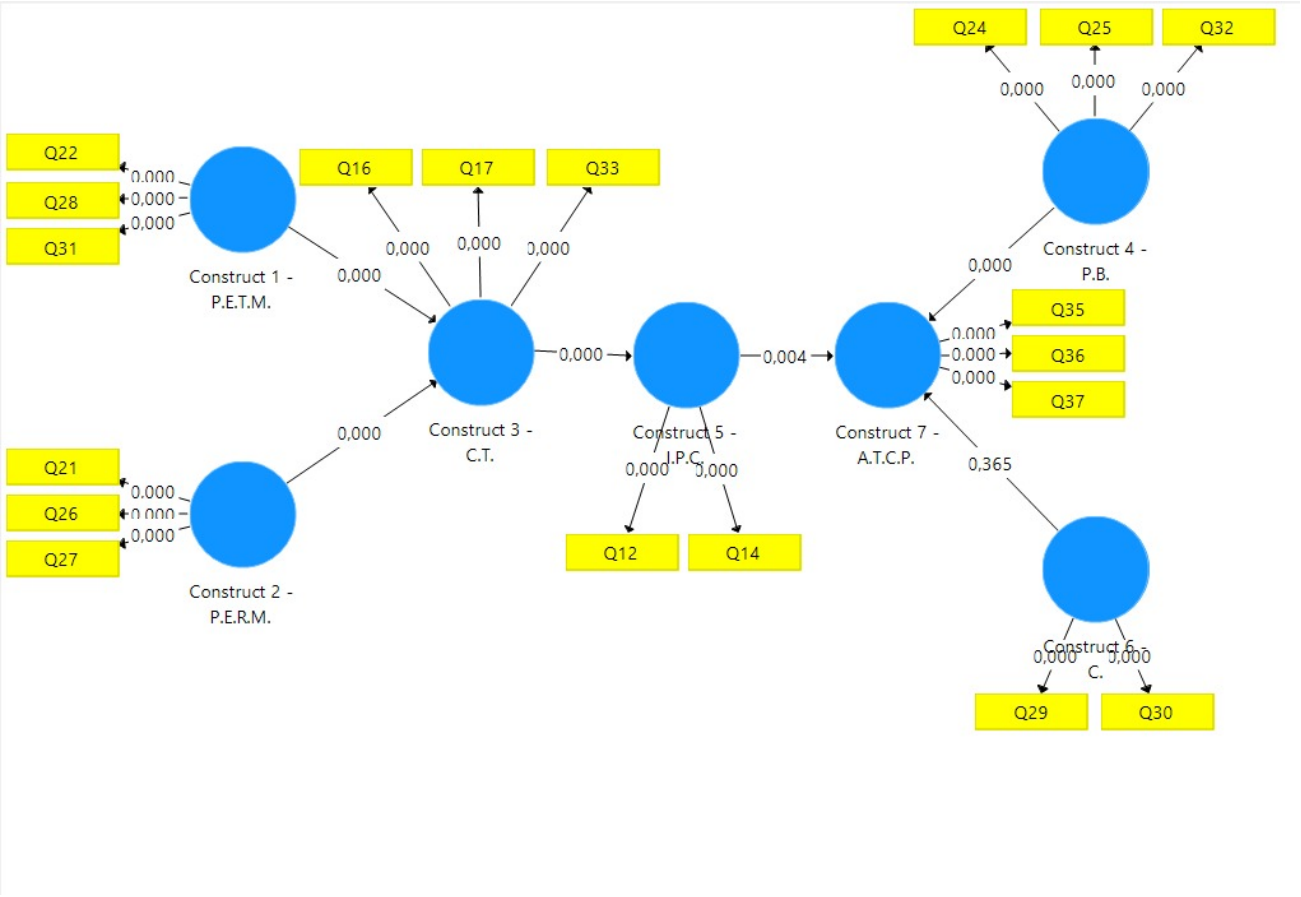

Figure 2: The conceptual model through the P-values obtained from the analysis.

6.2 Limitations

The construct attitude towards covidpass is not an off the shelf scale which could explain why the HTMT ratio between Perceived benefit and attitude towards covidpass is so high. A proper off-the-shelf measure that has existing empirical support for the construct it aims to measure would be more fitting however at the time of writing such a construct has been relatively difficult to find, at least for the greater covid pass context of the overall paper.

Furthermore, due to the sampling method used as well as the relatively small sample size the results may not be representative of the target population, that being people living in The Netherlands that use the covid pass. Furthermore, because people were not provided with any compensation, one may argue that the people responding are more vocal about their opinion on the covid pass, which may further skew the results.

6.3 Further research

For future research, it would be important to further investigate attitudes toward a covid pass, considering an adequate sample of the population to determine causation. To gain a deeper understanding of the constructs in the conceptual model, a quantitative data collection method can be combined with a qualitative data method by applying Methodical Triangulation. An example would be conducting semi-structured interviews with multiple respondents.

As this study mainly focuses on the Netherlands, it would be important to investigate whether the results in the other countries differ from those in the Netherlands. In short, this would make it possible to see whether attitudes towards a Covid pass are significantly better in other countries. It might then turn out that the difference in attitudes towards the Covid pass is due to other factors that were not investigated in the present study. It is therefore recommended that international research be conducted.

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Appendix

Table 1: Loadings, Composite Reliability, and AVE per item for the first analysis. Loadings marked with an asterisk have a too high loading.

Constructs	**Items**	**Loadings**	**Composite Reliability**	**Average variance extracted**
Construct 1 - P.E.T.M.	Q22	0,854	0,893	0,736
	Q28	0,891		
	Q31	0,829		
Construct 2 - P.E.R.M.	Q21	0,885	0,901	0,752
	Q26	0,893		
	Q27	0,822		
Construct 3 - C.T.	Q16	0,916	0,917	0,787
	Q17	0,928		
	Q33	0,813		
Construct 4 - P.B.	Q24	0,890	0,943	0,845
	Q25	0,949		
	Q32	0,919		
Construct 5 - I.P.C.	Q12	0,859	0,818	0,611
	Q14	0,898		
	Q15	0,536*		
Construct 6 - C.	Q23	0,299*	0,761	0,552
	Q29	0,871		
	Q30	0,900		
Construct 7 - A.T.C.P.	Q35	0,935	0,945	0,852
	Q36	0,900		
	Q37	0,934		

Table 2: HTMT per construct for the first analysis. For constructs marked with an asterisk the HTMT exceeds the boundary of 0.9.

	Construct 1 - P.E.T.M.	**Construct 2 - P.E.R.M.**	**Construct 3 - C.T.**	**Construct 4 - P.B.**	**Construct 5 - I.P.C.**	**Construct 6 - C.**
Construct 1 - P.E.T.M.						
Construct 2 - P.E.R.M._	0,475					
Construct 3 - C.T.	0,690	0,781				
Construct 4 - P.B.	0,642	0,626	0,801			
Construct 5 - I.P.C.	0,731	0,900*	0,837	0,873		
Construct 6 - C._	0,748	0,660	0,693	0,807	0,810	
Construct 7 - A.T.C.P.	0,628	0,722	0,853	0,986*	0,891	0,820

Table 3: Loadings, Composite Reliability, and AVE per item for the second analysis.

Constructs	items	Loadings	Composite Reliability	Average variance extracted
Construct 1 - P,E,T,M,	Q22	0,854	0,893	0,736
	Q28	0,890		
	Q31	0,829		
Construct 2 - P,E,R,M,	Q21	0,885	0,901	0,752
	Q26	0,893		
	Q27	0,822		
Construct 3 - C,T,	Q16	0,916	0,917	0,787
	Q17	0,929		
	Q33	0,811		
Construct 4 - P,B,	Q24	0,890	0,943	0,845
	Q25	0,949		
	Q32	0,919		
Construct 5 - I,P,C,	Q12	0,894	0,912	0,838
	Q14	0,937		
Construct 6 - C,	Q29	0,873	0,883	0,791
	Q30	0,905		
Construct 7 - A,T,C,P,	Q35	0,935	0,945	0,852
	Q36	0,900		
	Q37	0,933		

Table 4: HTMT per construct for the second analysis. For constructs marked with an asterisk the HTMT exceeds the boundary of 0.9.

	Construct 1 - P,E,T,M,	**Construct 2 - P,E,R,M,**	**Construct 3 - C,T,**	**Construct 4 - P,B,**	**Construct 5 - I,P,C,**	**Construct 6 - C,**
Construct 1 - P,E,T,M,						
Construct 2 - P,E,R,M,	0,475					
Construct 3 - C,T,	0,690	0,781				
Construct 4 - P,B,	0,642	0,626	0,801			
Construct 5 - I,P,C,	0,570	0,787	0,735	0,749		
Construct 6 - C,	0,770	0,667	0,732	0,868	0,662	
Construct 7 - A,T,C,P,	0,628	0,722	0,853	0,986*	0,780	0,835

Table 5: R and R square adjusted for the second analysis.

	R Square	**R Square Adjusted**
Construct 7 - A,T,C,P,	0,834	0,827
Construct 5 - I,P,C,	0,398	0,391
Construct 3 - C,T,	0,572	0,561

Table 6: VIF per item.

Item	**VIF**
Q12	1.861
Q14	1.861
Q16	3.103
Q17	3.159
Q21	2.195
Q22	1.840
Q24	2.615
Q25	4.545
Q26	2.179
Q27	1.691
Q28	2.033
Q29	1.516
Q30	1.516
Q31	1.728
Q32	3.330
Q33	1.709
Q35	3.436
Q36	2.735
Q37	3.513

Table 7: Results of the bootstrapping procedure. P-values marked with an asterisk are significant at the 5% significance level.

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Construct 1 - P.E.T.M. -¿ Construct 3 - C.T.	0,386	0,382	0,092	4,204	0,000*
Construct 2 - P.E.R.M. -¿ Construct 3 - C.T.	0,516	0,522	0,090	5,740	0,000*
Construct 3 - C.T. -¿ Construct 5 - I.P.C.	0,631	0,637	0,070	9,054	0,000*
Construct 4 - P.B. -¿ Construct 7 - A.T.C.P.	0,744	0,740	0,084	8,880	0,000*
Construct 5 - I.P.C. -¿ Construct 7 - A.T.C.P.	0,154	0,153	0,059	2,629	0,009*
Construct 6 - C. -¿ Construct 7 - A.T.C.P.	0,082	0,093	0,093	0,890	0,374

Table 8: Variables and measurement items.

Variable	**Measurement Item**	**Reference**	**Questions equivalent analysis**
Perceived effectiveness of technological mechanism	Q1. I think that the COVID-19 pass will use/ is based on effective technologies	Adapted to fit the covid pass context from: (Dinev et al., 2016)	Q22
	Q2. I think that the COVID-19 pass will use/ is based on reliable technologies		Q28
	Q3.I believe that the COVID-19 pass makes use of great technologies		Q31
Perceived effectiveness of regulatory mechanisms	Q1. I believe that the law is effective in protecting me from misuse of my personal COVID-19 pass data	Adapted to fit the covid pass context from: (Dinev et al., 2016)	Q21
	Q2. I believe that the law effectively governs the practice of how my COVID-19 pass records are collected, used, and protected		Q26
	Q3.I believe that the law will effectively address violations related to the COVID-19 pass.		Q27
Citizen's trust	Q1. I feel that government acts in citizen's best interest	(Teo, Srivastava, & Jiang, 2008)	Q16

	Q2. I am comfortable relying on the government to meet their obligations.		Q17
	Q3. I always feel confident that I can rely on government to do their part when I interact with them		Q33
Perceived benefits	Q1. I believe that it is beneficial for me to have an electronic COVID-19 pass.	Guidi et al., in press	Q24
	Q2. A COVID-19 pass will generate positive results for the health care in our society		Q25
	Q3. I believe the COVID-19 pass will benefit society.		Q32
Information Privacy concerns	Q1. I believe I will have control over the amount of my personal information collected by the COVID-19 pass	Q1/Q2 is adapted to fit the covid pass context from: (Dinev, Albano, Xu, D'Atri, & Hart, 2016)	Q12
	Q2. I believe that using the COVID-19 pass will not expose my private information to any unauthorized party	(FANG, CHAN, BRZEZINSKI & XU, 2005)	Q14
	Q3. Feeling secure that personal information is kept private would make it easier for me to use a COVID-19 pass app	Q3 Adapted from: (Pavlou & Fygenson, 2006)	Q15
Convenience	Q1 I'm tired of playing 'telephone tag' with test centers and filling out the same forms. Why can't I use an app?	Q1 is derived from the privacy calculus model by (Dinev, Albano, Xu, D'Atri, & Hart, 2016)	Q23
	Q2. I like the fact that I could easily access the COVID-19 pass from my phone*	Q2 and Q3 is adapted from (Colwell, Aung, Kanetkar & Holden, 2008)	Q29
	Q3. I think it is convenient to have a COVID-19 pass in the form of a QR code that can quickly be scanned when needed*		Q30
Attitude towards COVID pass	Q1. I believe it is a good idea to have a covid pass	Adapted to fit the covid pass context from: (Dinev, Albano, Xu, D'Atri, & Hart, 2016)	Q35
	Q2. I have a favourable opinion about electronic health records		Q36
	Q3. I believe using the covid pass is a good thing to do		Q37