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Chatbot as a Channel in Government Service Delivery

Findings from interviews with citizens,
Skatteetaten and NAV

Master's thesis in Computer Science

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Abstract

Over the past few years, governments have got the ability to provide public services more digitally due to advances in information and communication technology (ICT). Chatbots play a critical role in today's public institutions' multi-channel environment. Communication channels range from traditional channels such as telephone and letters to modern channels such as email, chat and chatbot. To better understand how chatbots interact across multiple channels, we conducted a qualitative and exploratory case study of two chatbots that operate in Norwegian public service delivery. Through semi-structured interviews with citizens and institutions and supplementary document analysis, we discovered that motivation, attitude, experience, and trust, combined with channel strategy and identified factors for communication, are the key drivers of citizens' channel behaviour. This research contributes to a better understanding of chatbot adoption in public institutions by combining it with a service delivery channel environment and previous studies on chatbots in the public and private sectors, and literature on service delivery channels.

Keywords: *Chatbot, Artificial Intelligence (AI), Public Institution, Service Delivery Channel, Channel Behaviour*

Sammendrag

I løpet av de siste årene har offentlige sektor fått muligheten til å tilby tjenester mer digitalt på grunn av fremskritt innen informasjons- og kommunikasjonsteknologi. Chatboter spiller en kritisk rolle i dagens kanalmiljø til offentlige institusjoner. Kommunikasjonskanaler består av tradisjonelle kanaler som telefon og brev til moderne kanaler som e-post, chat og chatbot. For å få en bedre forståelse av hvordan chatboter samhandler på tvers av flere kanaler, har vi gjennomført en kvalitativ og eksplorativ case studie bestående av to chatboter som opererer i offentlig tjenesteleveranse i Norge. Gjennom semistrukturerte intervjuer med innbyggere, institusjoner og supplerende dokumentanalyse har vi oppdaget at motivasjon, holdning, erfaring og tillit, kombinert med kanalstrategi og identifiserte faktorer for kommunikasjon, er de viktigste driverne for innbyggernes kanalatferd. Denne forskningen bidrar til en bedre forståelse av chatboter i offentlige institusjoner ved å kombinere dette i et kanalmiljø for tjenesteleveranse og tidligere studier relatert til chatboter i offentlig og privat sektor, i tillegg til litteratur om kommunikasjonsskanaler for tjeneste leveranse.

Nøkkelord: *Chatbot, Kunstig Intelligens (KI), Offentlige Institusjoner, Tjenesteleveranse Kanal, Kanalatferd*

Preface

This paper is a master thesis written as part of our final assessment during the spring of 2021 for a Master in Science degree in computer science at the Norwegian University of Science and Technology (NTNU). The study is based on a literature review conducted as a part of the preliminary project for this master's thesis in the autumn of 2020.

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Dusan Jakovic & Gajaen Chandrasegaram
Trondheim, 14th June 2021

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Acronyms

AI Artificial Intelligence.

CET Channel Expansion Theory.

CPM Communication Privacy Management Theory.

EU European Union.

FAQ Frequently Asked Questions.

HCI Human-Computer Interaction.

ICT Information and communications technology.

MCM Multi channel Marketing.

MRT Media Richness Theory.

NAV Norwegian Labour and Welfare Administration.

RQ Research Questions.

CHAPTER 1

INTRODUCTION

In this chapter, the project's motivation and goals will be explained. We will also present research questions that will help to achieve the goals. Further, the context for the cases and contributions through this research will be defined. Lastly, the thesis structure will be presented.

1.1 Motivation

This study investigates how chatbot as a service delivery channel changes the way citizens interact with public institutions and the motivation of implementing this channel. Chatbots are applications that communicate with users through written natural language, and we see a growing trend in the use of these in both the public and private sector (Shawar and Atwell 2007). The use of digital channels, such as chatbots, is expected to improve efficiency, overall costs and customer service - something that motivates public institutions in increasing these types of service delivery channels (Teerling and Pieterse 2009). Regardless of the introduction of digital channels and their advantages, citizens still regularly choose the more expensive traditional channels, such as the telephone (Pieterse and Ebbens 2020).

Digitisation has been a key area for the public sector for decades. In particular, the Norwegian government has presented a digitisation strategy for the next few years (moderniseringsdepartementet). However, there are still more citizens who use traditional channels such as telephone and letters than online channels as a primary channel or as an alternative channel (Pieterse and Teerling 2008). This is not very cost-effective compared to using online channels, where automation technologies can help reduce costs (Corea et al. 2020). To understand citizens actions in a multi-channel environment, it is worth examining the citizens' channel behaviour (Pieterse and Teerling 2008) and public institutions channel strategy (Pieterse and Dijk 2006) to get a greater understanding of what affects the choice, use, and evaluation of the channel.

Concerns about the effects that automation will have on the demand for labour, wages, and employment are today present, similar to what it has been through other technological breakthroughs in the past (Acemoglu and Restrepo 2018). The root of the concerns is in the displacement effect, where the replacement of tasks performed by workers lead to reducing the demand for labour, wages and employment. However, countervailing forces can neutralise these negative effects. Automation can, over time, increase the demand for labour in non-automated tasks (productivity effect), the capital intensity of production that triggers the further accumulation of capital, raise labour demand (capital accumulation), productivity in tasks that are already automated (deepening of automation) and create productivity effect without displacement (Acemoglu and Restrepo 2018). These concerns and effects apply to some of the most defining automation technologies of our age, such as Artificial Intelligence (AI) (Acemoglu and Restrepo 2018; Jakovic and Chandrasegaram, (2020)).

The adoption of applications that communicate with users in a human way is becoming increasingly popular in both the private and public sectors today (Shawar and Atwell 2007). The use of chatbots in public institutions introduces a new research area that investigates the capabilities and contributions of AI in government service delivery. Chatbots can help citizens, and public institutions communicate more effectively by providing quick responses to frequently asked questions (Noordt and Misuraca 2019). Chatbots, in combination with natural language processing, machine learning, and data mining technologies, create a new "richer" and more intelligent digital channel of communication between citizens and government (Androutsopoulou et al. 2019).

1.2 Project Goals and Research Questions

This research aims to better understand citizens' motivation to use chatbots to communicate with public institutions and explore how citizens interact with them. Furthermore, we will look at how the chatbot has changed the citizens' encounters with the government and the constraints of using the chatbot as a channel. It is also crucial to consider the institutions' point of view and understand what motivates them to provide the chatbot as a channel. Since the chatbot operates in a multi-channel environment, we will also discover its function as a part of the public institutions' channels. With exploring the literature on government service delivery channels in Jakovic and Chandrasegaram ((2020)), we discovered a gap between the adoption of chatbots in public institutions and chatbot as a service delivery channel. As a result, using the foundation provided by previous research, we want to contribute to filling the gap with this study. The following are the research questions that serve as the basis for this thesis:

RQ1: *How has the use of chatbots as a channel changed citizens' encounters with the government*

RQ1.1 *What factors motivate a citizens' choice to use a chatbot as a*

channel?

RQ1.2 *What are the constraints of using the chatbot as a channel?*

RQ2 *What is the motivation for public institutions to implement chatbot as a service delivery channel?*

RQ2.1 *What role does a chatbot serve in a multi-channel environment?*

1.3 Context for the Cases

This research is based on a practical problem addressed through a case study and a literature review. This problem might affect various public institutions, but in this thesis, we conduct an exploratory case study on NAV (Norwegian Labor and Welfare Service) and Skatteetaten (Norwegian Tax Administration). The two institutions are selected on the basis of being some of Norway's largest public institutions with a multi-channel environment - offering multiple channels. Both NAV and Skatteetaten have recently started to utilise chatbot as one of their service delivery channels, implementing it in 2018 and 2019, respectively. Therefore, it is interesting to investigate how the introduction of the chatbot has affected them and their experiences with the new channel. The institutions primarily want citizens to use the chatbot more frequently, and NAV, in particular, has set a goal for the chatbot to become the most preferred communication channel by 2025.

"Frida" is the name of NAV's chatbot, and she can be reached through the institution's website (NAV). Frida is a chatbot that can answer simple questions and is available 24 hours a day, 7 days a week. These might include inquiries regarding job clearance funds, as well as social services and financial social aid. Since the outbreak of the Covid-19 pandemic, NAV has seen a 250 per cent rise in user enquiries through Frida. The chatbot has managed the equivalent of 230 human supervisors during the peak week. This shows that Frida can make NAV processes more efficient and enable rich and expressive digital interactions for a wide range of users.

The "Skatteetaten chat-robot" is the name assigned to the chatbot by the Skatteetaten (Skatteetaten). Like NAV, the chatbot answers simple questions and is available 24 hours a day, 7 days a week. Skatteetaten's chat-robot handles questions on personal and business taxes and questions related to the population register. Approximately one-third of the chatbot's conversations occur outside of the Tax Administration's business hours, demonstrating that the chatbot has assisted in making contact with citizens more accessible and has played an essential role in the multi-channel environment.

This study consists of semi-structured interviews with citizens who have previous experience with the chatbots offered by NAV and Skatteetaten and employees at these institutions. Thematic analysis is used to analyse the interviews and document analysis to analyse documents gathered by us and provided to us by representatives of the public institutions.

1.4 Thesis Structure

In Chapter 2, we will provide the background and related work for the study. Description of the case study and the problem owners will be presented in Chapter 3. Further, Chapter 4 presents the research questions and shows the process followed for this study. Chapter 5 contains our main results. The results will be discussed in light of the background literature and findings in Chapter 6. Finally, Chapter 7 provides a synthesis of key points and implications for future research.

CHAPTER 2

BACKGROUND AND RELATED WORK

This section presents the literature review conducted on e-government, governmental service delivery channels, and chatbot. These areas were selected to give more background information in context with the case study, presented in Section 3. Section 2.1 will provide a state of the art in electronic government research. Further, Section 2.2 and 2.3 will go more detailed into government service delivery literature and chatbot literature, respectively. Lastly, in Section 2.4 we will connect the previous sections into a conceptual framework, using it as the foundation for our research.

Part of the background literature on government service delivery channels are taken from the literature review conducted as a part of the preliminary project Jakovic and Chandrasegaram, (2020), which includes Section: 2.2, 2.2.1, 2.2.2, 2.2.3, 2.3.8, and 2.2.4.

2.1 Electronic Government (E-Government)

The strategic, coordinated use of information and communication technology (ICT) in public administration and political decision-making is referred to as e-government (Von Haldenwang 2004). It is an area that has generated much attention in recent years, as new technological innovations for public policy and administration are being introduced regularly. With the advances in ICT, governments have got the opportunity of delivering public services more digitally. E-government is the use of information technology to enable and improve the efficiency of government services provided to citizens, employees, businesses, and agencies (Carter and Bélanger 2005). One can draw similarities to how companies serve their users with e-commerce. Still, according to Jorgensen et al., *access*, *structure*, and *accountability* of these systems is separating them from one another (Jorgensen and Cable 2002). The business side has the luxury of choosing its customers by targeting a specific preferred audience, has centralised decision-making authority, and is often non-political. In contrast, governments have to serve users in all shapes and sizes, have a more decentralised

structure, and provide services in the best interest of the public (Jorgensen and Cable 2002).

With challenges such as these, the European Union (EU) has called upon the EU institutions to undertake several policy actions to move towards a five-year objective for improving e-governance (Declaration 2017). One of these incentives is a "digital-by-default" strategy, improving accessibility, inclusiveness, and seamless digital delivery of services across sectors. A government that is based on information technology is more democratic, transparent, and effective than a traditional government (Moon 2002). This will assist in the improvement of government-citizen relations and the reduction of citizen dissatisfaction (Noordt and Misuraca 2019). It will be possible to share information electronically between citizens and government agencies through automated public service delivery. Incremental improvements in the existing procedure can be made to increase the efficiency in the government processes (Noordt and Misuraca 2019). ICT can also help allow more general organisational changes such as minor adaptations and internal changes to support new technologies (Misuraca and Viscusi 2015).

In e-government, the traditional *public encounter* can be used to describe the relationship between the government and the citizen, defined as "*the interaction of citizen and official as they communicate to conduct business*" (Goodsell 1981). Goodsell (1981) highlights four general aspects of the public encounter:

1. The nature and purpose of the encounter.
2. The communication forms and settings in which the encounter occurs.
3. The central actors involved.
4. The encounters' initiation, duration, and scope.

However, the introduction of e-government has affected the traditional public encounter. According to Lindgren et al. (2019), the digitization of public services has lead to changes to the four aspects highlighted by Goodsell (1981) by enabling:

1. Automatic exchange of information and citizen self-service.
2. Additional communication channels and flexible place of the interaction.
3. Changes in the role of the actors and adding new actors related to the technology affecting the interaction.
4. Round-the-clock access to government services, shorter response time, and proactive services.

(Lindgren et al. 2019).

Ultimately, the public encounter is affected by changes in when, where, and how the interaction occurs, which actors are involved, what each actor does, and the skills required for all involved actors.

2.2 Governmental Service Delivery Channels

When citizens want to contact public institutions, they have various *service delivery channels* to choose from, which is the first step towards achieving their goal. In the context of governments, a service delivery channel can be defined as “*a means whereby governments deliver services of an informational or transactional nature to citizens, and citizens communicate with governments about the services they need or want*” (Kernaghan 2013). Reddick and Anthopoulos (2014) classify these channels into three groups, which includes *traditional channels*, *e-government channels*, and *new digital media* (Reddick and Anthopoulos 2014). Traditional channels are defined as face-to-face meetings, voice-phone calls, and surface mail; e-government channels is defined as government websites and e-mailing options; new digital media is defined as text messaging, social media, and mobile apps.

Additionally, “intelligent channels” has emerged as a new category of channels due to advances in artificial intelligence (AI) technology, which includes, e.g., chatbots, intelligent assistants, and humanoids (Pieterse et al. 2017). Pieterse et al. (2017) stress the lack of literature on comparing the different intelligence channels, as well as between the new generation and the preceding ones. Based on existing publications, the authors have constructed a table that shows the characteristics of intelligence agents. Also, it shows where they position themselves in regards to short term channel supplement/long term replacement of the preceding generations of public sector service channels (Pieterse et al. 2017) (see Figure 2.1).

Property	Software agents			Virtual and virtuality enhancing robots		Physical social robots	
	Chat bots	conversational bots	Intelligent assistants	AR	VR	Non-humanoid Robots	Humanoids
Speed/interactivity	Medium	High	High	Medium	Medium	Medium	High
Ease of use	High	Med/High	Med/High	Low/Med.	Low/Med.	Low/Med.	
Stimuli richness	Low	Medium	Medium	High	Med/High	Medium	High
Ability to reduce complexity	Med/High	Med/High	High	Medium	Medium	Medium	Medium
Ability to reduce ambiguity	Medium	High	High	High	High	Medium	High
Short term channel supplement/long term replacement	Chat, Email	Telephone	Chat, Email, Telephone, Social Media, Apps, Website	Front Desk, Telephone	Front Desk, Telephone,	Front Desk	Front Desk

Figure 2.1: Characteristics of the different channels (Pieterse et al. 2017)

2.2.1 Channel Behaviour

The availability of numerous channels makes the government a multi-channel environment, leading to a complex *channel behaviour* by the citizens. The channel behaviour can be broken down into three interconnected steps, consisting of *channel choice*, *channel use* and *channel evaluation* (see Figure 2.2):

- Channel choice is the first step in the interaction between the receiver and the service provider and refers to the actual choice of a medium to interact with a governmental agency.
- Channel use is defined as employing the communication medium for a certain task.
- Channel use evaluation is based on the experience acquired in the process, influencing both channel perceptions and future channel choices.

(Pieterse and Teerling 2008).

Indubitably, multi-channel behaviour is far more complex in real life, as, e.g. users can use multiple channels at the same time, and the model is a generalisation of the process across all user groups (Teerling and Pieterse 2011). However, the steps in the model can be used to give an overview of the process citizens go through when interacting with public institutions.

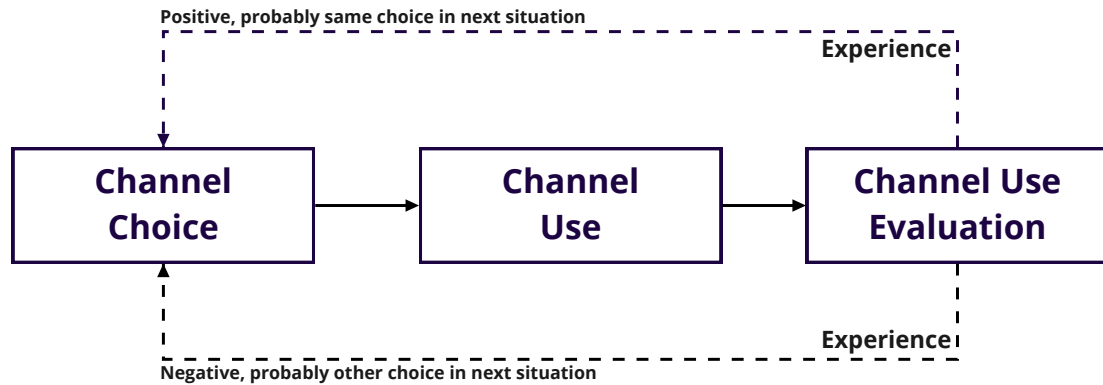


Figure 2.2: The channel behaviour model (Pieterse and Teerling 2008).

2.2.2 Identified Factors for Citizens' Channel Choice

While governments are offering new channels from the traditional ones and expect citizens to utilise them, there exists a *mismatch* between how they want the citizens to use channels and the preferences of the citizens (Ebbers et al. 2008). This mismatch is due to a complex set of factors that drives the citizen's channels choice,

a field that has been widely explored. Christian Ø Madsen and Kræmmergaard (2015) conducted a literature review on channel choice, where 19 out of 36 papers studied citizens' interaction with public authorities. This study provides a list of identified independent variables that impact citizen channel choice clustered into five groups: channel characteristics, task characteristics, personal characteristics, situational constraints, and satisfaction.

Through a literature review and statistical analysis of a survey in Canada, Reddick and Anthopoulos (2014) identifies security and privacy as a potential determinant for channel choice (Reddick and Anthopoulos 2014). With the attention trust has in their identified literature, they include it in their conceptual model. Their results show that citizens are not concerned with security and privacy with e-government and traditional channels but indicate that privacy concerns exist towards new digital media channels. Though this study was included in the literature review by Christian Ø Madsen and Kræmmergaard (2015), they did not mention it as a factor. However, due to the indications of results, it could be reasonable to take it into account.

By combining the reviewing work on channel choice and rationality in decision making, Ebbers et al. (2016) argue that most of the existing work suffers from the underlying assumption that citizens chose channels through a rational process. Using a scenario-based method, they find that while this is true, the process is also irrational, steered by habits. Their results show that habit for Internet and telephone plays a role in channel choice. A lower level of Internet habits correlates to a higher likelihood of choosing the face-to-face or telephone as a channel; furthermore, telephone habits positively influence the likelihood of choosing face-to-face and telephone as channels.

Laenens et al. (2018) performed a case study that looked into citizens' channel choice factors for spatial planning in Belgium and their opinion and perception towards digital communication. The authors identified that 'digital divide' was positioned together with socio-demographic elements through a literature review. However, they argue that digital inequality is essential for channel choice between e-services and offline government services and place it as its own factor. Through their qualitative research, the authors also identified "information characteristics" as an essential factor. They argue that the transmitted information is rarely seen as a determinant but may influence citizens' second choice of a channel.

Table 2.1 shows the identified factors and examples of its respective values. There are only examples of values provided because a full combination would have resulted in an extensive list. Merge conflicts have occurred due to some researchers classifying values as factors and vice versa. This is resolved by removing it as a value and placing it as a factor in cases where researchers define it as a factor.

Additionally, it is worth noting that the identified variables are from the individual level and that factors from the organisational level are not considered - such as channel strategy, integration, and migration - influencing the overall channel choice before an interaction takes place (Christian Ø Madsen and Kræmmergaard 2015).

Factors	Examples of values	Source
Channel characteristics	Multiple cues, Level of interactivity, Perceived ease of use, Perceived usefulness, Perceived risk, Tangibility, Accountability, Cost, Professional level, Knowledge of existence, Design, Satisfaction with channel	(Christian Ø Madsen and Kræmmergaard 2015), (Ebbers et al. 2016), (Laenens et al. 2018)
Task characteristics	Type of task at hand, Complexity of problem, Ambiguity of information, Uncertainty	(Christian Ø Madsen and Kræmmergaard 2015), (Reddick and Anthopoulos 2014)
Personal characteristics	Socio-demographics (age, gender, race, education, income), Experience with channel, Trust in public authorities	(Christian Ø Madsen and Kræmmergaard 2015), (Reddick and Anthopoulos 2014), (Laenens et al. 2018)
Situational constraints	Availability of channels, Price, Distance to channels, Practical constraints, Efficiency	(Christian Ø Madsen and Kræmmergaard 2015), (Laenens et al. 2018)
Satisfaction	Satisfaction with service encounter, Satisfaction with previous encounters	(Christian Ø Madsen and Kræmmergaard 2015), (Reddick and Anthopoulos 2014)
Digital inequality mechanisms	Access, Skills, Motivation, Diversity of use, Intensity of Use, Belief in digital	(Laenens et al. 2018)
Information characteristics	Information quality, Information quantity, Comprehensibility, Proximity level, Governance level	(Laenens et al. 2018)
Security and Privacy	Transaction security, Private data	(Reddick and Anthopoulos 2014)
Habits	Emotions, Routines	(Ebbers et al. 2016)

Table 2.1: Factors related to citizens' channel choice

2.2.3 Citizens Channel Use

Ebbers et al. (2008) believes that the complexity and ambiguity of the task are two of the most important, if not the most critical, determinants of the citizens' preference for the channel. This means that citizens would use either the traditional or more modern channels depending on the combination of the levels of complexity and ambiguity. E.g., citizens with a low level of complexity and ambiguity tasks, e.g. in need of information, would prefer to use the Internet. On the other hand, they would favour the phone for high complexity and ambiguity tasks, e.g. to solve a

problem. For this reason, the authors suggest that for consultation and conversation purposes, the traditional channels will remain popular in the future.

In line with this, a study by Reddick and Anthopoulos (2014) comparing channel use over time in Canada (2005, 2008, and 2012) shows that citizens web site usage increased to 47% from 2005 to 2008, but declined to 38% in 2012. Through their analysis, the authors suggest that the decrease is due to the channels limitation in problem-solving. Further, the results show that the website was mainly used for information/advice (53%), while the telephone was mainly used for problem-solving (68%).

In the more recent study by Pieterse and Ebbers (2020) examining the evolution in channel behaviour in the Netherlands, results show a general decrease in the use of traditional channels. According to the authors, this is caused by the rising availability of electronic channels and the reduction of traditional channels. However, their results show that the earlier research claiming traditional channels will remain popular is still valid for specific tasks. In particular, the telephone usage for complex questions had only a decrease of 0.01% between 2008 and 2017.

Ebbers et al. (2008) also identify, high complexity problems often mean multi-expertise; hence several "back office experts" talking to one single citizen. Madsen et al. (2019) introduce this phenomenon as *channel multiplexity*, suggesting that rather than perceiving and choosing channels as being discrete entities, citizens use a combination of channels sequentially or in parallel in what could be considered one service delivery contact or interaction. Their study also examines why citizens who have already adopted digital channels still supplement an interaction through traditional channels. The authors identified five problems, grouped into two overall categories: information related problems (need for information or explanation) and action related problems (need for documentation, negotiation or revision). Channel multiplexity is also said to provide a possible explanation for the overall number of channel interactions increasing in many countries (Madsen et al. 2019).

In a case study in Denmark conducted by Christian Østergaard Madsen and Kræmmergaard (2016), they claim that there is a lack of studies on channel choice in the mandatory setting where citizens have already adopted e-government channels. With their research, they set to change the focus from adoption to post-adoption processes. This study shows that although the majority used the mandatory self-service application, it did not stop the use of the telephone. The authors identified three issues; navigation, uncertainty in task completion and attempts to circumvent the mandatory requirement. Further, by improving the communication concerning these issues and including new channels in the service encounter, they measured a 40% drop in calls between 2013 and 2014. The increase in both reply rate and speed can indicate that the success was due to these efforts.

2.2.4 Theories used for Channel Choice

Amongst qualitative studies, previous studies, and marketing theory, the factors influencing channel choice have been found through technology adoption studies

and theoretical frameworks from the media and communication theory (Christian Ø Madsen and Kræmmergaard 2015).

According to the Media Richness Theory (MRT), different media or forms of communication have different and fixed degrees of so-called richness in the information that they provide (Daft and Lengel 1986). The richness is defined as the ability of information to change understanding through communication transactions within a time interval: rich if it can overcome different frames of reference or clarify ambiguous issues with changing understanding in a timely manner; poor if it requires a long time to enable understanding or cannot overcome different perspectives (Daft and Lengel 1986). According to the theory, medias' capacity for immediate feedback, the number of cues and channels utilised, personalisation and language variety are the four criteria that determine the richness of a media.

In contrast, channel expansion theory (CET) states that the individual experience with a media plays an essential role in determining the richness of it (Carlson and Zmud 1999). Hence, the theory claims that the perceived richness is somewhat flexible than fixed, based on the users' knowledge and experience gain by using a channel. Rather than focusing on criteria determining the richness of a media, the theory purpose four experience factors with the: communication partner, messaging topic, organisational context, and the channel.

By comparing collected data from a 9-year frame to assess the evolution in channel behaviour in the Netherland, Pieterse and Ebbens (2020) results show that task-channel fit for one task could be fixed, while not for another. Their findings suggest that MRT and CET are complementary rather than competing theories and call for renewed theory development in this area. Additionally, the authors suggest exploring the degree to which media have a set of baseline features that are fixed and specific properties that are variable and could change over time.

2.2.5 Channel Strategy

Developing different channels separately for the same service (*multichannel provision*) can lead to inconsistencies in formats and interfaces. However, this can be overcome by integrating and coordinating the different channels (Germanakos et al. 2005). Doing so, introducing a new channel is not merely an additional channel but a new opportunity to improve service delivery. As mentioned in Section 2.2.2, strategic choices from the organisational level influence the citizens overall channel choice before an interaction takes place. Channel management or multichannel management includes the *selection*, *rationalization*, *integration* and *migration* of service delivery channels (Kernaghan 2013). Firstly, through the selection phase, the government agencies select channels that it wants to offer the citizens. Secondly, the channels are prioritised according to which provides the most efficient and effective service delivery. Thirdly, to provide a seamless cross-channel service, integration between the channels are needed. Lastly, to provide better service or reduce costs, or both, users are migrated from one channel to another.

According to Pieterse and Dijk (2006), the arrival of the Internet and adoption

of other new media in public services has introduced strategic problems in service channel postponing for governments. The channel strategies proposed by the authors are linked to different historical phases in channel positioning, and in total, there are four types of channel management strategies (see Figure 2.3):

- **Parallel positioning** is the traditional way of dealing with service channels that most governmental agencies followed before the arrival of the Internet. The idea of the strategy is that all different channels are used alongside each other, where each question could be answered through each channel.
- **Replacement positioning** was the second strategy arriving after the advent of the Internet. Websites were seen as superior to the other channels, and it was conceived that channels could replace each other. However, the burst of the dot com bubble - a period with tremendous growth in the use and adoption of the Internet - and the enduring popularity of traditional channels has led to rethinking the replacement strategy.
- **Supplemental positioning** builds on the idea that fast and straightforward services should be dealt with via the electronic channels and the complex and ambiguous services via the traditional channels. In this way, channels supplement each other, and services should be offered via the best channel for the particular task.
- **Integrated positioning** combines elements of the supplemental strategy and the parallel strategy. Since universal service for all citizens is obligatory, it requires maintenance of old and new, advanced and straightforward channels in parallel. The idea behind this strategy is that all services are offered via all channels, but that in the design of the channels, its strengths and weaknesses are taken into account. A vital element of this strategy is that the citizens are directed to the proper channels effectively.

(Pieterson and Dijk 2006)

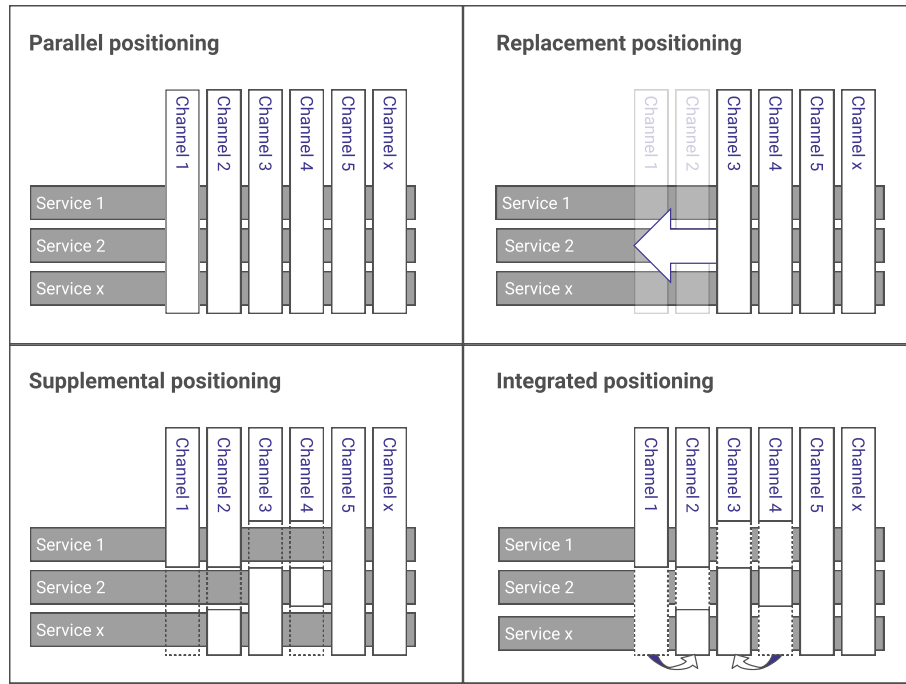


Figure 2.3: Different channel management strategies (Pieterse 2010)

With the integrated channel strategy, the public administrations plan the channel system from the beginning by considering the strengths and weaknesses of different channels, the individual and collective customer preferences, the legal constraints and the budgetary limits (Wirtz and Langer 2017). With such an approach, channels do not compete with but rather complement one another to best suit customer preferences and use potential synergies, resembling current developments of omnichannel retailing and marketing. Although there is no single formula or solution that fits channel choice for all situations, there have been reported certain steps that could guide a provider through the channel choice process (Germanakos et al. 2005):

1. Rate the feature of the available channels.
2. Rate the service provision requirements for each service type.
3. Match the channel features and the service provision requirements.
4. Investigate the channel preferences of potential users and use the results to fine-tune the selection of channels that meets the general user requirements.
5. Determine whether the remaining channels are technically and organizationally appropriate to deliver the services.
6. Determine which channels will realise the best public value based on (expected) costs and benefits.

According to Pieterse (2010), using this strategy, public institutions should not aim at reducing the number of contacts via a channel or replace one channel with another. However, they should make the contacts via the expensive channels as

efficient as possible (Pieterse 2010). Table 2.2 shows the suggestions for what purposes the channels are best suited for, the connection between certain services (tasks) and service channels.

Channel	Chosen why?	Suited for what	Suited for what situation?	Refers to other channels
Website	<ul style="list-style-type: none"> - Easy to use - High contact speed 	<ul style="list-style-type: none"> - Simple and standard tasks - Much information (background) 	<ul style="list-style-type: none"> - To reduce low levels of uncertainty - When emotions play a minor role 	<ul style="list-style-type: none"> - The telephone when ambiguity is high - The front desk when complexity and ambiguity are high - The telephone when closure is needed
Telephone	<ul style="list-style-type: none"> - High contact speed - High immediacy of feedback - Gives closure - High contact speed 	<ul style="list-style-type: none"> - Ambiguous tasks 	<ul style="list-style-type: none"> - To reduce high levels of uncertainty - When emotions play a major role - When people are in a rush 	<ul style="list-style-type: none"> - The website when ambiguity is reduced - The front desk when complexity and ambiguity are still high
Front desk	<ul style="list-style-type: none"> - Out of habit - Gives closure - Is personal - Offers high levels of service 	<ul style="list-style-type: none"> - Ambiguous tasks and (highly) complex tasks 	<ul style="list-style-type: none"> - To reduce high levels of uncertainty - When matters are of high importance - When emotions play a major role 	<ul style="list-style-type: none"> - The website when ambiguity is reduced
E-mail	<ul style="list-style-type: none"> - Easy to use - Gives closure 	<ul style="list-style-type: none"> - Simple & standard tasks - Much information (backgrounds) 	<ul style="list-style-type: none"> - To reduce medium levels of uncertainty 	<ul style="list-style-type: none"> - The telephone when ambiguity is high - The website when (simple) information is needed. - The front desk when complexity and ambiguity are high

Table 2.2: Examples of linkages between channel choice determinants, task suitability and channel referral (Pieterse 2010)

The governments can seduce their citizens to use the more cost-effective web channels by multichannel marketing (MCM) instruments. These instruments can include the well known 4p's from marketing (price, product, place, promotion) as well as typically used instruments by public administrations: communication, financial and legal (Teerling and Pieterse 2009). It is shown that improving web service offering, communication of the website services, and decreased price on web services are perceived as the most positive instruments by the citizens. On the other hand, forcing through legislation, exclusive distribution or increasing the prices of the traditional channels are perceived as unfavourable. However, these MCM instruments have varying potential impact dependent on the requirement, citizen characteristics and the channel behaviour of the citizens, and should therefore be implemented carefully (Teerling and Pieterse 2009).

Similarly, *nudging* is an approach used by both private and public institutions to steer people in desirable directions without limiting their options, designed to preserve complete freedom of choice (Sunstein 2018). As stated by Sunstein, the type of nudges span an exceedingly wide range, and their number and variety are constantly evolving, including, for example, default rules, simplification, and reminders. When nudging is performed on a digital platform, it is referred to as *digital nudging*, defined as "*the use of user-interface design elements to guide people's behaviour in digital choice environments*" (Weinmann et al. 2016). These user-interface design elements include, for example, graphic design, specific content, wording or small features (Mirsch et al. 2017). The presentation of these elements could affect the users' decision. In fact, as stated by Weinmann et al. (2016), there is no neutral way to present choices; therefore, all decisions related to user-interface design influence users' behaviour.

2.3 Chatbots

Chatbots are agents that provide access to data and services through communication using natural language (Brandtzaeg and Følstad 2017). They can be thought of as an "online human-computer dialogue system with natural language" (Jia 2003). The term chatbot has become central in modern times when it comes to human-machine communication (Weizenbaum 1966), and it is a relatively recent term; computer systems that can communicate with natural language have been studied and developed since the 1960s (Tezcan and Zhang 2014). Along with advances in artificial intelligence and machine learning, there has been an increase in the use of this form of technology in recent years (Vinyals and Le 2015). Chatbots can communicate with humans in various ways, including text and voice, but we will concentrate on text-only chatbots in this paper.

2.3.1 Chatbot Evolution

Chatbots have already been researched in the early 1960s (Weizenbaum 1966). This was one of the world's first chatbots and was developed at the MIT Artificial In-

telligence Laboratory and was named ELIZA. This chatbot simulated conversations using a substitution approach and pattern matching (Weizenbaum 1966). Furthermore, Dr. Wallace, whom ELIZA inspired, developed the chatbot ALICE in 1995 (Sharma et al. 2017). This was an award-winning open-source chatbot that created responses using AIML (Artificial Intelligence Mark-up Language). Chatbots have been used in particular for customer service (Følstad et al. 2018), but also in other fields like health care (Cameron et al. 2018) and education (Kerlyl et al. 2006). Several studies have been conducted on the possibilities of using AI technologies in public sector contexts. This can range from using Chatbots to interacting with users on procedures and other issues (Lommatzsch 2018).

2.3.2 Research on Chatbots

Since the 1960s, researchers have been developing and exploring computer systems that interact with users using natural language (Weizenbaum 1966). In recent years, there has been a surge in scientific interest in chatbot research, both in terms of exploring advances in their architecture and underlying technologies, especially artificial intelligence and machine learning, and improving our understanding of how people use and encounter these agents. Interaction with customer service through chatbots is a significant focus of the research field. However, chatbots for social and emotional support, knowledge, entertainment, and establishing user-machine interaction are also essential areas (Brandtzaeg and Følstad 2017). This paper would concentrate on chatbots as a service delivery channel.

Customer service is characterised as providing information, assistance, and support to an organisation’s customers; this is the most widespread industry for which chatbots are used (Følstad and Skjuve 2019). Chatbots as a self-service channel in customer service have gotten much attention in both research and practice because of their performance, cost savings, and automation potential (Corea et al. 2020). Customers participate in conversations with customer service chatbots mainly to have their (simple) customer questions answered quickly and conveniently, according to previous qualitative research (Adam et al. 2020) (Trivedi 2019) (Noordt and Misuraca 2019).

The number of students per lecturer has gradually risen in recent decades (Nicol and Macfarlane-Dick 2006). Giving individual assistance to students is becoming more difficult, and as a result, students are becoming less engaged (Brinton et al. 2014). Several studies have found positive outcomes by using chatbots in learning environments (Dutta 2017; Huang et al. 2017). The University of Georgia developed a chatbot to manage forum posts from students participating in computer science classes (Goel et al. 2015); this resulted in students becoming more involved and proposing this to be introduced in other classes as well. Researchers have looked at three major fields when it comes to chatbots for supporting students: 1) chatbots that are ideal for individual activities, such as assisting students in evaluating their class (Wambsganss et al. 2020), 2) chatbots with a single objective of becoming a companion/tutor (Hobert 2019), and 3) chatbots that are aware of chatbot specifications (Wolff et al. 2019)(Winkler and Soellner 2018)

The use of chatbots in mental health is another important field of research. Access to mental health care and treatments remains one of the most significant public health issues. Chatbots have been proven to be helpful in cognitive behavioural therapy and suicide prevention for individuals who may not want to communicate to a person (Hernandez). Trust, social presence, shame, and anonymity are four significant variables that influence whether people self-disclose and can impact the success of chatbot therapy (Croes and Antheunis 2020). In text-based chatbot experiences, research has shown that self-disclosure is related to increased closeness, liking, and trust (Chaves and Gerosa 2018). People say chatbot therapy is less beneficial and enjoyable than conventional human-human therapy (Fitzpatrick et al. 2017). However, it tends to be a more efficient and open tool for supporting people through therapy (Fulmer et al. 2018).

In the wake of the coronavirus (SARS-CoV-2) and COVID-19 pandemics, technology played a vital role. The pandemic has caused hospitals and health departments to be overburdened. In greater Seattle, Portland, and Los Angeles/Southern California regions, chatbots were used to screen patients for COVID-19 symptoms (Uohara et al. 2020). One of the health systems reported a 40% decrease in call volumes as a result of this implementation. In another study, Penn Medicine chose to launch a chatbot to help patients get answers to questions about Covid-19 (VolppKevin et al. 2020). They chose secure messages sent via the patient portal and information that patients often asked for while contacting the call centre. Possibilities to communicate with a clinician were still maintained, but just about 2/3 of those who did so went on to complete the discussion with the chatbot to one destination. However, about two-thirds of them moved on to complete the interaction with the chatbot, and 90% of them did so to one endpoint.

2.3.3 Variants of Chatbots

Chatbots can be classified in various ways, including by ease of user interface, algorithms, and the underlying technologies used. Gupta et al. (2020) classifies chatbots into three categories: contextual chatbots, menu/button-driven chatbots, and chatbots based on keyword recognition (Figure 2.4). Menu/Button-Based Chatbots are the most common form of chatbot today. These chatbots work similarly to decision trees; by choosing options, the chatbot will give the user the ultimate answers. This turns out to be a chatbot with low performance, and one cannot rely on it to provide the desired response. Keyword Recognition-Based chatbots use artificial intelligence to tailor responses based on a keyword list and algorithms. Contextual chatbots are the most advanced bots available today; they use machine learning and artificial intelligence to interpret the user's sentiments. The chatbot learns on its own over time when it encounters different experiences (Gupta et al. 2020).

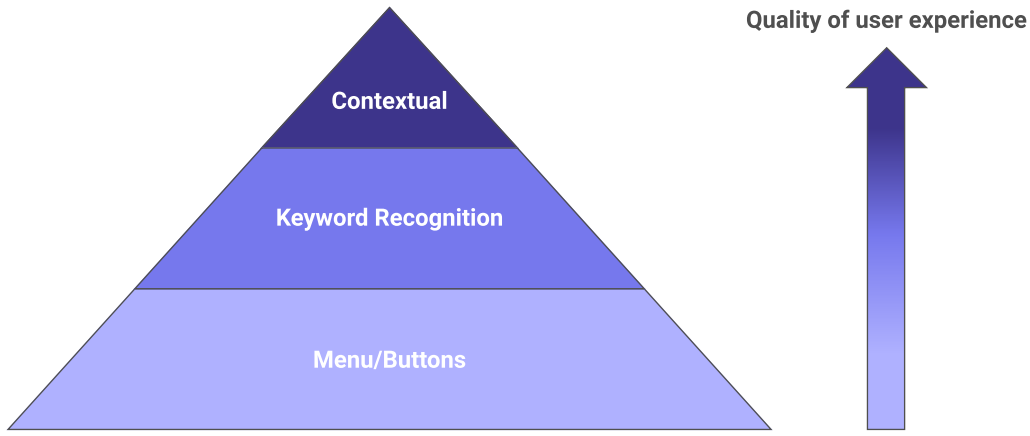


Figure 2.4: Preference of Chatbots. (Gupta et al. 2020)

Adamopoulou and Moussiades (2020), Hussain et al. (2019) and Nimavat and Champaneria (2017) classifies chatbots using parameters such as: interact mode, knowledge domain, goals, design approach, service provided, human-aid and build method (figure 2.5). The *knowledge domain* classification is based on how much data the chatbot can access or what it has been trained to do. It can be an open domain, which means it can talk about anything, or a closed domain, which means it can only talk about one area and will not be able to answer other questions.

The *service provided* classification is dependent on the number of intimate interactions the chatbot provides and is based on sentimental proximity. This can be interpersonal and is commonly used for restaurant reservations, flight bookings, and FAQ bots. This chatbot is not supposed to be the user’s companion; instead, they are meant to gather data and send it to the user; they are just enablers. Intrapersonal chatbots exist within the user’s personal domain and can be used in applications such as Messenger, Slack, and Whatsapp (Hussain et al. 2019). Inter-agents are chatbots that operate in IoT-dominated areas. They are two systems that communicate with each other to complete a task. An example of this is an Alexa-Cortana integration (Nimavat and Champaneria 2017).

Chatbots have a range of *goals* they intend to accomplish. Informative chatbots are intended to provide users with previously stored information. In contrast, task-based chatbots are intended to complete a given task, such as scheduling a flight or browsing a store. Chat-based/conversational chatbots converse with the user as if they were another human being, and their task is to respond to the user as accurately as possible (Nimavat and Champaneria 2017).

The *design approach* classification is focused on input processing and the response generation processes. To generate successful responses, three models are used: rule-based model, retrieval-based model, and generative model. A rule-based model selects a response based on predefined rules and understands the input text’s lexical structure without generating any new message responses. On the other hand, a retrieval-based model queries and analyses available resources by using APIs. The generative model produces responses based on current and previous messages, similar to what a human-like chatbot would do (Hussain et al. 2019; Adamopoulou and Moussiades 2020).

Human-aided chatbots use at least one human calculation from the chatbot. Compared to rule-based algorithms and machine learning, human calculations will have greater flexibility and robustness, but they will take much longer to execute. Chatbots can also be characterised based on their development platforms; this can be open-source and closed platforms. A chatbot designer would be able to intervene in most aspects of implementation using open source platforms. Closed platforms can serve as a black box, which can be a drawback depending on project requirements (Nimavat and Champaneria 2017).

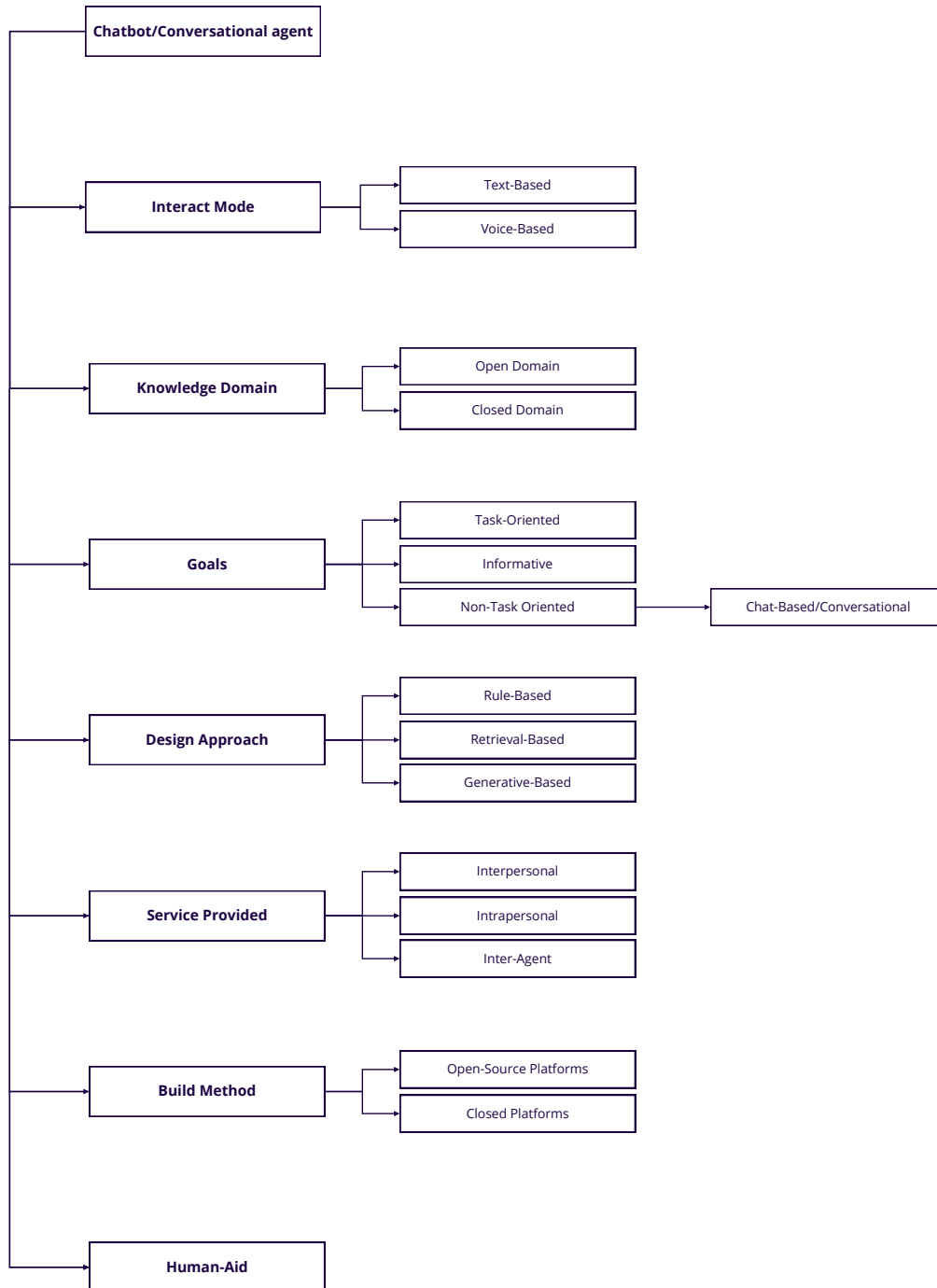


Figure 2.5: Classification of Chatbots. (Adamopoulou and Moussiades 2020; Hus-sain et al. 2019; Nimavat and Champaneria 2017)

2.3.4 Algorithms and Architecture

The most widely used algorithms for chatbots are: Naive Bayes, Decision Trees, Support Vector Machines, Recurrent Neural Networks (RNN), Markov Chains, Long Short Term Memory (LSTM) and Natural Language Processing (NLP) (Vijayaraghavan, Cooper et al. 2020). To determine the intent of sentences, chatbots primarily use classification algorithms. Topic modelling, which utilises algorithms like LDA and feature extraction (NLP), helps determine the overall topic or domain of a conversation. Decision Trees are great for figuring out how the chatbot landed at its classification prediction. At the same time, Nave Bayes is better for figuring out how confident the chatbot is in its prediction. RNNs and LSTMs are excellent algorithms for processing textual data quickly (Vijayaraghavan, Cooper et al. 2020).

We can divide chatbots into three types, as described in Section 2.3.3: Rule-Based, Retrieval-Based, and Generative-Based (AI-Based). There are several architectures, methods, and algorithms that can be used to develop a chatbot. We'll look at the most typical architecture for a chatbot based on Maroengsit et al. (2019), a study of 30 different chatbots. The user interface, which helps users to communicate with a chatbot and chatbot integration, is the most critical aspect of a chatbot system. Figure 2.6 illustrates the three key stages that a chatbot goes through: pre-processing, processing, and generation (Maroengsit et al. 2019).

The first stage is pre-processing, which involves retrieving data from the chatbot and preparing it for the subsequent steps. This stage primarily employs NLP (natural language processing), which includes pattern matching, parsing, TF-IDF which measures word frequencies, and word2vec, which converts text corpus to numerical form and plots them in a vector space (Maroengsit et al. 2019). Furthermore, natural language understanding (NLU) is used to process the text, and this stage will collect and handle the interaction based on the user's data. Techniques including intent classification, dialogue planning, name entity recognition, vector recognition with cosine similarity, lexicon, and long short-term memory (LSTM) help the model understand the conversation between the model and the user. Natural Language Generation (NLG) is the final stage, which is dependent on how the chatbot responds to the user. Lastly, as discussed in Section 2.3.3 we can differentiate between retrieval and generative bases (Maroengsit et al. 2019).

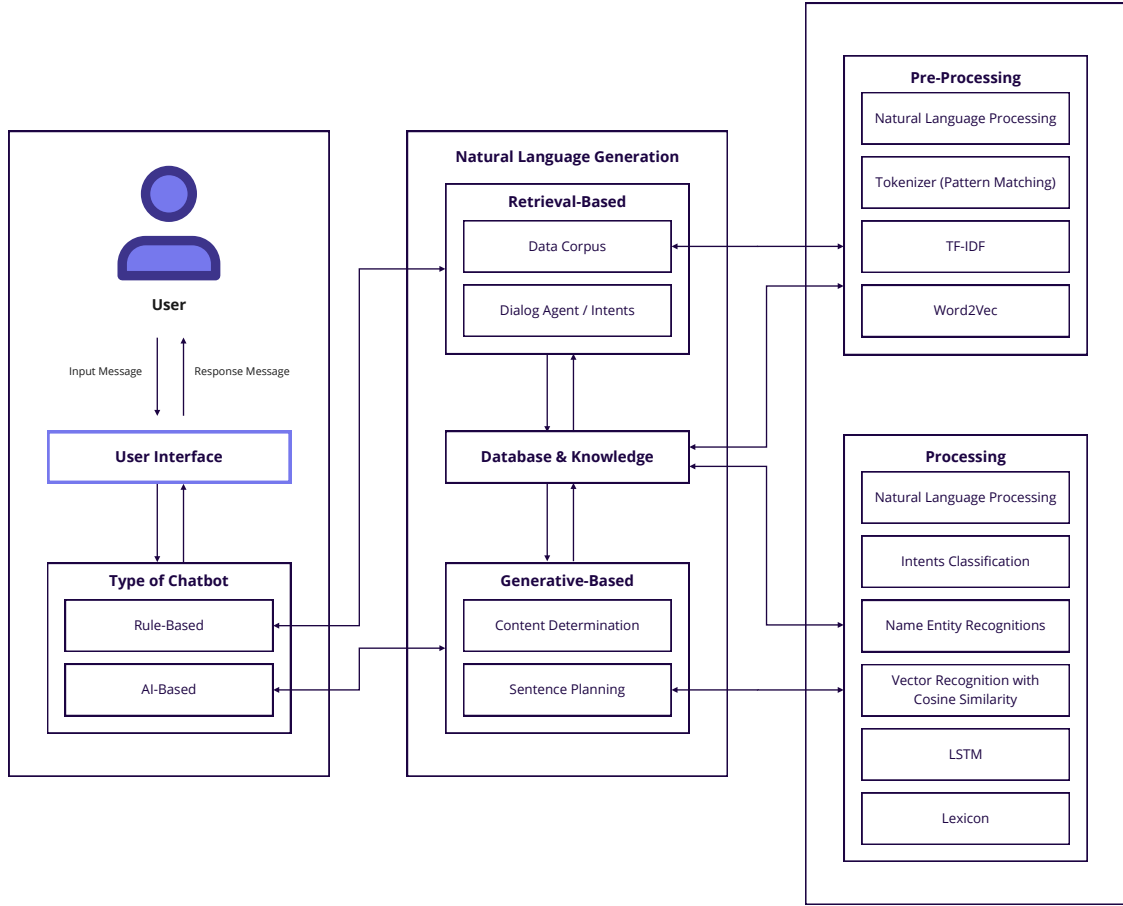


Figure 2.6: Chatbot architecture (Maroengsit et al. 2019)

2.3.5 Motivation to use Chatbots

People use chatbots for several purposes; however, Brandtzaeg and Følstad (2017) shows that efficiency is the primary motivation. A chatbot can be used 24 hours a day, seven days a week, and there is no need to wait in a queue, and it would give efficient assistance. Følstad et al. (2018) discovered that the chatbot’s inability to respond to more basic and complex questions limits the user’s options. On the other side, since the chatbot cannot judge the user, they feel more comfortable posing basic questions. Følstad et al. (2018) also found that informing the user about what the chatbot can and cannot do was critical. This is also mentioned in Section 2.2.2 that it is critical to avoid a mismatch between the citizen and the institution; this would also result in most people having more expectations of what the chatbot was capable of. Brandtzaeg and Følstad (2017) also found that chatbots helped to save time and made it easier and not least faster to get help or information. This served as a motivation for using chatbots. According to Hadi (2019), your mood will affect your chatbot conversation experience. They discovered that users who began conversations with the chatbot in an angry emotional state were less happy than those who started with a single human.

Nadarzynski et al. (2019) looked at the motivations for using health chatbots and

their acceptance. Users in the study thought chatbots were particularly helpful when they could not follow the advice given over the phone and felt that written material was easier to understand. Chatbots were seen as time-saving and a useful platform to guide users to appropriate healthcare services (Nadarzynski et al. 2019). Chatbots are also used in developed countries, according to Chopra (2019) a study conducted in India to understand better the motivation of young shoppers that use artificial intelligence technology as a chatbot where Vroom’s expectancy theory of motivation was included in this study. The motivating force for behavioural-oriented intervention, according to Vroom’s theory, is a product of three distinct components: expectancy, instrumentality, and valence (Van Eerde and Thierry 1996). According to this theory, shoppers prefer AI that is simple to use, competent in performance and create satisfaction, trust and rewarding experience (Chopra 2019). We can also see in Figure 2.1, based on the characteristics of different channels, that chatbot has the highest ease of use and the lowest stimuli richness compared to virtuality enhancing robots and physical social robots (Pieterse et al. 2017).

Another critical factor is trust, which influences motivation (Følstad et al. 2018), especially in the case of public service delivery. When it comes to a variety of services, user trust is crucial, and particular services require only a limited level of trust for it to get users to initiate and maintain an interaction (Bickmore and Cassell 2001). Chatbots can carry out several motives and tasks, but for them to be carried out with a good flow, trust is essential. Følstad et al. (2018) looked at users trust in chatbots for providing the necessary support. They found that factors such as the quality of its interpretation of requests and advice, human-likeness, self-presentation, and professional appearance, are essential for creating trust in the use of chatbots. According to Brandtzaeg and Følstad (2017), the most significant reason for using a chatbot is to increase productivity, and the bot’s ability to respond quickly and consistently was a key factor. The use of chatbots was often motivated by entertainment; it turns out that many users want to complete tasks in a social and fun manner (Brandtzaeg and Følstad 2017).

In another research performed by Følstad and Brandtzaeg (2020), who analysed 200 chatbot users experiences, getting assistance or help from the chatbot was one of the most often reported events when users were asked to tell about a good event. Another attribute contributing to a good chatbot experience was getting information and updates from a chatbot in the same manner as from a search engine. Entertainment and novelty were also two attributes that stood out in the same way as Brandtzaeg and Følstad (2017) mentioned; participants used terms like “fun”, “cool”, “entertaining”, and “eye-opening” when reporting their experiences. Users also reported that the chatbot had some similarities with a human agent, which was seen positively. In contrast, adverse experiences were also mapped, including the situations when the chatbot was not able to help, strange, dull and repetitiveness in the responses (Følstad and Brandtzaeg 2020). The users’ chatbot experience will also impact channel perceptions and future channel choices according to Pieterse and Teerling (2008).

2.3.6 Communication with a Chatbot

When it comes to communicating with a chatbot, multiple aspects must be taken into account: Zumstein and Hundertmark (2017) characterise the communication based on the emotional, psychological, and behavioural interactions between the user and the chatbot. Users want the chatbot to be courteous. They prefer not to be burdened with information, which should be provided in a courteous way (Zumstein and Hundertmark 2017). The extent of extroversion influences how users express themselves. Dominant extroverted personalities need more adverbs and adjectives than introverted people, and they often use the first person plural more often. Users prefer to communicate with others who have common personality characteristics (Reeves and Nass 1996). If this is valid for the chatbot, the chatbot can also use special language codes to determine the user's personality during the conversation and then evolve to take advantage of the user's personality by using similar language usage. Research shows that users prefer answers from a specialist rather than a generalist (Zumstein and Hundertmark 2017). As a result, the chatbot should present itself in a professional manner with human characteristics. When users communicate with a chatbot, gender is also an element that is taken into consideration (Zumstein and Hundertmark 2017). When it comes to technical questions, it turns out that users trust a male rather than a female (Reeves and Nass 1996). Users prefer a female to handle customer service requests or hotlines (Zumstein and Hundertmark 2017).

If the chatbot repeatedly provides incorrect answers or requires the user to repeat the same question, the chatbot loses credibility. If the chatbot fails to solve the user's question, the user will break the conversation. Users anticipate that the chatbot will consider the context of the conversation and will not repeatedly pose the same question back (Zumstein and Hundertmark 2017). On the other hand, if the chatbot expresses emotions, it would increase its credibility. Positively charged emotions can help to improve the interaction between the user and the chatbot; however, it should show as little empathy as possible. If the chatbot does not respond right away but instead takes artificial pauses to imitate a human, it would also be more credible (Zumstein and Hundertmark 2017).

When communicating with other individuals, people have clear expectations regarding privacy limits and guidelines about third-party disclosures, according to the CPM theory (Petronio 2002). In the context of technologically mediated communication, Petronio's CPM theory shows how individuals handle their privacy in interpersonal environments and has a lot of empirical support (Petronio 2002). If users expect the same factors from a chatbot as they do from a person, CPM theory will help us better understand how privacy-related situations play a part. Sannon et al. (2020) states that when humans and chatbots interact, they enter into a relationship of information co-ownership. People have expectations and rules for how the chatbot handles their data, according to the CPR theory (Petronio 2002).

2.3.7 Chatbots in relation to other Communication Channels

There has been a lack of studies comparing chatbots to other communication channels, and we will attempt to cover this topic in this section. According to Juniper Research, a chatbot conversation with a customer saves \$0.70 per interaction as opposed to calling via a traditional channel. Chatbots can initiate conversations based on the user's particular context, predicting consumer queries and interacting proactively with their users, displaying precisely the knowledge they need (Howlett 2017). Chatbots are often used to respond to simple questions where humans must step in if the situation gets too complicated (Haan et al. 2018).

In a study about the use of chatbot for restaurant takeaway orders (Leung and Wen 2020), they compared three different food ordering methods, which include phone ordering, online ordering, and chatbot ordering. They discovered that customers have lower cognitive attitudes toward online ordering than they do toward phone ordering and that online ordering (also recognised as self-service) produces the highest degree of satisfaction. The phone ordering method resulted in the highest levels of social presence, cognitive attitude and satisfaction. This method often reduced the order time. The satisfaction was also higher with phone and online ordering than with chatbot ordering. This could be due to shorter order times on other channels than chatbot. Since chatbots are not considered to be as social as humans, their sociability must be increased in order to increase their performance. Another study about factors that affect satisfaction with technology-based service encounter (Meuter et al. 2000) found that incidents where the user saved time, as they got information more quickly from a chatbot than waiting for a mail was one of the most satisfying incidents for the user. One of the defining characteristics of the intelligent channels is the higher level of stimuli richness, compared to most other electronic channels like e-mail as mentioned in Section 2.2.3 (Pieterse et al. 2017).

2.3.8 Adoption of Chatbots by Public Institution

The adoption of chatbots in public institutions defines a new research area that explores the possibilities and contributions of using AI in government service delivery. Androutsopoulou et al. (2019) explores the use of chatbots as a communication channel between citizens and government. The way citizens behave towards this channel shows that today's communication across digital channels has reduced the richness and expressiveness of the communication. This study has interesting implications when it comes to both research and practice. To utilise AI for communication between citizens and government, it is necessary to combine knowledge from chatbots, NLP (natural language processing), machine learning and data mining technologies. To make the most out of technology such as these, a "knowledge base" must be created. This must include essential documents, relevant internal data, and other data types that complex chatbots can deal with. It requires that public institutions are careful when building a knowledge base like this, especially when the data must be protected against unauthorised access and malicious attacks.

Chatbots have been used to offer public services in several countries. In Latvia, they introduced a chatbot that answers frequently asked questions regarding the process of enterprise registration (Noordt and Misuraca 2019). These are questions regarding businesses as well as the liquidation, merchants, companies and organisations. The chatbot was developed because the institution had to reply to many repetitive e-mails and phone calls. This was resource-intensive tasks that might have been automated using artificial intelligence. Another country that has also used the opportunity with chatbots is Austria, Vienna. They launched a chatbot called *Wienbot*, and this chatbot provided answers to questions citizens had about online services available in the city. The reason for this implementation occurred when the city discovered that several thousand searches for information on the services they provided were performed on the municipality’s website every month was repetitive. They found that users could rather ask a chatbot directly to get easy access to the information instead of searching on numerous separate websites (*WienBot - Smart City Wien*). The studies conducted by Noordt and Misuraca (2019) and *WienBot - Smart City Wien* indicates that chatbots implemented within the European public institutions provide a specific value for the citizens. Through increasing citizen-administrative communication by offering simple answers to frequently asked questions (Noordt and Misuraca 2019). It is worth noting that the chatbots in the studies will correlate to operations inside a single public institution, rather than being a chatbot with integrations across several institutions. Suppose the public sector truly wants to gain maximum benefits from emerging technologies, such as chatbots. In that case, it will require massive public reform, a change in organisational culture and a strong reflection on current organisational practices is needed (Noordt and Misuraca 2019).

2.4 Conceptual Framework

The conceptual framework presented in Figure 2.7 is based on the channel behaviour model presented in 2.2.1, consisting of three interconnected steps: **Channel Choice**, **Channel Use**, and **Channel Use Evaluation**. It is expanded with the knowledge accumulated from the background literature:

- In Section 2.2.5 it was shown that the Channel Choice is influenced by the **Channel Strategy** because it can affect the citizens choice even before an interaction takes place. Therefore it is added to the model (upper left) and is connected to Channel Choice.
- **Identified Factors** (mid left) resembles the factors from Table 2.1, merged into one concept. As stated described in Section 2.2.2, the complex set of factors drives the citizen’s decision, and is therefore connected to the Channel Choice.
- We supplemented the model with findings from the chatbot literature to bridge the gap between channel behaviour and chatbots.

- In Section 2.3.5 several motivational factors were highlighted for chatbot usage, adding **Motivation to Use Chatbot** (lower left) and connecting it to Channel Choice.
- In Section 2.3.6 multiple preferences in communication with a chatbot were highlighted, connecting Channel Use to **Communication with Chatbot** (lower mid).

We found very few studies that focused on the relationship between chatbot as part of multiple channels, which resulted in this study's motivation.

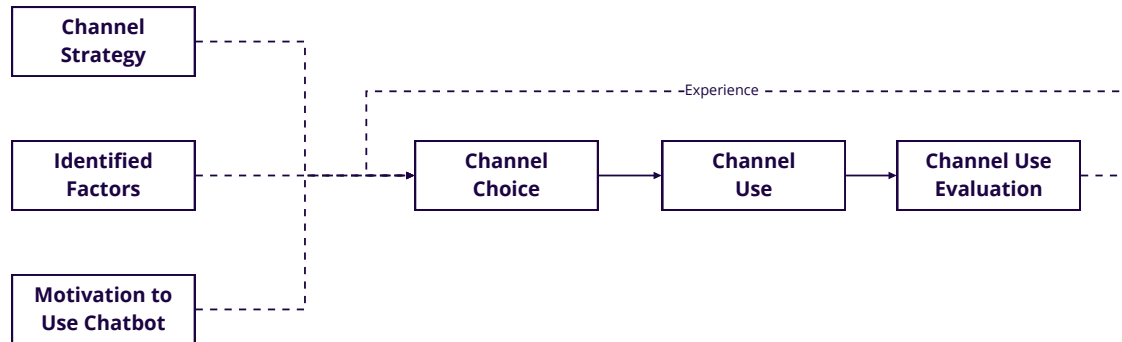


Figure 2.7: Extended conceptual framework based on Pieterse and Teerling 2008.

CHAPTER 3

CASE DESCRIPTION

The research in this project is a qualitative case study where we study how chatbot as a communication channel has affected the way citizens interact with Norwegian public institutions using chatbot as a channel. The data is generated through interviews with representatives of NAV and Skatteetaten and with users of the platforms in Norway. Additionally, documents provided by the institutions is used as supplemental documentation. These data sources will be combined to construct a thematic analysis in the following chapter.

3.1 About the Institutions

The two Norwegian institutions were selected on the sole basis of having implemented chatbot as one of their service offerings. The study does not compare the chatbots of the two platforms, and therefore we will not contrast the differences of the chatbots. Instead, this section only presents the two platforms, what type of organisation they represent, what service they offer to the citizens, and general information about their implemented chatbot solution.

3.1.1 NAV - Norwegian Labour and Welfare Administration

The Norwegian Labour and Welfare Administration (NAV) was established in 2006. NAV administers a third of the national budget through unemployment benefits, work assessment allowance, sickness benefit, pensions, child benefit, and cash-for-care benefit. The goal of NAV is to get the citizens in work and activity, provide the proper support schemes, and provide good service customised to the users' prerequisites and needs. The organisation employs around 19 000 people at 456 NAV offices in municipalities and city boroughs. The communication channels NAV offers to the citizens are face-to-face meeting, telephone, "write to us" (webform), chat, chatbot, social media, and video call.

NAV's chatbot started as a project in the summer of 2017, where a group of students developed the foundations of what is today called "Frida". The first version of Frida was publicly released on NAV's website in April 2018. At that moment, it was only available on the sites that embraced parental benefits area and could answer questions involving that theme. It has evolved, and currently, the chatbot is supposed to handle most types of inquiries. The chatbot itself is built on a chatbot platform delivered by a software company that specialises in conversational artificial intelligence, called Boost AI.

Frida is available on the nav.no website, represented as an icon in the lower right corner. By clicking on the icon, a chat window pops up to start the conversation with the chatbot. At the time being, the user is met with consent to process personal data, which is only shown the first time the user visits the website. After consenting, a greeting follows with a short presentation of Frida. Additionally, the chatbot gives two options to the user to click on: "for English, click here" and "I am a doctor or a partner". The reason for these two options is that the chatbot does not support assistance for those. Lastly, the chatbot asks: "What are you wondering about?"

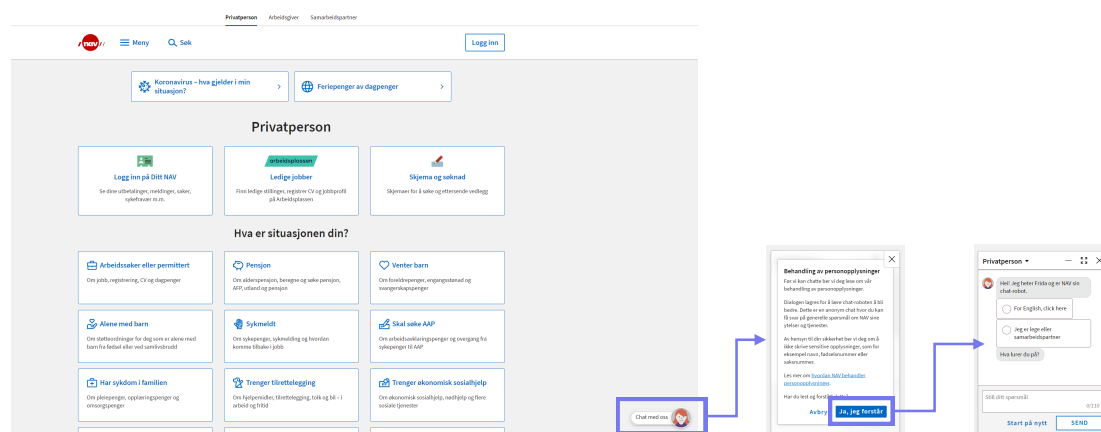


Figure 3.1: NAV chatbot - Frida

3.1.2 Skatteetaten - Norwegian Tax Administration

Skatteetaten is the Norwegian tax administration that is subordinate to the Ministry of Finance. They are responsible for an updated population register, and that the taxes and fees are determined and paid correctly. They employs around 7500 at 63 offices in Norway and offers face-to-face meeting, telephone, "write to us" (webform), webform, chat, chatbot and social media as its service delivery channels.

In 2016, a task group was established to examine how artificial intelligence could help Skatteetaten function more effectively. In 2017, IBM Watson (IBM) was used in a project that resulted in a proof of concept. The project showed an automated chat solution that could assist taxpayers with high-volume questions with a reasonable cost-benefit ratio. Several questions could be automated with the use of a chatbot. This project was expanded to a pilot project in 2018, with the goal of answering the question: "Will users who receive a response from the chatbot be satisfied?". If

the user was satisfied with the answer, they could conclude that a chatbot might benefit them. They discovered that a chatbot would be beneficial to them after conducting user tests. As a result, they appointed Boost.ai to develop the chatbot solution, which they use today. Skatteetaten launched their chatbot "Skatteetatens chat-robot" in 2019.

The chatbot for Skatteetaten can be found on skatteetaten.no under "contact us" and then the "Chat with us" button. The user picks their desired topic to talk about, the purpose of the inquiry, and then select the "start chat" button. This leads the chat robot in the bottom right corner to popup. The chatbot begins with a welcome message, informs the user about privacy, and links to more details about privacy. Finally, the chatbot asks, "What are you wondering about?"

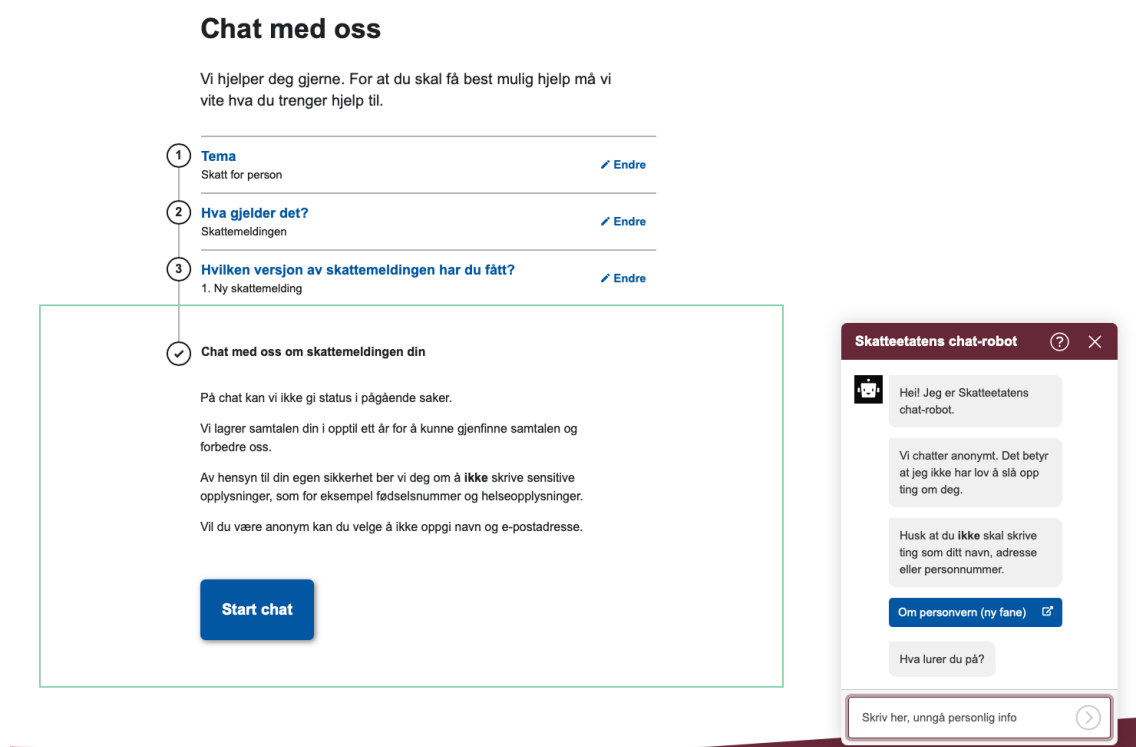


Figure 3.2: Skatteetaten chat-robot

3.2 Comparison of the Chatbots

Both institutions uses Boost.ai (Boost.ai 2021) as their chatbot provider; therefore, the chatbots have a lot in common. Both chatbots use a combination of button-based and keyword-based interactions. On the other hand, getting in touch with Skatteetaten's chatbot requires going through a step-by-step procedure. In contrast, NAV's is easily accessible in the bottom right corner of all NAV's webpages. Skatteetaten's chatbot is shaped like a robot, with the name "Skatteetatens chat-robot" and an icon that looks like a robot. NAV has gone for a more human-like approach, giving the chatbot the name "Frida" and a human icon. The chatbots also utilise various approaches to inform the customer about privacy. NAV displays a popup at

the start of the conversation, whereas Skatteetaten does it as part of the welcome message. On the other hand, both chatbots inform that they are the institutions' chatbot and tell the user to ask what they are wondering. Because both chatbots are domain-based, they can only answer inquiries inside their domains. When it comes to feedback, the user has the opportunity to press thumb up or down on the speech bubbles on Skatteetaten's chatbot. While at NAV, the user can only give feedback at the end of the conversations using a feedback form on NAV's chatbot. Another significant distinction is that, in addition to ordinary citizens, NAV's chatbot serves employers, doctors, and therapists, whereas Skatteetaten's chatbot only serves citizens.

CHAPTER 4

METHOD

This section presents the research questions for the study. Additionally, it introduces and explains the research method we used for generating and analyzing our data.

4.1 Research Questions

We came up with research questions that will state the specific problem we want to address, our research questions are the following:

RQ1: *How has the use of chatbots as a channel changed citizens' encounters with the government*

RQ1.1 *What factors motivate a citizens' choice to use a chatbot as a channel?*

RQ1.2 *What are the constraints of using the chatbot as a channel?*

RQ2 *What is the motivation for public institutions to implement chatbot as a service delivery channel?*

RQ2.1 *What role does a chatbot serve in a multi-channel environment?*

RQ1 investigates how chatbots have impacted citizen-government interactions. This is important to consider because public institutions and private sector companies have very different approaches to dealing with users of their services. In addition, the sub-question RQ1.1 would focus on variables that influence and motivates the

user’s choice of the chatbot as a channel. We do not believe the same considerations play in the citizens’ channel choice for chatbot as there are for other channel choices. As a result, we believe this is an excellent question to discuss. RQ1.2 would look at the limitations and constraints of using a chatbot as a channel. These are questions relating to previous research on service delivery channels and chatbots.

Furthermore, we address RQ2, which explores the motivation for introducing chatbot as a public service delivery channel from the institutions’ standpoint. We think it is essential to identify what motivates institutions to use this technology. Finally, RQ2.1 would address the chatbot’s function in a multi-channel environment. This question would explain the role of chatbot across public institutions channels.

4.2 Data Generation and Analysis

We used two primary data generation methods for this case study, which includes semi-structured interviews with both the representatives of the public institutions and users of their chatbots, and analysis of relevant documents provided by the public institutions. Thematic analysis is used to find themes from the interviews, which is then used to compare and extract findings from the documents.

4.2.1 Interviews

The interviews were conducted in a semi-structured format for both chatbot users and chatbot providers. We adopted an inductive approach to explore the relationships between the different channels, role and challenges with the chatbots since we did not know much about the two chatbots.

The interview with the chatbot providers was conducted with employees from the two public institutions mentioned in the case. The interview started with gaining insight into their day-to-day activities, including goal-oriented task management, how they transfer users between channels and how they collaborate with other channels. These were interviews that were further supplemented by the document analysis and were useful in understanding the channel strategy, goals, principles in language, and communication of the chatbot. These interviews were also helpful to create a better context for the document analysis. The employee interview guide is added as Appendix A.

The user interviews were split into two parts and focused on users of the two particular chatbots. The first part had a more transparent structure, with the purpose to explore what people had to say on how they contacted public institutions, as well as their opinions, feedback on chatbots and why they choose to communicate through a chatbot. Follow-up questions were also posed during this part. This part aimed to inductively explore users’ interaction with the chatbot and how they interacted with other channels while contacting a public institution. The final section was more structured, emphasising the chatbot’s functionality, ease of use, and the information it provides. The user interview guide is added as Appendix B. The findings from the

interviews were the basis for the context used to carry out the document analysis. In comparison, the document analysis served as a tool for expanding and specifying the findings from the interviews.

4.2.2 Thematic Analysis

Compared to quantitative studies, qualitative studies can be more challenging to evaluate, compare and synthesise with other studies on a given topic because we do not know how people went about analysing their data or what assumptions informed their analysis (Attride-Stirling 2001). To bring clarity on the process and to conduct it more rigorously, we followed guidelines provided in Braun and Clarke (2006). This guide is separated into six phases, and as specified by the author, it is more of a recursive process, where movement between the phases goes back and forth as needed. We will elaborate on the phases in the following sections.

Phase 1: Data Familiarizing

All the interviews were conducted, transcribed, read and re-read by us, and in that, we familiarised ourselves with the data. During this process, initial ideas were noted down for coding that was done in later phases. Using the conceptual framework in Figure 2.7, the ideas were noted down inductively.

Phase 2: Generating initial codes

We worked systematically through the entire data set and gave full and equal attention to each data item. Features that appeared interesting were extracted into *codes* that referred to segments or elements of the raw data or information that could be assessed in a meaningful way regarding the phenomenon. The coding was performed using the qualitative data analysis computer software NVivo and creating them as a system of so-called nodes. The process of assigning and creating nodes was done iteratively.

Phase 3: Searching for Themes

After initially coding and collating all the data, the analysis was done at a broader level by sorting the codes into potential themes. This was done in NVivo by creating new theme nodes and placing the previous low-level nodes within these. Codes that did not seem to belong to any place were housed under the theme "miscellaneous", which eventually either got replaced or discarded in later phases. Additionally, a mind map was created to give us a holistic view of the relationship between the codes, themes and different levels of themes (sub-themes).

Phase 4: Reviewing Themes

By reviewing the firstly created themes, codes were moved from one theme to another, a combination of several themes created global themes, new themes emerged, and some themes were discarded based on lacking support of data. During this phase, the themes were well defined, and we had a good idea of how they were connected.

Phase 5: Defining and naming Themes

The themes were defined, named, investigated and presented by analysing the data

within them, producing the outline for the results of this research. For each theme, a detailed analysis was written describing it and how it fits into the whole and in relation to the research question. This was done to ensure that there was not too much overlap between the themes.

Phase 6: Producing the Report

Finally, within and across the themes, a summary of the analysis was written that provides a concise, coherent, logical, non-repetitive, and exciting account of the story the data tell. Ultimately, this laid the foundation for the discussion and conclusion section.

4.2.3 Document Analysis

Document analysis is a method for systematically analysing and examining written and electronic documents. To gain an understanding and establish empirical knowledge, this data should be analysed and interpreted. Bowen (2009) is used as the base of our qualitative document analysis, with ideas from Altheide and Schneider (2012). We will look at the different steps in this process in more detail in this subsection.

Setting Inclusion Criteria for Documents

We had to decide which institutions that should be included, what types of documents, and when these documents were published to choose the documents for the analysis. Our requirements are targeted at public institutions that use chatbot as one of several communication channels. Presentations, reports, strategies, and other documentation were among the documents included. Three different organisations provided documents for their chatbot solutions. We discovered that one of them could not be counted in our definition of a public institution, so only documents from two of them were included. Documents published after 2015 were considered when determining the publication date.

Collecting Documents

Firstly, we examined the chatbot to see what it is capable of doing, what it can respond to, and what kind of information it can give us. We could not locate the documents we needed online, so we had to request them from the institutions. The majority of them are documents that are made available only internal in the institutions.

Categorise Documents

We categorized the documents based on Bowen (2009). This involves a total of five steps: first, do the documents provide information about the context in which the research participants operate? Second, Does the information in documents indicate any questions that should be answered or circumstances that should be observed as part of the research? Third, Do the documents have any additional research data? Fifth, Is there a way to track change and development in the documents? Sixth, Do the documents corroborate or validate conclusions from other sources?

Document coding and analysis

We started by determining who produced the papers, why they were produced, and whom they intended. This served to provide context for the papers, which would be helpful in the analysis part. We studied the documents in the same way as we did the thematic analysis. The first step was to familiarise ourselves with the documents, including developing an overview and identifying relations between them. Then, using the findings from the interviews as context, we were able to make valuable connections between the documents and the interview findings. Using the qualitative data analysis program NVivo, text relevant to each theme was highlighted and coded. We identified important themes and mapped a thematic tree in the second step, including understanding the documents. These themes were then merged with the themes discovered during the previous interview thematic analysis. Finally, we correctly determined the document's themes relevant to our research objectives and purpose.

CHAPTER 5

RESULTS

Following the thematic analysis process described in Section 4.2.2 in combination with the document analysis process described in Section 4.2.3, six global themes emerged from the interviews with the users and institution representatives of NAV and Skatteetaten (see Table 5.1). This section would describe the themes in more detail, where quotes from the interviews verify the statements. Quotes with citizen interview subjects are marked with ISC-X, and quotes with interview subjects employed at the public institutions are marked with ISE-X. Additionally, documents provided by the institutions that corroborate or validate these themes are included wherever feasible.

Global Themes	Organising Themes
Motivational Drivers	Task Complexity Habits Availability Efficiency
Communication	Conversation Challenging Topics User Groups Appearance
Language	Wording Information Characteristics
Attitude	Expectations Satisfaction Positive View and Experiences Negative View and Experiences
Trust	The Need for a Human
Strategy	The Role of the Chatbot Mitigation of Users

Table 5.1: Overview of global and organizing themes

5.1 Motivational Drivers

As chatbot is a relatively new service offered within a multi-channel environment, we looked at why and when the citizens choose it. Based on the interviews, several motivating factors were identified that drives the citizens towards choosing the chatbot.

5.1.1 Task Complexity

The citizens choice of chatbot as a channel is strongly influenced by the task they are set to solve. As expressed by most citizen interview subjects, they discriminate their choice heavily based on the complexity of their task or problem. They seem to reflect on their task characteristics before choosing a channel, and there is a great understanding amongst the citizens that the chatbot is not suited for complex problems:

"My biggest impact will be the complexity of the problem. Do I think that the chatbot can help, or do I think that it is a human being who needs to. It all depends on what I am wondering which will be crucial for which channel I use." - (ISC-1/1)

"That's what I think is the main point: "What is one wondering about?". If it is too complicated, you notice it immediately when you start writing, then it is unable to answer it." - (ISC-2/2)

As will be discussed later in Section 5.6.1, one of the primary roles of the chatbot is to free up capacity for the complex inquiries to come through to human supervisors. The limitations of the chatbot to handle complex inquiries are expected, and employees at Skatteetaten and NAV anticipate this behaviour by the citizens:

"The fact that we have Frida allows us to free up the capacity of supervisors to take the inquiries that are too complex for a chatbot to answer." - (ISE-7/4)

"... but then we see that if people have a case, e.g. they have applied for a probation certificate to get married, and then they wait to get that certificate, and they must have it before they have the ceremony, then it is more likely that they will call us or meet us in person because they realize that they do not resolve this on a general web page or chatbot." - (ISE-14/5)

5.1.2 Habits

During the interviews with the citizens, it was clear that most of them preferred the telephone to contact the public institutions, mirroring the background literature on channel usage quite well. However, exploring how they approached the selection of channel, their use and the reasons for their behaviour, a theme emerged.

Multiple users stated that when first contacting the public institutions, even if they initially said they used other channels and did not mention chatbot as one of them, their starting point was the chatbot. Meaning that even if they prefer and use other channels, out of habit, the chatbot is often a channel where they initiate the contact and try to get an answer first:

"Right now, I'm a little more open to it because no matter what I wonder, I would test out the chatbot before I call them. - (ISC-4/1)"

"First, I try to see if there is information already on the website because there is often information where you have to search a bit. When it's specific, and I can not find the answer to what I need, then sometimes I try chat robot first, but then I often feel that they can not answer exactly what I wonder, so I end up sending via such mail-like thing, where you enter and get a little more personal feedback after a few working days." - (ISC-7/1)

Trying the chatbot first in the hope of resolving the task on their own is a phenomenon that NAV is aware of. As stated by one of their employee's in an interview, it is a trend they believe will continue, especially outside the opening hours:

"... we will see a good number who will get answers a bit outside opening hours, try a little, e.g. if they are going to send an application and get so far that they find the application, but the moment they get stuck on something, then they come back again at nine o'clock the next day and ask again if they can talk to a human, so we get quite a few double hits on it with them getting help with what Frida could not answer them the day before." - (ISE-3/1)

Also, in an analysis of chatbot conversations performed by a Skatteetaten employee, it was shown that users often give the chatbot a chance. Users were found to have higher success rates when they had limited options of accessing other channels:

"From time to time, I read 100 sequential conversations. Then I count if the user finished, or did we have to refer him to send us a contact form or did he have to call about this. Sometimes conversations stop before I can guarantee if the user is happy, then we mark it as unknown and are very picky with this since it is the green [line] we want to be the longest. When we see people having conversations in the evenings when people have nothing to do but try again, they are a little more persistent in getting to the finish line more often." - (ISE-14/1)

5.1.3 Availability

The chatbot on both Skatteetaten and NAV are available at all hours of the day. The citizens express the excellent availability of the chatbot to be an essential factor for selecting it as a channel. Citizens often experience that they cannot reach the public institutions due to their opening hours and express that a chatbot is a good option in those cases:

"... it is between 09-15, you do not wake up at that time, or you have something to do, sometimes it is 09-13 you often lose that time period, and it is short. Also, everyone calls at the same time in the morning, and people also have lunch. The questions often come late at night and not in the middle of the day ... I think it is helpful since people are not at work all the time, and you can get answers to questions 24/7. In that sense, it is useful. You get answers to some questions, so it helps a bit."
- (ISC-3/1)

"The advantage then is that they can answer the questions at all hours of the day. Most agencies are closed on weekends and evenings, so sometimes it works very well; if there is something you are wondering about and you can not find on the website, then it can be a lovely way to get an answer to the question on a weird time of day." - (ISC-7/3)

These experiences are well mirrored in the activity that Skatteetaten experience during closing time. They have noticed that roughly 1/3 of the chatbot conversations are during hours they are closed, something that the availability of the chatbot has given the citizens. As stated by one of the Skatteetaten employees:

"What we saw is that approximately 30% of chat conversations take place outside opening hours, and it's new - that people get help outside opening hours. We do not resolve all conversations; we resolve 40-50% of them, but it means that 15% of the conversations are successful in the time that was closed before. About 1/3 (33%) are transferred to the supervisor, but those who are transferred are often in need of supervisors." - (ISE-14/2)

Furthermore, while the constant availability of the chatbot plays a significant role in the channel choice, the placement and exposure of the chatbot have a strong reinforcing effect. As mentioned earlier, NAV started making the chatbot accessible in one specific area and has now made the chatbot accessible on most of its sites. According to multiple employees at NAV, this has resulted in increased use of the chatbot:

"But at least at the beginning of Frida, Frida was only on the page about parental benefits and was very invisible on NAV.no. So it is clear... that as I taught her more, she came on several pages, and now she is on the front page of NAV.no. And follows you when you are on NAV.no. And that increases the use of chat." - (ISE-5/1)

"We started with Frida on one page, meaning that you had to, in a way, go through the "contact us" page, then you had to find a chatbox, and then start it that way. While now it lays... we developed an icon on Frida, which is in the bottom right corner, and it should be on about eighty, ninety percent of the time on nav.no now. And it haunts you. So we have in a way increased the availability significantly in recent months, and we also see the effect on when it comes to the evolvement of volume in Frida." - (ISE-1/2)

Similarly, Skatteetaten is experiencing the same effect. Introducing their chatbot within the tax return form made it more accessible and had a significant effect on the use, as stated by the Skatteetaten employee:

"For example, this year, we have for the first time set a small chat button so that you can chat on the actual tax return form so that when you are at the tax return form, you can start a chat with the chatbot. Last year you had the tax return in one window, and then if you wanted help in the middle of the night with the tax return and knew that no one would take the phone, and you did not find what you wanted on skatteetaten.no, and then you started a chat with the chatbot, then you had to "play" two windows. This year the tax return came on Tuesday the 16th, and last year on the first tax return day, there were only 1272 chat conversations, similar to the numbers this year. But on Thursday, we managed to get the chat button in place within the form, and that meant that we got more chat than on similar days last year. We got more chat, period, but we got a lot more because it was right there when you asked a question. This is my support for the claim that the channel's availability affects what people choose." - (ISE-14/3)

5.1.4 Efficiency

The chatbot has a significant advantage over the other channels to deliver a quick response to the user. Whenever the user types and sends a question, the chatbot replies within seconds. It is something that is widely acknowledged and appreciated by the citizens interviewed:

"I think chatbot is very useful; it gives you a kind of quick written message on what you are looking for." - (ISC-6/4)

"... therefore, I first try to look for information; if I can not find it, then I try the chat robots because then you can also pick up that you are linked in the right direction or get a good enough answer to get the answer quickly. And then, the last resort is to contact a human being because then there will be a delay in the response." - (ISC-7/4)

The quick response of the chatbot is often mentioned in correlation to an web form channel called "write to us" that both Skatteetaten and NAV utilise. The citizens often acknowledge that the response time is considerably longer there and that they therefore often try the chatbot instead:

"I think it's much easier. It's much easier than email and stuff like that. That's because it often takes several days, so I guess that's the best way." - (ISC-3/3)

"I felt like testing it out instead of sending them emails. I wanted an answer like that immediately, so I tested it out." - (ISC-4/2)

The correlation is acknowledged by NAV, as stated by one of the employees:

"We see that we may have the problem with the channel called "write to us" where you send a message and it takes approximately 2 days before you receive an answer. And many people perceive it as a chat, and the moment they realize that "now it takes a very long time before I get an answer", they contact other channels as well." - (ISE-6/1)

As mentioned by the NAV employee, citizens often express that they use the chatbot in addition to another channel. Often the citizens start with selecting another channel and switch to the chatbot in believe of a more efficient answer, as stated by one of the citizens:

"The times I have chosen chatbot, it has simply been because the queues have been too long. A good example is now around Korona times, where there have been extremely long queues on the phone. Either you give up or just think: "Okay, just let me use chatbot"." - (ISC-2/5)

Selecting the chatbot as a secondary or supplemental channel for faster response is something that Skatteetaten also is aware of:

"... a lot of work has been done in our division called user contact or user dialogue, where they believe that they can prove that some users are in a telephone queue, and while they are standing there, they enter a chat. They look at skatteetaten.no, call and chat simultaneously, and it has something to do with where they get the fastest answer." - (ISE-14/4)

5.2 Communication

Before we look at the chatbot's language use, it is worth examining how the chatbots communicate. Both citizens and institutions appreciated a smooth flow of conversation and noise-free communication with the chatbot. The citizens had issues with

the chatbot not always understanding them. NAV's chatbot provides alternatives for the user's questions. These were not as clear to the citizens. We can see that citizens often struggle with the chatbot not always understanding them:

"Sometimes there are minor errors when you send something to the chatbot, because it may not understand what I try to say. You also get alternatives, which may or may not be what you wish for. There are also chatbots where you do not get a alternative that is like: "The alternative I want is not listed above". There are simply lots of different suggestions of alternatives for what you may be looking for." - (ISC-6/1)

5.2.1 Conversation

When it comes to conversations, most chatbots are not able to communicate as human beings. Approaches can be developed by allowing technological advancements. When we addressed the question of chatbots potential to answer the citizens' questions, one of NAV's employees mentioned:

"It does not have the same ability to clarify as a human being has. But we have started to build a clarification base where the user can use words that are used in different settings. A typical example is words like "exemption cards". We have exemption cards for health expenses, we have a tax exemption card, and we also have a third exemption card which is a tax exemption card to cover the deductible of the exemption card. Therefore, we then received the clarification answer on exemption cards that asks "Do you mean exemption cards for this or this.."" - (ISE-7/1)

As previously described, the chatbot offers a variety of alternatives. The desired alternatives are necessarily not displayed to the user. As a result, the users often come to a halt, further unsure how to proceed to obtain the best alternatives. Several citizens have expressed their dissatisfaction with the lack of suitable alternatives:

"There can also be difficult situations where you in a way feel that, you do not get one alternative where you can move on with." - (ISC-6/2)"

Another interesting finding was that even though a citizen receives the correct answer, it is not what they actually wanted:

"If it says in black and white that I am not entitled to one or the other. I would soon call to genuinely verify or get the matter clarified carefully enough. So that I know I have not overlooked something, but I do not settle down until I get the response I want, obviously." - (ISC-8/1)

This was something NAV was also aware of. The answers were correct, but the satisfaction with the response was insufficient. Following that, it is important to note that the chatbot provided the correct answer to the user's question. As stated by the NAV employee:

"We often see that in fact they have received the correct answer, but they are then in a way dissatisfied. It may be that they did not like the answer." "I have asked for a right", but you are also told that you are not entitled to that right". I have so far received an answer to my question, but I am not satisfied with the answer I received. So it is also a challenge"
- (ISE-5/3)

The conversation's flow was one aspect that gave it a human-like quality. The flow was one of the reasons why citizens choose to call rather than use the chatbot. They could feel more taken care of and get the assistance they need more straightforwardly. These were important factors for the citizens:

"I prefer to call anyway, I feel that it is always easier, there is more flow in the conversation." - (ISC-2/1)

"I personally prefer to talk to someone, not over chat but over the phone. Because then you get more flow in the conversation, get more out of it. You can formulate yourself in the right way. At the same time feel that you have talked to a real person and got the help you need" - (ISC-1/2)

NAV had looked into it as well by using context topic - a technology enabling the chatbot to understand the users' context through the conversation. This played a significant role in achieving a smoother and more natural flow. The conversation became a bit more normal and less monotonous as a result of this. The terms used by public institutions have some similarities with one another; this may be different types of tax cards etc. People often use them to refer to the topic they began the conversation with, making the use of context topic valuable:

"We get a much more natural conversation flow by using Context topic."
- (ISE-4/1)

"The biggest advantage would be if the user-chatbot conversation seems a bit more like a normal conversation, because it should not sound like the chatbot is senile. If you haven't added Context topic yet, you can have a conversation about e.g. illness advantages, and the chatbot would respond with: "yes but what are you going to apply for?", at an abstract question further in the conversation. So being able to use Context Topic is a huge benefit. We use Context Topic where we believe it has a need."
- (ISE-8)

5.2.2 Challenging Topics

Sensitive topics, such as conversations about death, were challenging to communicate through a chatbot. When such topics arise, the NAV's chatbot transfers the user directly to a chat with a person. The fact that there were many emotions involved, whether the user was angry or sad, was one of the reasons they did it this way. So it was preferable that the user spoke with a human being rather than a computer. They were particularly cautious in this area, especially when citizens used terms like "death", "deceased", and "estate". They also noticed that the term "death" may be associated with many situations and has a wide range of meanings depending on the context. This has been taken into consideration in order to isolate themselves from the synonym list, as described by a NAV employee:

"We looked at it for people who use terms like death, deceased, and estate. There are terms like where they want to know about the deceased's year statement, for example. We've divided the terms in the synonym list so that each one is its own synonym, and we've also given responses to them. Some people still use the term dead: "My husband is dead", "where can I find the year statement?" for example. They still end up on the death intent and thus get an offer to be put over to a chat with a person." - (ISE-9/1)

The chatbot should also consider the fact that users might be in a vulnerable situation. For users of services by a public institution such as NAV, they may face difficult life situations. The institutions want to be careful under those circumstances, as stated by a NAV employee:

"There is a huge risk there, if something happen and if there is a wrong answer. There are user groups that have a lot of different challenges and it is something completely different than being a bank, for example, than being a telephone company and that there are often people in vulnerable situations and that is okay to take that into account" - (ISE-8/4)

5.2.3 User Groups

Depending on the users' digital situation, life situation, and the services they receive from NAV, it has been identified targeted groups who need additional information assistance. Residents of Norway and everyone with EEA privileges, employers, physicians, and other merchants are among the user groups they have to deal with:

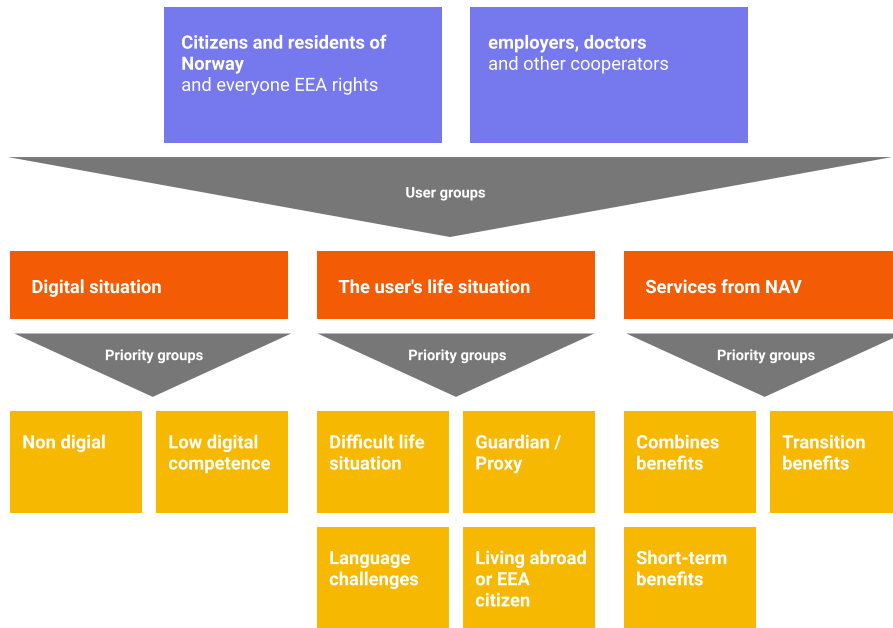


Figure 5.1: User groups at NAV that need extra information assistance

One of the difficulties with new technology is dealing with different user groups. This adds to the number of variables that must be considered when developing a chatbot. Employers, physicians, therapists, and event planners are examples of user groups NAV deals with. There may also be citizens with special needs in a challenging life condition, citizens with limited digital skills, and citizens who receive services for a limited period. NAV is actively working to handle such user groups for the chatbot, as addressed by a NAV employee:

"We have had a some more challenges in the last year with the fact that we are going to serve more user groups also in the chatbot. This has become an extra element that we must take into account, that we must receive questions from employers, doctors and therapists. We have actually had that before, but now we will actually serve them to a greater extent than we have done before as well. One element we need to consider would be: how to design answers and how to take care of several user groups at the same time." - (ISE-7/5)

NAV also added a filter solution so that the chatbot could consider the context in which the citizen contacted them, such as whether the user is an employer, a physician, or a therapist. The chatbot will then be able to have responses for the various groups more effectively. Since NAV is an institution that is large and complicated, the citizen can ask the same question and get different answers depending on their role. Employees have stated the filter as a supportive functionality:

"We launched this filter, which we will also continue to work with, where you choose which user you are. Whether you are an employer or personal user. We will eventually add more roles like doctors, collaborators etc.

It has been especially important for us that the chatbot understands the context with those who contact us, because NAV is so large and complex. can get in touch and ask exactly the same question but there are different answers based on who you are, and this is difficult to capture like that without further ado. Therefore, the filter solution is very important to us.” - (ISE-1/4)

Elderly citizens are one user group that has received particular attention. Citizens said, among other things, that when their parents used the chatbot, they faced immediate issues. The parents also composed lengthy messages with several typos. Elderly people, according to the citizens interviewed, do not have enough experience to figure out how to get the best out of the chatbot. A citizen also stated this:

”I think it’s pretty easy to use it for me but for example my parents would not understand it, among other things they would write long texts to the chatbot. I do not know what it is like with typos and things like that, but if it is not grammatically correct in a way. I think it’s a lot more easier for young people to use chatbot than older people.” - (ISC-3/5)

This was something NAV has considered as well, but which they had observed when users contacted them about pensions. Users interact with the chatbot as if it were a real person. As a result, this creates problems on how the chatbot predict the answers, as mentioned by a NAV employee:

”We also have a pension area that we started with in January, where we may see that it is not quite that simple. They formulate themselves as if the chatbot is a person and this would result to problems with prediction.” - (ISE-9/2)

Skatteetaten, on the other hand, prioritises citizens with frequently asked questions. If a topic receives many questions from users, the questions related to this topic are assigned as a higher priority than other questions. According to a Skatteetaten employee, this was done to improve the conversation with the user groups that use the chatbot the most:

”When we prioritize, we prioritize the users who have questions that are often asked. The chatbot is an offer that is successful for people, and when we put in more effort, we change the chatbot so that it becomes more user-friendly. If many e.g. 17-year-olds come and ask for a exemption card, we see that those conversations can be improved since there is no good outcome on them. Then we put a lot of pressure on creating a better exemption card conversations in the chatbot. We see that there are a lot of people who ask about things that have to do with d-numbers, work permits and tax cards for foreigners, and a lot of work has been put into making those conversations work well. ” - (ISE-14/6)

5.2.4 Appearance

The appearance of the chatbot is a controversial area. This includes, among other things, the chatbot's personality, design, and transparency. The chatbot's appearance is the first thing the users notice. Colours and logos are chosen depending on the style profile of the institution. A welcome message appears as well, where it is mentioned that the chatbot is a robot in the case of the NAV chatbot. Users do not read what is written on the message if it is long, so they kept it short, according to NAV employees:

"We had a big discussion about it quite recently and came to the conclusion that we would be more like others, who have no particular large welcome message. Because we want it as short as possible, so that users just get started. Because we know that, users do not read what is written in the message." - (ISE-9/3)

The NAV chatbot was created with a human-like interface. It has a human name called "Frida" and a human-like image. This was partly because NAV is a public institution, and they did not want to come off as cold and cynical to citizens. Instead of a robot, Frida desired to be more warm and human. As one As described by NAV employee described:

"NAV, and the government can seem very cold and a bit cynical towards citizens. So we wanted in a way to be a little more warm, and not be such a mechanical robot that only is there to answer you and refer you and so on. That the chatbot appears a little more human-like, without us giving it too many human traits." - (ISE-1/3)

One of the difficulties is that many users think the chatbot is a person. When assigned to a supervisor through the chat, some users are unsure whether they are communicating with the chatbot or whether they have reached a person. According to a NAV employee, the distinction was not very clear for some users:

"We see that there are some users who believe that the chatbot is a human being, and perhaps if it had been more robotic, both in appearance and name, then people would have communicated in a slightly different way as well. Because we hear that, there are some supervisors who also say that they experience being asked "are you a human or a robot?" when the user are transferred. It is not so easy to know if you whether still are communicating with a robot when the robot have a human name like 'Frida', and the one you are transferred to is called 'Karen', maybe." - (ISE-4/3)

Clarifying that Frida is a robot is also part of expectation management, and NAV has made several changes to the design, profile, and text to make the difference between human chat and robot clearer:

"Lately, it has been important to make it clear that Frida is a robot, ie expectation management. If we go back one/two years in time, it was much more difficult to understand that it was a chat-robot. It also had something to do with the fact that it was new in the society, people thought they met a supervisor at first glance. So then we took action on design, profile and text so that there will be a greater separation between human and robot." - (ISE-11/3)

It was also necessary to make Frida's communication more human-like, but in such a way that users realise they are not talking to just a human. NAV added artificial breaks in Frida, among other features, to make it feel more natural:

"Some of the answers can be a bit long. We have added artificial breaks there, so that they will come in bulk and will be more natural as if you are talking to a human being" - (ISE-9/4)

Skatteetaten's chatbot, unlike NAV, does not have a human name or appearance. This was based on the fact that when users believe they are talking to a person, the expectations are different from when talking to a robot. As a consequence, the user's needs could not be fulfilled. That is why the chatbot is referred to as "Skatteetaten's chat-robot" to emphasise that it is a robot. When asking why they did not have human characteristics to the chatbot, a Skatteetaten employee stated:

"It becomes obvious that when you expect to talk to a person, you expect a different degree of flexibility than users who think they are talking to a chatbot, so we have always said that "if user expectations are met, they should have the best possible chance to succeed". So it's more important to us that they understand that they are talking to a chatbot than that we get to profile them with a cool avatar or name. I see that this with a cool avatar and cool name is very much a communication group. Where they are concerned with seeing what kind of image we have, we are more concerned with how many users are successful. I am very strong that "Your image dose'nt make a better difference, if the experience is crap", "The image doesn't guide the experience, the experience is the image". That's why it's called the Skatteetaten's chatROBOT." - (IS-14/8)

NAV has been careful when it comes to the use of vocabulary, including the use of humour, jokes, and the addition of personality. This was done because the users could be in challenging situations, and not getting met informally might be harmful. They see this as a benefit because when people use jokes in the NAVs chatbot, they will not get further in the conversation. The users who actually need assistance are then filtered out. According to a NAV employee, this has contributed to the chatbot's increase in trustworthiness:

"So what NAV have done to lift that trust is among other things, put a profile on the chatbot with the same professional integrity as you get by

the meeting a supervisor on the phone. We have been very careful in the use of humor, jokes and so on. Which we see many other robots may have added as a little personality, so we have thought that here you will meet people who may be in a very difficult life situation and to be met with a joke can be very wrong when we have not clarified the situation. A good example of this can be that you are expecting children and take contact with NAV in relation to child support. Then it can be a very happy message for those who have wanted a child for a very long time. We could have easily programmed: "Congratulations, of course we will help you apply for leave" in the chatbot, but for some it is actually a crisis to get pregnant. Maybe you are in a health situation that puts your life and death at risk because you have been pregnant, and a robot cannot take all these preconditions until it gives you the actual answer. So that's why we've built the profile on the chatbot to be nice and informal in tone." - (ISE-11/4)

Users benefited from interactivity as well. Some thought it was necessary for the chatbot, whereas others thought it was entertaining. A user specified that being able to write and test different outcomes was a great benefit:

"Yes, it's a bit fun that it thinks by itself. That you can press some buttons, it's kind of interactive, then you can sort of try yourself several times on the different topics and see where you end up. "- (ISC-3/10)

This was mirrored in Skatteetaten's decision to make the chatbot button-based. They found that rather than writing, people preferred to press on buttons:

"What we have done in our chatbot, was to make it very button-based. On average, I think our users write fewer than two own messages per conversation. Often they come with a lead message, or two, but very often they complete the conversation by pressing on buttons that we offer them. And, it surprised me a little, because I thought maybe would write their own words, but people would rather click than write. It is much easier for the chatbot to respond correctly to a button you press, than a text you write by yourself." - (ISE-14)

Users also believed that chatbot responses were impersonal and that they could tell it was a chatbot on the other end of the conversation rather than a person:

"You notice that there are impersonal answers, that it is a robot sitting on the other end and not a human." - (ISC-1/4)

"It's very impersonal" - (ISC-6/6)

The fact that the chatbot is open and transparent on what it can and cannot do managed to define the expectations. In essence, NAVs chatbot says it can answer short questions and asks the user to let it know what they are looking after. It was important for NAV employees not to provide unrealistic expectations about what the chatbot could do for the citizen:

"In the welcome message to the chatbot, it says that it can answer short questions and it would also asks you to mention the support or benefit you need help with. It is important not to set the expectations too high, because we often see that things are not going so well. So it is important to have such a realistic expectation of what the chatbot can help with, and it helps the chatbot when the the user writes briefly and concretely"
- (ISE-5/3)

In comparison to NAV's chatbot, Skatteetaten's chatbot begins each conversation by informing the user not to disclose personal details. Users positively received this:

"The chatbot to Skatteetaten immediately tells you not to share any personal information, and that it can't go into my information and tell me about my tax deduction or tax card specifically. So then you know right away that you are limited to only get answers to general questions, you get it very clear right away what it can and cannot do. " - (ISC-1/5)

NAV's chatbot can also only answer general questions. However, explaining to citizens what "general questions" entails is a challenge. Making the difference between what is general and what is specific to a citizen can be difficult at times, as one NAV employee put it:

"It would have been nice if we could make them understand this with the fact that the chatbot could only answer general questions. But we know that it is a challenge for people to understand what lies in the concept of "general questions". Maybe someone thinks that questions about my payout is a general question, while we consider it a question about the users own case. The dream scenario had been that if people understand what it mean, and that they could have had an expectation about receiving help with general information from Frida. But then you have to be able to be sure that people know what is in that concept first and foremost."
(ISE-7/8)

The chatbot also did not provide information about whether the conversation was saved or not; this created uncertainty among users. Users also discovered that unless they asked many questions and were given several alternatives, the chatbot did not have enough details on what it might do:

"You can't do that because you ask a lot of questions to get a lot of different answers. There is no such thing as a guide for it, or a section of a website that says the chatbot should answer this or that. It's almost like when you ask for it and it asks back: "How can I help you?". Then you start posing questions, and you eventually get more choices and responses. Then you end up with a idea about what the chatbot can do. Then you continue to write one or more words into the chatbot, and you're hoping the response you want will appear there. " - (ISC-6/7)

5.3 Language

Both the chatbot and the citizens need to adapt their language to get the best possible outcome of an interaction. The chatbot knowledge base consists of a vast amount of information, and the challenge is to present this in a comprehensible and understandable manner. On the other side, the user needs to ask the questions in an understandable way for the chatbot. Both the chatbot and citizens are challenged to best possibly express themselves, constrained by technology and human behaviour.

5.3.1 Wording

When communicating with a chatbot, one can not simply do it in the same manner as with a human being. For the best possible outcome, the user has to write short and concise sentences. It is something the citizens have experienced when using the chatbot:

"... I had a question, and I could not formulate it as a sentence, it became, in a way, a small paragraph, and like then, I do not feel the chat robots manage to capture the essence of what I am wondering." - (ISC-7/5)

" I have the experience that if I write whole sentences, the chatbot picks up a word that is not relevant to what I am asking about, and then it is completely lost." - (ISC-8/2)

This is something that NAV has noticed, where one of the employees calling it one of the greatest challenges with chatbots:

"The biggest challenge is that people do not know how to write to a chatbot. They are unable to distinguish between talking to a human being and talking to a computer. It is as if we are talking together, then it can often be a long dissertation before they get to the point. By then, the question has already been ruined by a lot of words that create noise, which means that the chatbot is unable to get the right answer or answer at all." - (ISE-7/6)

To address this problem, NAV has taken on a mission to create content to educate people in using the chatbot correctly and for the right purpose, as stated by one of the employees:

"It is about training people to use a chatbot in the right way, and this training materials that are worked on at the NAV contact center, which we can hopefully get posted, to show people examples of good and bad conversations, words you use, how to get the most out of a chatbot" - (ISE-4/2)

With that being said, the citizens interviewed has expressed that they have learned to adapt to the chatbot. Many express that they have learned to use it more effectively by not communicating with it like with a human and by shortening down their sentences:

"I skip the nice bit: "Hi, I'm wondering about this here", I skip this bit and just write "Korona leave after three months", I also write it pretty quickly. Like a google search in a way where one does not have too many words. Then I feel that things are going better. If I use the chatbot several times, I have probably read some information about what I need. Then I realize that I have to use some specific words. Then I will remember it until next time." - (ISC-3/6)

"It's more about knowing and learning how to ask the questions that are a little difficult because, like me, I talk a lot, so I have to work a little to shorten and concretize: "one sentence and no more". - (ISC-7/6)

The evolving knowledge of using a chatbot is something both NAV and Skattetaten have noticed. They mention that while some people do not adapt to the chatbot, others seem to change their wording during one single conversation. Employees from Skatteetaten and NAV have similar experiences with this:

"While you can see in other conversations that this user understands the difference between chatting between a machine or a human and has learned many tricks like writing short and just keywords, not too much context (chatbot understands context very poorly). Some people start by giving lots of contexts, then they get feedback from the chatbot, and then they adjust their communication style; they learn to communicate with the chatbot during the conversation. Having a successful conversation, and I think: "Wow, you were smart", but others do not change their communication style at all and only get crap from the chatbot." - (ISE-14/7)

"There are many that you in a way see improve during a conversation, such as if they write a long, meaningful sentence, e.g. "I was just at the

store, I did not have money to pay for the food, do I have right on social assistance for food?” and when Frida says that she does not understand or perhaps that there are suggestions that they should choose the right answer, you often see that people often moderate themselves during the conversation.” - (ISE-8/2)

Many citizens mention using a catchphrase or specific actions that make the chatbot initiate an offer to talk with a human being straight away. This way, the citizens only use the chatbot to be transferred to another channel:

”You always start with the chatbot, the only thing I do is write something wrong so that it does not understand, so that it asks me to be transferred to one person at once. Then I press it, and come to it. So I use that chat feature” - (ISC-5/1)

”And many times, I use it to get directly to a person, because I think it’s just as easy to write to them, or even better to write to someone physically than to call, so I may use chatbot just to get directly to chat with an actual human being.” - (ISC-8/3)

Both NAV and Skatteetaten have seen from their chatbot logs that citizens often use this trick to get past the chatbot and straight to a human. As stated by one NAV employee:

”We can see that those who are familiar with talking to chatbots in general, who are used to having to go through chatbots to make contact with people, often go very fast to start writing ”human”, ”person”, or ”supervisor” or something like that. Because they know that most likely, it will trigger an offer to talk to one person.” - (ISE-7/7)

Skatteetaten has looked into this matter and found there is an increase in citizens using this trick (see Figure 5.2). However, they state that the increase in this behaviour does not necessarily directly imply that the chatbot is performing worse but rather that the citizens have discovered the possibilities of the chatbot, knowing they cannot solve the problem using that channel.

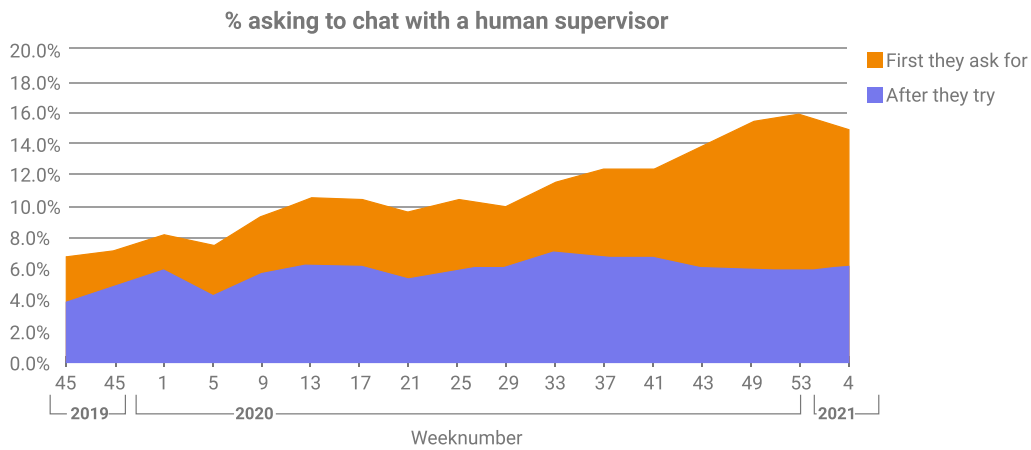


Figure 5.2: The amount of citizens redirected to a human after trying (purple) versus those that ask for it straight away (orange)

The use of chatbot and learning how to communicate with them is especially challenging for citizens with poor Norwegian language skills. As the chatbot at NAV and Skatteetaten does not support the English language, it is a significant obstacle to use the channel. Some of the employees at NAV mentioned this issue:

"... but it is clear that we see that we have a good number of users who have language challenges, for example, and we read through the inquiries and see what comes there." - (ISE-6/2)

"But if there are too many typos, or too bad Norwegian or a very long sentence, then the answer comes with putting you over to a human being, then we simply cannot manage it." - (ISE-11/2)

On the other side, one of the employees at NAV view this the opposite way and sees this channel an excellent opportunity for these type of users:

"It is a huge advantage for those who are foreign speakers; we see that there are often some who, e.g. can translate in google translate and then paste in a somewhat strange worded Norwegian question, but in that way now gets access in a completely different way, when they may not feel comfortable calling in and asking and be put over to the NAV office and stuff like that." - (ISE-8/3)

It is worth noting that both Skatteetaten and NAV have implemented ways for non-speaking citizens to get transferred to other channels quickly. NAV's chatbot starts with offering a button for English speaking that transfers the citizen to another channel, while users that access Skatteetaten from the English version goes directly to human chat, not even interact with their chatbot. However, as will be discussed in Section ??, the support for English is something that is planned to be implemented in the future.

5.3.2 Information Characteristics

The information that is provided by the chatbot is what is found on the institutions' website. The chatbot provides this information in the form of short answers and links to specific areas of the website or links to channels suitable for solving specific tasks. Instead of searching for the information on the website itself, which can be overwhelming, the citizens acknowledge that a chatbot is a good tool for doing this work:

"It is much easier than looking around on websites because there is a lot of information out there." - (ISC-7/7)

"If you are looking for information on their website, then the chatbot is a good option." - (ISC-3/7)

However, the information provided by a chatbot is not always accessible for the user to use. The length and the amount of information provided can often seem overwhelming for the user. The number of answer alternatives and options to continue on the topic is sometimes seen as overwhelming. This is stated by some of the citizens interviewed:

"What I feel about NAV's chatbot is that it goes too fast and that you get a lot of information in the small space, in a way. I have to scroll up in a way to see all the information it has given me. It does it very fast; I try to read it, and it goes up and up. You can make it bigger, but I do not bother to have it full screen either." - (ISC-3/8)

"... all the options are in there simultaneously; it could be that it gets too long or that you get a lot of options in the end." - (ISC-6/5)

This problem is something that NAV has looked into for quite some time and have clear guideline around how the answers should be structured. In the institution's principles for tone, language and style, there should be a maximum of three choices or so-called "action buttons" for the user to choose from. Nevertheless, as some of the NAV employees express, this is not always easy to accomplish, especially for some service offerings:

"I make answers for those who are on social services. There it can be a more significant challenge to get enough information in the chatbot because there is often a trade-off with getting enough information that may take up significantly more space, but still, compress the information to be as small as possible so that it is user-friendly. And on social services, there are completely different laws that apply, it is the municipal side, while the other benefits are state laws, so there is such a huge difference

from municipality to a municipality in how it is organized and things are treated, and it is perhaps not the same principle of equality and just as evident if one has rights, such as in a straightforward way as it is on state benefits, such as unemployment benefits and sickness benefits, that either we are inside or outside. So it's a bit like getting out what you are entitled to in a good way, and you can in a way not write 40 text bubbles in Frida with how social services in Norway are organized. So that is perhaps the part that one must always look for and find a good balance between making us understood and getting the person to apply, without saying that: "everyone should receive social assistance, apply now!"." - (ISE-8/5)

5.4 Attitude

Citizens have varying attitudes towards chatbots. It is often determined by users' expectations and whether or not they are satisfied with the chatbot. We mapped out positive and negative views, as well as impressions, through the interviews.

5.4.1 Expectations

Before we look at the users' experiences, we need to know their expectations from the chatbot. Some users wanted it to handle the issues before they could start using it actively. They wanted it to be able to answer complex questions in particular. Users expected to get a slightly more concrete response to their questions:

"I simply want the chatbot to be better before I start using it more actively, that it can answer more complex questions and things that are about me and not just that in general." - (ISC-2/3)

"So yes, more personal follow-up and a deeper understanding of complex questions is needed." - (ISC-7/8)

This was also something Skatteetaten had noticed that users expected. As things get more complex, it will become more about the individual and personal details. In those situations, sitting with the users was preferable rather than using a chatbot. An employee at Skatteetaten concretised that they do not create the chatbot to provide data that is exclusive to the users:

"The fact that the chatbot will handle more complicated things: what is more complicated than what we handle now is what is more individual. In the case of: "Why have I received 33,000 in residual tax this year and I did not receive it last year, but everything is the same", this requires that you look at the data with the user. It's not something we create a chatbot for." - (ISE-14/13)

Information from the chatbot was often available on the web pages, and some users were also aware of this. They believed that the information provided by the chatbot was information they knew before through the website. They get in touch through the chatbot to get new information, which is not on the website. Users have compared this with calling the institutions, explaining that they did so because the websites did not have enough information. They also wanted the chatbot's responses to be as specific as possible; this was also something a user specified:

"There are things you can actually search by yourself, without needing the chatbot to find it for you. That is often the reason why you call them by the phone instead, the reason you contact a chatbot is because you do not get the answer on the web page. That I'd like a more concrete answer or an expectation of my question to be answered." - (ISC-6/8)

According to a NAV employee, the chatbot to NAV mostly retrieves information from nav.no, so the chatbot is involved in assisting the website:

"We also mainly get information from nav.no. So information from frida will help us to assist with what is on nav.no." - (ISE-10/1)

Many users experienced that the chatbot was helpful, but not to the degree that they desired. They stated that the chatbot assisted them in locating information but did not have a direct response. This was not what one of the users had expected:

"I expect a chatbot to be able to help me with what I'm really looking for then, and try to give you the answer to what you're looking for." - (ISC-6/9)

Furthermore, users reported that the chatbot only worked as a guide to where the information could be found rather than giving the information itself. Users often expected a fast response to their questions rather than a link to the information:

"I quickly find out if I get the information I need or if I have to search further and commonly the chatbot gives me a short answer. Possibly with a link further, that it answers as best as it can and says "here are the regulations for this and that" and then you can go on to a link and read carefully. Resulting that you can use the chatbot to get to the part of the page you wanted to start with." - (ISC-8/4)

Besides that, some users expected the chatbot to refer to a person rather than links:

"I also expect the chatbot to refer me to a person who can answer questions about the topic I want." - (ISC-3/11)

NAV acknowledged that users had different expectations but added that this was based on previous chatbot experiences:

"There will always be changes in users expectations as other services evolve and users become more accustomed to having communication with a chatbot elsewhere. That bar will constantly move on to what they can expect." - (ISE-4/5)

Users felt they did not get assistance with personal issues because they could not exchange sensitive information with the chatbot. There were only general questions it could respond to:

"A chatbot can only help me with general questions. When I ask general questions, let's say we have NAV, and I use Frida, and then I ask: "how long does unemployment benefit last", and it is 52 weeks or 104 weeks depending on income and such. I think you can get answers to such simple things." - (ISC-2/4)

This was something users expected the chatbot to do. That it only can answer simple questions and not be able to give answers to everything:

"I expect the chatbot to help me with very simple questions, which one might find answers to FAQs." - (ISC-3/12)

5.4.2 Satisfaction

The degree to which users are satisfied with their responses is essential for the chatbot's success. It is measured for NAV's chatbot depending on the user's feedback form after the conversation is over. They found that only about 30% of people are satisfied with the chatbot's assistance, compared to 80% for the supervisor through chat, as stated by a NAV employee:

"The best success criteria are if we get concrete feedback from a user that they got what they needed from the chatbot. That is the challenge, to get that information because we have a "did you get an answer to what you were wondering?" question, but it is anonymous. It can say that it helped something with family or work cases, but it does not say more than that. If people are dissatisfied, we do not know why they are dissatisfied, the survey that says if people are satisfied with the chatbot says that about 30% are satisfied with the help they get from the chatbot. While with chat supervisor the same number is 80%+, so it is a great distance. If we can reduce that distance a lot. Then it will probably be the biggest success." - (ISE-4/7)

NAV also works on what they can do in their subject areas to react to their feedback. When they do this, other entities in NAV are frequently involved. According to a NAV employee:

"It depends a bit on what the feedback is about, if there is something specific in our subject areas. We will look at what we can do in the chatbot. But often we see that there is room to involve others who work outside the chatbot team as well. Such as NAV.no for example that there are some steps we must take there. That will improve user satisfaction in the chatbot." - (ISE-7/11)

Skatteetaten, on the other hand, allows users to give thumbs up and down. If the user is satisfied, they can press thumbs up, and if they are dissatisfied, they can press thumbs down. They have the opportunity to provide feedback both during and after the conversation. This has proven to help gain insight into the users' satisfaction, according to a Skatteetaten employee:

"They have the opportunity to give feedback at the end of a conversation, it is rare that people bother to give positive feedback. On a good day 2% positive feedback and up to 8% -12% negative. It looked pretty similar at the beginning of 2021, we also came on Thursday with the chatbot into the tax return form. We have never seen so much positive feedback as we got the tax return in the chatbot. It continued to be twice as positive all the way." - (ISE-14/16)

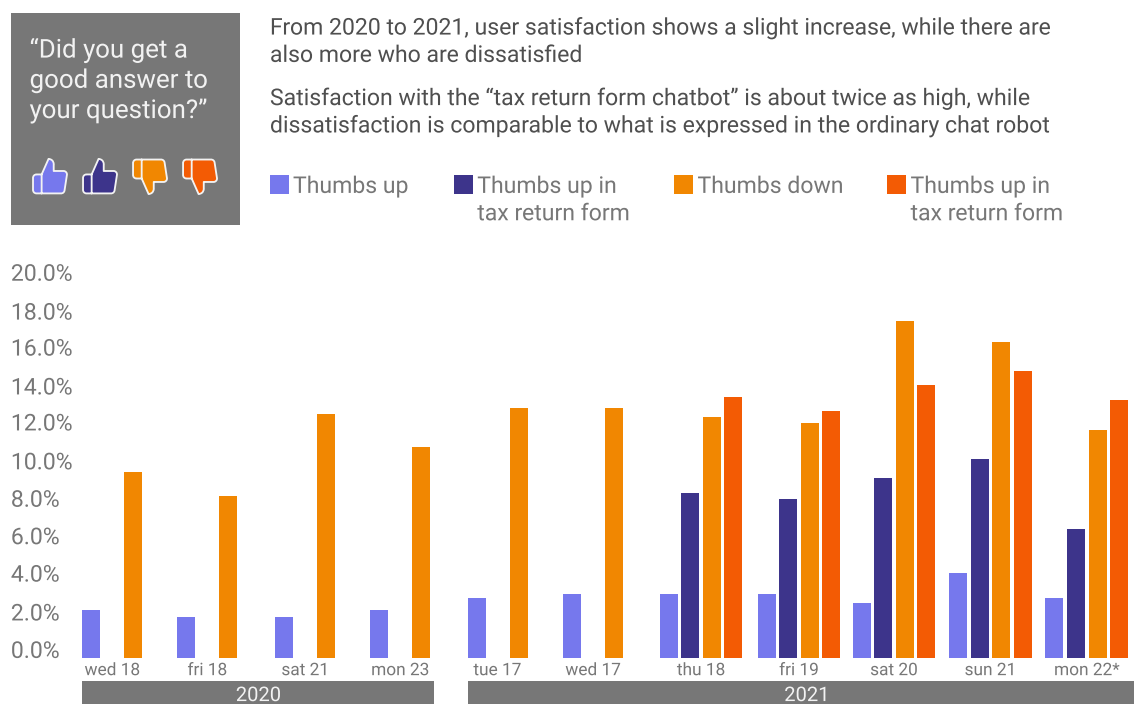


Figure 5.3: User feedback during the tax reporting period 2020 and 2021

NAV removed this feature because they thought it was unnecessary to get a thumbs up and down on all of the dialogue bubbles. However, in retrospect, they have changed their minds, and it is something they will implement again in the future because employees at NAV have shown a need for it. This functionality would indicate which responses users were satisfied with or dissatisfied with and whether they received help from the chatbot. According to a NAV employee, this was advantageous functionality:

"We took away that functionality, it was something we did not wanted to have. Because we felt it was wrong that there should be thumbs up and thumbs down on everything, all the speech bubbles as it was then. So I'm not quite super happy for that one, but chatbot coaches were very clear that this is an important thing to get in place for their job. That it's easier for them to find out what works and what doesn't." - (ISE-1/10)

Users, on the other hand, state that the chatbot is helpful but that they become dissatisfied when they ask more complex questions:

"The chatbot helps, but not to the extent I want. As soon as I ask something a little more difficult and complicated, I would loose my satisfaction." - (ISC-2/6)

5.4.3 Positive View and Experiences

Many users had a positive view of the use of chatbot. They thought it was great that it was there and that having a chatbot rather than not having one was good. Several users said it could not take the place of traditional customer service. The fact that the chatbot served as an alternate way of avoiding waiting a long time for a response was an advantage for the users:

"I think it's easy to use because it is often easily accessible on the website and in terms of design you get things written in the chatbot easy, you get the answer very quickly, so there is no obstacle there." - (ISC-7/9)

The vast majority of users is in support of automating customer service. They experienced that things were going faster and that they could get some help if they were stuck. The idea that a human being was still accessible through other channels provided a sense of protection. Users wanted to get through simple and straightforward questions as quickly as possible:

"It's just positive that things are being automated, I think it's good that things are more efficient. Then I think it's nice that there is always a person nearby. So for simple, easy things to go through, then it is nice to get through as quickly as possible." - (ISC-1/7)

The chatbot has also evolved in recent years, according to users. Some users expressed that the threshold for asking the chatbot questions was low. Also, some users enjoyed using chatbots:

"It can be a little fun sometimes. You can ask it as many questions as you want, or you can kind of restart the whole process." - (ISC-4/7)

"Yes it's a little fun that it thinks a little by itself. That you can press a some buttons, it's kind of interactive, then you can sort of try yourself several times on the different topics and see where you get." - (ISC-3/14)

On the other hand, the experiences of other chatbots played a role. Several users had previously used chatbots from different banks, and this was often the first meeting they had with chatbots. Some users experienced NAV's chatbot better than the previously used chatbots:

"I would say that NAV's chatbot are quite a lot better than DNB's. Because they sort of give alternatives that you might ask about, then you might click on the alternatives and then they become more specific. Then you can ask more questions" - (ISC-3/15)

The fact that one did not have to formulate the questions but only had to compose specific keywords was considered as a plus:

"I often get good feedback/answers to what I'm wondering. You do not have to formulate the questions specifically, and they understand well what you are asking about." - (ISC-4/8)

Both the NAV chatbot and Skatteetaten chatbot have alternatives users can click. Users were given the option of selecting the alternative that was nearest to relate to their answers. This worked in many ways as an overview of what users might be wondering, as stated by a user:

"Not only do you get an answer right away about what you are wondering about, but it also gives you alternatives about what you may wondering about. So if you are on leave, unemployed and looking for a job, then it gives you tips on how to apply for a job, how to write a CV. Abstract tips around what you are wondering. I would not get that from a supervisor if I had called by phone, I think they would have given you a yes/no type of answer." - (ISC-4/9)

5.4.4 Negative View and Experiences

Users also shared negative experiences they had with chatbots. Some users reported that getting a response from the chatbot took more time because they had to ask the chatbot several different questions before getting the correct answer. Going back and forth from different channels, from the chatbot to the website and then back to the chatbot, was also a concern. A user described this:

"Because they are not always as good at understanding the nuance of the questions, so then you are sent a bit in a loop often in the web pages. So that you get into something, you wonder something more, contact the chatbot, then it sends you to exactly the same place as you were. There is also often that you are sent in a loop through their channels. It was for example a question I ended up sending mail about, and I was looking for the solution quite well before I sent this mail. I ended up to be sent in a loop like that 3 times with links that link to a page, that link back to the same page. " - (ISC-7/12)

Some users reported that the chatbot could not answer their questions but only provided them with options rather than a solid answer. That several conversations ended with the chatbot being unable to respond to the questions:

"but it's still like you're not always getting an answer to your question. The conversation might stop from the chatbot saying 'unfortunately, I can not answer this', 'this is too complicated', 'I'll redirect you to a link here, read what you want.'" So then the link may not be exactly what you are looking for, because the link is often part of the page itself and the page layout of the website itself "- (ISC-6/10)

The experiences were also something that had a significant impact. The users' experience was sometimes negative. Some users had poor experiences with chatbots in the past, and they were frequently disappointed as they reflected on it. Most of the chatbot conversations went straight to a human supervisor since it was challenging to address the problem they had:

"I've talked to some bad chatbots before, so when I think about it I always get a little frustrated, especially if it's the only way to contact a company or agency, is through a chatbot" - (ISC-7/10)

According to a NAV employee, the fact that users had terrible experiences with chatbots affected when they used NAV's chatbot:

"It's clear that it affects everyone who's going to chat with NAV, who have a bad experience from a chatbot they did not get a response from, that you went on a loop with, or that just tells jokes." - (ISE-7/12)

It was also difficult for users to ask general questions that were dependent on some other topic; this was something that one of the users found frustrating:

"But if, as now, for example, I ask Frida, as I did recently, if you have taken sick leave, if you have been on sick leave for 8 months, which is a long period, it affects how much holiday you can take. If you are an employee, then you are entitled to 5 weeks holiday, but the sick leave affects the weeks you are entitled to, I tried to ask Frida, but I did not get a satisfactory answer to that, so I do not know what the answer is yet." - (ISC-2/7)

The chatbot had to improve in order for citizens to use it more regularly. It should be able to answer more issues like a human supervisor can do. Users experienced that the information was too generic, and they preferred that it could merge information across topics. Some users stated that the chatbot needed to improve its comprehension of complicated questions:

"But it still requires a lot of investment for them to understand a little more nuances in the questions and be able to put together more when it is in a way a question has several parts, that they are able to work across. Right now there is more "here is it, here it is, here it is" instead of taking information from several places and merging it into one answer." - (ISC-7/11)

When citizens do not know what they are looking for, they find it challenging. They lack a specific question and are unsure what subject to pose to get the desired responses from the chatbot. Users often do not have a specific question and are unsure about what topic to pose in order to get the desired responses from the chatbot:

"I think it expects me to have one precise question. That it knows what I'm wondering. I do not always know what the answer should be or what topic I am actually going to ask for." - (ISC-3/2)

Many users believe that the chatbot assumes they know exactly what they want. As a result, citizens are uncertain which terms apply to their situation. There are often several terms that refer to the same topic, as previously mentioned. It has added confusion and made it more difficult to figure out what one was curious about. If citizens do not know what to ask, it will make it harder to be able to figure it out by themselves, as many citizens have pointed out:

"I believe the chatbot assumes that I know exactly what I'm looking for and that i am prepared to write on my own to figure it out. It can even be a challenge if I don't know the word I'm looking for and some words may be similar to others, which can be frustrating. The chatbot seems to assume that I know what I'm searching for with a specific wording." - (ISC-6/3)

5.5 Trust

Trust is often a highly debated area; this is something that citizens develop over time. It is critical to protect the citizens' data, especially data handled by public institutions. When a new technology is introduced, citizens often express doubt, questioning whether this is a technology that they want to use. This was something a user reflected about:

"Eventually I have built up some trust in how it works. I have always thought that it would be better to call the institution by phone such as Skatteetaten, NAV or Laanekassen and ask them about things I wonder about. Now I have used chatbot gradually over time and I think what made me switch more over was that I did not find it so credible at first. I thought it was a bit like "jalla" type AI behind it, but it seems that it is pretty good." - (ISC-4/4)

Trust in the chatbot, according to a NAV employee, is related to the information it provides:

"I experience that we have trust to the extent that when the user receive information, it seems that they are happy with that information and end the chat. But, if they do not get the information they want right away. Then I notice that the frustration happens. And it seems that the trust falls very quickly." - (ISE-10/2)

At the same time, NAV utilises other aspects, such as the chatbot's dominance over the conversation. Which NAV believes has a positive impact and the fact that, even if the chatbot did not understand the user, NAV understood what the user needed:

"So the fact that Frida can control the conversation a little more, we experience that is a good help. Maybe to build some trust and show that even if the chatbot does not understand you, at least the people behind the chatbot have understood what the user needs and through information get the right answers." - (ISE-7/10)

One of the primary concerns the chatbot had to deal with was trust. The challenge was to convince the user that the information provided by the chatbot was reliable and prevent users from contacting across several channels to confirm what the chatbot claimed was right. As described by a NAV employee:

"I think the biggest challenge is trust. That if the user have received the right answer, but also confirm to you, give the reassurance that yes, you have understood this is right. It's probably there that the user thinks "yes, I got an answer here, but can I trust it?". Am I confident enough on this answer, do I have to check it out a new place to be absolutely sure of it? or do I just have to call in just to get a confirmation, that I have understood the answer correctly." - (ISE-11/9)

The exchange of personal and private data was a significant obstacle for specific users. Part of this is that they did not know who would read what was written to the chatbot and wanted sensitive information to reach the fewest people possible. This was why more people felt safer when there was a chat with a person rather than a chatbot. Where sensitive information was involved, some users preferred to call rather than initiate a conversation with the chatbot:

"Maybe if it's a little sensitive information if you have to provide your social security number, bank details and things like that. Then I would rather think of calling them than writing it in the chatbot. Maybe that's when I would not consider using it. " - (ISC-4/5)

"I just feel that when I write in the chatbot I do not quite know who is reading it. There should probably be some privacy stuff, but I kind of want to share my personal data with as few people as possible in as few places as possible." - (ISC-3/13)

"Potential barriers for me are, for example, sharing personal information, so if I've eager to know more about things that concern me, then I can not use chatbot." - (ISC-1/6)

There was also much scepticism about the chatbot's security. Users were unaware of how secure this was. Furthermore, if the data were stored, it would be uncomfortable for some users:

"I'm actually a little cautious, I do not want to enter a full social security number or account number or whatever it may be in a chatbot, I do not know how good the security of a chatbot is at all" - (ISC-8/5)

NAV's chatbot Frida gets a popup that tells about privacy the first time the user uses it. They are clear on what users should not write, describes a NAV employee:

"When you start Frida, you will get a popup that says something about privacy. We are clear that you should not enter personal information. We are clear on how this information may be processed and so on. And that you give an acceptance that you have read and understood, before you then continue with Frida." - (ISE-1/9)

Another finding was that users found it relaxing that they were free to write whatever they wanted to the chatbot and spend as much time as they wanted because there was no human on the other side of the conversation that needed to rush through the questions:

"It can be a little entertaining, since it's not a person and since it's a chatbot you can write anything, you can tell it what you want and ask about what you want. You can ask questions as long as you want, you can chat with it for hours and you will be able to get equal answers all the time. " - (ISC-4/6)

5.5.1 The Need for a Human

The citizens often mentioned their need for human support when contacting the public institutions and mentioned that it is nice to know that it is a person on the other side. It was often recorded that the human touch was seen as more personal and essential for the quality of service than communicating with the chatbot:

"I personally prefer to talk to someone, not over chat then, but over the phone. Because then you get more flow in the conversation, get more out, formulate yourself in the right way. And then, at the same time, feel that you have talked to a person and received the help you need." - (ISC-1/2)

"... but I still think it's a nice addition, that it's nice that it's there, but it does not replace the usual customer contact. Well, it's good that it's there when things are not open, customer service is not in place on weekends or in the evenings, but that during opening hours I appreciate it much more, and I have heard from several others that they appreciate much more to get to talk to a proper person. Then you experience that you are heard to a greater extent; it immediately becomes a little more personal." - (ISC-7/2)

NAV has acknowledged the citizens' need and desire for human contact. As stated by one of the employees, it is some of the greatest challenges they face with using a robot to take care of the citizens:

"The biggest challenges are that society is still a bit fresh in the use of robotics in user meetings. You are probably still used to meeting a human being. Society in Norway is very used to using digital solutions, so we are not there that we will necessarily meet face to face, but for the most part, the dialogue has so far been involved in meeting a human being, whether it has been on chat or telephone or in some written channels. So what is new about chatbot as a channel is that you have automated a dialogue between the person who contacts NAV and a machine." - (ISE-11/1)

According to one of the NAV employees, they have experimented with changing the text label displayed when selecting chatbot depending on their opening hours to steer the expectations of meeting a chatbot:

"... but when you are on nav.no and are going to chat with NAV between nine and three, or between nine and half-past three, so if I remember correctly, it says "chat with us". And after that time, before and after, I think it says "chat with Frida" or something like that, "chat with chatbot", something like that. I do not quite remember the text because we have fiddled with it a bit. But it is also such an essential thing in a way

to control the expectations of what it is that meets you. And the reason why we have chosen "chat with us" is because it should seem a lower threshold for you to talk to a person behind this. Even if you may also be disappointed because you do not meet a person as you might have thought when it says "chat with us" because it seems much nicer and ... yes, it does not sound like you meet a chatbot basically." - (ISE-1/1)

5.5.2 Credibility of Information

Users experienced some uncertainty around the information that is provided by the chatbot. This uncertainty is due to the trust in the information provided and the trust the user has in himself/herself in understanding the information thoroughly. As stated by some of the citizens:

"One of the reasons I was a little sceptical about it, and I did not trust the data I got from it, was because those I know do not use it that often. So the more people who use it, the more credible it becomes, at least." - (ISC-4/3)

"I have not tested it for all cases, but I would like the answer to be up to date if I ask it a question. That they can say that: "three months ago we changed some rules", it may happen that you in a way think wrong, or that you have to check that information again. That they say that something has changed." - (ISC-3/9)

The lack of trust in the information is something that NAV has observed. As stated by some of the employees, whether this is due to the information being provided by a robot and its limited capabilities, or just the need for confirmation on understanding, is unknown:

"... so there are probably some who need that confirmation then, of what they have read in Frida is correct. But how much it is that they do not trust it entirely because it comes from a chat robot and how much it is the need to have the same thing repeated in another way to be sure that one has understood it. Like when I have sat and chatted with users, it has often been that if there is something complicated, they would like to be allowed to repeat that: "Ok, so then it's like this and that, and that's how I should do it? so that I can repeat and say: "Exactly, you understood it right. It's like that and that". And that is where Frida falls a little short because she will just give the same answer again or say that: "I have tried to answer this, but... I understand that this was not quite right". Even if they really just want a confirmation. So, yes, I would say that there is some trust in the content, but it is difficult to say how much that goes on trust and how much that goes on the need to repeat and confirm that we are not quite able to resolve in the chatbot." - (ISE-3/2)

5.6 Strategy

The public institutions have a strategy where they want the citizens to choose the most cost-efficient channel possible. To achieve this, they cannot simply remove the traditional channels that are less cost-efficient but instead cut the use of these channels as much as possible. This means enabling citizens to solve their task or problems independently and selecting the ideal service for their inquiry. As stated by both NAV and Skatteetaten employees, this is part of their current channel strategies:

"We have a channel strategy in NAV that says that it is the user who chooses the channel, we can not decide which channel the user wants to contact us in. But we want those who can do things themselves to do it on nav.no. In other words, use the digital solutions, and then Frida is a help on nav.no to find answers in the jungle of laws, rules and routines that can tell you where you can find the right service." - (ISE-5/2)

"Channel strategy was a big topic in Skatteetaten 5 years ago, and then it was mostly: "how can we get rid of so many personal phone calls and letters?" because it is very demanding to answer. This led to a huge upgrade and simplification of Skateetaten.no." - (ISE-14/10)

The strategy around the chatbot is to make it an increasingly more popular channel for the citizens to choose. At NAV, they have a target image for how they envision the use of the channels, based on the past, present and future trends (see Figure 5.4). According to how they see it, the trend for 2025 is that the channels will fuse more together where the citizens communicate seamlessly across the different channels offered. The strategy for the chatbot (and other potential new automated channels) is to assist with general inquiries for all of NAVs' services and seamlessly transfer the users in need to a human supervisor over to the human chat channel.

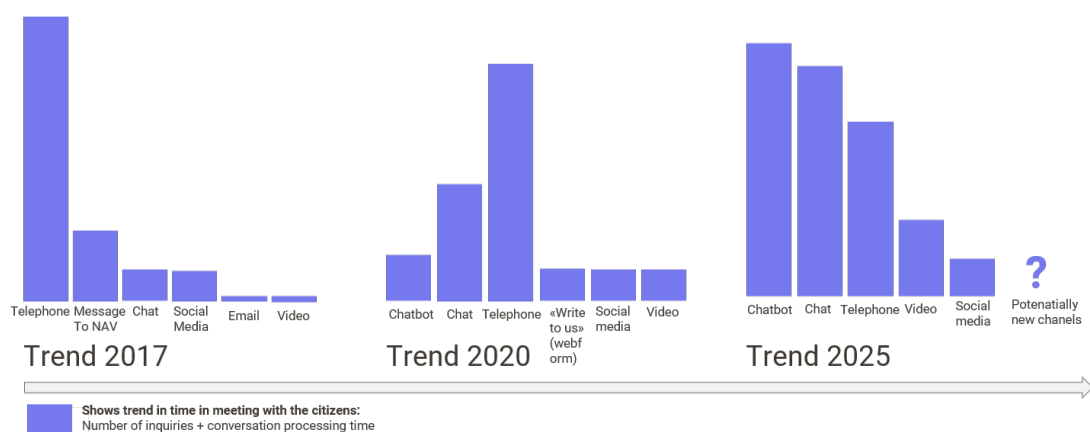


Figure 5.4: Target image for NAV Kontaktsenter 2017-2025

The channel strategy at NAV is revised regularly, but at the time being, the target

is to increase the written channels to match the trend for 2025, as stated by one of the employees:

"... when we at the NAV contact center look at what kind of channels we will offer, we have a target for channel choice, where we have outlined some trends that now go up to 2025, at which channels we will offer and also what service we will have in the various channels. So what we in NAV contact center are working on is to increase the offer in the written channels, and chat and the chatbot are the channels we see, as the trend shows, will increase the most and that we will provide expanded offers on in the coming years." - (ISE-11/5)

5.6.1 The Role of the Chatbot

The public institutions often describe the chatbot as the new front line for the digital users of their services. The chatbot is not meant to replace but rather supplement the other channels and making them more available for those in actual need. It is often referred to as a start of a funnel or a filter for general inquiries - analogies used by both NAV and Skatteetaten (see Figure 5.5):

"I would say that we use it as part of the funnel on Skatteetaten.no, and we look at the chatbot as a kind of backup solution because you can not access the chatbot without being on our website. Ok, we look at it this way, you are on skatteetaten.no, you find something you do not understand, or do not find what you want, it seems overwhelming, or you want faster answers... And then you go to the chatbot." - (ISE-14/11)

"I think the most significant change is similar to the changes one sees on the phone and several self-service solutions. You filter out the simple questions. You do not answer the same question 10 times in a row because Frida manages to say where you find the form, or where you see the case processing time or where you log in. So what you are left with are longer and more complex conversations to a greater extent. But that applies to other channels as well. The general trends are that human beings are left with more complexity, and the routine answers are filtered out very quickly." - (ISE-3/3)



Chat-robot in Channel Strategy

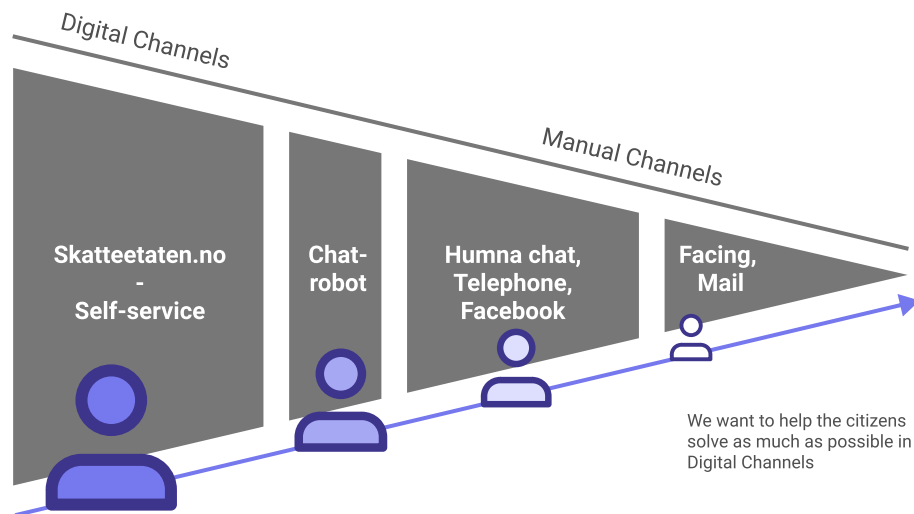


Figure 5.5: Skatteetaten's service delivery channels placed in a funnel

The effect of the chatbot as a channel has been recognised by both employees of Skatteetaten and NAV, praising the role it has and making human supervisors more available:

"But without Frida, we would not have people available to help those who need a human, we would probably have an hour-long line where we answered simple questions." - (ISE-3/4)

"A pronounced problem for Skatteetaten is that people called in and they did not even get into the queue, it was so difficult to get in contact with us. So that problem was very motivating to try to resolve. And a chatbot was one of the things that could provide... and as you can see, we freed up 12,000 human supervising hours. And these were not terminated, they were moved over to the telephone." - (ISE-14/12)

The number of citizens with general inquiries filtered out at the chatbot stage of the funnel can be seen as a success criterion for how well the chatbot is performing. It is because that is the level of complexity the chatbot is meant to handle, as stated by one of the NAV employees:

"We have succeeded if we manage to take over some of the general inquiries. And that's what we had clarified quite a lot also when we started; we saw that, now I do not remember the number exactly, but let's say that approximately 40% of the inquiries to the NAV contact center were of a general nature. And it is precisely these percentages that we want to automate. But then it is essential that the threshold for moving on to the supervisor is not too low and not create frustration that you will not be able to move on. And that one is challenging." - (ISE-1/5)

” ... we had 860,000 chats that passed through Frida last year [2020], and based on the feedback from users, there were probably approx. 250,000 wholly or partially redeemed by Frida. And we think that’s good. We can say that the proportion is not so high, it is almost like manual chat, but still, with the volume, we have, of course, it is very important if we should have served 250,000 users by phone or chat entirely manually.” - (ISE-1/6)

During times of high demand, the chatbot has shown to deliver on its purpose of being in the so-called front line. The COVID-19 pandemic, having its outbreak in Norway in march 2020, is often brought up as a theme that illustrates the importance of the chatbot in this kind of situations. With the public sector being flooded with inquiries connected to the pandemic, there were not enough human employees to handle all inquiries. As shown in Figure 5.6, NAV’s chatbot handled approximately 1300 inquiries daily on average in January 2020 while handling 5400 inquiries on average per day through the worst pressure after the pandemic outbreak.

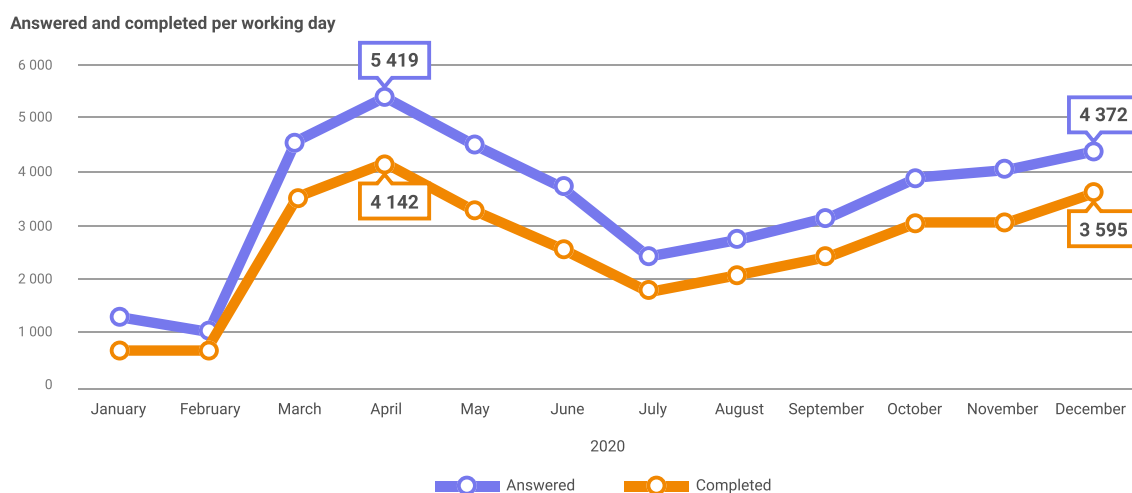


Figure 5.6: Amount of inquiries answered (purple) and completed (orange) by the chatbot Frida

Numbers from NAV also show a sudden shift in the channels utilised in 2020, which became the year where the written channels increased significantly and decreased telephone use. From 2019 to 2020, the numbers of inquiries handled by telephone had a decrease of approximately 20%, and similarly, chat (chatbot + human chat) had an increase of approximately 12% (see Figure 5.7). As the figure shows, the trend continues from the pandemic outbreak (March 2020) to present (April 2021). The shift was primarily due to the pandemic but also, as stated by NAV in documents provided, because of the availability (as discussed in Section 5.1.3). During this period: 1) the telephone channel was less available due to shorter opening hours and closed queues on disability benefits and pension, and 2) NAV’s chatbot was developed so that it: stood in front of all human chat queues, handled cases connected to pension, placed on the front page of nav.no, and lastly it was accessible on all their sites.

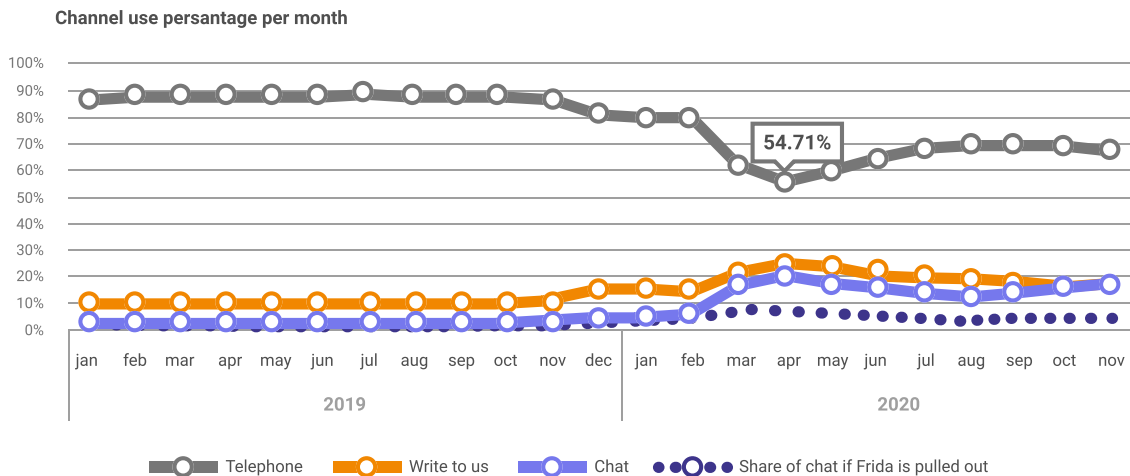


Figure 5.7: Parentage of citizens using the telephone (gray), "write to us" (orange), and chat (purple). The dashed line (dark purple) shows the share of chat without Frida

Many of the employees at NAV express that they are happy for having the chatbot in place and that they could not imagine how this period would have ended if this channel was not part of their service delivery offerings:

"It is a very important exoneration, especially during the Corona time, where there has been an enormous demand. And Frida has a large part of the credit for it not going worse than it did when there was so much going on." - (ISE-8/6)

"The chatbot has come to stay, and without the chatbot, we would not have gotten through April 2020. Because it was probably in April, we had 250,000 calls on Frida. So you can say 30% of what never became anything, but it was a considerable volume. The waiting time on the phone was almost 1 hour, with the chatbot. Can you imagine what it would have been like without the chatbot? It would have collapsed." - (ISE-4/4)

5.6.2 Mitigation of Users

The institutions have various strategies to influence citizens channel choice and shift it from one channel to another, often done to reduce the pressure on a channel. One of the main instruments used on the chatbot is making the citizens use it before entering a human chat. At Skatteetaten, the users can choose from three topics when they meet the chatbot; otherwise, they will be redirected to a human chat straight away. On NAV, the chatbot supports more topics, and therefore most users have to go through the chatbot first. However, when NAV's chatbot was first implemented, it allowed the users to select between the chatbot and human chat freely. This resulted in the citizens preferring the human chat, and it was later

changed to steer the citizens in using their chatbot instead. As stated by one of the employees:

"If we go back to when it was a small pilot project, it was on the family and parental benefits area that we piloted, then we equated the offer of chat with supervisor and chat with Frida on our website. You could make a conscious choice, and what we saw there was that pretty much everyone chose to chat with the supervisor. So the motivation/desire to get an answer from a robot was not great; we did not get enough volume for it to be good enough training, and that we got the chatbot quality up. So what we chose to do then was to seamlessly connect them, so that you met a robot first... So what I want to point out was probably that there was a scepticism to use it, but when you did not get a choice, the scepticism was not so great anymore because you got an answer to what you were wondering. And then approximately 30% went on to the supervisor, and it was based on the measurements we had done, the proportion of complex inquiries that we did not have quality in the chatbot to answer." - (ISE-11/6)

Additionally, NAV has seen a mismatch in the "write to us" (web form) channel, where they experience that the citizens ask many questions that are suited for their chatbot and human chat. Currently, they are working with a strategy to shift citizens channel choice by first going through their chatbot:

"And in 2020, we received 1.06 million such inquiries on "write to us", and we now have a strategy to move a good part of that volume to Frida and chat, so what we are working on currently is to create a new entrance page on the login page where we will try to differentiate better on how far you will need to submit information, i.e. information that will be processed somewhere in NAV, as opposed to a question where you are wondering about something. Then we want to have a distinction: "Ok, you can send in information like that, but if you have questions to NAV, then you go in here, then it is Frida who meets you first, but also with clear information that in our opening hours, you can also talk to a supervisor". So we have tried to give a careful estimate on the channel mix there, where we will be able to move 50% of the "write to us" messages over to Frida and signed in chat. And then we do not know how much Frida will take away from this, but at least it means that maybe as much as 500,000 or something like that will pass Frida, in addition to the volume we have today, so it will generate quite a lot." - (IS-1/7)

Except for this kind of mandatory strategy, both Skatteetaten and NAV have mentioned that one nudge users towards the chatbot by sending out SMS messages. This is usually done while the users are waiting in the telephone queue:

"What we do is that when there is a long wait, it sometimes happens that those who are in line on the phone receive an SMS: "Hey, you can talk

to chatbot Frida. She answers general questions". This is something we started with last year. It has helped quite well, especially when we have a very long queue, so we see that it helps to reduce the line. People hang up and try." - (ISE-12/1)

"One thing we have done is that we have started sending out an SMS-link with the chatbot to people who are waiting in a telephone queue." - (ISE-14/14)

Similarly, NAV uses also this feature in their voice messages when the users are in the telephone queue:

"We have pretty clear voice messages that if they do not need to talk to a human being, then we ask you to go to nav.no, etc., and especially in demanding periods." - (ISE-1/8)

The users are also nudged indirectly by how the different channels are prioritised. As stated by one employee, the queues are steered to be shorter on specific channels:

"We manage in such a way that we will have a shorter waiting time for chat than for telephone and our other written channels. So it is a priority where we want chat to be a channel that you get answers quickly. In Frida, you get answers around the clock, without any waiting time, but in this handover process, we have a goal that it should not average more than 2 minutes. ... But what we see is that priority is incredibly important because you are impatient in chat. Thirty seconds on chat seems much longer than thirty seconds on the phone. So there, we know that we must prioritize it. Those who work at NAV with staff management and traffic management have aids and tools to prioritize that a supervisor gets a chat before a telephone." - (ISE-11/7)

It is worth noting that these strategies are not only based on moving citizens to use the cheapest possible channels and to force them in doing so. It is more of a strategy of steering them towards selecting the more cost-efficient channel for solving their problem, if possible. As stated by both NAV and Skatteetaten employees:

"So perhaps one of the most challenging things is to be able to send people to the right place, that we stop those who only need to read correctly on a website or get a concrete answer, and at the same time send back those who actually need a human being, because one has a crisis, has a bad language, for various reasons can not get good enough help from a chatbot." - (ISE-3/5)

"But we do not move people because we think they should use a cheaper channel, and we actually finally have a relatively new policy that has been

integrated a couple of years, and which has now been adopted ... that our goal is to give the user what the user are looking for as soon as possible the channel they have selected. And if we can not, then we try to move them to the channel where they can.” - (IS-14/15)

Moreover, the mitigation of users is not only done from other channels towards the chatbot; it also goes the other way around. In many cases, the only way of resolving an inquiry is to contact a human supervisor, and the chatbot users must get transferred efficiently. As stated by one of the NAV employees:

”I do not know how to prevent people from talking to people. Sometimes it’s just right too; for some answers, we have the offer that comes unrequested: ”here you should talk to a person”, for example.” - (ISE-7/9)

”... like on social services, it is in many cases that one should talk to people and that there should be a low threshold for one to be put over, and that it should be easy to get in touch with people.” - (ISE-8/7)

Finding the suitable threshold for when to transfer the citizens to another channel is somewhat tricky to set, as stated by some of the NAV employees:

”What can be challenging is to make that distinction yourself, when you realize that: ”Okay, now we have to stop and understand that Frida has to deal” and find one point: ”Here the conversation must go to another channel”, for example, to a human chat. It’s not always the boundaries are straight forward, it is a bit more fluid.” - (ISE-4/6)

”... we must be able to give answers, and it has been vital not to go in a loop: ”But that was not what I asked,” ”Yes, what more can I help you with?” Then we have to offer that: ”Maybe it is best that you talk to a colleague of mine who can chat and give a little more answers to complex inquiries.” So that threshold for putting over, we have also constantly adjusted” - (ISE-11/8)

In this section we will discuss the results presented in Section 5, in combination with the conceptual framework presented in Figure 2.7. The section's structure is similar to Section 5, which is based on the global themes. Using the interviews and previous literature, we discuss the themes from the thematic map and how they relate to the chatbot as a channel in public institutions.

6.1 Motivational Drivers for Choosing the Chatbot as a Channel

From previous research, we know that the traditional channels are more suited for complex tasks, and it was suggested that they also would remain popular in the future (Ebbbers et al. 2008). Several of the citizens highlighted that when choosing the channel for their inquiry, the complexity of the task was a vital decision trigger. It was made clear that as the complexity of the task increased, the chatbot seemed to be a less popular option because of its capabilities. As stated by the public institution employees, this is intended and expected behaviour by the citizens when choosing the chatbot. This indicates that the chatbot is more suited and should be used for information provisioning rather than problem-solving, and citizens seem to understand its purpose.

We find several reasons why the chatbot's availability is a determinant for the citizens' channels choice. As the public institutions have the chatbot available during all hours of the day, the channel appeals to citizens, especially in time slots where human support is not available. Though it has limited capabilities of solving problems, the chatbot gives at least the citizens guidance and the possibility to solve their problems during closing hours. Our data shows that when the other channels were not available, the citizens were more persistent to complete their task. Furthermore, the importance of accessibility is emphasized by the fact that the chatbots' placement and exposure have been seen to have a significant impact on how the user

uses the channel, applying to both institutions in this study.

Citizens have expressed that they choose the chatbot because it is an efficient channel due to the quick feedback, especially compared to the webform channel. The responses indicate that the chatbot can be considered a replacement for the webform channel because it usually takes a couple of business days to get an answer from this channel. It can also be seen as another supplement to the other channels, where users now get efficient answers from the chatbot while waiting in line in another channel. This is in line with previous research claiming that the most significant factor for using a chatbot is productivity (Brandtzaeg and Følstad 2017).

The supplemental use of the chatbot is also found to be a habitual behaviour. It is shown that the citizens often start with the chatbot no matter what their inquiry is about and then potentially move on from there. The fact that the chatbot is used sequentially or in parallel with other channels shows that it contributes to channel multiplexity, which also may be responsible for the increase of the overall number of channel interactions (Madsen et al. 2019). Even though the chatbot increases the overall channel use and does not necessarily solve the citizens' problem, it can at least contribute to reducing the complexity and ambiguity (Pieterse et al. 2017) and contribute to more efficient handling of the inquiry.

6.2 Communicating with a Chatbot

NAV's and Skatteetaten's chatbots are a hybrid of menu/button-based and keyword recognition-based chatbots (Gupta et al. 2020). This is because these chatbots use buttons as alternatives, and users can also ask questions by typing them into the chatbot's input field. We discovered few difficulties that users faced while interacting with chatbots of this kind. When there were minor spelling mistakes in the user's questions, the chatbots often did not understand them. Sometimes users experienced getting options they did not necessarily want to receive, resulting in users avoiding using chatbot. This corroborated Zumstein and Hundertmark (2017) findings; that if a chatbot repeatedly gives the wrong response, the chatbot loses credibility, and the user stops the conversation. Surprisingly, NAV's chatbot often gave the proper response to the users' questions, but this response was not always what the user preferred. This was because they did not really like the answer they received.

According to the institutions, the chatbot has more control over the conversation than the user, which they perceived as positive. This was to assist the user if the chatbot did not have the desired responses. They did so by providing information relevant to the user's questions and thereby indicating that they understand the user's questions. This was a finding that was partially in line with the Collier et al. (2014) study, which showed that users are more receptive to self-service technologies with less control capability. Since the flow was smoother on the phone and chat, some users preferred to call or use human chat rather than communicate with a chatbot. They often experienced poor flow in the chatbot's conversations and wanted it to be a bit more like a human conversational flow, and this can be a challenge for the institutions because both Skatteetaten and NAV's chatbots are closed-domain

chatbots. The correlation between closed-domain chatbots and human-likeness is an area of research that has received little attention.

A great challenge discovered during the interviews with the citizens was the need to adapt to the chatbot. The citizens expressed that they need to adjust their wording to communicate and get the most out of the chatbot. This was also recognized by the public institutions, claiming that this was one of the biggest challenges they face with offering the channel. Though users interviewed claim that they have learned and adapted the chatbot, and employees at NAV and Skatteetaten acknowledge this, there is still a concern regarding the inclusiveness of this channel. The chatbots in this study do not support other languages than Norwegian and do not understand those with poor Norwegian language skills. With EU's "digital by default strategy" (Declaration 2017), where improved inclusiveness is one of the goals, the chatbot seems to contradict this. In addition to inclusiveness, accessibility is another goal of the digital by default strategy (Declaration 2017) that the chatbot struggles with. The citizens have mentioned that the chatbot makes the information on the website easily accessible, but at the same time, it is not accessible in the way it is presented. The presentation of information seems to be a significant obstacle for the public institutions in this channel, as the challenge is in the balance of providing enough information to make the user understand fully and make it comprehensible and user-friendly.

Few topics are more complex for the chatbot to communicate with than others. Death, deceased, and estate were among them. Conversations containing these keywords were routed directly to a chat supervisor by the chatbots in this study. This was due to the high level of emotion involved; this was an interesting discovery. We know from previous studies that when a chatbot expresses sentiment, its credibility rises (Zumstein and Hundertmark 2017). Positive emotions would improve the interaction, while negative emotions, on the other hand, should show as little empathy as possible. Users who use services from public institutions may be in a vulnerable situation, and there may be a risk of giving unwanted answers when sensitive topics appear in the chatbot.

6.2.1 Managing Diversity

When it comes to adopting new technology like a chatbot, most public institutions deal with various user groups and fulfilling the needs of all of them can be a challenge. Residents of Norway and those with EEA privileges, employers, physicians, and other collaborators are among the user groups served by the chatbots in this study. One of the challenges involves determining how to manage multiple user groups simultaneously and developing responses to them. According to Zumstein and Hundertmark (2017) most users would rather get responses from a specialist than a generalist. They want the chatbot's responses to be presented in a professional manner. NAV has included a filter for employers, physicians, therapists, and other collaborators that allows the user to pick their role before beginning the conversation. The chatbot must know the context in which users approach it, as public institutions are often large and complex, with various responses depending on their

role. The filter function was quite crucial to NAV.

Senior citizens are one user group that has received particular attention. These are typically users with limited digital capabilities who may find it challenging to utilize new technology. Since the conversations through the chatbots in this study are anonymous, it can be challenging to identify which user groups are contacting through the chatbot. By looking at the different topics the chatbot handles, the institutions can estimate which user group the users that chat with the chatbot belong to. NAV has discovered this with primarily one of the topics the chatbot handles, which involves pensions. When it comes to this topic, it is often the case for users to think they are talking to a real person when they are actually chatting with a chatbot. This does not necessarily imply that the chatbot contains human characteristics, but rather those elderly users cannot tell the difference between a traditional chat and a chatbot.

Skatteetaten uses a different strategy, prioritizing the user groups that ask the most questions. So, if a question has been asked several times, questions on that topic will be given greater priority than questions about other topics. Then they train the chatbot to be good at answering these types of questions. This is to put more effort into the users who use the chatbot. One example from the interview was when Skatteetaten embedded the chatbot in the tax return form. Then, compared to the previous year, more users used the chatbot. Interestingly, positive feedback more than doubled after the chatbot was integrated into the tax return form. This may be because the chatbot was well-trained to answer questions about the tax return as it was a top priority area at that time, and as a result, it was able to provide the users with satisfactory service. On the other hand, low-priority questions that do not get as much attention can be a drawback - something we have not seen from Skatteetaten.

6.2.2 Building Expectations

When the user starts a conversation with a chatbot, they receive a welcome message. Some chatbots choose to have it longer and more formal than others. This was not the case at NAV and Skatteetaten, where the welcoming messages were kept brief. Users of the chatbots have been discovered to avoid reading long welcome messages and instead go directly to ask the chatbot questions. This might be because the chatbot is used to receive an answer as fast as possible as stated by Brandtzaeg and Følstad (2017), therefore a welcome message may seem unnecessary to users. The NAV chatbot features a human-like Interface, and the chatbot's name is "Frida", with a female figure as the icon. Shaping the chatbot as a female character is seen to be positive as users prefer female rather than male to process customer service requests according to Reeves and Nass (1996).

On the other hand, because the chatbot and the human chat are both in the same chat window, it is confusing for some users. This occurs because it is unclear if users are still talking to the chatbot or not while they are routed to human chat, as at NAV, where the chatbot has human traits. Furthermore, another problem is to make it clear that the chatbot is a robot, not a human. When it comes to managing

expectations, it is vital to make this visible. When users were transferred to humans, NAV made it more noticeable by altering colours and symbols. However, this did not always work well enough for some of the users.

Conversely, Skatteetaten discovered that several chatbots acquired human-like characteristics like NAV's chatbot. This was not the case for Skatteetaten's chatbot; instead, the icon was a robot, making it apparent to users that they were speaking with a robot and not a human supervisor. This helped to establish that the user was conversing with a chatbot, and they were clear that it should be known as the Skatteetatens chat-robot. One of the interesting findings in this study was that users preferred to press buttons rather than write to the chatbot. This may be due to users' previous experiences with phone menus. Here, buttons are also pressed based on what the user thinks is appropriate for them. Users frequently began a conversation with the chatbot with a simple guidance question and then utilized the chatbot's buttons to continue the conversation. Both chatbots in this study are button-based, as previously stated. In return, users received impersonal responses, which were very generic. Both chatbots greet the user with a welcome message at the start of the conversation, as previously stated. This message explains what chatbots can accomplish and how they maintain the user's privacy. Users found this informative to understand what the chatbot had the opportunity to help them with. There were also misconceptions on specific terminology between the chatbot and the user. These can be the term "general questions", users and institution had two different perceptions of what "general" meant. There were also misconceptions about whether the chatbot saved the conversations or not; it made users withdrawn and be more cautious about what they typed into the chatbot.

6.3 Users Attitude towards the Chatbot

Users' attitudes and views were frequently shaped by their past interactions with chatbots. Many users wanted the chatbot to handle more complex questions. These were also more personal questions, with fewer general questions. The chatbots in this study either directed the citizens to specific pages on the institutions' websites or gave them a generic response. Users' expectations often changed due to their interactions with other chatbots; thus, the user's expectations were equally dynamic. The most significant reason for using a chatbot was to increase productivity, and the chatbot's ability to respond quickly and consistently was a key factor as identified in Følstad et al. (2018). We can see from the interviews that the chatbot responded to the most basic questions, and this in a quick way.

6.3.1 User Feedback

It was received positive that the user could ask the chatbot as many questions as they needed without worrying that it had limited time and had to be passed on to another user as a regular supervisor would do. This provided an opportunity to test different combinations of questions and overview the answers that supervisors might

not have given. Users also found it enjoyable and entertaining to talk to a chatbot. It was beneficial to be able to restart the process and try out new different topics.

The chatbots in this case study had various approaches to receive feedback from users regarding the experience. Skatteetaten added buttons on the chat bubbles that consisted of thumbs up and down, while NAV only had a feedback form at the end of the conversation. The most significant success with the chatbot stated by the institutions would be that users say they got answers to what they were wondering. About 30% are satisfied with the chatbot for NAV, as opposed to 80% who are satisfied with the supervisor chat. This might be because chat supervisor can answer more complicated questions than chatbots, resulting in higher customer satisfaction. NAV also wants the chatbot to provide the same level of satisfaction as live chat, which is one of their goals. It was rare that users provided feedback to the chatbot. On a good day, Skatteetaten receives roughly 2% positive feedback and 10% negative feedback. Users seemed to spend more time providing negative feedback than good feedback. This might be because they want to express their dissatisfaction and frustration somehow, so they utilize the feedback feature.

6.3.2 Loop through Channels

Users also reported cycling in a loop between the multiple channels, with the chatbot being reached first, then the website, and then back to the chatbot. When users gave up, they usually ended up sending an webform or call by phone. This loop took much time and led to frustration among users. Much of this can be due to misinterpretation of questions and the fact that the chatbot cannot answer complex questions, so it instead tries to point the user to where the answer might be.

Another issue was the situations where the chatbot could not respond to the questions at all. Either it specifically said that it could not answer the question, or the user received a link and did not answer the user's question. Sometimes the link was also part of the website the user started the conversation on. This demonstrates that the information on the website is not always adequate or precise. When a user is sent in a loop between different channels, the chatbot's trust and expectations are also weakened. As a result, numerous users avoided using the chatbot for follow-up questions in concern of being sent through multiple channels again.

6.4 Trust in the Chatbot

An information-technology-based government is more democratic, transparent, and effective than a traditional government according to Moon (2002). This will assist in the improvement of government-citizen relations and the reduction of citizen dissatisfaction (Noordt and Misuraca 2019). The fundamental goal of public institutions is to serve citizens, and then trust is a topic that is essential in service delivery.

When users do not obtain the requested information, it turns out that trust falls quite quickly. Another interesting finding was that when users were not confident

in the responses they received from the chatbot, they attempted to contact the institutions through multiple channels until being confident in having received the proper response. As stated by one of the NAV employees, this is a mixture of trust in the information being given from a robot and the need people have on confirmation in their understanding of the information that the chatbots' limited capabilities in doing so.

The handling of sensitive personal information was another factor that impacted trust. As previously stated, people were frequently confused about how their data was treated. Several users avoided using the chatbot to disclose sensitive information, such as their social security number or bank account information. Much of this uncertainty may arise because the welcome message does not clarify how the data management is explicitly done but instead provides a link to their privacy management or a popup to accept privacy management. As the chatbot is used to get answers quickly, it turns out that users avoid reading information that looks time-consuming.

These are factors that can also be included in the series to build trust in chatbots together with: interpretation of requests and advice, human-likeness, self-presentation, and professional appearance (Følstad et al. 2018).

The great majority of users were positive about automation, seeing it as a sign that things were becoming more efficient. At the same time, the fact that there were opportunities to contact a human was comforting. One of the NAV employees stated that new technology was not new for the people; however, getting assistance from a robot is. Several citizens expressed their need for a human, not because it was suited better for their task, but rather because it simply feels better and more personal talking to a real person. This demonstrates that, even if services are automated, there should always be a way to contact a human being.

6.5 Chatbot Strategy

Both NAV and Skatteetaten has shown to have channel strategies that where they offer most services over all channels and direct the citizens to the proper channels, resembling the integrated positioning (Pieterse and Dijk 2006). The chatbot seamlessly transfers the citizens to other channels if they do not have general inquiries, especially to the human chat channel. Both public institutions studied highlight that they cannot decide which channel the citizens utilize but that they want to limit the use of traditional channels. NAV has shown with their target image towards 2025 that they aim to shift the citizens channels use towards the written channels (human chat, chatbot, webform) by expanding the offer on them.

As suggested by Pieterse (2010), the integrated channel strategy should aim at making the contacts via the expensive channels as efficient as possible, which is precisely what the chatbot contribution. Skatteetaten and NAV both expressed that the chatbot has served as a filter for general inquiries and made the human supervisors available for the ones in actual need for a human. This was especially

highlighted during the COVID-19 pandemic, where the number of inquiries sky rocked, leading to channel usage shifting away from the traditional ones at NAV. The shift was shown to be due to the decreased availability of the traditional channel and increased the availability of the written channels, mirroring Pieterse and Ebbers (2020) findings of channel behaviour in the Netherlands.

As mentioned, NAV and Skatteetaten has a strategy that enables citizens to choose the channels freely. However, we know from previous studies that nudging is used to steer people in desirable directions (Sunstein 2018). To increase the use of the chatbot as a channel it has been shown that nudging people towards it has affected, both in digital and non-digital form. In non-digital form, we have seen nudging in SMS messaging, voice messages and prioritization of channel queues. With digital nudging, we have seen that the label of the chatbot button has been changed sometimes to steer the expectation and use of the channel. Also, the placement/location of the chatbot button was shown to affect the increase in use.

However, the introduction of the chatbot has decreased the freedom in choosing the human chat channel, as we have seen both Skatteetaten and NAV "force" the users to go through the chatbot first. Letting the citizens choose freely does not seem always to be the right approach. As we saw from NAV's experience, when the citizens were not digitally nudged and had the option to choose between human chat and chatbot equally, the human chat was selected most of the time. However, when the choice was removed, most of the citizens got sufficient help from the chatbot, as only approximately 30% were transferred to human chat.

6.6 Public Institutions Service Delivery Transformation

By bringing chatbots in as part of several communication channels in the public sector, this study has shown that chatbot as a channel have a significant utility for both institutions and citizens. Overall, public institutions can filter out inquiries that are generic and repetitive, while citizens have the ability to get responses efficiently and quickly. This frees up capacity and allows the institutions to focus on other objectives. The introduction of chatbot also has negative ripple effects, in relation to that public institutions serves a diverse user group. As stated by Jorgensen and Cable (2002), governments have to serve users in all shapes, have a more decentralised structure, and need to provide services in the best interest of the public. Not every user group has the knowledge or capacity to adopt new technology easily as others. This is a concern that the institutions in the case study have identified as well, with NAV attempting to make it understandable how to use the chatbot to achieve the desired response. They'll also focus on creating a chatbot instruction video in the near future. This further demonstrates that changing communication channels in the public sector carries with obligation to protect the needs of all individuals. The mismatch between how the institutions wants the citizens to use the channel is also seen in previous research (Ebbers et al. 2008).

According to the institutions, many users still use traditional channels such as telephone and letters, so public institutions feel the need to retain them. As a result, it is important to see the chatbot as a part of the overall channel environment rather than in isolation. Furthermore, NAV has introduced steps such as nudging to migrate citizens from one channel to another, as previously stated. This has proved to be a factor that public institutions should use to improve the user journey of the citizens. It is also critical to remember that if citizens do not receive the necessary services from the institutions, they have no other alternatives as they would have with a private sector service. As a result, it is essential to overcome misunderstandings and challenges between citizens and institutions and ensure that public institutions do not prevent people from accessing services or providing feedback. For applications like the chatbot, this can be a challenge, and our research shows that there are instances where citizens stop and struggle to move further in the conversation with the chatbot. It further demonstrates that, although chatbots are a new technology, they must gain acceptance, not least guidance and understanding from the citizens, to get the most out of this technology.

6.7 Framework

The framework described in Section 2.4 and illustrated in Figure 2.7 was based on the channel behaviour model (Pieterse and Teerling 2008) and combined with findings from the background literature. It was used to overview how previous research on public service delivery channels and chatbots was connected in this study. The results that are discussed in this study are mapped within this framework, extending it further. Figure 6.1 shows the revised framework and serves as an illustrative summary of this chapter, connecting the findings, and the conceptual framework firstly presented. Ultimately, Figure 6.1 shows citizens channel behaviour with the chatbot channel that was discovered in this study.

The channel strategy of the public institutions affects the citizens' choice of the chatbot channel by integrating the channel to make it a part of a funnel that the user must go through. Also, we have identified several nudging methods, both digital and non-digital variants, utilized to skew the users towards the chatbot channel.

Motivational factors that resemble the background literature from both channel choice determinants and motivation to use chatbots. These two are therefore merged into one, called "Motivation". Results showed that the citizens were motivated to use it for low complexity tasks due to its 24/7 availability and unconvincing efficiency in retrieving information and responding. Interestingly, the "chatbot habit" was also discovered to be a motivational factor for choosing the channel, where citizens were found to be selecting the channel out of habit.

Communication with a chatbot significantly influences the user's experiences and views and how the user interacts with the chatbot. The appearance of the chatbot is the first thing the user encounters, and the characteristics of the chatbot have a lot to do with the user's initial impression. Furthermore, the user's ability to efficiently navigate through the chatbot is dependent on the conversation flow. It

should also be emphasized that, in order to have a proper conversation flow, the amount of information must be considered. For the chatbot and the user to comprehend each other, the users' wording has an impact. When a user does not get the desired answer, several circumstances highlight the need for human beings, and it also happens that the user goes straight to a human chat. This might indicate, among other things, that the user does not trust the chatbot's information. As a result, they require confirmation on the information from a real person. When it comes to implementing new technologies like the chatbot, public institutions must meet the needs of various user groups, which is a challenge. Users may, among other things, be in vulnerable situations with challenging topics, requiring to be taken care of in a different manner than regular users.

The migration of users to the appropriate channel was an important tool to utilize. Institutions utilize various methods to move users across channels, including text messages, voice communications, and, not least, chatbots. This also helps regulate traffic, but it also directs users to the appropriate channels for their inquiries. Furthermore, people might be seen in a position where they are looped through multiple channels. They usually start on the website, then proceed to another channel such as the chatbot, and return to the same website again.

Users have differing attitudes towards chatbots, with many of their attitudes is based on previous interactions with other types of chatbots. Feedback from the users provided by the feedback functionality in the chatbot indicates the level of satisfaction, which demonstrates that the chatbot has a somewhat lower level of satisfaction than the alternative channel - chat. Likewise, user interviews reveal that users have a more negative attitude toward the chatbot than a positive one. This appears to be related to users being frustrated after not receiving the intended answer from the chatbot.

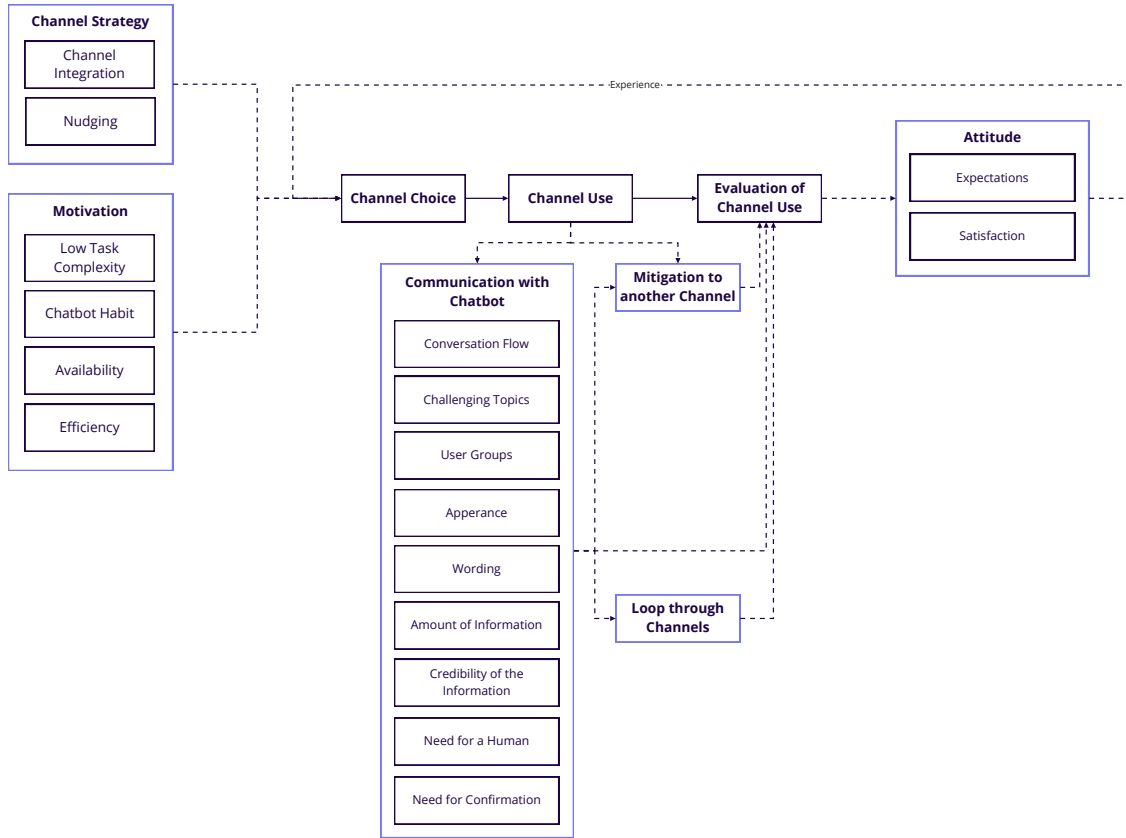


Figure 6.1: Revised conceptual framework based on the findings. Boxes with purple border shows additions and altercations to the framework firstly presented.

Furthermore, the revised framework shows how the introduction of the chatbot contributes to changes to the traditional public encounter - resembling Laenens et al. (2018) identified changes:

1. The citizens can more independently solve their task with the chatbot automatically giving them information and guidance, especially for low complexity tasks.
2. The chatbot introduces an additional communication channel into the multi-channel environment, enhancing the flexibility of where the encounter occurs.
3. The chatbot can be seen as an introduction of a new actor. Also, it adds new actors in one service interaction by mitigating users to other channels.
4. It has boosted the availability of public service delivery and contributes to a shorter response time.

6.8 Implications for Practice

This study demonstrates how a chatbot can be integrated as a part of a multi-channel environment in public institutions, focusing on citizens motivation, communication,

and attitude. Furthermore, we can see that channel choice, the use of the channel and the evaluation of the channel is critical for determining channel behaviour of the chatbot.

We have noticed some differences between our findings and other chatbot studies. This may be because studies are primarily conducted on commercial chatbots, and little research is conducted on channel choice in public service delivery, focusing on chatbots. Users trust, channel availability, managing complex questions, and migrating users to other channels are the most significant factors that impact the users' channel choice discovered in this study.

Though the citizens expressed the motivation to use a chatbot for low complexity tasks, the chatbot's ability not to understand complex questions appeared to frustrate users the most. This was often the conversation's major obstacle, as users were unsure how to continue further to obtain their desired response. Several users expressed the need for it to respond to questions that are more aimed at their particular situation than general responses. Furthermore, users found it difficult to interact with the chatbot when they had complex questions involving two topics in one question. Moreover, the fact that the chatbots were button-based was a plus, as users preferred to press buttons instead of writing directly to the chatbot.

Since public institutions have multiple channels and manage various user groups, getting users to choose the right channel can be challenging. Introducing another channel can give the citizens an additional choice and make the decision even more difficult. On the other hand, part of the chatbots' role is to assist users in selecting the right channel for their tasks. The chatbot appears to be an integral part of the integrated channel strategy, where the key of the strategy is to direct citizens to the proper channels effectively.

Although the chatbot is still in development, the institutions in this case study are actively working to adapt it to the needs of the citizens. It turns out that regardless of whether automated channels and self-service technology such as chatbots are used, users want the safety of having a person available as an alternative.

Many of our findings are also applicable to commercial chatbots. It is unclear if other domain-based chatbots face the same problems as public institution chatbots. It would also be difficult to persuade users to use the chatbot instead of traditional channels like phone and webform since previous experiences influence channel behaviour.

Lastly, we see that chatbots are not appropriate for all types of tasks, reducing their utilization, as shown by our data. Our findings provide a solid foundation for future study in this field.

CHAPTER 7

CONCLUSIONS AND FUTURE RESEARCH

This section summarises the paper and reflects on the findings compared to previous research in this field. This section also goes through some of the study's limitations. Finally, we discuss the future research that was not included in this study.

7.1 Contribution

In this paper we conducted a case study based on two chatbots implemented in the Norwegian public institutions. The study's purpose is to discover how chatbots are used in public institutions' communication channels and users' perspectives on chatbots as a channel. Twenty-two interviews with employees from the institutions and users of the services provided by the institutions were conducted as part of the study. The study also conducted document analysis on reports and the websites that dealt with the chatbots, channel use and strategy.

This research contributes to understanding the adoption of chatbots in the public sector, which does not always have the same characteristics as commercial chatbots. The research also sheds light on the value of chatbots as one of multiple channels in public institutions. It turns out that chatbots have become increasingly important in the public sector's channel environment. On the other hand, numerous previous studies based on commercial chatbots are still applicable, but they must be considered in a channel environment with multiple channels. This research also brings channel choice research along with public sector and chatbot research and human-computer interaction and information systems based on users' communication through multiple channels with the public institutions through digital solutions.

7.2 Limitations of the Study

In a multiple-case study, the number of cases must always be carefully considered. Due to the time constraints of this thesis, it was determined to focus on two different cases. This was enough work to give us an understanding and insight of both Skatteetaten and NAV. It may be preferable to have more cases, in order to offer a solid foundation for the research and to investigate for contradictions. Furthermore, we are now dealing with the Covid-19 pandemic (WHO 2021), which means we have fewer opportunities to meet people physically due to restrictions by the government. This was a challenge when we had to collaborate and interview people, but we solved this primarily by conducting the interviews through teams video chat. It was also more challenging to recruit interview participants, as we could not physically meet up at the institutions and recruit users ourselves.

We conducted relatively few interviews with users, of which eight user interviews and fourteen employee interviews. We might have done some more user interviews if it had not been for the restrictions due to the pandemic. Many of the user interviews were conducted on a younger group of participants, as it was not possible to show up at the offices of the public institutions, so we had to recruit them on our own. This meant that we did not have a relatively diverse group of users. We interviewed several types of employees at the institutions, and these were chatbot coaches, coordinators and managers. We also gained a clear understanding of the data we needed. One-half of the users we interviewed had used or had a relationship with the chatbot to NAV, and the other half had used the chatbot to Skatteetaten. We did not conduct interviews with other chatbot solutions or users of services provided by other public institutions. We also got different perspectives from users who had used both chatbots. Since we conducted user interviews simultaneously with employee interviews, we used this opportunity to get employees in the institutions to reflect on some of the citizens' findings.

Both chatbots were released recently, with NAV's first release in 2018 and Skatteetaten released in 2019. In comparison to other chatbots, this is a comparatively recent technology in their institutions. Examining new chatbots opens up new insights by allowing researchers to see what other entities have done with chatbots in the context of channel choice. This adds to the intrigue since the bulk of the research is done on commercial chatbots. Comparing the public and private sectors, on the other hand, is more difficult since they serve two separate user groups and operates with different boundaries.

7.3 Future Research

In the public sector, further study into chatbots as a channel is necessary. According to previous research, the chatbot has primarily been identified with commercial chatbots, with a few minor studies focusing on chatbots in the public sector. When public institutions deliver services, they must consider certain factors that the private sector does not always consider. Given the small size of this study, more

research across different public institutions is needed. Future studies will be able to quantify their differences and similarities, as well as delve deeper into how citizens interact with chatbots.

Only a small amount of studies has been done on chatbots as a part of a channel environment. For service providers, chatbots perceived as one of several channels have a different significance than chatbots that are isolated. Furthermore, insufficient studies have been done in the public sector on channel choice using chatbots. Because public institutions are compelled to traditional channels such as telephones and letters, future studies should investigate how public institutions can accommodate different user groups when new, modern channels are introduced. Additionally, research focusing on public sector motivation to utilise AI channels for their services would give intriguing insight not only into channel usage but also into how artificial intelligence acts in an e-government setting. The models in Figures 2.7 and 6.1 illustrate the impact of adopting chatbot as a channel as well as the user behaviour of the channel. Future studies should aim to use this framework in a new context to evaluate the additional utilitarian value.

Currently, the chatbot can only answer general questions and provide general responses, links, or transfers to a supervisor. Chatbots are a developing technology that will most likely answer more complicated questions and conduct more complex tasks in the future. In a future study, it will be interesting to see how satisfied the user is with the chatbot compared to other channels and what alternative factors surrounding the chatbot's structure affect the user channel choice.

7.4 Acknowledgements

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APPENDIX A

INTERVIEW GUIDE WITH CITIZENS

The interview will take place by video conference (Teams/Zoom) and will be recorded for transcription purposes. Thank you for taking the time to participate in this interview. The goal of this interview is to map user preferences regarding communication channels, with a particular focus on chatbots. All information has been anonymised. Is it acceptable if the interview is recorded so that it may be transcribed later? The topic of the interview is how you use chatbots as one of multiple communication channels. We can expect it taking 30-45 minutes.

Part 1

1. How do you contact public institutions when you need help with something?
 - 1.1 Why are you doing it this way?
2. What do you think of when you hear the word chatbot?
 - 2.1. What do you think is the meaning of chatbot?
 - 2.2. What do you expect the chatbot to help you with?
 - 2.3. What do you think is good about chatbot?
 - 2.4. What do you think is bad about chatbot?
 - 2.5. What do you think about such automation of customer care?
3. How did you first come into contact with a chatbot?
 - 3.1. What was it like to get started with it? Easy/difficult?
4. Have you used chatbots with public institutions before?
 - 4.1. Can you tell us about your experience with using chatbot to contact public institutions?
 - 4.2. What do you usually use it for?
 - 4.2.1. Are you able to obtain a response to your question?
 - 4.3. Why did you choose the chatbot instead of using other channels? (e.g. calling them by phone?)

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- 4.4. How do you experience chatbot in relation to chat?
 5. How do you proceed when chatting with a chatbot?
 - 5.1. What impact has your previous usage of chatbot had on your future use?
 6. In what circumstances would you utilize a chatbot?
 7. In what circumstances would you not utilize a chatbot?
 8. Would you recommend others to use chatbot? Why/Why not?

Part 2

9. Do you find chatbot useful? if so what and why is it useful/not useful?
 - 9.1. What prevents it from being useful?
 - 9.2. What does it take for it to be useful?
10. Do you think chatbot is easy to use? Why/Why not?
 - 10.1. What prevents it from being easy to use?
 - 10.2. What does it take to make it easy to use?
11. Do you feel that you get enough information from the chatbot?
 - 11.1. What do you do if you do not get your question answered from the chatbot?
 - 11.2. Why do you choose to do this?
12. Do you feel that the chatbot is helping you to solve your question?
13. What do you think the chatbot expects from you?
14. Do you experience any risk by using chatbot?
15. Do you feel that you receive information from the chatbot about what it can do/answer?
16. Do you find it entertaining to use chatbot?
17. What do you think others think about chatbots?
 - 17.1. Would you say this affects your use of chatbots?
18. What do you want the chatbot to help you with?
 - 18.1. What questions do you think it should answer?

What would you have chosen as the three most significant aspects of what we've been discussing if you had to choose only three? Is there anything else you'd like to add or say? Then I simply want to express my gratitude for showing here and for the thoughtful responses. Around the end of this month, we'll give you a gift card as an extra thank you. If you have any other thoughts, please send a message or contact us.

APPENDIX B

INTERVIEW GUIDE WITH PUBLIC INSTITUTIONS

The interview will take place by video conference (Teams / Zoom) and will be recorded for transcription purposes. Thank you for taking the time to participate in this interview. The goal of this interview is to map user preferences for communication channels, with a particular focus on chatbots. All information has been anonymised. Is it okay if the interview is recorded so that it may be transcribed later?

1. What are the biggest challenges you have with offering chatbot as a channel?
2. What is the strategy around taking care of prioritised user groups that take contact through the chatbot? (like users with low digital skills, language challenges, short-term benefits)
 - 2.1. How do you take care of several user groups at the same time?
 - 2.2. Which user groups do you consider to be a priority when it comes to the chatbot's channel strategy?
3. We have been in contact with chatbot users who feel they have received a response from the chatbot by receiving sufficient information, but who say that they are still unsure whether they have understood it 100% and therefore choose to contact the institution through others channels.
 - 3.1. How do you work to prevent this information safety for the user, to avoid them contacting the institution several times through multiple channels for the same inquiry?
4. What tools are you using or considering implementing to migrate users to the chatbot?
 - 4.1. How do you measure the effect of these implementations?
5. Have you experienced challenges with traffic from users?
 - 5.1. How did you handle this?
 - 5.2. How do you work for different channels to be able to handle the traffic from the users?

5.3. Is there a possibility that the chatbot can take on more tasks that are done manually now? If so, which ones?

6. Can you tell us a little about the channel strategy of the institution and how the implementation of the chatbot has changed this?

6.1. Are there any strategic decisions that led to the establishment of your chatbot?

6.1.1. Or has the development happened due to the increasing chatbot trend?

7. Many of the chatbot users we've spoken with have expressed dissatisfaction with their previous interactions with chatbots, and as a result, they avoid using chatbots in general.

7.1. What do you think about this?

7.2. Is this a problem you have also observed and are you doing something prevent this problem?

8. What goals do you have for your chatbot to be successful?

8.1. How do you work to achieve these goals?

8.1.1. Should it, for example: Respond to a certain percentage of incoming messages? Is it necessary for user satisfaction to be that high? Is it necessary to reduce traffic on particular channels to such a level?

9. Have you mapped any parameters that affect the users' channel choice, e.g. demographic background, digital skills, habits, etc.?

9.1. Are there any parameters that stand out specifically for the chatbot?

10. Users we have been in contact with often say that they do not use chatbot because you only get impersonal answers and that they can usually look for it themselves. Are you working towards making the chatbot more personal?

11. Do you experience any change in how users communicate with their chatbot today versus when it was implemented?

12. How do you make sure that the chatbot provides answers that are easy for the user to understand?

12.1. Users we have talked to say that there are often a lot of messages at the same time, that they lose track of the answers. Do you have any thoughts on this?

12.2. Users often say that they choose a phone because there is a better flow in the conversation, are you working on improving the flow of the conversation with your chatbot?

13. What is the next step in automation? Should your chatbot remain just a chatbot, or take care of other tasks such as e.g. (answer) mail, phone, front desk (short term channel supplement/long term replacement).

14. Do you have any documents or data related to what we discussed today that you might share with us?

