

Design of Measures to Prevent Coronavirus Infections in the Tourism Sector

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MSc in Business Administration

Major Tourism

Degree Dissertation submitted as part of the requirements for the MSc in Business
Administration at the School of Business, Lucerne University of Applied Sciences and Arts.

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Management Summary

The outbreak of the SARS-Cov-2 virus at the end of 2019 has brought our life to a standstill. Due to the high infection rate, within a short period of time we have been confronted with measures that impacted not only everyday life, but also brought tourism to a standstill. Even though tourism is considered to be a main driver for the spread of the virus, it is as well heavily impacted by health crises, such as covid-19. There have been travel restrictions, boarder closures and more than 2.000 worldwide travel and tourism policy announcements concerning the covid-19 pandemic. Due to the vast amount of existing Non-Pharmaceutical Interventions (NPIs) it is challenging to decide which ones a tourism business should implement. Travel restrictions and NPIs limit the range of movement and, thus, the virus is spread at a reduced rate, but it also leads to a change in individual travel intentions that needs to be taken into consideration when designing NPIs.

This master thesis aims to evaluate a set of NPIs from a social psychological point of view on how to influence individual travel behaviour during the covid-19 pandemic, while at the same time maintain tourists safety. Most existing studies and official recommendations on implementing NPIs have evaluated either a small set of NPIs on the basis of medical knowledge, or looked at particular measures on the basis of either the Theory of Planned Behaviour (TPB), the Health Belief Model (HBM) or the risk-taking behaviour. This master thesis addresses this shortfall by using the theoretical model from Vu et al (2022), that examines the impact of the COVID-19 pandemic and tourist's assessments of NPIs in relation to their travel intentions by combining the TPB, the HBM and the Domain-Specific Risk-Taking Scale (DOSPERT).

In total 70 different NPIs have been collected from different online sources over five months (September 2021 to February 2022) and grouped into different categories. By applying Aiken's two step approach those 70 NPIs have been evaluated with the theoretical model from Vu et al. (2022). Further, seven personas representing specific touristic target groups were defined and the NPIs were assigned to the personas. Additionally, inputs from an Expert Workshop helped to support the evaluation of the NPIs.

This thesis shows how the socio-psychological model from Vu et al. (2022) can be applied to develop suitable NPIs in tourism. However choosing the right NPIs needs to balance the effectiveness of the NPI to secure safety and its impact on travel intention. Thus the result shows that NPIs should be selected in a target specific way in order to influence the travel intention of the respective target group. This is because evaluations of NPIs are based on subjective perceptions, which can differ from person to person and is therefore difficult to generalize. Hence, it is advisable for tourism professionals to expand their existing target groups with the attributes from Vu et al. (2022) theoretical modal to elaborate the best fitting NPI for their business.

Keywords: *covid-19, travel intention, non-pharmaceutical intervention, HBM, TBH, DOSPERT*

Table of Content

Preface	6
1 Introduction.....	7
1.1 Aim of this Research.....	8
1.2 Research Question	8
2 Literature Review.....	9
2.1 Tourism Behaviour during the Covid-19 Pandemic.....	9
2.2 Intervention Designs during the Covid-19 Pandemic.....	10
2.3 A Theory Based Model of Factors Influencing Travel Intention	11
3 Methodology	14
3.1 Desk Research	14
3.2 Two Step Approach	14
3.3 Personas.....	15
3.4 Expert Workshop.....	15
4 Results and Discussions.....	16
4.1 Overview of Collected NPIs.....	16
4.2 Evaluation of NPIs based on the Theory Based Model	18
4.3 Evaluation of NPIs based on Personas.....	21
4.3.1 Description of Personas	21
4.3.2 Assignment of NPIs to the Personas.....	23
4.4 Inputs from the Expert Workshop	25
4.4.1 Usability of the Theory Based Model in Practice.....	25
4.4.2 Fish Bowl Discussion	26
4.4.3 Recommended NPIs by the Experts	27
5 Conclusion	28
6 Bibliography	30
7 Appendix: List of NPIs.....	36
8 Declaration of Sole Authorship.....	54

List of Tables

Table 1: Social psychological factors influencing travel intentions and the acceptance of NPI 13
Table 2: Description of the personas with the influencing factors on travel intention 22
Table 3: Recommended NPIs by the experts to address the influencing factors on travel intention... 27

Preface

First, I would like to thank the research team Prof. Timo Ohnmacht, Dr. Thao Thi Vu, Dr. Andreas Hüsser, Dr. Martin Schonger, Dr. Florian Eggli and Jérôme Gauch who helped me with this master thesis and supported me throughout the whole project. I would like to thank the whole research team for organizing the Expert Workshop. Especially Dr. Martin Schonger, who guided me with tips when I was uncertain and critically commenting on my approach. I would like to thank Jérôme Gauch, who supported me with his thoughts and valuable inputs on the evaluation of the NPIs. Also, many thanks to my supervisor Prof. Dr. Timo Ohnmacht for his support and motivation in the process of writing this paper. He accompanied the progress of my thesis as well was available for relevant questions, gave me advices and supported me with valuable inputs.

1 Introduction

The outbreak of the SARS-CoV-2 virus, was first reported in December 2019 in Wuhan, China. Due to globalization and the high reproduction rate, the virus spread within a short period of time all over the world (Swiss Tourism Federation, 2022). Tourism is one driver for the spread of the virus. For instance, the number of tourists in Thailand showed a significant correlation with the number of covid-19 infected people, which supports this argument (Tantrakarnapa et al., 2020). Hence, governments around the world took action to stop the spread of the virus. Destinations introduced travel restrictions, stay-at home orders, and other Nonpharmaceutical Intervention (NPI) such as the obligation to wear face masks (UNWTO, 2021). These and many other measures have brought our lives to a standstill. And so tourism also came to a halt (Gössling et al., 2020).

Cheng et al. (2020) has collected a dataset of more than 130,000 covid-19 related policy announcements across more than 195 countries since March 2020 until today. More than 2,000 of those policy announcements are directly connected to travel and tourism (external boarder restrictions, restriction on mass gathering, internal boarder restrictions). Such restrictions have led to a massive decline in worldwide international overnight visitors by 74% from 2019 to 2020 (UNWTO, 2021). Consequently, Swiss tourism has collapsed as well by 62% in the first eight months in 2020 compared to 2019, which led to a drop of 8.5 Mrd Swiss Francs in 2020.(Leimgruber, 2021; Swiss Tourism Federation, 2021).

Although travel restrictions and NPIs limit the range of movement and, thus, the virus is spread at a reduced rate, it also brings negative implications. The survey of the Swiss Touring Club (TCS, 2021) showed that, 68% of the Swiss population said that covid-19 has an influence on their travel intentions and 47% (an increase of 20% compared to 2019) indicated that they travel less compared to the past. However the need of international travel is still there, as 22% indicated to have a very strong longing for international travel, and 25% indicated a strong need. Consequently, TCS concluded that too much uncertainty leads to lower travel intention and even travel cancellations.

Nevertheless, recent development and the lifting of all measures by April 1, 2022 in Switzerland (FSO, 2022) indicates a brighter future for tourism. Although tourism seems to be picking up again, it is difficult to plan, and the industry must always be prepared to act quickly and adapt to the current situation.

1.1 Aim of this Research

A coherent and comprehensible set of NPIs is needed to mitigate closed borders and other travel restrictions. Especially in the domain of tourism, intervention designs and specific measures are needed to ensure forms of safe tourism. This ensures that tourists feel safe and therefore their intention to travel during a health crisis is reinforced. This master thesis aims to analyse a set of existing NPIs with a social psychological theory based model developed by Vu et al. (2022) to evaluate how travel intention can be influenced with NPIs. Based on the evaluations recommendations will be made for the tourism industry regarding implementing appropriate NPIs that influence individual travel intentions, while, at the same time, maintaining the tourists' safety while travelling.

While most of the existing studies focus on either travel behaviour or risk perception of tourists regarding covid-19, this study aims to come up with solutions on how to influence such perceptions by NPIs. To do so, the research findings from the SNF NRP 78 research project 'Risk Perception and Tourism Behaviour: How to Control Pandemic Infectious Diseases Through Nonpharmaceutical Intervention (NPIs)?' from Ohnmacht et al.(2022). They combine the Theory of Planned Behaviour (TPB) with the Health Belief Model (HBM) and the Domain Specific Risk-Taking Scale (DOSPERT) to a combined theoretical model (Vu et al., 2022), that will serve as an argumentation framework in this thesis.

1.2 Research Question

The objective of this master thesis is to develop recommendations for NPIs that are justified with the theoretical research from Vu et al. (2022). By aligning the social psychological factors that influence individual travel intention with specific NPIs, it is possible to evaluate those NPIs from a psychological point of view. This is a new approach to evaluate NPIs, as previous studies investigated the effectiveness of NPIs mostly by analysing KPI's or either with the HBM, or the TPB, but not by combining different social psychological theories.

'Travel intention' describes the 'outcome of a mental process that leads to action and transforms motivation into behaviour' (Makhdoomi & Baba, 2019, p. 38). 'Nonpharmaceutical Interventions' include all kind of measures that are not based on medication. In the absence of Pharmaceutical Interventions (PI) such as a vaccine, 'NPI are the most effective public health interventions against COVID-19' (ECDC, 2020, S. 3) and 'aim to prevent and/or control SARS-CoV-2 transmission in the community' (ECDC, 2020, S. 3) .

The following research question emerges for this master thesis:

How can Nonpharmaceutical Interventions (NPIs) implemented by the tourism industry influence individual travel intention during the covid-19 pandemic, while at the same time prevent coronavirus infections ?

In order to answer the research question, the master thesis is structured as followed: Chapter two highlights the current state of research and points out the research gap. In chapter three, the methodology is described with a focus on desk research, a two-step approach, the expert workshop and the designing of personas. In chapter four, results are shown and discussed. In a first step, the NPIs are described. Second they are discussed, on how they influence travel intention by arguing with the theoretical model from Vu et al. (2022). In third step the NPI are assigned to the described personas. As a last step, the inputs from the expert workshop are mentioned. Then in chapter five, a conclusion is made and further research is mentioned.

2 Literature Review

This chapter gives an overview of the current state of research. First it names different scopes of studies about tourism behaviour during the covid-19 pandemic and how the pandemic influenced travel behaviour and intentions. It further names the ongoing research about NPIs, travel restrictions and recommendations about the usage of NPIs. It will then describe in depth the results of Ohnmacht et al. (2022) and Vu et al.(2022) research, which sets the theoretical framework that will be used to evaluate NPIs.

2.1 Tourism Behaviour during the Covid-19 Pandemic

Since the outbreak of the SARS-CoV-2 virus, a vast number of studies have been published concerning different issues related to this health crisis. As the tourism industry is heavily affected by the crisis, several tourism related studies have been published. There are mainly studies that highlight the impacts of Covid-19 on tourism on a worldwide (e.g. Bakar & Rosbi, 2020; Karabulut et al., 2020; Škare et al., 2021) and on a geographical country-specific scale (e.g. Foo et al., 2020; Hoque et al., 2020; Wasiul et al., 2020).

Despite the rather general, economic and data based studies, there are studies that investigated the change of travel behaviour and travel intentions due to covid-19, considering social psychological aspects (e.g. Abraham et al., 2020; Agyeiwaah et al., 2021; Bae & Chang, 2021; Golets et al., 2020; Isaac & Keijzer, 2021; Pappas, 2021; Zhang et al., 2021).

For instance, Bratić et al. (2021) used the perceived risk theory combined with travel restrictions to explain the vacation behaviour shift of Serbian residents. They concluded that covid-19 risk perception influenced travel anxiety, which again has impact on some forms on travel behaviour.

As well did Sánchez-Cañizares et al. (2021) showed that the individuals beliefs on the ability to control circumstances during a trip and the perceived risk from covid-19 has a significant impact on the travel intention of Spanish travelers. Chua et al. (2021) further investigated the effect of covid-19 on the role of negative affect, perceived health risk, and perceived uncertainty on attitudes towards travel. Abel and Brown (2020) did a research on a prosocial behaviour in the time of covid-19 by analyzing the effect of private and public role models.

2.2 Intervention Designs During the Covid-19 Pandemic

Several studies focused on the design of interventions and travel restrictions. While most of the studies analysed the impact of specific NPI such as wearing face masks (e.g. Bai & Brauer, 2021; Schulze-Röbbecke et al., 2020), social distancing (e.g. Aquino et al., 2020; VoPham et al., 2020), or test strategies (e.g. Blain et al., 2020; Gorji et al., 2021), others estimated effects of a set of different NPIs (e.g. Flaxman et al., 2020; Liu et al., 2021). Rutz et al. (2021) for instance, named five measures that are important to contain the coronavirus not only in the tourism industry: Quarantine measures, the wearing of face masks, social distancing, restricting and banning large gatherings of people, tracing and testing measures, and school closures. However, they mention that different studies have produced different results regarding the effectiveness of school closings.

Most studies mentioned above, investigated the effects of the NPIs mainly by using mathematical models and analysed KPIs such as the reproduction number (Francisco et al., 2020). Only few studies took advantage of socio-psychological aspects to investigate the effectiveness of NPI. Thus Sánchez-Cañizares et al. (2021) calls for action concerning this issue. They made a linkage of reducing the perceived risk with communication and advertising and recommends disclosing effort in improving safety, cleanliness, and hygiene measures to lower the perceived risk. Additionally, Sánchez-Cañizares et al. (2021) point out the importance of social media and the usage of independent reporters to prove compliance with their measures.

Although the studies on the effectiveness of NPIs are rather limited and in some cases contradictory (Soltesz et al., 2020), there is considerable literature dealing with recommendations and recovery strategies (e.g Leimgruber, 2021; Luengo-Oroz et al., 2020). The WHO published various interim guidance for specific sectors, such as the hotels and accommodations facilities. Their recommendations are about specific measures to keep distance and maintain hygiene, as for example the banning of buffet, disinfection measures, communications or limiting the number of guests to maintain distance (WHO, 2020a). Additionally, their recommended action plan for the management, the arguments are rather vague, and suggested NPI mostly cover distance and hygiene measures. Yet, the WHO concludes that countries ‘must balance the epidemiological benefits, socioeconomic impact and the degree of public acceptance for each measure when designing and implementing NPIs’ (WHO, 2020c, p. 1).

Bartić et al. (2021) further recommend lifting boarder closures, restore international aviation and robotise the hospital service. They conclude that the activation of international travel will ‘require general strategies to build tourists certainty about covid-19 as a manageable travel risk’ (p. 10). However, Michie et al. (2021) generally stressed out the need of concerted programs, covering in the financial, physical, and social structure to embed covid-safe behaviour in everyday routine. Bavel et al. (2020) called for action by drawing on the insights of behavioural and social sciences to mitigate not only the Corona-pandemic but also future pandemics.

2.3 A Theory Based Model of Factors Influencing Travel Intention

The research team of Ohnmacht et al. (2022) examined the impact of covid-19 on the travel intention and the acceptance of NPIs of the Swiss population. Their study is conducted on a Swiss National Scale with a total of 1683 Swiss residents (39% response rate) surveyed. Hence, this study is one of the few existing large-scale nationally-representative surveys that uses social psychological theories to explain the travel intention during the pandemic and the acceptance of interventions.

The result of this research is a theory based model for predicting intention to travel. It includes three established theories, namely the theory of planned behaviour (TBH) (Ajzen, 1985; Frey et al., 1993), the Domain Specific Risk-Taking Scale (DOSPERT) (Solvic, 1990), and the health belief model (HBM) (Rosenstock, 1974).

In total seven factors have been identified to have a significant influence on travel intention and on the acceptance of NPIs. In table 1, each factor is defined according to Oberholzer et al. (2022) and ranked based on the results from Ohnmacht et al. (2022) and Vu et al. (2022). The numbers in the column describe the rank of the strength of the influence (1= strongest influence) and the plus ‘(+)’ and minus ‘(-)’ in the brackets describes, if the impact is positive (+) or negative (-). The table indicates, that the strongest impact on travel intention has the perceived susceptibility. The negative impact of the perceived susceptibility indicates, that the higher the perceived susceptibility, the lower the travel intention. The lowest impact on travel intention has the perceived behaviour control with a positive impact. This means the higher the perceived behavioural control, the higher the travel intention. Looking at the acceptance of measures, the perceived susceptibility is ranked to have the lowest impact with a positive influence. Thus the higher the perceived susceptibility, the higher the acceptance of measures. As this master thesis is focusing on the travel intention, the influencing factors are sorted according to the strength of the impact on travel intention, as this is the dependent variable for this research.

Table 1.*Social psychological factors influencing travel intentions and the acceptance of NPIs.*

Influencing factors	Impact on travel intention	Impact on Acceptance of NPIs
Perceived Susceptibility (HBM) Refers to a person's subjective perception of the likelihood of being exposed to coronavirus and becoming infected while traveling.	1 (-)	7 (+)
Perceived Benefits (HBM) Refers to the subjectively perceived benefits of interventions in terms of their effectiveness in containing coronavirus and reducing the risk of getting infected when traveling.	2 (+)	No significant impact
Risk behaviour The individual's own risk behaviour in the area of leisure and tourism. It can be used to predict the extent to which risk behaviour influences the intention to travel as well as the intention to implement measures.	3 (+)	No significant impact
Attitude (TPB) Attitudes are psychological tendencies that persist over time and are used to express liking or disliking toward attitude objects or behaviours. It is about whether individuals are in general rather favourable or rather unfavourable towards protection measures when traveling.	4 (+)	2 (+)
Perceived severity (HBM) Refers to a person's subjective perception of the severity of a possible disease. Both pathological consequences of a potential disease (health, cognitive impairment) and social consequences (family life, work, social life) are taken into account.	5 (-)	1 (+)
Perceived Barriers (HBM) Refers to the subjectively perceived barriers to implementing interventions in travel. The barriers include aspects such as time, money, convenience, as well as the practicality of implementation.	6 (-)	6 (-)
Perceived behavioural control (TPB) Refers to the individual's perception that he or she has the resources and skills to perform the desired behaviour. Examples include assessments of whether a person has the financial resources, the time, and the necessary skills and competencies to (correctly) implement protective measures when traveling.	7 (+)	3 (+)
Self – Efficacy (HBM) Refers to the confidence in one's own abilities and competencies to perform a particular behaviour. It determines whether or not individuals are convinced that they can contribute to the containment of the pandemic by changing their own behaviour and implementing protection measures.	No significant impact	5 (+)
Subjective norm (TPB) Expectations from important reference persons regarding an person's own behaviour. These are socially shared and communicated values, whose compliance is demanded by the social environment, such as the protection of fellow individuals through the correct application of measures.	No significant impact	4 (+)

3 Methodology

To answer the research question, different methods have been used, which are described in this chapter. The combination of gathering information's and inputs by desk research and by an the expert workshop and align those information's with the two-step approach from Aiken (2011) is considered as a good way to supplement the theoretical knowledge. This study will focus on Aiken's (2011) second stage and uses the theory based model from Vu et al. (2022) to evaluate the list of NPIs. The methodologies applied in this master thesis are considered reliable, valid and ethical standards are met.

3.1 Desk Research

Main focus of this master thesis is the collection of existing NPIs using desk research (Travis, 2016). The data was collected by open published documents such as newspapers, magazines, blogs, government statements, TV and Radio News, which are all published online. The starting date for the desk research was September 1, 2021, and the end date was January 31, 2022. For assessing the quality of the resources John's (1990) four criteria 'authenticity', 'credibility', 'representativeness' and 'meaning', have been taken into consideration. The collected NPIs were listed in an Excel spreadsheet to evaluate them in a next step. For each NPI the name, description, location, publication date, and the source has been written down for further analysis.

3.2 Two Step Approach

Once the different NPIs have been collected, they were evaluated in a next step. To do so, Aiken's two step approach (2011) was used. According to Aiken's two step approach (2011) there is an interplay among health theories, empirical modelling, and behavioural interventions. She states that the flow from existing theories to empirically supported theories to the translation of those models into model driven interventions has a great potential for stronger and more effective behaviour change interventions. By applying this two-stage approach, this master thesis will focus on using the theoretical model from Vu et al. (2022) to define NPIs that impact the influencing factors of the theoretical model. This means that the collected NPIs have been assigned to the influencing factors. These can then be evaluated as to whether and to what extent they influence intention to travel.

3.3 Personas

Seven different ‘personas’ have been defined to reflect different travel behaviours and needs during covid-19. The personas have been designed by the organisers of the expert workshop and were then aligned to the model of Vu et al (2022). Basic descriptions (e.g. age, job, income) were not applied in depth, as the focus was given to the perceptions of the influencing factors that shape the personas travel intention. The use of fictitious characters is a well-known method to reflect norms and perspectives of practice, that according to Wikberg (2010) is a ‘process to enhance and support learning, improvement, development’ (p.1). Thus the principle is often used in practice to describe, understand behaviours and set a focus (Chang et al., 2008). It is a suitable method to apply the theoretical research in practice and thus to design target specific NPIs.

3.4 Expert Workshop

A one-day expert workshop was held on October 25, 2021 in Lucerne at the University of Applied Sciences. Experts from the Swiss tourism industry have been invited to take part at the workshop in order to learn a new approach on designing NPIs , to further discuss this approach and apply it to different target groups. The expert workshop was organized and held by Timo Ohnmacht, Florian Egli, Tha Thi Vu, Gabriele Schwarz and the author of this thesis. The ten participating experts were all professionals in the tourism industry but from different sectors (Cablecar company, Train, FOPH, DMO, ship cruises, Airport, Swiss Tourism). This made it possible to gain different points of views and having insightful discussions. The names of the experts can be found in the report from Oberholzer et al. (2022).

On one hand, the expert workshop helped the experts to gain knowledge and, on the other hand, gave important insight to the adaptability of the theoretical model from Vu et al. (2022) in practice. First, the tourism experts learned about the theoretical model and its findings. After that, the participants have been divided into focus groups to apply the gained knowledge on specific personas (Flick, 2018). Two personas have been explored in depth with a variation of the fishbowl method. Each fish bowl method consisted of three to four tourism experts. A fish-bowl method is considered as a good way to held discussions with large groups, as it allows all participants to take part in the discussion (Flor et al., 2013).

The discussions have been protocolled and analysed using descriptive coding (Miles et al., 2014). As the experts are all native German speakers, the expert workshop was hold in German. Therefore, the coding has been done in German as well. The inputs have been put together in a published report by Oberholzer et al. (2022).

4 Results and Discussions

The following chapter point out the results occurring from the analysis of the collected NPIs. The different categories of the NPIs (direct and indirect droplet infection, airborne transmission, campaigns, diagnosis, knowledge transfer) will be described and the NPI will be aligned to the theory based model from Vu et al (2022) to evaluate the described NPIs. Subsequently the personas behaviour and perception will be defined and linked to the theory based model from Vu et al. (2022) to evaluate the NPIs in a target specific manner. The list of NPIs and their assessment can be found in the Appendix. This list provides the basis for the following chapters. Finally, the chapter will also describes most important key learnings from the expert workshop.

4.1 Overview of Collected NPIs

A total of 70 NPIs have been analysed (see NPI List in Appendix). The measures mentioned are not necessarily implemented in tourism, but are adaptable to tourism businesses as well. Note that the list is not exhaustive, but rather serves as a source of inspiration and illustrates the diversity of NPIs. The NPIs are grouped according to the categories described hereafter.

NPI to prevent indirect droplet transmission. This occurs by an infection through fomites. If an infected person touches surfaces or objects (e.g. a doorhandle) there is a potential risk of infection when a non infected person is touching the same surface shortly after (WHO, 2020b). The list of NPIs consists of nine NPIs belonging to this category and are further grouped by the themes 'disinfection', and 'others' (see NPI List in Appendix No. 1-9).

NPI to prevent direct droplet transmission. This occurs when a person is in close contact to an infected person (less than one meter). There is a risk of infection when the person is exposed to potentially infectious respiratory droplets with a diameter of <5-10 micrometres. An infection occurs by mouth, nose or eyes.(WHO, 2020b). In order to prevent such transmission, the distance between people must first and foremost be large enough so that the droplets cannot be absorbed directly. The list of NPIs consists of 16 NPIs belonging to this category and are further grouped by the themes 'visitor volume control', 'stay home offer', 'prevent group mixing', 'robots' and 'protective face masks' (see NPI List in Appendix No. 10-25).

NPI to prevent airborne transmission. Such a transmission is possible when the SARS-CoV-2 viruses retain their infectivity in aerosols (particles with a diameter smaller than 100 micrometres) and spread widely in enclosed spaces. The pathogens can be exhaled by infected persons, dispersed through the air and inhaled by another person, who is more than one meter away.

The risk of an infection by airborne transmission requires circumstances, where the aerosols remain suspended (e.g. poorly ventilated rooms) (WHO, 2021). There are several ways to stop the airborne transmission of viruses. One possibility is to use appropriate measures to inactivate possible pathogens in aerosols or to reduce their concentration to such an extent that the risk of disease transmission is reduced (Schulze-Röbbecke et al., 2020). The list of NPIs consists of eight NPIs belonging to this category and are further grouped by the themes ‘protective face masks’, ‘air quality’ and ‘others’ (see NPI List in Appendix No. 26-33)

Campaigns: According to The Lancet (2020) communications of verified information’s and prevention measures is an effective way to combat the pandemic. Because communication is considered important, various NPIs have been grouped under this category. Scientific information is presented in a comprehensible and target group-oriented way, linking the individual or collective added benefits with the smaller costs of prevention measures. The list of NPIs consists of 20 NPIs belonging to this category and are further grouped by the themes ‘music campaigns’, ‘Government campaigns’, ‘travel campaigns’, ‘hygiene campaigns’, ‘target group oriented campaigns’ and ‘professional multipliers’ (see NPI List in Appendix No. 27-53).

Diagnosis: It is important to detect infected persons at an early stage so that they can avoid contact with other persons and do not spread the virus. Accordingly, it also requires infrastructures that enable testing. Various NPIs have been taken to ensure simple access, which have been listed in this category. The list of NPIs consists of ten NPIs belonging to this category and are further grouped by the themes ‘infrastructure’, ‘detect possible infections’ and ‘verification of the certificate’ (see NPI List in Appendix No. 54-63).

Knowledge transfer: This category includes NPIs that aim to bring together experts to acquire new knowledge and find solutions regarding covid-19 issues. It also includes NPIs to support businesses with knowledge. These measures are at a corporate level and are not perceived by the tourists.

However they are important to include as well, as the output of the NPIs may affect travel intention. The list of NPIs consists of seven NPIs belonging to this category and are further grouped by the themes ‘trainings’, and ‘network and innovation’ (see NPI List in Appendix No. 64-70).

4.2 Evaluation of NPIs based on the Theory Based Model

To find out, how NPIs can impact travel intention, the NPI are evaluated based on the theory based model from Vu et al. (2022). This implies, that each of the 70 NPIs was evaluated from the tourists' point of view. This means that it was determined which of the influencing factors (perceived susceptibility, perceived barriers, risk behaviour, attitude, perceived severity, perceived barriers, perceived behavioural control) are addressed by the NPI and, thus, the travel intention is influenced. The order of the influencing dimensions in the NPI List (see Appendix) correspond to the strength of influence on the intention to travel, which correspond to the findings of Vu et al. (2022). A '-' symbolise a negative impact on the corresponding influencing factor, whereas a '+' indicates a positive impact. A '-' for the perceived susceptibility, perceived severity and perceived barriers increases travel intentions, whereas a '+' for the perceived benefits, risk behaviour, perceived behavioural control and the attitude towards NPIs against the coronavirus when travelling also increases travel intention (See chapter 2.3).

The analysis showed that most NPIs address two to three influencing factors. Thus the combination of the factors differs, which is why a combination of different NPIs is considered worthwhile. NPIs of the categories that focus on preventing infections (indirect and direct drop-let transmission and airborne transmission) all influence perceived susceptibility. Champaign mostly focuses on influencing the attitude and NPIs from the category diagnosis mainly lower perceived barriers. The knowledge exchange NPIs are hard to review from a customer perspective, as the outcome is unpredictable, thus they only address the perceived benefits.

The study by Vu et al. (2022) confirmed the hypothesis that the higher the benefit of carrying out a NPI, the higher the intention to travel. Given this argument, it can be concluded that all proposed NPIs address the perceived benefit. This is because a suitable measure generally goes hand in hand with the perceived benefit. If this is not the case, the measure is not recommended. For example, installing an 'self-disinfecting door handle' (2020, see NPI list in Appenix No.5) reduces perceived susceptibility because the risk of infection is reduced. In conclusion, the implementation of the measure also must addresses the perceived benefit.

However, there is a variation in the degree of impact on perceived benefits and the other influencing factors, which is not shown in the table, because it also depends on a person's individual perception. An example of this are the different types of face masks. Knowing that the surgical mask (2021, see NPI list in Appendix No.24) protects against droplet transmission, whilst the FFP2-mask (2020, see NPI list in Appendix No.27) protects against droplet and airborne transmission (Schulze-Röbbecke et al., 2020; Wick et al., 2020).

Therefore, it can be assumed that the benefits of wearing FFP2 mask is higher. Nevertheless this conclusion is based on medical research and only limited influence can be exerted on the perceived benefits (Yasa et al., 2021). The study of Zimmermann et al. (2021) qualitatively highlighted the differences of the perceived benefits and perceived risks of Swiss residents on wearing face masks. He found out that some people feel safer wearing a face mask while others only wear a mask to maintain some freedom. This finding supports the above made statement.

Additionally does a perceived barrier have to overweight the perceived benefits, to consider a NPI as effective. If an NPI requires a lot of preparation in advance and involves additional costs, this additional effort can be considered too high for being able to travel (e.g. 'Womo Dinner', 2021, see NPI List in Appendix No. 20). Consequently, there is a risk that people will decide against traveling, if the perceived barrier is too high for them. One option solve this issue is to come up with NPIs that are easy to implement, so that this case does not occur. NPI that ensure safety and thus do not call for a behaviour adoption(e.g. 'robots with UV-C lights', 2021, see NPI List in Appendix No.3) are considered useful.

The distinction between whether an NPI addresses perceived barriers or perceived behavioural control is difficult to determine. The definitions are close and somehow interchangeable. For example, both definitions include the financial factor (see table 1, chapter 2.3). Therefore, it was decided to focus on the needed skills to apply the measure regarding the behavioural control and the perceived barriers were chosen if the measure requires certain preconditions (e.g. possession of a mobile home). Nevertheless, the attribution of the NPI to the two influencing factors can be debated and needs to be taken into account, as Vu et al. (2022) also mentioned that 'e.g. perceived behavioural control may have a high negative interrelation with barriers' (p.8)

The influencing factor risk behaviour describes the general risk behaviour of a person. For example, the question of how likely a person is to camp in the wilderness was used to determine general risk behaviour in the study from Vu et al. (2022) . The study found that people with high-risk behaviour have a greater intention to travel during covid-19. Influencing people's risk behaviour is rather difficult to achieve with NPIs, as it depends on various factors that go beyond. Farnham et al. (2018) for instance, proved that gender, age, and type of travel have an influence on risk behaviour. They concluded that young backpackers and smokers are more risk-taking than others. This indicates that NPIs can only reduce the perceived risk, but the risk behaviour itself cannot be changed by the listed NPIs.

For this reason, none of the NPI directly address risk behaviour. In this regard, a risk-averse person will benefit more from the NPI ‘digital wait’ (2022, see NPI List in Appendix No.12) or from the NPI ‘online information on the current number of visitors’ (2022, see NPI List in Appendix No.10) compared to a risk-taking person. This is because a risk-taking person does not make their travel intention dependent on the number of visitors, whereas a risk-averse person is more likely to make a trip if they know that the occupancy rate is low.

As well can the perceived severity not be influenced by NPIs, as the state of health cannot be influenced by the NPIs mentioned. Neither can the NPIs reduce the consequences of a disease. To be able to influence the perceived severity, pharmaceutical interventions or other health measures are needed. For example, does the comparison of the number of vaccinated patients to the number of non-vaccinated persons in Swiss hospitals indicate a more moderate disease progression for vaccinated persons, as the number of vaccinated persons in the hospital is smaller (Federal health office, 2022). Therefore it can be assumed that the vaccine is a measure that impacts the perceived severity. However, such pharmaceutical Interventions go beyond NPIs and are not part of this study.

Impacting the attitude can be achieved most effective by campaigns. Scientific information is presented in a comprehensible and target group-oriented way, linking the individual or collective added benefits with the smaller costs of prevention measures. Especially the tourism industry needs to communicate about their engagement to keep people safe, while at the same time maintain positive perceptions of the destination (Barbe & Pennington-Gray, 2020). Von Rüden et al. (2021) stated that people with public attention (so-called ‘professional multipliers’) can use personal statements to persuade people to adhere to the measures. As some of the campaigns deliver knowledge about covid-19 on a neutral and informative way (e.g. ‘so schützen wir uns’ campaign, 2022, see NPI list in Appendix No. 38), others aiming to get peoples attentions by using emotions (e.g. ‘commercial’, 2020, see NPI list in Appendix No. 39) or target a specific audience (e.g. ‘#SeifenBoss’, 2020, see NPI list in Appendix No.46). Especially social media campaigns and interpersonal communications (e.g. ‘cartoon music video’, 2020, see NPI list in Appendix No.34) proofed to have a high influence on the attitude and intentions to adhere to restrictions (Duong et al., 2021).

4.3 Evaluation of NPIs based on Personas

The analysis and discussion of the 70 NPIs indicates that statements about the impact of specific NPI on travel intention based on the theoretical model from Vu et al. (2022) can only be made to a certain extent. This is because people's perceptions have a great influence on how strongly the measure affects their intention to travel. If one takes into account that these perceptions differ from person to person, the influence of a measure on the individual intention to travel must also be considered in a differentiated way. Based on this argument, the NPIs will be assigned to specific customer segments and their needs. For doing so, the personas presented in the expert workshop are used. Their behaviour is first described and then the NPIs are assigned to the personas.

4.3.1 Description of Personas

Table 1 describes the respective personas and their travel behaviour during covid-19 in alignment to the theoretical model from Vu et al. (2022) . A '↓' stands for a low perceived susceptibility, low perceived benefits, low perceived barriers and low behavioural control. It also stands for a risk-avoiding behaviour and negative attitudes towards the measures. A '↑' on the other hand, stands for a high perceived susceptibility, high perceived benefits, high perceived barriers and high perceived behavioural control, as well a risk-taking behaviour and a positive attitude towards the measures. The more arrows, the stronger the impact of the given factor on a personas travel intention. The factors are ordered from left to right according to the strength of their influence on the intention to travel (see chapter 2.3).

This means that the factors perceived susceptibility, perceived benefit followed by risk behaviour and attitude should be given the most attention when defining NPIs. On the other hand, the factor perceived behavioural control has the smallest influence. This indicates for example, that even tough Mia and Max have one '↑' for the perceived susceptibility and two '↑' for perceived behavioural control, the perceived susceptibility has statistically a higher impact on the travel intention and should be taken into consideration first, when designing NPIs.

Table 2.*Description of the personas with the influencing factors on travel intention.*

Characteristics	Perceived susceptibility	Perceived benefits	Risk behaviour	Attitude	Perceived severity	Perceived barriers	Perceived Behavioural control
<p>Pia She only makes the very necessary trips at off-peak times and is in favour of stricter measures, as she is among those at high risk. She plans her trip very carefully in advance and does not hesitate to call if she cannot find the needed information's. Although she has the most up-to-date mobile phone, she only uses it to make phone calls. She often feels insecure when travelling and does not know whether she is doing the right thing or not.</p>	↑ ↑ ↑	↑ ↑ ↑	↓ ↓ ↓	↑ ↑ ↑	↑ ↑ ↑	↓ ↓ ↓	↓ ↓ ↓
<p>Clemens He is a rather anxious person, which is why he decides to go on a winter hike instead of skiing. Although he belongs to the risk group, he believes that the course of the disease will be mild for him. Nevertheless, he does not want to take any unnecessary risks of being infected and is willing to make sacrifices for this. Clemens and is open to new innovative solutions and likes to try out gadgets.</p>	↑ ↑	↑ ↑	↓ ↓	↑ ↑	↓ ↓	↓ ↓	↑ ↑
<p>Bertha She is environmentally conscious and therefore always travels by bike or public transport. Bertha is of the opinion that compliant behaviour makes a journey possible and therefore has a high acceptance of measures. She is afraid of becoming infected, as she could then unknowingly infect her partner, who suffers from an immune disease. She therefore gets tested regularly and only meets people she knows.</p>	↑	↑ ↑	↓ ↓	↑ ↑	↓ ↓	↓ ↓	↑ ↑
<p>Mia&Max Mia and Max are parents of a four and eight year old child. They go on holiday by private car, avoid crowded places, and enjoy the time together as a family. They are aware of the risk of infection, but the enjoyment of the holiday outweighs the risk. It is important to them that they feel safe and that the measures are easy to implement and to adhere to, especially for the kids.</p>	↑	↑ ↑	↓ ↓	↑ ↑	↓ ↓	↑ ↑	↑ ↑
<p>Heinz He lives in a city and mostly uses public transport. He likes to go out for a drink with friends, meet new people and does not avoid crowds. He also does not inform himself about the current measures. He complies with the measures only because social interaction is important to him. Therefore, he gets tested in front of the club, not because he wants to, but because he has to in order to be allowed to enter the club.</p>	↓ ↓	↓ ↓	↑ ↑	↓ ↓	↓ ↓	↑ ↑	↓ ↓
<p>Anton He is a freeskier and likes to ski off-piste, is adventurous and finds a 3G – rule (being recovered, vaccinated, or tested) in ski resorts obstructive. In general, Anton has a low acceptance of NPI. He would have the resources to find out what measures are in place and would be able to comply with them. Anton, however, is annoyed by the effort involved and considers the measures useless. He does not see a benefit in the measures, which is why he usually does not adhere to them.</p>	↓ ↓	↓ ↓	↑ ↑	↓ ↓	↓ ↓	↑ ↑	↑ ↑

4.3.2 Assignment of NPIs to the Personas

Knowing the previously described personas perceptions helps to understand their intention to travel and hence allows to design NPIs that fit to their needs. The NPI List in the Appendix has a column named ‘addressing persona’. All personas that can be addressed by the corresponding NPI are listed there. Most of the NPIs address more than one persona. Generally speaking, the more personas the more suitable is an NPI, as it influences different target groups and mitigates conflicts between the target groups.

Pia has a very high perceived susceptibility, a very high perceived benefits and a very low risk taking behaviour. She therefore has as well the highest attitude towards NPIs, as her perceived severity is very high. As she does not know where to get information’s on how to travel safely, but is willing to invest time in preparing for her travel, she has rather low perceived barriers and low perceived behaviour control. To address Pia, NPIs are needed to lower her perceived susceptibility (e.g. ‘disinfection dispenser’, 2020, see NPI list in Appendix No. 1; ‘CO2 measuring device’, 2021, see NPI list in Appendix No. 30) The more NPIs the better for Pia. Thus it is important to communicate easy understandable and accessible. The ‘clean&safe’ certificate (2020, see NPI list in Appendix No. 43) in Switzerland is therefore a good NPI for Pia. The certificates is awarded by Switzerland Tourism and is trustworthy. The label is a sign to visitors that they are visiting an institution that has committed itself to adhering to the protection measures.

Compared to Clemens, who’s perceived susceptibility and perceived severity is lower than Pia’s, it is important to communicate the risks of getting infected (e.g. ‘schau auf dich – schau auf mich’ campaign, 2020, see NPI List in Appendix No.37). As he is open to innovation (very high attitude), using robots and other new technologies, which lower the perceived susceptibility are considered as NPI that increase his travel intention. NPIs addressing Clemens’ travel intention are for example ‘self-disinfecting door handles’ (2020, see NPI List in Appendix No. 5), the use of robots in Restaurants (2020, see NPI List in Appendix No. 22), or Apps that show the current number of visitors at different locations (2022, see NPI List in Appendix, No.11).

Traveling with kids calls for NPIs that do not need a lot of behaviour change, as it is hard to understand for the kids why they are not allowed to do certain things. Hence information campaigns addressing kids is seen as successful NPIs to impact the kids attitude and to explain the current situation in a simplified way (e.g. ‘Minion clip’, 2020, see NPI list in Appendix No. 50) and control their actions in a playful way (e.g. ‘pathspot’, 2022, see NPI list in Appendix No. 9).

Mia and Max have very high perceived barriers, because of their kids. NPIs that reduce waiting times or make them more convenient are also recommended beyond the covid-19 pandemic (e.g. ‘digital wait’, 2022, see NPI list in Appendix No. 12). Such NPIs do lower perceived severity and increase perceived benefits and therefore do not only attract Mia and Max but also Anton, Clemens and Bertha. Anton likes it, because he can have a drink during the waiting time, Clemens likes it because it’s a technical device and Bertha likes it because people do not have to stand in line and can keep distance easily.

Anton and Heinz both have a very low perceived susceptibility, very low perceived benefits and a very high risk taking behaviour. This indicates, that NPI must be very thought trough so that they adhere to. The best for Anton would be to have no NPIs at all, however this is not possible during the covid-19 pandemic. That’s is why he also needs NPIs that include control mechanisms (e.g ‘e-display’,2020, see NPI List in Appendix No. 63) and trained employees that ensure that he obeys the NPIs, especially when he intends to visit same places as Pia, Bertha and Clemens. However, if there are too many NPIs, there is a risk that Anton does not want to travel anymore. In conclusion, NPIs addressing Anton are those that do not require any or little behavioural changes, for example the use of partition walls in restaurants (2021, see NPI List in Appendix No.18). Other fitting NPIs are those that lower the barriers, such as offering tests at the airport (2022, see NPI List in Appendix No. 55) or next to restaurants and clubs (2021, see NPI List in Appendix No.58). Those are also fitting for Heinz, as he does not inform himself in advance about regulations and is therefore dependent on testing possibilities on site.

Heinz and Bertha differ to Anton, as they are more likely to adhere to the NPIs. Although Bertha has a slightly high perceived susceptibility, her attitude towards NPIs is high. Her behaviour indicates that she is willing to comply with the NPIs, as long as they make sense to her, and allow her to meet friends without the risk of being infected (e.g. ‘serres séparées’, 2020, see NPI list in Appendix No. 21). She is a person that tests herself regularly to make sure she cannot transmit the virus to her partner. This is why a ‘test from the vending machine’ (2020, see NPI List in Appendix, No. 57) is a good NPI for Bertha.

For Heinz it is very important to have social interactions and the possibility to meet new people. Therefore he is willing to sacrifice as long as he has the opportunity to be social active. Therefore NPIs that make happenings possible are highly recommended for Heinz. During the pandemic new offers have to be created, that make such things possible, while secure the safety. Such new offers could be ‘car concerts’ (2020, see NPI List in Appendix No.19), or the installations of heating units for outdoor spaces (2020, see NPI List in Appendix No.33), which allows to have a dink outside even when it is cold.

4.4 Inputs from the Expert Workshop

The expert workshop was hold on October 25,2020 with 10 experts from the Swiss tourism industry. First, the overall impression of the presented theory based model from Vu et al. (2022) is mentioned, to see if this model could be applied in practice. Then, Inputs from the fish bowl discussion and their ideas on what kind of NPIs can influence the influencing factors of the theoretical model from Vu et al (2022) are given. The mentioned inputs concerning the expert workshop are taken from the report of this workshop, written by Oberholzer et al. (2022).

4.4.1 Usability of the Theory Based Model in Practice

The experts said that the presented framework is a useful tool but will need a lot of practice to implement it in everyday life. Further, they said that the origin country from tourists impacts their travel behaviour and acceptance of measures. Thus, the constant change in countrywide restriction imposed by the government is a big challenge for the industry. Generally, if stricter measures than those imposed by the federal government are implemented in the destination, they must be very well designed. The measures must be plausible and easy to implement for visitors in order to be accepted.

The experts further concluded, that the key challenge is to implement NPI that secure safe travel and at the same time lead to a higher demand. They also said that it is a challenge to attract new customers, who did not want to travel because of covid-19. Before the pandemic, target groups have been defined by classical methods and attributes such as country of origin, travel mode, age, and income. Nowadays this segmentation needs to be complemented with up-to-date elements that influence the travel intention. The framework from Vu et al. (2022) might be an useful tool to meet those new needs of the tourism industry.

They also mentioned that besides the customer perspective, an internal perspective is helpful to develop the right NPI. The experts agreed with each other by pointing out the importance of a high involvement of the employees as they are in direct contact with the guests and, hence, know their needs. Lastly, it was mentioned that it is also important to introduce measures that are ideally beneficial in the long term, even after a pandemic.

4.4.2 Fish Bowl Discussion

The experts had the task to develop NPI with the fish bowl method, which fit to the previously presented personas (see chapter 4.3). The experts agreed that Pia is in favor of stricter NPIs. If Pia decides to go on an excursion despite of the risk, then she chooses to go at off-peak times. However, the experts mentioned that there is a risk that Pia will not be satisfied if she meets more people than expected. A possible solution for this issue is the introduction of a queue management system. This would not only improve Pia's well-being but could also bring long-term benefits from an operational point of view.

The experts mentioned possible tools for queue management, such as time-ticketing, reduced prices at off-peak times, or information on the number of visitors. The experts concluded that it would take a lot of persuasion to make Pia feel safe and that she can be influenced by friends and relatives. It is not enough to have NPIs, but they have to be strictly adhered too, both by the guests and by the staff.

On the contrary, only the most necessary NPIs should be implemented to address Anton. The less NPIs, the better this would be for Anton. Although vaccination is not an NPI, some experts mentioned that a distinction should be made between vaccinated and unvaccinated people, as they behave differently. The importance of coherence of measures was also mentioned. The measures must be consistent and comprehensible throughout the travel chain. For example, the experts argued that Anton would not understand why masks were compulsory in closed rooms, but as well on an open ship's deck, and would therefore not adhere to.

4.4.3 Recommended NPIs by the Experts

As a final step, the experts have been asked to write down NPIs and assign them to the influencing factors from the theoretical model from Vu et al. (2022). Table 2 shows recommended fields of actions to the influencing factors to summarize the suggested NPIs from the experts.

Table 3.

recommended NPIs by the experts to address the influencing factors on travel intention.

Influencing factors	Recommended NPI by the Experts
Perceived Susceptibility	Raise awareness that the measures are being adhered to and thus reduce the risk of infection Show certificates of cleanliness
Perceived Benefits	Declarative knowledge transfer communication on the benefits of the measures operational adjustments (e.g., real-time information on visitor volume)
Risk behaviour	Knowledge transfer about the disease pathogenesis and the risk of infection operational adaptations (e.g. robots replace service staff in restaurants)
Attitude	Declarative knowledge transfer information on the effectiveness of measures extrinsically influencing intrinsic motivation
Perceived severity	General information on the disease process Tourism measures can only address this to a limited extent.
Perceived Barriers	Knowledge transfer economic instruments operational adjustments (e.g. outdoor heating system on terraces)
Perceived behavioural control	Knowledge transfer on personal contribution to mitigate the virus.

5 Conclusion

Today, official recommendations on NPI in the tourism industry are rather general and mostly include generic measures on hygiene and distance measures. Their argumentations are heavily based on containing the virus and avoiding infection, but omits the impact on the intention to travel. This work focuses on this shortfall. By applying the model of Vu et al (2022) and therefore understanding people's perceptions on the travel intentions, the right NPIs can be chosen. Unlike other studies on NPIs to contain the covid-19 pandemic, this study took advantage of a social psychological model from Vu et al. (2022). As this model was developed through a large-scale representative survey, it is considerable as very robust. Other existing studies have evaluated either a small set of NPIs on the basis of medical factors, or looked at particular measures on the basis of either the HBM, the TPB or the risk-taking behaviour. This paper, however, has looked at NPIs using HBM, TPB and risk behaviours jointly to evaluate the fitness of NPIs. Therefore, this study responds to Sánchez-Cañizares (2021) and Bavel's (2020) call, to study NPI on a socio-psychological level.

The implementation of Nonpharmaceutical Interventions in the tourism industry, allows to influence individual travel intention during the covid-19 pandemic, while at the same time prevent coronavirus infections. However choosing the right NPIs needs to balance the effectiveness of the NPI to secure safety and its impact on travel intention. This conclusion also aligns with the guiding principles from WHO (2020c).

The choice of the right NPIs differs from company to company, because tourism businesses are very diversified and can target different customer groups. The applied methods used in this thesis can be used in practice as well and provides an argumentation tool for the implementation of fitting NPIs, in analogy to what has been done in this work. It is recommended to combine the scientific and medical evidence on the effectiveness of NPIs with the socio-psychological approach used here. In this way, NPIs successfully contain the virus and strengthen the intention to travel at the same time. This ensures that the safety of travelling during a health crisis, in particular the covid-19 pandemic, is maintained.

However, the study also showed the limitations of applying the theoretical model of Vu et al. (2022) into practice. Bringing together the gained knowledge from the expert workshop with the results from the analysis of the 70 NPIs, it became evident that NPIs have to be selected in a target specific way in order to influence the travel intention of the respective target group. This is because the evaluations are always based on subjective perceptions, which can differ from person to person and it is therefore difficult to generalize.

This aligns with research findings from Farnham et al. (2018) who concluded that gender, age, and type of travel have an influence on risk behaviour. As well did the experts from the workshop pointed out this limitation. This challenge is overcome in this thesis by grouping certain types of behaviour and travel patterns with the help of personas. This approach makes it possible to evaluate the NPIs in a more differentiated way, and to make recommendations as to which NPIs are suitable for addressing the respective target group. Therefore, it is advisable for tourism professionals to expand their existing target groups with the attributes from Vu et al. (2022) theoretical model to elaborate the best fitting NPI for their business.

The withdrawal of all measures in Switzerland on April 1, 2022 in Switzerland (FSO, 2022) indicates a brighter future for tourism. Although tourism seems to be picking up again, the number of overnights in Switzerland is not back yet at a pre covid-19 level (Abrahamsen et al., 2021). For the tourism industry is difficult to plan, and they must always be prepared to act quickly and adapt to the current situation. This is master thesis and the List of 70 different NPIs can be used in the event of an increase in the number of infections to quickly define and implement appropriate NPIs.

Specifically with the covid-19 pandemic, according to the experts, the information whether a person has a valid certificate (vaccinated or recovered) also has an impact on designing NPIs. This argument has been left out in this paper due to the focus on NPIs only. Nevertheless, this argument could be a starting point for a further research, as it could be a suitable measure to influence the perceived severity, since the NPIs alone cannot address this influencing factor. As well could this information be a further characteristic, that influences peoples travel intention. It would thus be valuable to investigate the correlation of the influencing factors, like it was done in other studies. Acheampong & Siiba (2020) for instance, researched if a pro-environmental attitude correlates with the perceived benefits of car sharing. Such a study design could be adopted to covid-19 research, by examine if the attitude towards covid-19 related measures influences perceived benefits of measures significant. Additionally it would be valuable to have evidence-based statements about the strength of the influence of the influencing factors on specific measures, such as the wearing of an FFP2 mask. This would allow the assignment of NPI to the theory based model in an evidence-based way and not on assumptions, that are made based on the information about the behaviour of the personas, as it is the case in this work.

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7 Appendix: List of NPIs

Category	Group of measures	NPI Name	NPI Description	Initiator (country)	perceived susceptibility	perceived benefits	Risk behaviour	Attitude	perceived Severity	Perceived barriers	Perceived. behavioural control	Evaluation of the NPI	addressing Persona	
					-	+								
indirect droplet transmission	Disinfection	disinfection dispenser	Installation of disinfection dispensers at the entrance and other, allowing people to disinfect hands if there is no possibility to wash hands.	various companies	-	+				-	+	This NPI kills the viruses on the hand, which reduces the likelihood of getting the disease. The measure is easy to implement and easy to use. This NPI addresses Pia, Clemens, Bertha and Mia&Max. For them, it is seen very useful, because it allows maintain hygiene standards and lowers their perceived susceptibility.	Pia Clemens Bertha Mia&Max	
		disinfection drones for remote locations	Drones that can reach rural areas and to disinfect narrow alleys from above	Military (IN)	-	+							Large-scale disinfection reduces the perceived vulnerability. resources are saved and even inaccessible places can be reached easily within a short time. This NPI addresses mainly Clemens, as he is very tech-driven. As people do not have to change their behavior and perceived susceptibility is lowered, Pia could like this NPI too, despite the modern technology.	Clemens Pia
		Robots with UV-C light	Robot disinfect the air and surfaces in a hotel room by using UV-C light. The robots clean independently, which means that the employees are not in the same room as the robot, to not harm them.	V8 Hotel (DE)	-	+							The use of UV-C light renders viruses harmless. This reduces the susceptibility and the benefit is given. This NPI addresses mainly Clemens, as he is very tech-driven. As people do not have to change their behavior and perceived susceptibility is lowered, Pia could like this NPI too, despite the modern technology. The same accounts for Bertha and Mia & Max, as they see a benefit in this measure, by knowing that nobody is harmed and that if applied correctly, the virus are killed effectively.	Clemens Pia Bertha Mia&Max
		NovaRover	A cleaning robot that sprays an antimicrobial mixture onto all surfaces in the aircraft. This mixture kills bacteria and viruses and prevents them from multiplying.	United Airlines (US)	-	+							Disinfection reduces the perceived susceptibility. The fact that disinfection is gentle on the resource means that the benefit is addressed. This NPI addresses mainly Clemens, as he is very tech-driven. As people do not have to change their behavior and perceived susceptibility is lowered. The same accounts for Bertha and Mia & Max, as they see a benefit in this measure, by knowing that nobody is harmed and that if applied correctly, the virus are killed effectively.	Clemens Bertha Mia&Max

Category	Group of measures	NPI Name	NPI Description	Initiator (country)	perceived susceptibility	perceived benefits	Risk behaviour	Attitude	perceived Severity	Perceived barriers	Perceived. behavioural control	Evaluation of the NPI	addressing Persona
indirect droplet transmission	Disinfection	5 Self-disinfecting door handle	A door handle that recognizes when someone touches the handle. When the handle is released, it is automatically disinfected with a sanitizing sponge that is inside the handle.	Tweaq (CH)	-	+					+	This measure prevents viruses and bacteria on door handles. This reduces the risk of infection. From the user's point of view, the behavior does not change, which is why the benefit is given. Therefore it does address Clemens, Pia, Bertha and Mia & Max.	Pia Clemens Bertha Mia&Max
		6 Silver and copper door handle	A coating for door handles made of silver and copper which has an antiviral and antibacterial effect and thus neutralises viruses.	Freyline (DE)	-	+					+	This measure prevents viruses and bacteria on door handles. This reduces the risk of infection. From the user's point of view, the behavior does not change, which is why the benefit is also given. Therefore it does address Clemens, Pia, Bertha and Mia & Max.	Pia Clemens Bertha Mia&Max
		7 Sanitizing Pads	The door handles are equipped with disinfecting stickers that kill 99% of viruses.	World Youth Forum (EG)	-	+					+	This measure prevents viruses and bacteria on door handles. This reduces the risk of infection. From the user's point of view, the behavior does not change, which is why the benefit is also given. Therefore it does address Clemens, Pia, Bertha and Mia & Max.	Pia Clemens Bertha Mia&Max
	others	8 Hand-free door opening	Device allows grocery shop doors to be opened with the forearm so hands do not have to be used.	Fortum (FI)	-	+					+	The measure means that the hand does not have to be used and the risk of becoming infected is reduced, because the virus density on the hands is high. The measure is rather easy to implement, which means that in addition to the lower perceived susceptibility, the benefit is also given and people can effectively reduce the spread of the disease themselves. This NPI therefore addresses Pia, Clemens, Bertha and Mia&Max.	Pia Clemens Bertha Mia&Max
		9 Pathspot	PathSpot is a scanner that checks the efficiency of hand washing. After handwashing, people place their hands in the scanner and immediately see how effective their handwashing was.	Pathspot (US)	-	+				+	+	The measure enables users to check themselves whether they are adhering to the hygiene measures and, if necessary, wash their hands again. This lowers behavioral control, but can also raise barrier, if the hand needs to be washed again. This measure is especially suitable for the kids from Mia&Max, as they can check, if they washed their hands in a playful way. It also fits to Clemens, as it is a innovation.	Clemens Mia&Max

Category	Group of measures	NPI Name	NPI Description	Initiator (country)	perceived susceptibility	perceived benefits	Risk behaviour	Attitude	perceived Severity	Perceived barriers	Perceived. behavioural control	Evaluation of the NPI	addressing Persona		
10 11 12 13	direct droplet transmission	Visitor volume control	Online information on the current number of visitors	The current visitor volume is displayed on the website (as a percentage of the maximum permitted capacity)	Zurich Zoo (CH)	-	+					Information is easily accessible and individual behaviour can be adjusted accordingly. If the number of visitors is high, the decision to visit the zoo at a different time can be made. This measure is particularly suitable for Pia, Clemens, Bertha and Mia&Max, as the information is easy to find and they can plan their trip on the basis of the given information, to mitigate perceived susceptibility.	Pia Clemens Bertha Mia and Max		
			App displays information on the current number of visitors	App displays information on the visitor volume for certain areas of the city. It informs about busy areas of the city, so that tourists can avoid them and visit those a different time.	Feel Florence (IT)	-	+						Through the app, information about number of visitors are accessible and behavior can be adjusted accordingly and thus reducing perceived susceptibility when visiting a low-crowded location. The measure appeals to target groups like Clemens and Bertha, because they are flexible and know how to use an app. They feel safe when they can control their visit with the help of the app and can visit places that are not overcrowded .	Clemens Bertha	
			Digital Wait	A notification device, that allows people to go anywhere instead of waiting in line or sitting in a waiting room. When it is the person's turn, the device rings like a mobile phone. Standing in queue becomes redundant.	Digital Phone (DE)	-	+							This NPI reduces perceived susceptibility as people do not have to physically queue close to each other. Additionally, waiting time becomes more pleasant, which provides perceived benefit. Such a measure makes sense for Anton, who has a low attitude towards. However he recognizes a benefit in this measure, because he does not have to wait in line, but can do something else during the waiting time. The measure thus not only reduces the risk of infection, but generally enhances the experience. For children, too, standing in a queue is often tedious. With this measure, Mia and Max's children can, for example, play in a playground instead of waiting in line, and the parents also feel safe because they do not have to wait in a crowded room.	Anton Clemens Bertha Mia and Max
			Online ticket with arrival time	When purchasing tickets, the time of arrival must be specified so that not everyone arrives at the same time and the visitors are spread out throughout the day.		-	+					+		This NPI reduces perceived vulnerability as people do not arrive at the same time and the volume of visitors is spread out. It is also convenient for traveling with children as waiting time is reduced. However, it also increases barriers as planning has to be done in advance and the time of arrival needs to be defined.	Clemens Bertha Max and Mia

Category	Group of measures	NPI Name	NPI Description	Initiator (country)	perceived susceptibility	perceived benefits	Risk behaviour	Attitude	perceived Severity	Perceived barriers	Perceived. behavioural control	Evaluation of the NPI	addressing Persona
14	Visitor volume	Registration in combination with limited number of participants	Volunteering at the children's zoo is now only possible with an application from the parents and the number of places is now limited.	Basel Zoo (CH)	-	+				+		Children cannot simply pass by, as parents have to make an extra effort so that the children can participate. The number of participants is now limited, the barriers increase, but the perceived benefits and susceptibility are addressed positively, as the children who can participate are better protected. This is an appropriate measure for Mia and Max, as the measure is intended for children and their parents.	Mia and Max
		fill the fridge	Online grocery shopping during a hotel stay, via their online platform, so that guests do not have to go to a shopping center.	Pite Havsbad (SE)	-	+						Guests avoid contact with other people by shopping online. This reduces perceived susceptibility and provides a benefit. Bertha and Clemens in particular respond to this measure as it lowers the perceived vulnerability and is an innovative solution.	Clemens Bertha
	Stay Home offer	Hotel office	Hotel rooms are rented out as home office spaces.	Various hotels	-	+					+	This offer is useful for persons who live with persons who are among those at high risk and thus can prevent possible infection. The perceived susceptibility is lowered. However, the financial means are a high barrier, as only few can manage to stay in a hotel long term. This measure is suitable for a target group like Bertha. Since this NPI is specifically targeted at people who have high-risk individuals in their environment. If for example Bertha is informed that she was in contact with an infected person, she can stay at the Hotel for a few nights to make sure she is not infected. By doing this, Bertha can prevent the risk of infecting her partner.	Bertha
		Art Digital	Various innovative ideas from Swiss cultural institutions to offer digital services during the lockdown. (e.g. online concert of the Basel Symphony Orchestra, digital museum tour).	Various institutions (CH)	-	+					-	The offer facilitates online access to art, which is why barriers are lowered. It also offers the possibility to experience art digitally despite closures, which addresses perceived benefits. Visiting a museum digitally, mitigates contact with other people, which reduces susceptibility. Because of the innovative approach, Clemens and Bertha in particular respond to this measure, as they can stay at home and still be in the museum virtually.	Clemens Bertha

Category	Group of measures	NPI Name	NPI Description	Initiator (country)	perceived susceptibility	perceived benefits	Risk behaviour	Attitude	perceived Severity	Perceived barriers	Perceived. behavioural control	Evaluation of the NPI	addressing Persona	
18 19 20 21	Prevent group mixing	Partition walls	Plexiglas panes are placed between tables and counters to separate groups from each other	Various restaurants (CH)	-	+						Groups remain among themselves, which reduces perceived susceptibility. It does not require any behavioral change, which is why it can be easily implemented and strengthens the feeling of safety. Therefore, this NPI addresses all personas except Anton, because of his attitude. Especially risk-averse people like Clemens and Pia can use such a NPI to visit a restaurant, as they deliberately keep to themselves.	Pia Clemens Bertha Mia and Max Heinz	
		Car concert	In order to keep the distances between people, car concerts are created. The music is broadcast via FM or transmitted into the cars via headphones.	Silent Events (CH)	-	+				+		This NPI makes it possible to attend an event despite the ongoing restrictions. It reduces the perceived susceptibility, and thus a perceived benefit is given. On the other hand, only people who own a car can participate. This measure is very suitable for Heinz, as he has a need to maintain social contacts and have fun despite the limitations. So, he is willing to make a compromise in order to attend a concert.	Heinz	
		Womo dinner	Motorhome owners can order food in the car park of a restaurant and eat it in the motorhome. The principle is to be continued after the crisis by having restaurants labelled "camper welcome". Guests are allowed to stay overnight in the car park after eating.	Various restaurants (CH)	-	+					+		Despite restaurant closure, people who own a mobile home can eat out and do not have to eat at home. Since guests eat in their mobile home, there is no contact with other people and the perceived susceptibility is reduced and the benefit is given. This measure is aimed exclusively at people who own a mobile home and therefore it cannot be assigned to the personas due to the lack of information.	-
		Serres Séparées	The solution involves tiny greenhouses that provide a safe space for restaurant guests to dine out, even in times of pandemic. Each of these greenhouses has a table as well as several seats.	Mediamatic (NL)	-	+							Groups remain among themselves, which reduces perceived susceptibility. It does not require any behavioral change, which is why it can be easily implemented and strengthens the feeling of safety. Therefore, this NPI addresses all personas except Anton, because of his attitude. Especially risk-averse people like Clemens and Pia can use such a NPI to visit a restaurant, as they deliberately keep to themselves.	Pia Anton Clemens Bertha Heinz

Category	Group of measures	NPI Name	NPI Description	Initiator (country)	perceived susceptibility	perceived benefits	Risk behaviour	Attitude	perceived Severity	Perceived barriers	Perceived. behavioural control	Evaluation of the NPI	addressing Persona
					-	+							
direct droplet transmission	Robots	Using robots in restaurants	The service employees are replaced by robots that serve drinks and food. This is to maintain the distance between customers and staff.	Restaurant (NL)	-	+						The physical contact with the service staff is prevented, which addresses the perceived susceptibility. If the robots provide the same service quality as the staff, the benefit from the guest's point of view is given. The measure does not involve a major change in the behavior of the guests-This NPI appeals to customer that generally have an acceptance for the use of modern technology. Therefore, it is recommended for Clemens. It also suits Anton and Heinz, as it allows to participate in social life.	Clemens Anton Heinz
		Robot reminds of minimum distance	A robot moves through the park and plays a voice message to remind visitors of the minimum distance and to counts the number of visitors to make sure, that the number of visitors does not exceed the limit..	Parks Authority Singapore	-	+						It reminds people to adhere to hygiene measures and thus contribute self-effectively to the containment of the virus. By counting visitors, it prevents too many people from being in the park, thus reducing perceived susceptibility. This NPI addresses Clemens, as he likes tech-driven innovations and thus his perceived benefits is impacted.	Clemens
	Protective face masks	Surgery masks	Masks that are designed to prevent droplets and other biological fluids from passing through the mask, thus protecting against droplet infection.	Various providers	-	+					+	This mask protects against droplet infection, which reduces susceptibility. The masks are available almost everywhere and wearing them is not a big inconvenience (much more comfortable compared to FFP2 mask). This measure is suitable for all groups of guests, except Anton. Because of the low barriers in combination with the reduced perceived susceptibility, the measure is recommended. Furthermore, the measure is implemented in all areas of public life, which is why the measure can also be evaluated as not hindering when travelling.	Pia Clemens Bertha Mia and Max Heinz
		Community mask	Suppliers produce reUSble fabric masks which are manufactured in accordance with the certified surgical masks and meet the minimum requirements.	Various providers (CH)	-	+						+	The masks meet the minimum requirements, which is why the perceived benefit is addressed and perceived susceptibility can be reduced. However, the masks are not available everywhere and it is difficult for people to see whether the fabric mask actually meet the minimum requirements. This measure appeals to Heinz , as for him the minimum requirements provide sufficient protection.

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					-	+				+	+					
26	Airborne Transmission	Protective face masks	Osmotex	A technology of active membranes, conductive textiles and electroosmotic processes to sterilize microorganisms. This technology is used in the face masks, and thus protects from airborne and droplet transmission.	Osmotex (CH)	-	+				+	+	This mask protects not only from droplet infection but also from aerosols, which reduces susceptibility. However, the masks are not available everywhere, so perceived barriers increase. This mask appeals to Clemens because he supports innovative solutions and likes to try them out. He has no problem with the fact that the mask cannot be bought everywhere and gladly accepts the extra effort knowing that the mask offers more protection than a surgical mask. Because of the additional protection, Bertha also responds to this measure.	Clemens Bertha		
			FFP2 masks	Face masks which are designed in order to prevent inhaling of aerosols and droplets. Thus the fit of the mask leaves no gaps.	Various manufacturers	-	+					+	+	This mask protects not only from droplet infection but also from aerosols, which reduces susceptibility and provides benefit. The masks are available almost everywhere and wearing them is not a big inconvenience (but more uncomfortable to wear compared to surgical masks). This measure is well suited for Pia because she is risk-averse and it is important for her to protect herself. She can also buy this mask at various places, so her barriers are small. Because of the higher protection factor, the mask is recommended for Bertha and Pia. They do not mind that it is uncomfortable to wear as long as they know that this mask protects more effectively.	Bertha Pia	
			ReUseable mask	Development of an ecological and washable face mask that provides long-lasting protection against bacteria and viruses.	Livipro (CH)	-	+					+	+	+	This mask protects not only from droplet infection but also from aerosols, which reduces susceptibility and provides benefits. However, the masks are not available everywhere, so barriers increase. This mask is particularly suitable for Bertha as it ensures protection and is more environmentally friendly than other masks.	Bertha
			Virustatic Shield	A face mask with an antiviral coating. Thanks to the coating, an antiviral, multifunctional mask has been created that, according to laboratory test results, prevents the transmission of flu viruses through the air.	virtualistic Shield (UK)	-	+					+	+	+	This mask protects not only from droplet infection but also from aerosols, which reduces susceptibility and provides benefits. However, the masks are not available everywhere, so barriers increase. This mask appeals to Clemens because he supports innovative solutions and likes to try them out. He has no problem with the fact that the mask cannot be bought everywhere and gladly accepts the extra effort, knowing that the mask offers more protection than a surgical mask.	Clemens

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					-	+								
30 Airborne Transmission	Air quality	CO2 measuring device	Measuring devices measures the CO2 concentration in a room and signals when it is too high. The measuring device starts to beep and the room must be ventilated to bring fresh air into the room. If the CO2 level drops, the device stops beeping.	Various initiators (CH)	-	+					+	By checking the air quality, rooms are ventilated as soon as the CO2 level is too high. This lowers the concentration of viruses in the air and reduces perceived susceptibility. The measure is easy to implement, which is why behavioral control is addressed and the benefit is given. This measure is easy to implement once the device is installed and does not require a major change in behavior, which is why the measure is suitable for all personas, except Anton.	Pia Clemens Bertha Mia and Max Heinz	
		Air purifier	An air purifiers with defined filter classes and specific requirements that eliminate airborne viruses and bacteria in an enclosed room.	Various initiators (CH and DE)	-	+							Same reasoning as CO2-counter, but the room does not have to be actively ventilated, as this is done by the device. The NPI brings with financial issues, as it is cost-intensive and therefor barriers are perceived higher. However, it is easy to implement once the device has been installed and does not require any change in behavior, which is why the measure is suitable for all personas.	Pia Clemens Bertha Mia and Max Heinz
		correct ventilation	Instructions on how to have the room properly ventilated to ensure that the air is circulated as much as possible.	Various initiators (CH and DE)	-	+						+	It requires no initial costs and is easy to implement. Susceptibility is perceived lower, and the benefits are given. It can also contribute to the containment of the pandemic. The measure can be applied almost all personas because they are all used to airing their rooms regularly.	Pia Clemens Bertha Mia and Max
	other	Heating units for outdoor spaces	Heating units for outdoor spaces that enable guests to sit outside and consume food and drinks even in cold weather.	various restaurants and bars (CH)	-	+					-		People do not stay in closed rooms where the air mixing is not always optimal. This reduces the perceived susceptibility, and the benefit is given. The measure was originally implemented to allow people to consume without a covid-19-certificate. Therefore, this NPI primarily addresses such guests and reduces their barriers. It also appeals to Heinz and Anton, as they like to be in company and thus have the opportunity to chat with friends, even in colder temperatures.	Heinz Anton

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34 35 36 37	Music campaigns	Cartoon music video	A Cartoon video in karaoke style to educate about Corona and the hygiene measures. For the song, there is a dance challenge on TikTok on how to wash your hands properly.	Government of Vietnam (VT)		+		+				The video is easily accessible and is spread quickly online. It informs about hygiene measures in a playful way and can thus address perceived attitudes. The participation factor also influences attitudes. This measure is particularly appealing to Mia and Max's children, as they can dance along.	Mia and Max
		Rap song	Various rap songs about Corona to appeal to the young people	Hip-Hop Public health (US)		+		+		-		The video is easily accessible and is spread quickly online. It informs about hygiene measures in a playful way and can thus address perceived attitudes. This measure was developed especially for young people. They aim is to get attention with emotions and showing the audience the benefits of adhering to NPIs while at the same time reduce their perceived barriers.	
	Government campaigns	Deutschland gegen Corona [DE against Covid]	A German initiative against Corona, which emphasises social distance and prevention measures. It is a Solidarity campaign under the hashtag #allefüralle [all for all].	Federal Government (DE)		+		+		-		The initiative prepares information in a way that is easy to understand, trustworthy and accessible (benefits, barriers). Through the transfer of knowledge, attitudes can be addressed. This measure addresses all personas, except Anton. The focus is on knowledge transfer and it is a platform on which information is made accessible across all sectors. This way, people can get the information they want without having to do a lot of research, which is why it also appeals to a Pia. In addition, the initiative is launched at government level, which is why trust is high.	Pia Clemens Bertha Mia and Max Heinz
		Schau auf dich - schau auf mich [Look at you, look at me]	An Information and solidarity campaign by the federal government in cooperation with the Red Cross, with up-to-date information broadcast on various channels.	Federal Government and Red Cross (AT)		+		+		-		The website prepares information in a way that is easy to understand, trustworthy and accessible (benefits, barriers). Through the transfer of knowledge, the attitude can be addressed. This measure addresses all personas, except Anton. This way, people can get the information they want without having to do a lot of research, which is why it also appeals to a Pia. In addition, the initiative is launched at government level, which is why trust is very high.	Pia Clemens Bertha Mia and Max Heinz

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38 39 40 41	Government campaigns	So schützen wir uns [protect yourself and others]	An information campaign that bundles all information on one website (videos, travel information, certificate, testing, vaccination, hygiene measures)	Federal Office of Public Health (CH)		+		+		-		The website prepares information in a way that is easy to understand, trustworthy and accessible (benefits, barriers). Through the transfer of knowledge, the attitude can be addressed. This measure addresses all personas, except Anton. This way, people can get the information they want without having to do a lot of research, which is why it also appeals to a Pia. In addition, the initiative is launched at government level, which is why trust is very high.	Pia Clemens Bertha Mia and Max Heinz
		Commercial	A commercial showing an elderly gentleman looking back on his experience with Corona.	Federal Government (DE)		+		+		-		The campaign aims to raise people's awareness and provide an incentive to comply with the measures. This primarily addresses attitudes. They aim to get attention with emotions and showing the audience the benefits of adhering to NPIs while at the same time reduce their perceived barriers. This NPI especially influence Heinz's attitude, because he is a person who likes to be around people, but this is not always possible during the pandemic. It sensitizes, because Heinz identifies with the person in the video.	Heinz
	Travel campaigns	Air miles for staying at home	Thai Airways gives customers air miles for every hour they stay at home. This is controlled with an app, via a location query.	Thai Airways (TH)		+		+				Through the action, people who follow the rules are rewarded. A financial incentive is given, which addresses perceived benefits for the participants (receiving air miles). This NPI appeals to Clemens and Anton's perceived benefit, as they will have to pay less for a later trip. The reward system is particularly suitable for Anton, as the perceived barriers remain unchanged, but the measure provides a future benefit. In addition, these personas are more willing to share their location.	Clemens Anton
		Recovery Campaign	Multi-part media campaign by CH Tourism to promote a holiday in CH.	CH Tourism (CH)		+					-		The campaign shows that holidays can also be spent at home and thus offers an alternative to travelling abroad. By doing so, the barriers are perceived lower compared to travelling abroad. The campaign appeals to people like Heinz and Anton who would like to travel abroad but are unable to do so. The campaign draws attention to the fact that they can also experience something great in CH.

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42	Campaigns	Hygiene campaigns	Travel Campaign for DE	Under the motto <i>Rediscover DE</i> , the campaign aims to encourage people to spend their holidays in DE and avoid long-distance travel.	Deutsche Bahn (DE)	+				-		The campaign shows that holidays can also be spent at home and thus offers an alternative to travelling abroad. By doing so, the barriers are perceived lower compared to travelling abroad. The campaign appeals to people like Heinz and Anton who would like to travel abroad but are unable to do so. The campaign draws attention to the fact that they can also experience something great in DE.	Heinz Anton
43			Clean&Safe certificate	The certificate is awarded to establishments in CH to show that the protective measures are being complied with, in order to let guests have the knowledge that the prescribed protective concepts are being adhered to.	CH Tourism (CH)	-	+				-	By issuing a trustworthy certificate, the perceived susceptibility is addressed. The benefit is given because the certificate is used throughout CH and all kinds of tourism sectors (hospitality, mountain railways, restaurants ect.) and guests are easily informed. The certificate decreases perceived susceptibility. In addition, barriers are reduced as guests do not have to search extensively for the hygiene measures on site. This measure appeals to people for whom the correct implementation of NPIs is important, as well as for Pia, Clemens, Bertha, Mia & Max. The uniformity makes it easier to access information about the protection concept, which is particularly beneficial for Pia.	Pia Clemens Bertha Mia & Max
44			United Clean Plus	A protection concept for cleanliness and hygiene measures on all United flights, which is communicated to the customers.	United Airlines (US)	-	+					-	By issuing a trustworthy certificate, the perceived susceptibility is addressed. The benefit is given because the certificate inspires confidence and the guests are informed. It also lowers barriers, as guests do not have to search intensively for information about hygiene measures on site. This information reduces perceived susceptibility and increases trust and the knowledge that hygiene measures are being implemented. However, the NPI only provides information for a specific the company and compliance cannot be checked, which is why particularly susceptible people remain skeptical. However this measure make information accessible, that is why it is mainly addressing Clemens, Mia&Max and Bertha as it is important to them to see that a company puts effort to ensure safety. Pia has the same need, but for her it is only suitable, if she trusts the company and the information is clearly communicated.

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Campaigns	Hygiene campaigns	Security protocol	Hotel companies name internal measures to increase the feeling of safety and communicate these to their guests.	various companies	-	+						By issuing a trustworthy certificate, the perceived susceptibility is addressed. The benefit is given because the certificate inspires confidence and the guests are informed. It also lowers barriers, as guests do not have to search intensively for information about hygiene measures on site. This information reduces perceived susceptibility and increases trust and the knowledge that hygiene measures are being implemented. However, the NPI only provides information for a specific the company and compliance cannot be checked, which is why particularly susceptible people remain skeptical. However this measure make information accessible, that is why it is mainly addressing Clemens, Mia&Max and Bertha as it is important to them to see that a company puts effort to ensure safety. Pia has the same need, but for her it is only suitable, if she trusts the company and the information is clearly communicated.	Clemens Mia & Max Bertha
		#SeifeBoss [Soap boss]	Providing information for children and young people on how to wash their hands properly.	Canton Solothurn (CH)		+		+				Through the target group-oriented campaign, the subjective norm and the attitude of the target group can be addressed on an emotional level, to increase their interest and therefore aiming that the target groups watches the campaign to the ends and does not forget it. This NPI is specifically geared towards children and young people and can thus also provide informations for the children of Mia & Max in an understandable way.	Mia & Max
	Target group oriented campaign	Instagram-campaign	In order to motivate young people to vaccinate, a special campaign tailored to young people was created and spread on Instagram.	Federal Office of Public Health (CH)		+		+		-		Through the target group-oriented campaign, the attitude of the target group can be addressed on an emotional level, to increase their interest and therefore aiming that the target groups watches the campaign to the ends and does not forget it. They also aim to show the audience the benefits of adhering to NPIs while at the same time reduce their perceived barriers. This NPI is specifically geared towards teenagers, why none of the personas is dresses by the NPI.	

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48	Campaigns	Target group oriented campaign	Spread the World not the virus	In CN, there was a large-scale social media campaign in which young people spread the information provided by WHO in their indigenous language. Other nationalities joined the trend.	UNDP (CN)	+		+				The video is easily accessible and is spread quickly online. It informs about the hygiene measures and can thus address attitudes. The use of indigenous languages also influences the subjective norm and makes information's accessible for everyone. This campaign is particularly appealing to Bertha, who feels it is important that everyone has access to the information, as she believes that only together the spread of the virus can be stopped.	Bertha
			Campaign from visit Berlin	Campaign aims to raise awareness, by using the typical berlin humors humour to create amusing sayings like "Maske auf- sonst Lokal zu" [mask on – otherwise the bar will be closed].	City of Berlin (DE)	+		+		-		Through the target group-oriented campaign, the attitude of the target group can be addressed on an emotional level, to increase their interest and therefore aiming that people adhere to wearing a face mask and aiming to lower perceived barriers. This invitation to comply with the measures appeals especially to sceptics like Anton. It is shown that downsides of wearing a mask are much smaller than if the pubs have to close. This increases their incentive to comply with the measures. Because it is about maintaining social life by adhering to the measures, it also addresses Heinz.	Anton Heinz
			Minion clip	A video of Gru and the Minions (from the movie : Despicable Me) with information's on correct behavior. The video is child-friendly and humorous.	WHO	+		+		-		Through the target group-oriented campaign, the attitude of the target group can be addressed on an emotional level, to increase their interest and therefore aiming that people adhere to the NPIs, as their perceived barriers is lowered. The use of the well-known Minions and Gru especially addresses children and raises their attention, which is why this campaign appeals to Mia & Max's children in particular.	Mia & Max
			Influencer	Influencers promote vaccination on social media and disseminate information to their followers	Various influencers	+		+		-		Influencers can effectively address and sensitize their followers. the attitude of the target group can be addressed on an emotional level, to increase their interest and therefore aiming that people adhere to the NPIs, as their perceived barriers is lowered. The measure has an influence on a persona, if he or she is active on social media and they are inspired by and trust influencers. It can be assumed that this could be the case for Anton (e.g. outdoor influencer), Heinz (e.g. famous football players), or Bertha (e.g. follows vegan influencers).	Anton Heinz Bertha
51		professional Multipliers											

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52	professional Multipliers	Celebrities for vaccination campaign	The federal health office created "Ein Herz für alle" [a heart for everyone] that actively involves Swiss celebrities to promote the vaccine and raise awareness.	various knowns and FOPH (CH)		+		+				Celebrities can effectively address and sensitize their fans. The subjective norm of the followers is therefore addressed, as well as the attitude. This measure has an influence on a persona, if he or she is a fan of the given celebrity, as they are inspired by and trust them. It can not be concluded which persona is addressed, as the knowledge of their attitude towards celebrities is not known.	
53		Healthcare workers report on social media	Various doctors and nurses who are in contact with Covid patients share their opinions and experiences on social media to raise awareness.	Health personnel (CH)		+		+				Health workers report on an emotional as well as knowledge-based level. Although these people are not celebrities, they are trusted because they are in close contact with the pandemic due to their work. For this reason, the subjective norm and attitude is addressed. This measure is particularly suitable for Bertha, as she is surrounded by high-risk person and empathizes with the health workers. It motivates her to stick to the measures so that the health workers do not get more covid patients. It might also be eye opening for Anton to see what the situation is like in hospitals and how much people can suffer.	Bertha Anton
54	Diagnosis Infrastructure	Drive-in Test Center	People are tested directly out of the car to avoid contact with people as much as possible.	Air Force Center (CH)	-	+				-	-	By testing people from the car, contact points are minimized and perceived susceptibility is reduced. In addition, it is convenient to be tested from the car. This is especially a suitable measure for Bertha, because it is important to her not to infect other people in case of infection.	Bertha
55		Airport test centre	Installation of simple walk-in test centers directly at airports.	various airports (CH)		+				-	-	Travelers can take a test directly before departure, which reduces the perceived barriers. This NPI is suitable for people who are travelling abroad by plane and tend not to have arranged a test appointment in advance at another location. This is why this NPI addresses Anton, Heinz, as they want to have as little effort as possible.	Anton Heinz

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56	Diagnosis	Infrastructure	Vaccine before the party	Young people can get vaccinated and tested until 11 pm. This way, they can take a test before the party and receive a certificate afterwards, which allows them to participate in the party.	Canton of Vaud (CH)		+				-	-	Party-goers can take a test directly before entering the club, which reduces the perceived barriers. This NPI is very suitable for Heinz. Because he does not deal with the given regulations intensively and since he goes to the party anyway, he does not have any extra effort to vaccinate himself.	Heinz		
			Tests from the vending machine	A Covid-19 test is designed to be user-friendly with self-testing and pool testing. The test kit is taken from a vending machine, carried out independently and handed over in a box. This reduces the amount of personnel required.	ETH Zurich (CH)		+					-	-	Access to testing is greatly made easier. People can test themselves independently and do not have to travel long distances to a test centre, because they have a testing facility at their workplace. This measure is suitable for people like Bertha because they test themselves repetitively. The testing procedure becomes much less complicated and easier.	Bertha	
			Test station in front of the restaurant	Before visiting the restaurant, a quick test can be carried out on site and a certificate will be issued.	various companies (CH)		+						-	-	Visitors can take a test directly in front of the restaurant, which reduces the barriers and the perceived behavioral control. This is a suitable NPI for persons who do not plan to test them in advance or are not informed about the need of a certificate. It also provides easy access and therefore is suitable mainly for Heinz and Anton, because they do not have to take a test elsewhere, but can do so directly in front of the restaurant. In general easy accessible test station in front of attractions addresses all personas, who do not have an certificate yet.	Heinz Anton
			Anti-Epidemic Robots	An Anti-epidemic robot detects covid infected people on arrival at the airport. It further reminds people to wear the mask and measures the temperature of up to 150 people per minute.	UNDP and Government of Rwanda (RW)		-	+					+		The robots can screen people in a short time and are therefore more efficient than staff employees. Due to the innovative technology, Clemens in particular responds to this measure and Bertha also supports the measure, as she knows that this provides a control instance and strengthens her sense of security. As well, it can impact the perceived benefits for Mia&Max, and Heinz, because waiting time is shorter.	Clemens Bertha Mia & Max Heinz

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					-	+							
60	detect possible infections	Use of robots instead of staff	Robots are used at events to avoid human contact. They disinfect rooms with UV, provide information and measure the body temperature of guests.	World Youth Forum (EG)	-	+				+		With the robots, people can be screened within a short time and contact with staff is avoided. The use of disinfection also reduces the perceived vulnerability. Due to the innovative technology, Clemens in particular responds to this measure and Bertha also supports the measure as it reduces contact.	Clemens Bertha
61		clearstep	COVID-19 chat-based screener: The screener asks questions about symptoms, travel and contact with others. After answering all questions, the user receives an assessment of their COVID-19 exposure. In addition, the next steps to follow for further action are displayed.	Clearstep (US)		+					-		It serves as a useful tool to identify potential infections and to provide decision support for those affected. In addition, the screener is easily accessible and supports people. This is an additional decision-making aid for Bertha and Clemens in particular, because they feel safer and know how to behave in case of a potential infection to not infect other people.
62	Diagnosis	Verification of the certificates	Certificate scanner	People can scan the certificate on their own when they enter the building and will then receive a sticker with their name on it, confirming that the person is in possession of a valid certificate.	HSLU (CH)		+					The measure requires fewer staff and is easy to implement for visitors. Queues can be shortened, which is why the perceived benefit for Anton, Heinz, Clemens and Mia&Max is given. However, there is the potential that the certificate is not scanned and a human control instance is missing (behavior control). Clemens also finds this measure helpful and enjoys scanning the certificate because he is fascinated by the technology.	Clemens Bertha Anton Heinz Mia & Max
			e-Display	the certificate and the face is scanned and controlled by a device. Optionally, the temperature can also be measured or it can be detected whether the person is wearing a mask or not.	e-display (CH)		+					-	
63													

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64	Knowledge exchange	Training for SME	Free coaching sessions for SMEs on possible strategies to minimize losses due to Covid.	International Training Center		+						This measure only takes place at a company level and is perceived only indirectly by tourists. Based on the knowledge gained, the companies can act and take action. These NPIs developed from the knowledge exchange have an influence on the guests depending on the extent, but can turn out differently. For this reason, the assignment to the influencing factors from a guest-specific perspective is not possible. Neither is it possible to assign them to the personas.		
		WeDoctor	Virtual sessions via WeDoctor. Chinese experts share their knowledge of the disease with over 250 doctors from African countries.	WeDoctor (CN, KE, UG, SS)		+						This measure only takes place at a company level and is perceived only indirectly by tourists. Based on the knowledge gained, the companies can act and take action. These NPIs developed from the knowledge exchange have an influence on the guests depending on the extent, but can turn out differently. For this reason, the assignment to the influencing factors from a guest-specific perspective is not possible. Neither is it possible to assign them to the personas.		
		E-learning platform	An online employee training which includes general information about prevention and how to deal with guests in the most appropriate way.	Epicert (DE)		+							This measure only takes place at a company level and is perceived only indirectly by tourists. Based on the knowledge gained, the companies can act and take action. These NPIs developed from the knowledge exchange have an influence on the guests depending on the extent, but can turn out differently. For this reason, the assignment to the influencing factors from a guest-specific perspective is not possible. Neither is it possible to assign them to the personas.	
		Training for hoteliers and restaurateurs	A training for the management to implement the Corona guidelines efficiently in their own company	Epicert (DE)		+							This measure only takes place at a company level and is perceived only indirectly by tourists. Based on the knowledge gained, the companies can act and take action. These NPIs developed from the knowledge exchange have an influence on the guests depending on the extent, but can turn out differently. For this reason, the assignment to the influencing factors from a guest-specific perspective is not possible. Neither is it possible to assign them to the personas.	
65														
66														
67	Trainings													

Category	Group of measures	NPI Name	NPI Description	Initiator (country)	perceived susceptibility	perceived benefits	Risk behaviour	Attitude	perceived Severity	Perceived barriers	Perceived. behavioural control	Evaluation of the NPI	addressing Persona		
68	Knowledge exchange	Network and Innovation	Innovation Map	A digital world map listing innovative projects related to covid-19, making information more easily accessible and allowing experts to exchange ideas.	Health Innovation Exchange and Startup Blink (world-wide)	+							This measure only takes place at a company level and is perceived only indirectly by tourists. Based on the knowledge gained, the companies can act and take action. These NPIs developed from the knowledge exchange have an influence on the guests depending on the extent, but can turn out differently. For this reason, the assignment to the influencing factors from a guest-specific perspective is not possible. Neither is it possible to assign them to the personas.		
			Helpful ETH	A platform that brings engineering teams together with doctors to easily and quickly develop solutions related to covid-19.	ETH Zurich (CH)	+								This measure only takes place at a company level and is perceived only indirectly by tourists. Based on the knowledge gained, the companies can act and take action. These NPIs developed from the knowledge exchange have an influence on the guests depending on the extent, but can turn out differently. For this reason, the assignment to the influencing factors from a guest-specific perspective is not possible. Neither is it possible to assign them to the personas.	
			Hackaton	Hackaton for digital health solutions related to Corona. There were more than 1200 applications.	UNDP and National Incubation Center (PK)	+									This measure only takes place at a company level and is perceived only indirectly by tourists. Based on the knowledge gained, the companies can act and take action. These NPIs developed from the knowledge exchange have an influence on the guests depending on the extent, but can turn out differently. For this reason, the assignment to the influencing factors from a guest-specific perspective is not possible. Neither is it possible to assign them to the personas.

8 Declaration of Sole Authorship

I, Lea Oberholzer , hereby certify that the attached work, Design of measures to prevent Coronavirus infections in the tourism sector, is wholly and completely my own and that I have indicated all the sources (printed, electronic, personal, etc.) that I have consulted. Any sections quoted from these sources are clearly indicated in quotation marks or are otherwise so declared. I further attest that I have included acknowledgement of the name(s) of any person(s) consulted in the course of preparing this assignment

Date : 01.06.2022



Name: Lea Oberholzer