Perception of Society's Trust in Care Robots by Public Opinion Leaders

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Abstract

The rapid demographic shift toward a greater percentage of the elderly population increases the need for welfare services. Welfare technology and especially care robots can be regarded as an important measure to counteract such demographic challenges. However, when implementing new technologies, structured information is of immense importance to develop societal trust. Frequently, research addresses trust solely at the level of the end-user. However, trust at the level of opinion leaders and political decision-makers is also relevant as they are catalysts for trust. This study aims to detect the perceived trust level of users from the viewpoint of opinion leaders (politicians, insurance organizations, and media) in the Swedish, Finnish, and German society. Furthermore, this study uses qualitative expert interviews and identifies four trust categories: trust in the health care system, trust in regulations, trust in technology, and interpersonal trust. The findings stress that targeting only the end-users is not sufficient for developing technology trust in society.

Keywords Care robots, opinion leaders, society, trust, welfare technology,

1. Introduction

The paper at hand focuses on trust that can be observed in society regarding welfare technology (e.g., technology, gerontechnology), especially care robots. Currently, the number and percentage of older adults grows rapidly, and this demographic change increases the need for health care services (Scherer, 2017). Projections by Eurostat (2020) indicate that the share of adults above 65 years of age (EU-27) will grow steadily from 20.3 percent (90.5 million) at the start of 2019 to 31.3 percent (130.2 million) by 2100. This predicted 11.0 percentage points increase amounts to an additional 39.7 million older adults by 2100 (Eurostat, 2020). Moreover, life expectancy at birth is expected to increase, as well (European Commission, 2012). Therefore, the number of people of old age who endeavor to live an independent and self-determined life in their familiar home—probably with only little help—is growing. Hence, European health policies need to be adapted.

Welfare technology, e.g., care robots, is expected to help in meeting the needs of older, independentlyliving persons and may contribute to their quality of life (Johansson-Pajala & Gustafsson, 2022). To achieve significant technological progress, the developers of welfare

technology and its end-users (older adults and caregivers) must be well-connected to create innovative development processes in which end-users' authentic needs can be considered. Therefore, a framework for trust development is crucial since end-user participation is recognized as one of the most important factors to develop sustainable welfare technology (Nambisan, 2010). Thus far, one reason for the missing interaction is stereotyping. Developers usually think of older adults as fragile, sick, or technology-adverse which distorts the way they include them in the development process (Compagna & Kohlbacher, 2015). However, technology in care is frequently described as threatening. Frennert et al. (2021) note that the most prevailing public notion about care robots is that "care robots are threats to the quality of care, and a substitute for humans and human care."

Yet, care robot development, in particular, requires co-creation and mutual trust. Previous research on technology trust in care frequently addresses the user as the main target of trust development during use (Bartneck et al., 2004; Johansson-Pajala et al., 2019, 2020; Koay et al., 2007; Olson, 2013; Shinozawa et al., 2005; Van Wynsberghe, 2013; Winfield & Jirotka, 2018).

A deeper level of trust, as needed for the co-creational process among older adults and developers, has to be established before use and is, therefore, more difficult to achieve. In this regard, public opinion leaders play a crucial role. "Opinion leaders are defined as those individuals from whom others seek advice and information" (Rogers & Cartano, 1962, p. 435). Their views and perceptions are important as they can facilitate or slow down technological development in health and welfare technologies through funding, enabling, and connecting actors. In this study, public opinion leaders are regarded as multipliers. They dominate public debates, act in the interest of society, influence the latter through media, and have an impact on (re)formulating health policies, which, in their part, frame the role of technology in care services. Moreover, opinion leaders can transfer trust to society by giving structured information, e.g., informing on regulations and explaining potential areas of use (Rogers, 2003). In this study, the focus is shifted to the role of trust and how it is currently developed in society by taking opinion leaders into account. This study particularly focuses on politician's, insurance organization's, and media's perceptions to evaluate the current level of societal trust in care robots as an example of welfare technology.

Understanding the opinion leaders' trust in technology contributes to our general societal understanding of technology introduction (Kachouie et al., 2014). The aim is to understand if and how the public and opinion leaders form trust regarding care robots. Therefore, the study

raises fundamental questions about the current information and trust level of society in the field of welfare technology, especially regarding care robots.

The remainder of our paper is structured as follows. The paper continues by reviewing the literature on care robots and levels of trust in Chapter 2. Subsequently, Chapter 3 contains the description of our methodical framework while our results are illustrated in Chapter 4. Finally, conclusions are drawn in Chapter 5, and our findings are discussed and evaluated in Chapter 6.

2. C*are robots and levels of trust*

The aim of care robots is not only to aid caregivers and older adults in overcoming obstacles in their daily life. Wichert and Eberhardt (2012) stress that welfare technology should assist older adults to achieve autonomy and dignity appropriate to their needs and conditions, as well as independence. However, despite the potential benefits, care robots are not widely disseminated. Care robots can be distinguished into two main categories (Kachouie et al., 2014): rehabilitation robots and social robots. The latter can further be subdivided into companion robots and service robots.

Rehabilitation robots focus on physically assistive features to maintain and increase mobility. They are designed to support regaining diverging physical functions, such as muscular strength and flexibility. These include, e.g., Exoskeletons, which are smart robot systems aimed at enhancing gait performance and daily activities (Lee et al., 2017; Sale et al., 2012). Rehabilitation robots are also designed to facilitate tasks at home, for instance, lifting and transporting objects (Huo et al., 2016).

Assistive social robots can be divided into companion robots and service robots, often resembling animals or human bodies. Companion robots are designed to improve older adults' lives by increasing physical and psychological well-being, as well as combating feelings of loneliness (Fischinger et al., 2016). One example is the robot Zora. With its child-like character, it motivates physical activity (Melkas et al., 2020). Service robots are aimed at facilitating elementary activities, such as eating, bathing, or housework. They also monitor and maintain safety and support the mobility of older people (Kachouie et al., 2014). Yet, although the spectrum of older adults' requirements in the field of housekeeping or physical support for daily tasks is broad (García-Soler et al., 2018), barely any service robots are in use. One notable

exception is cleaning robots, e.g., vacuum robots, which are frequently used household tools (Kachouie et al., 2014).

The concept of trust in care robots differs from trust in other robots, e.g., trust in a vacuum robot and specific literature is rare (see for our search process Appendix A).

Users are likely to trust this robot to clean their floors, and even if they do not, mistakes may not have a severe impact compared to the potential mistakes care robots might make. Since they are used in care settings, their work involves patients with medical conditions, who are often old and fragile. Hence, mistakes made by care robots can have severe consequences for people's well-being and security (Botsman, 2017). Hence, care robots and their potential failures are associated with a higher risk and, therefore, highly legally regulated (Cresswell et al., 2018; Wan et al., 2020). However, co-innovation and co-construction of robots inevitably require the involvement of potential users. Thus, very strict and inflexible prohibitive rules may slow down or even break innovations. Opinion leaders, e.g., politicians, can argue for or even allow exceptions. This, however, demands them to trust robotics in the first place. MacNeil et al. (2019), for instance, investigated health technology innovation in Canada and provide evidence that care technologies can improve patient outcomes. However, they note that policies and regulations that were established to protect public interests may become a hinderance to the improvement of welfare services. Therefore, the analysis of the current societal trust in the care context is of immense importance for the forthcoming process of implementing care robots (Pekkarinen et al., 2020).

In general, people tend to rely on technology they trust but reject what they do not (Muir, 1987). Problems could arise if users' trust does not match the actual capacity of the system (Parasuraman & Riley, 1997). There are different approaches developed regarding trust and welfare technology, e.g., the diffusion of innovations theory introduced by Rogers (2003), which describes the stages individuals go through who have not yet adopted the innovations and thus made a final decision to adopt or not adopt. Additionally, there are different acceptance models on the individual level, such as the unified theory of acceptance and use of technology, the technology acceptance model, or Almere model. which investigate the explanation of users' technology adoption (Heerink et al., 2010; Venkatesh & Davis, 2000; Wu et al., 2011). Moreover, the concept of transparency relates to the idea that transparency will lead to an increased level of trust. Transparency is thereby synonymous with openness and simultaneously an antecedent and an outcome of trust (Loomis, 1959). The trust model (Goto, 1996) consists

of the institutional, progressive, and dispositional trust whereas the triadic model of trust categorizes the factors influencing trust development as human-related, robot-related, and environment-related characteristics (Hancock et al., 2011). This study focuses on trust by highlighting Goto's trust model (1996), which explains that trust has three layers: (1) Institutional trust includes the experiences with the governmental systems in countries, e.g., trusting in the reliability of the systems and organizations at play. Institutional trust in this specific area consists of, e.g., trust in the health care system, trust in the financing system of health care services, trust in the working ethics of care staff and care institutions, or trust in the legal system in case of misconduct. (2) Progressive trust, which is defined as the updating of beliefs via experiences, can be divided into two types. The first type of individuals has general trust in every technology because they have made good experiences with it and are, therefore, open to further advancements. The second type has made good experiences with one specific technology but does not initially trust all other technologies. (3) Dispositional trust is defined as a personal characteristic, i.e., individuals are born with a certain level of trust.

Trust has become an important concept in the research of human-robot interaction. The literature on trust in care robots finds that the greatest influence on developing trust are factors pertaining to the robots' performance, such as failure rate, reliability, and false alarms (Hancock et al., 2011). Stuck and Rogers (2018) find that perceiving a robot as kind or companionable also enhances older adults' trust in care robots. Further research also indicates that trust in welfare technology is context-sensitive, showing that, in particular, gender and technical affinity influences the user's decision to trust or distrust (Brell et al., 2019). By highlighting trust in welfare technology, trust among patients can, according to Van Wynsberghe (2013), be transferred through the caregiver who uses a care robot, e.g., a person lifter. Hence, older adults accept technical support because they trust their caregivers (Van Wynsberghe, 2013). It is likely the physical presence (Bainbridge et al., 2008) and the appearance of robots, as well as an empathic language (Tapus et al., 2007), that create trust. In general, people respond similarly to robots and screen agents, but they trust a robotic agent slightly more than a screen-agent. This supports the notion that the actual embodiment of a robot is perceived as more appealing than the virtual embodiment of the screen-agent (Bartneck et al., 2004; Shinozawa et al., 2005). Another aspect of building public trust in robots is the guidance of ethical governance. For the public, trusting in new technologies is much more accessible if there is transparent and agile ethical governance (Winfield & Jirotka, 2018). Moreover, trust in technology is also dependent on security measures. The user should be certain that the information which will be collected is

not accessible to others (Koay et al., 2007). Thatcher et al. (2011) distinguish between trust in information technology (IT) and IT support as object-specific beliefs and how these influence the intention to explore knowledge management systems mediated by behavioral beliefs about IT. They find that trust in IT translates to direct effects on behavioral beliefs which lead to intentions to explore knowledge management systems. Moreover, they found that trust in IT compared to trust in IT support plays an important role in the formation of behavioral beliefs, and these, in turn, lead to the exploration of IT. All in all, older adults can only develop trust in care robots if they receive adequate information about the capabilities, reliability, and limitations of the welfare technology (Johansson-Pajala et al., 2019; 2020; Olson, 2013).

Hence, users' trust does not evolve in isolation but is affected by the level of trust transmitted via society and other stakeholders, such as opinion leaders (Rogers, 2003). MacNeil et al. (2019) find that open political and public debates might also increase the trust level of society and ensure more structured processes of welfare technology implementation (MacNeil et al., 2019). Brown Cooper (2015) aims to provide a better understanding of how opinion leaders influence the adoption of innovative programming, e.g., telemedicine. For this purpose, the diffusion of innovations theory by Rogers (2003) was applied to gain a better understanding of the adoption in telemedicine. They argue that the following five topics should be considered: financial feasibility, resistance to change and acceptance of new technology, access to specialists or subspecialists, collaborative governance, and champion or opinion leader roles in the adoption process. They highlight that additional research is needed, which should include focus groups and interviews with legislative bodies, vendors, and a variety of health care professionals to investigate external factors that lead to the adoption of innovative technology in care (Brown Cooper, 2015; Melkas, 2003). In this study, among other means, interviews with legislative bodies were conducted. However, since the study did not aim to understand if and how the public and opinion leaders form trust regarding care robots, further conclusions cannot be drawn from these findings.

3. Methods

To analyze public opinion leaders' perceptions and trust in welfare technology, especially care robots, semi-structured interviews were conducted in Finland, Germany, and Sweden. The interviewees represented key persons in public sector politics (PDM), insurance organizations

(I), and media (M). Their occupations included, for example, politicians, journalists, as well as heads of department for public and private health insurance organizations. A stratified clustering technique was applied in order to conduct at least two interviews per country (Fin, Ger, Swe) and group (politics, insurance, media). Apart from that, we used convenience-based sampling. For the study interview players were deliberately chosen on the macro-level of society as they can campaign for or against usage of robots and for and against regulations; by implementing laws, speaking on societal issues, publishing news on welfare technology, especially care robots, or by providing support and funding for people who need welfare services. In total, 20 individual semi-structured interviews were conducted. Table 1. gives an overview of the background information of the public opinion leaders interviewed in this study.

Table 1. Background data of the public opinion leaders

Background information		**Finland**	**Germany**	**Sweden**
Gender	**Female**	5	3	4
	Male	2	4	2
Age	**Mean (range)**	55.2 (42-62)	44.1 (26-62)	44.5 (37-56)
Experts	**Politicians**	2	2	2
	Insurance	3	3	2
	Media	2	2	2
Education	**University**	7	7	5
	Upper secondary school	0	0	1

For this study, especially when focusing on institutional trust, it is crucial to note that there are differences in the organization of social and health care services in our sample countries. In Finland and Sweden, the public sector, mainly the municipalities, are responsible for social and healthcare services, including older adults' care services. These services are funded by municipal taxes and complementary patient fees. In Germany, the insurance sector has a more influential role in financing care. Care is financed here by municipalities or relatives only if necessary. The differences between the Beveridge (Sweden and Finland) and Bismarck (Germany) systems regarding financing, provision, and regulation (see Wendt et al., 2009) may affect the processes related to new technologies and especially the implementation of welfare technology, especially care robots.

Across all countries, about two-thirds of the interviewees had at least some experience with care robots. The expert interviews lasted about 1–1.5 hours; they were audio-recorded and transcribed The interview guide was structured into opening, introductory, key, and closing questions. Interviewees were asked to describe the current perceived situation in society regarding care robots in their country. Furthermore, they were asked to describe the current information dissemination processes and to outline where processes need to be revised to provide better information for society regarding the process of implementing care robots.

The interviews were conducted in each country's native language but were translated into English after the initial coding phase. The data were analyzed following a qualitative approach. During this process, the authors of this study started conducting first-order open coding (Corbin & Strauss, 2008). This coding was verified and complemented via discussions among all the authors, followed by a more detailed coding that led to a coding scheme created by this multi-step coding procedure (Neale, 2016) since this study used a deductive-inductive category development. To ensure the consistency of the study among the three countries, an interview guide with common questions and general instructions, as well as instructions for the analysis of initial coding, was prepared (see Appendix B)

By analyzing all expert interviews, 15 minor categories were inductively conducted that are determinants of trust in robots. Afterward, a deductive approach was then used to sort the 15 minor categories into the three trust levels (dispositional trust, institutional trust, and progressive trust). These three main categories reflect Goto (1996), who divided trust into dispositional trust (e.g., personality traits), institutional trust (e.g., trusting that the system is reliable), and progressive trust (e.g., updating of beliefs via experiences), four respective categories were deductively developed out of the minor categories established before. In the course, two categories were found for institutional trust (trust in health care systems, trust in regulation) as well as one category each for progressive (trust in technology) and dispositional trust (personality traits). See the analysis of the initial coding in Appendix C (Figure C1).

4. Results

The findings will be presented according to the minor categories as well as categories based on the trust levels of Goto (1996). Table 2 shows an overview on the categories and minor

categories analyzed in this study (Table 2). Evolving categories derived from expert interviews and the trust approach of Goto.

Table 2. Categories of trust

Trust levels	**Category**	**Minor category (determinants of trust)**
Institutional trust	Trust in Health Care Systems	-Holistic view and knowledgeable actors -Lack of actions and processes -Different perceptions because of lack of sustainable processes -Call for capable institutions
	Trust in Regulations	-Payments -Privacy and data security -Coherent regulatory system -Regulatory innovations
Progressive trust	Trust in Technology	-Missing experience -Speed of development -Human-centered design -Clear division of labor with human -Implementation of care robots
Dispositional trust	Personality Traits	-Different perceptions -Optimal technology introductions

4.1 Trust in Health Care Systems

Trust in health care systems is divided into four minor categories: Lack of trust in a holistic view on care robots and knowledgeable actors, lack of action and processes even though there is a need, lack of different perceptions because of lack of sustainable processes, and call for capable institutions. In the following, in each explanation of the minor categories, one or two citations were provided as an example. More citations are found in Appendix D .

Insurance organizations and politicians argue that the level of knowledge about care robots in society implies rudimentary information. However, no initiative monitors the forthcoming results and developments to gather and disseminate this knowledge to impact decision-making on care robots. Currently, the process runs aground because of the variety of knowledge that stakeholders are currently not capable to bring together. In society, a black or white debate is prevalent.

When I talk to the developers of robots, or with decision-makers, or with caregivers, very few seem to have a holistic view. They seem to glance only through one window. And then we are stuck with the question of if a robot or remote access replaces a human being. This is, unfortunately, a yes-no debate (PDM FIN, 2019).

Opinion leaders detect the need for change in the health care system. However, some kind of unintentional reluctance prevails, especially among insurance organizations, which hinders the forthcoming of care robots. Journalists and politicians mentioned the immense shortage of skilled workers and highlight the need for care robots but also express a skeptical point of view, saying that this is neither affordable nor manageable. However, they are cautious about speaking up for this: firstly, due to the lack of adequate information structure and, secondly, because of the generally perceived negative attitude towards care robots in society.

Technology is absolutely necessary; we will not cope with our welfare and keep the level we have today if we do not go in and work with new technologies or accept changes in the way of working. The potential is huge, but, above all, we cannot afford it and cannot manage it currently (PDM SWE, 2019).

A further problem regarding the information processes of politicians might be that they do not have sufficient information regarding the implementation of care robots in practice. Politicians are under the impression that care robots work much better in practice than they do in actuality. Moreover, politicians criticize that the results of research projects regarding the implementation processes or development of care robots were, in the end, mostly too complicated for users and, therefore, not transferable into practice. Hence, there is a lack of sustainable processes regarding care robots.

[…] *knowledge, in general, is poor. […] politicians may think the situation is much better and there is a wide range of possibilities and the devices and applications work much better than they currently do. On the other hand, the nurses see the reality. They have been involved in the*

projects and they are frustrated, and the care robots and other devices end up lying abandoned in storage rooms (PDM FIN, 2019).

Especially politicians and the media highlight the need for restructuring the processes in health care services to implement care robots into daily routines. Therefore, politicians stress society's need to take such a risk, even if such a trial results in failure, since the lessons learned may improve the processes.

It is not about learning the technical stuff, but it is about how to modify and work in a new way. […] It is important to understand that it is not only about the technical gadgets, it is about how to change and conduct things in a new way and how to inspire others to change and conduct things in a new way. We must dare to change ourselves, to dare to say yes to things, Yes! (PDM SWE, 2019).

4.2 Trust in Regulations

Trust in regulations is divided into four minor categories: lack of regulations concerning the payment of care robots, lack of regulations concerning the privacy and data security of users, lack of coherent regulatory systems, and lack of processes of regulatory innovations.

According to the interviewed insurance organizations, more transparency must be provided regarding the costs of care robots. It must be defined which tasks a robot should take over, and it should be subsequently allocated which office pays or subsidizes certain costs. Another essential aspect is the determination of the availability of care robots for users. Which individual health conditions must be fulfilled to receive a certain type of care robot? Moreover, insurance organizations and politicians highlight that if care robots can take over nursing services, legislation must be involved. Currently, there are no guidelines regarding the use of care robots. This is one of the obstacles hindering the advancement of the implementation process of care robots—missing fundamental structures.

[…] who bears the costs. Because if you say, okay, that's a matter of pension offices (Versorgungsämter) like the conversion of cars. […] But if you say that a care robot is a service that can also take over nursing services and is therefore subsidiary or reimbursable from the compulsory social nursing insurance, then the legislation must be involved (I GER, 2019).

Another essential issue for politicians and journalists is the fear of the potential misuse of care robots. This holds especially true for the misuse of data that will be saved by care robots, i.e., who can access the recorded data, who can decide on policies, and how long and where data is stored.

The fear (Angst) of misuse of technology in terms of the use and recording of data, who can access the information (PDM GER, 2019).

At the moment, according to politicians, there are neither defined regulatory processes in the welfare system that provide directions and guidelines for the implementation of care robots nor any authorities that can represent a holistic approach to advise opinion leaders.

There are conflicting laws, or the authorities say different things about what you can do and cannot do, and that is an obstacle (PDM SWE, 2019).

Additionally, according to politicians, there are no innovative laws in social welfare services that support new innovative approaches. Quite on the contrary, some laws give little to no leverage for innovative changes in the health care systems. Hence, society is not able to implement processes that care robot technology requires to make full use of these new technical opportunities. To keep up with the development processes and meet challenges adequately, politicians underline that it is of immense importance to update the laws.

I do not think that our laws are really updated. […] recommendations in legislative changes are needed to be able to make full use of care robots and other welfare technology, so I think our laws do not really keep up with the development (PDM SWE, 2019).

4.3 Trust in Technology

Trust in technology is divided into five minor categories, consisting of lack of trust because of missing experience, trust in the speed of development, trust in human-centered design, trust in a clear division of labor with humans, and lack of implementation of care robots.

The use of care robots is, especially for insurance organizations, currently in the initial phase and has not reached visibility yet. Moreover, insurance organizations, media, and politicians demand more information on how and to what extent care robots can be used. Furthermore, they demand to allow future users to experience care robots in practice.

I think that we are just in the initial phase, that the topic is just coming up and there is a lack of experience. And for me, there is the question of what possibilities care robots can offer (I GER, 2019).

According to politicians, technology has evolved rapidly in the past years. However, if one looks at the field of care robots, expectations and reality have not converged yet. Only small steps have been taken if any to move from legislation not allowing for care robots at all to mentioning robots as an opportunity or something necessary. Moreover, journalists highlight that care robots pose a highly ethical issue and need time to be implemented.

[…] we have moved quite a bit, from not having allowed it at all, where you talked about robots not as an opportunity, but as a limitation measure and now talking about them as something that is even necessary (PDM SWE, 2019).

Politicians also detect a problem in the process of developing care robots. They currently see an exclusive supplier orientation. However, the problem is that developers or manufacturers do not include users in the development processes. Hence, it is impossible to develop robots that offer services which are needed in reality. Moreover, politicians argue that welfare technologies that fit the real needs of users were already adopted in health care services. One important point to implementing care robots successfully into care is to center the user of welfare technology and care robots to build up welfare technology that complies with existing and future needs. Additionally, politicians suggest a human-centered robotics approach for care robots to become a product for sale in the market.

If we not only talk about putting the patient in the center but also understanding that the patient is the center. That we should start from the patient, that the patient is a great source of knowledge, then there is also a huge potential for making people independent (PDM SWE, 2019).

According to the interviewed journalists, there is, on the one hand, a very positive attitude towards care robots. Some see the use of this technology in care as a promising solution to address the shortage of skilled workers. On the other hand, they also detect a significantly negative attitude regarding care robots in society because people fear that robots could take over crucial tasks. According to journalists, the aim should be a nuanced perspective in which structured information dissemination channels allow the public to make informed decisions on welfare technology and particularly care robots.

There are two perspectives here; either that you give voice to welfare technology fear and that robots are something that will take over. Or, that it is the only thing that can save us in some way. There must be room for more nuanced perspectives (M SWE, 2019).

Moreover, politicians argue that the fear of care robots replacing human caregivers is one essential aspect that hinders the process of implementation. According to them, society is also afraid of mistakes that care robots could make. For instance, people might be left untreated, abandoned, and helpless without any means to contact human caregivers. Hence, relying too much on care robots poses a certain undeniable risk. Society's current notion is that robots are not allowed to make mistakes but should complete every task 100 percent correctly to be safe.

No technology is faultless. […] when something stops working and the connections don't work, really bad things can happen, like people can be left untreated and abandoned and helpless. There is a big risk if we rely too much on technology. As technology should be reliable in care work, it should provide automatic notifications that there is a problem […]. I don't think that they can all be prevented, so even though a lot of technology can be created, it is never 100 percent and error-free (PDM FIN, 2019).

Journalists are arguing that nothing can currently be subsumed under the term "care robot" and that mass production is still not available. Hence, the process of implementing robots into care is still in its evaluation phase. Similarly, politicians identify several aspects that prevent the use of robots in care. The main problem is a lack of advanced introduction processes in the use of care robots and also the lack of mass production, making care robots too expensive.

Much is still in the evaluation phase, in project phases. There is still nothing that can be subsumed under the term care robots that is really produced in series. I know many care homes where, for example, Pepper is tested. But in mass production, it will probably take a little longer (M GER, 2019).

Examining research on care robots, politicians argue that there are many studies, which show that this technology has huge potential but is not yet sufficiently tested in practice and therefore inapplicable.

I think that there is a huge potential which is already very advanced in research but has not yet sufficiently been tested in practice and therefore cannot be applied yet. Moreover, the costs are very high because they are often still unique pieces and are not produced on a nationwide basis

so that care institutions cannot afford them. This means that there is still a lot of unused potentials that have to be put into practice, which has not yet happened (PDM GER, 2019).

4.4 Personality Traits

We found noteworthy individual differences among interviewees in their level of trust. Frequently, they were projecting their lack of trust to other stakeholders.

Politicians argue that the perception regarding care robots depends on individual preferences and experiences with technology, as well as on the health status of an individual. If individuals need care, they will have a greater desire to use supporting tools, e.g., to employ care robots to live independently at home for as long as possible. People who do not need assistance in their daily life are more uncertain and apprehensive regarding care robots.

If you yourself have a need, you have a greater desire and willingness to dare to use technology and understand that it is something that can be good for me. And the farther one is from the need the more uncertain you become and the more you feel that you need to be a little protective (PDM SWE, 2019).

Politicians also argue that one problem of implementing care robots into practice is the fear of process changes in care. This indicates that society and especially professional users could be afraid of leaving behind established procedures even if they are not satisfied with their current situation at work.

Well, I think the greatest fear is the fear of change. This is particularly noticeable among the staff, who tend to say that everything should actually remain as it is. But if you ask them if the current situation is good, then everyone says, no, it is terrible (PDM GER, 2019).

5. Discussion

In the discussion, each of the categories will be evaluated related to Gotos' trust model.

5.1 Trust in Health Care Systems

The analysis of Finnish, Swedish, and German opinion leaders' perceptions has shown various aspects regarding lacking trust in care robots. According to the detected lack of trust in health

care systems, especially in Germany, insurance organizations are reluctant towards the forthcoming of care robots. Yet, they argue that care robots are essential to meet future challenges in care and that their reluctance is unintentional. One explanation for this unintentional apprehensiveness is derived from the low level of institutional trust in health care systems, e.g., due to the lack of structured information dissemination processes. Another explanation could be that the trust relationships in the health care sector are not necessarily high, in general (Groenewegen et al., 2019). Another problem is that there are, to the knowledge of the considered opinion leaders, no information networks and hardly anyone who feels responsible for moving this issue forward. Hence, trust can hardly evolve if many basic questions on care robots are not sufficiently answered. The non-transparency of services and products in the health IT market, which Swain et al. (2015) found in the US, might also exist to a certain extent in the Swedish, Finnish, and German health care systems.

Even though public opinion leaders are aware of the possibilities that care robots entail, especially in times of a severe lack of skilled caregivers, they are cautious to speak up for their implementation. Firstly, this is due to the lacking information structure and, secondly, because of the generally perceived negative attitude of the public towards robots in care. The problem, as Studley and Winfield (2020) note, is that most widespread and profound impacts depend on the economic and political system that motivates the introduction of robots in the workplace. This could be one possible explanation for why care robots are stuck in the initial phase in the health care sector.

5.2 Trust in Regulations

When focusing on institutional trust in regulations, firstly there are no legal regulations regarding payment or availability of care robots. These facts hinder the advancement of the implementation process of care robots because missing fundamental funding structures lead to uncertainty, which, in turn, negatively affects institutional trust. Insurance organizations highlight that if care robots can assist the nursing staff in various tasks, legislation must be involved to provide a systematic basis, especially regarding the payment of care robots. It must also be clarified where the information collected by the care robot will be stored to ensure the safety of patients' personal data. According to politicians, some laws offer little to no leverage for innovative changes in the health care systems. Hence, society is practically not able to implement the changes required to make meaningful use of care robots in daily care. However, to keep up with the development processes and adequately meet challenges regarding care

robots, politicians argue that it is of immense importance to update the laws. Our results support the findings of MacNeil et al. (2019) who investigated health technology innovation in Canada and concluded that care technologies can improve patient outcomes, but policies and regulations may become a hindering factor regarding the improvement of health care services. On the other hand, policies and regulations can also form the basis for new innovations.

As an expedient to these problems, politicians demand an authority that represents a holistic approach while receiving information from the different groups, such as developers, users, researchers, insurance organizations, caregivers, and other stakeholders. Currently, there is no coherent regulatory information system regarding robots in which all the knowledge is gathered. Such a regulatory system could facilitate gathering all relevant information and aid politicians in deciding on further steps.

Before societies can develop institutional trust, it is inevitable to update welfare service laws regarding care robots to enable changes from established processes without care robots to innovative processes with care robots. Focusing on progressive trust, opinion leaders in society find a lack of trust in care robots, primarily because of missing experience. Insurance organizations argue that care robots are mostly not visible. Additionally, insurance organizations, media, and politicians demand more information on how and to what extent care robots can be used to provide future users the opportunity to form an opinion. Even previous ethical literature finds that older adults can benefit from welfare technology if it is introduced with foresight and careful guidelines (Sharkey & Sharkey, 2012). The prevalent apprehension toward robots suggests that it is difficult for society to develop progressive trust in care robots because, as stated in this study, the considered opinion leaders do not currently see themselves in the position of organizing the processes that society needs to form an opinion. Their position can more precisely be described as a “wait and see”-attitude. However, opinion leaders are expected to give society the possibility to gain structured information to improve their understanding and consequently increase their trust level. This poses the question of who should advance this topic if opinion leaders fail to live up to their task.

5.3 Trust in Technology

Politicians argue that most pilot projects aimed to implement care robots were in the end mostly not applicable in practice. Moreover, insurance organizations highlight that politicians tend to have a much more optimistic view of care robots than caregivers. This is likely due to the fact

that caregivers are involved in the project itself and witness that most welfare technologies cannot be used in practice as they are too complicated or do not fit into the daily processes.

To increase trust in technology, politicians suggest a human-centered approach to the development process of care robots. The aim would be to develop care robots that perform tasks that are actually needed in daily care (see Nambisan, 2010). Only then can care robots be sustainably implemented into care practice. However, the development process of care robots is mostly focused on what developers believe users need. These findings correspond with the study conducted by Henriksen et al. (2003) who investigated the structures and processes of care, albeit without including care robots in the processes. By interviewing local politicians and managers, they found that older adults are seen as passive receivers of care, as objects that take no active part in care decisions that affect them. Therefore, the opinion leaders suggest not only paying attention to users but also understanding that the user is indeed the center with which all processes should align. However, a rising number of studies focus on individual assessments of gerontechnologies and welfare technology based on various criteria. Halicka and Surel (2020) find that the highest-rated technology criterion in their study is the improvement of the quality of life of older people. In a follow-up study, Halicka and Surel (2021) focused on individual assessments of the most desirable group of gerontechnologies and discovered that the paramount point regarding assistive technologies is functionality, e.g., allowing older adults to call for help. Importance was also assigned to technologies improving the quality of life for older people. Furthermore, Andtfolk et al. (2021) reviewed how humanoid robots can be used in the elderly's everyday life and identified benefits and challenges regarding their usage. They derived four main categories: domain of use, support in everyday life, providing interaction, facilitating cognitive training, and facilitating physical training. Moreover, they find that the older persons' enjoyment of using humanoid robots decreases significantly over time.

According to a study conducted by Johansson-Pajala et al. (2020), basic knowledge is needed to increase the understanding and conceptualization of care robot use in daily life. Primary issues concern general questions about what a care robot is, what it can do, and what is available on the market. People may think that using robots means less human care, but when knowledge is provided about the tasks the robot performs, the attitude usually changes (Pekkarinen et al., 2020). Ejdys (2018) finds that the usefulness of technology is positively related to the perspective of building social trust in new technologies. Other important aspects are the use of care robots for lonely people, improving the safety of older people, and the quality of care services for the aging population. Another study by Ejdys and Halicka (2018b) finds that one

of the most important aspects of shaping human attitudes is a perceived social impact, e.g., the use of humanoids in the care of lonely older people making life more enjoyable. They also find men to have a more positive attitude toward humanoids than women, and people between 26 and 40 years of age hold the most positive attitude toward humanoids.

Additionally, according to journalists, there is no possibility for society to engage in a nuanced debate regarding the use of care robots, which indicates that potential users are not appropriately informed enough to hold nuanced attitudes. Trust in technology can hence only be developed through previously made experiences with other technical tools used in daily life. These experiences will then also depend on individual personality characteristics or affinity for technology and may partly be transferred to care robots. While there are still mostly pilot projects, it is hard for society (users) to get an idea or form an opinion on to what extent a care robot can assist in daily care. Hence, this also lowers the level of trust in welfare technology, especially in care robots. Finally, opinion leaders add that expectations and reality regarding care robots have not yet aligned at a level they were expected to reach ten years ago. These results are in line with the study by Van Aerschot and Parviainen (2020), who found that, despite the effort and money invested in research, there is no specific care robot that is a firmly established part of assistance in older adults' life and truly helps older adults by improving well-being or maintaining their independence (Van Aerschot & Parviainen, 2020).

5.4 Personality Traits

Regarding dispositional trust, politicians and journalists believe that individuals needing care are significantly more open-minded. However, personal preferences and technological experiences are also relevant to determine whether individuals are more interested in technology. Another hindering aspect, according to politicians, is the fear of changes in familiar care processes. Stakeholders are afraid of leaving the established routines (see also Johansson-Pajala & Gustafsson, 2020). Archibald and Barnard (2018) complement our findings by highlighting that forethought and understanding of nurses are indispensable for further integration of welfare technology to maximize the benefit of technologies in care. The study by Salzmann-Erikson and Eriksson (2018) provides insights into why our findings indicate that stakeholders are afraid of leaving behind established processes in care services. They investigated the volume and visibility of data on care robots in social media and highlight that most findings are related to the idea that care robots will replace humans in healthcare all over the world. Hence, it is of utmost importance to find structured information dissemination

channels to demonstrate to users and caregivers which tasks care robots can carry out independently to relieve their daily (working) life. Here, too, the approach of Goto (1996) proved well suited for analyzing the data.

According to established approaches regarding trust and technologies in welfare services, this study, focuses on Goto's trust model (1996) and his division into (1) institutional trust, (2) progressive trust, and (3) dispositional trust to categorize our minor categories. This study aimed to establish an explorative overview of how trust and care robots are connected, as well as which topics are highlighted by opinion leaders. Goto's trust model (1996) fits this purpose well since this model covers the overall areas of trust by highlighting experiences with governmental systems in countries. Opinion leaders also emphasized this point as they argue that most widespread and profound impacts depend on the economic and political system that motivates the introduction of innovations and especially robots in the workplace. Regarding progressive trust, which is defined as the updating of beliefs via experiences, the considered experts in this study suggest a human-centered approach to the development process of care robots. The same holds for dispositional trust, which is defined as a personal characteristic. The opinion leaders argue that stakeholders fear changes in familiar care processes. Therefore, our explorative minor categories have, in the end, been divided into categories that gear towards the three trust levels of Goto (1996).

6. Limitations

Naturally, this trust model is subject to some limitations. By following Goto's model (1996), the focus is less on transparency, which, according to its concept, leads to an increased level of trust (Loomis, 1959). For future research, that aspect of transparency could further be discussed, even though the opinion leaders in this study have already criticized that more transparency must be provided regarding the costs of care robots and services and products in the health IT market. Our study design, too, is subject to limitations. Firstly, an explorative and qualitative approach was employed. Consequently, this study cannot attest to any causal relations as it only has few informants. Hence, relations that might be tested in a quantitative study were generated. Moreover, the findings may suffer from some biases as the study has interviewed two informants per country and group. Yet, the study reached saturation which makes us believe that the number of informants is sufficient. It would have been interesting, however, to interview more informants from other countries. The study already finds remarkable differences

between the three countries, particularly pertaining to their levels of trust in the health care system. Therefore, we would urge to add another qualitative study with more countries—especially including more countries with varying health care systems. Moreover, it would be of great interest for future research to understand how this perceived function of opinion leaders is projecting trust into society. Based on these findings, one can assume that national trust in health care systems greatly differs among opinion leaders and also strongly affects trust in robotic care systems. Moreover, this study finds not only differences in trust across countries, but also differences in the lack of distrust. Lacking distrust may or may not be equal to trust if users or societies have no experience with a certain technology such as in the case of care robots. We leave this for future research.

7. Conclusions

The impacts of the development of welfare technologies are challenging to foresee until care robots are extensively developed and implemented. New technologies are constantly being developed and can, therefore, be seen as “moving targets" (Frennert, 2021). However, not only the development of technology but also the implementation of new structures and dynamics in these processes must be well considered, e.g., the mutual effects between care robots and social practices, to develop trust in welfare technology, particularly in care robots. Moreover, according to all interviewed opinion leaders, one must note that care robots have currently not found their role in care processes in society. This is caused by several gaps, e.g., state of legislation, financing, data security, responsible persons, experiences, structured dissemination of information, and networking with users or other opinion leaders, which results in low institutional and progressive trust levels among the future users of care robots.

Opinion leaders argue that more structured information dissemination processes increase trust in health care systems (institutional trust) and reduce uncertainty. Moreover, information networks must be built, and all actors should feel responsible for moving this issue forward. This is hard to achieve due to the generally perceived negative attitude of society towards robots in care. Moreover, regarding trust in regulations, politicians argue that no laws in welfare services exist that support new innovative approaches. Hence, it is of immense importance to update the laws and implement regulations regarding payment or funding, as well as the availability, of care robots. Moreover, if care robots can relieve the nursing staff in various

tasks, legislation must be involved to systematically advance. Regarding trust in technology (progressive trust), politicians suggest a human-centered approach to the development process of care robots and, consequently, developing care robots that perform tasks that are actually needed in daily care. One aspect that opinion leaders continued to stress was that users need to be spotlighted as they are the central point on which all other processes need to rely. According to journalists, there must be more structured information about care robots to enable potential users to hold nuanced attitudes, e.g., to get an idea or form an opinion to what extent a care robot can assist in daily care. However, currently, public opinion leaders do not see themselves in the position of organizing the processes that society needs to achieve a nuanced view regarding welfare technologies.

When implementing these aspects into established innovation and technology introduction processes, care robots could be a promising avenue for user-oriented future welfare services. All in all, politicians and insurance organizations should hold themselves more responsible for playing a part in organizing, establishing, and determining sustainable processes for the implementation of care robots.

Although Sweden, Finland, and Germany differ to some extent regarding the organization of their services (see chapter 3), this study identifies aspects that were mentioned in all three countries. These aspects are recommended to be discussed now by governmental organizations if they aim to take a step forward.

Firstly, payment or funding issues are mentioned in all three countries. This emphasizes that one of the next steps in the implementation process of care robots should be drafting a law that provides a standardized rule catalog on clarifying which individual receives which type of care robot support and which institution pays for this service. Secondly, shedding light on the lack of trust in human-centered design, all three countries currently see an exclusive supplier orientation. The problem here is that developers do not include users in the development processes. All three countries' respondents plead to move the user of care robots to the forefront to build up technology that complies with existing and future needs. Thirdly, all considered countries' respondents mentioned the lack of trust derived from a potential replacement of the human workforce by robots. This includes the fear that a lack of human contact increases loneliness among the elderly. Additionally, relying too much on care robots poses a risk, as well, since no technology is 100 percent error-free, potentially jeopardizing the users' physical well-being in case of malfunction. On the other hand, we are already facing a serious staff

shortage in the care sector which means that effective distribution of the limited human resources is key. Consequently, we need to—whenever ethical and possible—replace someone (care staff) with something (welfare technology).

In addition, it can be assumed that the aspects mentioned, should urgently receive attention to increase the trust level concerning care robots in society and forward the implementation process.

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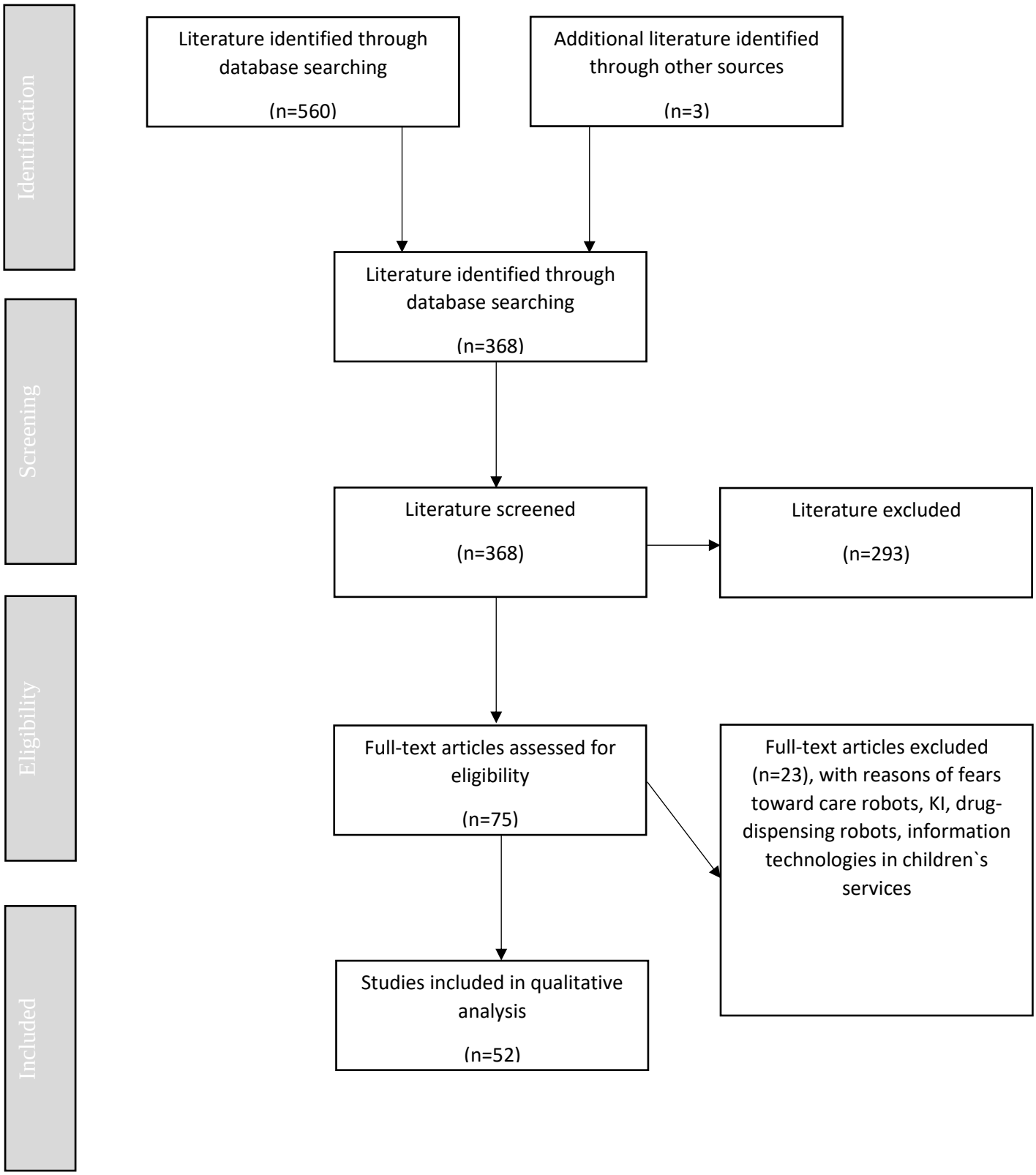
Appendix A

Table A1. PRISMA Flow Diagram



Appendix B

Table B1. Interview guide

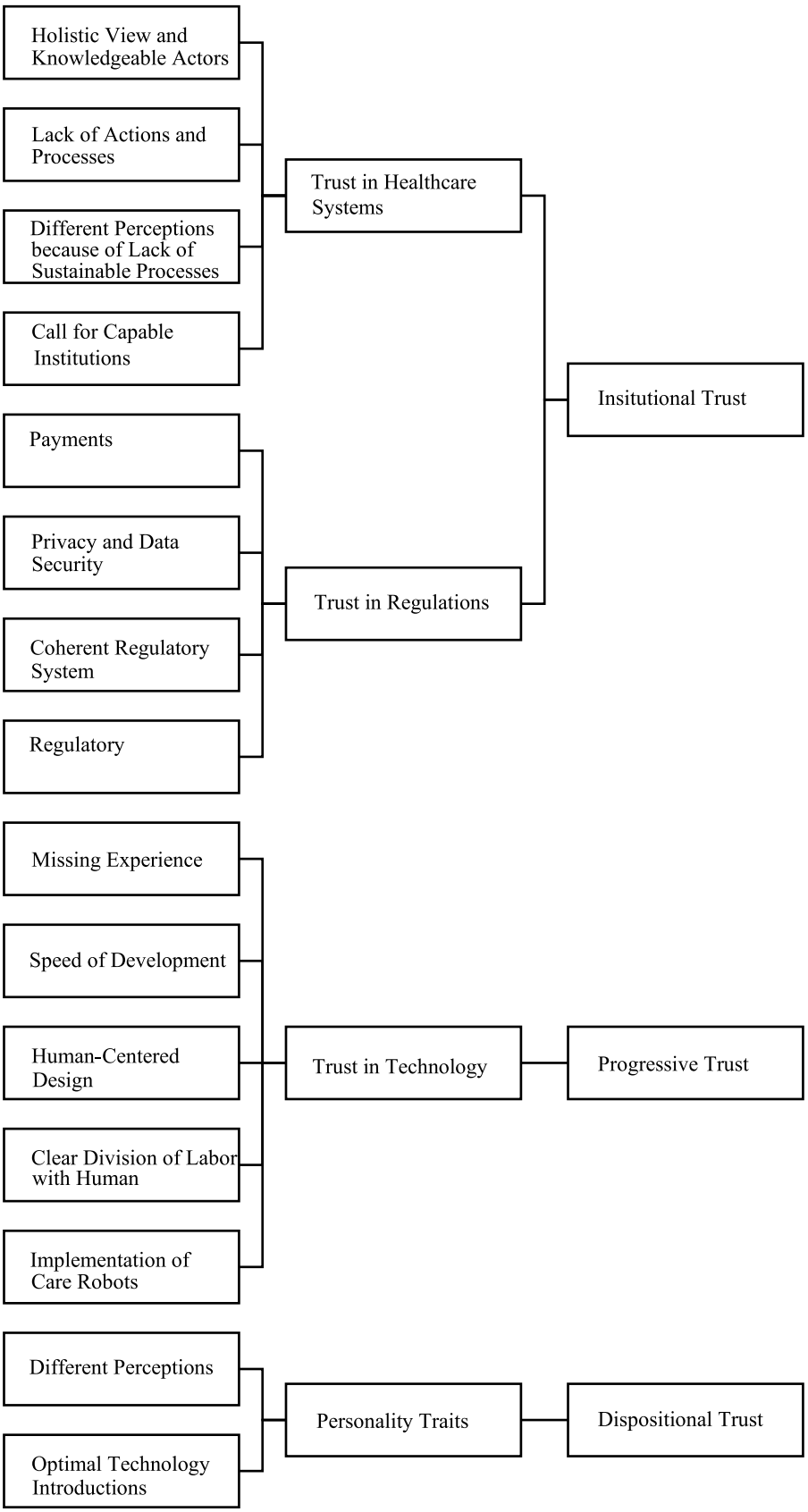
Themes and questions	**Political decision-maker**	**Insurance**	**Media**
1. Opening question: What are your spontaneous thoughts about the use of care robotics? **("Definition")**			
2. Introductory questions:			
2.1 Current situation	In your opinion, how is the current situation regarding care robots? (Does society need care robots? Which kind of care robots and why? Which aspects are important? Which questions are unanswered?)		
2.2 Risks regarding the current development	In your opinion, are there any risks concerning the current development of care robots? If yes, what kind of risks?		
2.3 Potential	Do you see potential in the current situation of care robots? If yes, what kind of potential? If no, why not?		
2.4 Level of knowledge/information and needs	How is the level of information and knowledge (of the actors)?		
2.5 Future	What does the field of care robots look like in five and ten years in your opinion?		
2.6 Responsibility with care robots	Which elements are part of the responsible development and utilization of care robots – how does the responsible development and utilization look like in your opinion?		
2.7 Acceptance of robotics	Do you think it is necessary to increase the societal acceptance regarding care robots? If yes, how could the acceptance be increased?		
3. Key questions:			
	Political decision-maker	**Insurance**	**Media**
3.1 Strategic level	Which strategies do you follow regarding care robots? Which problems/ obstacles do you observe here? (e.g. in the agenda, where is the priority?)	What is the importance of care robots in your field of interest? What are the central objectives? Which problems/ obstacles do you see here?	What is the importance of care robots in your field of interest? What are the central topics? Which problems/ obstacles do you see here?

3.2 Needs of information and communication in the development of new technologies (development of care robots)	Through which kind of networks do you hear about the development of a new technology? Which processes are initiated by this information? Where do the driving forces of this change lie?	Through which kind of network do you hear about the development of a new technology? Which processes are initiated in your company before the introduction of a new technology can be integration in the market? Which are the driving forces of the change?	Through which kind of networks do you hear about the development of a new technology? Which processes follow such information? What are the driving forces of change?
	How should politics be incorporated into the development of new technologies? What kind of regulations (legislation) would be needed? Which additional interests should be incorporated and how?	How should the insurance industry be incorporated into the development of new technologies? Which additional interests should be incorporated and how?	How should the general public be incorporated into the development of new technologies? Which additional interests should be incorporated and how?
3.3 Ideal implementation process of a new technology	How should the information processes of the implementation of a new technology be ideally incorporated into politics?	How should the information processes of the implementation of a new technology in your company ideally look like?	How do you get information about the implementation of a new technology? How should this information processes ideally look like?
3.4 Collaboration and networks	To which extent do you think the collaboration with other actors is important? What are special strengths of the current network? In which fields is a network missing in your opinion? Where should networks be extended? And how could missing networks be developed, in your opinion?		
3.5 Factors that promote or hinder	In your opinion, what are the three most important factors that hinder the use of robotics [in your country]? In your opinion, what are the three most important factors that promote the use of robotics [in your country]?		

3.6 Systematic transition	How can the interaction of end users and the new technology look like? What are the best practices, from your own perspective?
3.7 Start of the usage of care robots and their establishment: competences and strengths	In your opinion, to which extent are older adults willing for the use of care robots in care (domestic care, care homes)? Which competences and capabilities should be developed and how? How do you think would care professionals and relatives react? How will the situation change in the future in your opinion?
	In your opinion, are care professionals willing for the use of care robots? How are their competences regarding the use of care robots in care (domestic care, care homes)? Which competences and capabilities should be developed and how? To which extent will the situation change in the future in your opinion?
3.8 Costs	How should the costs be distributed – who should pay for the different types of care robots?
4. **Closing question**	If you were to develop a robot for social or welfare services, how would this robot look like? What would it do? Who should be involved in the development? How would its benefits be learned?

Appendix C

Figure C1. Coding schema



Appendix D

Table D1. Institutional trust citations (Trust in Health Care Systems)

Holistic view and knowledgeable actors	• *"There is no one who coordinates these issues. You talk about digitalization and there is no one who really takes a holistic approach about it" (PDM SWE,2019).* • *"I have to admit that there is very little knowledge available on care robots, [...] I don't know if there is any place at present where knowledge is gathered in a centralized way, so that someone would be monitoring it and disseminate research knowledge that could impact decision-making" (I FIN, 2019).* • *"There is no one who coordinates these issues. You talk about digitalization and digitalization possibilities and there is no one who really takes a holistic approach about it" (PDM SWE, 2019).* • *"Yes, so there is a lack of knowledge, pretty much in everyone, many parts of the chains and the actors" (PDM FIN, 2019).* • *"[...] I'd like to know who makes decisions on the use of care robots, who is responsible if there are problems, who supervises safety issues. And are the robots used to replace humans in care work. And furthermore, thinking of old people in sheltered accommodation, what is their ability to evaluate [...] who will bear responsibility for the activities. These are quite big questions from the societal perspective" (I FIN, 2019).* • *"In Sweden, one creates an authority instead of ensuring that someone is responsible for driving the development forward. It would be more useful to just make sure if someone has the responsibility to drive this development forward, the National Board of Health and Welfare is the one I would point out most clearly" (PDM SWE, 2019).*

Lack of action and processes	• *"If the insurance companies would push everyone in that direction and say we want care robots and need solutions that are somehow effective, then that would speed up the process. But the reluctance of the insurance companies slows down the processes. Unintentionally, but it just happens" (I GER, 2019).* • *"I think society needs robots because of the immense shortage of skilled workers, […] partly also by assistive technology that relieves the burden of care. And that is why I believe that society needs technology in order to get this nursing crisis under control in the first place" (M GER, 2019).* • *"Politics inhibits a little unintentionally. [...] There is a certain fear of pushing such an issue with a fairly large group of voters who may still be skeptical about it. Maybe this is not a winning issue for politicians either? - To say that ''I'm now basically the one ''who's pushing robots into care. Even if it is important" (I GER, 2019).*
Different perceptions because of lack of sustainable processes	• *"A huge number of projects are carried out in Finland related to these technologies, and they do not necessarily lead to anything because they are too complicated. The processes are not working so that caregivers and the older people have really understood them" (PDM FIN, 2019).*
Call for capable institutions	• *"I think that especially in Norway, they work in a more structured way with how to proceed when working with different forms of techniques in different ways. How to handle this challenge, then you have a structured way to do it and it is a fairly long-term way to do it" (PDM FIN, 2019).* • *"I think it seems very, very complicated. [...] it feels like you have to rebuild whole environments in some way that*

	the implementation of robots in care will work" (M SWE, 2019). • *"To dare to stand when there is a risk that it will storm, and it promotes development, that one dares. So that courage is needed. We have to dare to fail more and we must dare to expose ourselves to it because many lessons are then learned" (PDM SWE, 2019).*

Table D2. Institutional trust citations (Trust in Regulations)

Payments	• *"There are no guidelines in legislation, for example, on what devices elderly persons have the right to get home (free of charge)" (PDM SWE, 2019).* • *"[…] which technology or robot considers to be the right for the older adult to have it at home (free of charge). I think at the moment it has several drawbacks which should be changed by legislation" (PDM FIN, 2019).*
Privacy and data security	• *"Concerns about data misuse" (M GER, 2019).*
Coherent regulatory system	• *"In Sweden, one creates an authority instead of ensuring that someone is responsible for driving the development forward. The National Board of Health and Welfare is the one I would point out most clearly" (PDM SWE, 2019).* • *"Care robots are in general an area that has been left with very little attention in legislation. […] perhaps regulation on what kind of devices can be registered as hospital devices is currently pretty lax" (PDM FIN, 2019).*
Regulatory innovations	• *"The healthcare and social welfare services reform is an obstacle. As I just said, it focuses on wrong structures. Then it gives no leverage for change. It's more a pushing than a pulling force. Moreover, there is unawareness.*

	People don't know and see how care robots could assist and how to use them" (PDM FIN, 2019)

Table D3. Progressive trust citations (Trust in Technology)

Missing experience	• *"I think that it isn't visible to us at all, […]" (I FIN, 2019).* • *"I think they are not really being used yet and that is still very much in its beginnings" (M GER, 2019).* • *"Often when we think about robots, we picture the whining, human-like humanoid that talks. We need some sort of classification to understand all the different aspects of robots or welfare technology, to grasp the wide specter […]" (PDM FIN, 2019).*
Speed of development	• *"In a way, technology has evolved very quickly, and there are hopes that also welfare technology develops quickly to get good new applications and good products; which will help staff and older people or the sick and disabled in general, to cope better at home. But then, when you follow the development and look back at it from 2007 and what has been delivered so far, you get the feeling that it hasn't quite maternalized and expectations and reality do not meet at a level they should or could be assumed" (PDM FIN, 2019).* • *"There are limits how fast technology advances. Price, ethical questions" (M FIN, 2019).* • *"It has developed much slower than I thought it would, status today is considerably further back than we predicted around 2010-2011 when we worked in a team at the Assistive Technology Institute. At this time we probably thought that in 2019 there are a lot more care robots in use, which we today can state that it is not" (PDM SWE, 2019).*

Human-centered design	• *"It would be good to get innovation into daily practice more quickly. Currently we see an almost exclusive supplier orientation. There are startups that think about what users need and develop something (like Pepper). I think that this is actually the wrong way to go in the field of care robots, but what we need is a user-oriented robotic approach. […] to take a closer look at the potential of robots in order to relieve caregivers and identify the real needs of users" (PDM GER, 2019).* • *"Robots that have been developed based on the needs of older people, and consider these needs, only they have really been adopted and have become products for sale in the private sector" (PDM FIN, 2019).* • *"Older people use welfare technology that is easy to handle and responds to their existing or desired needs" (PDM SWE, 2019).*
Clear division of labor with human	• *"The fear that robots will replace the necessary humanity in care and lead to a reduction in human contact is slowing down the use of welfare technology" (PDM GER, 2019).* • *"[…] the fear, that we are afraid to make mistakes and we believe that everything should be 100 percent. As soon as it comes to technology, there is nothing that can fail and in the analogue world, it fails a lot. It is very much about this fear, but also about the methods we use" (PDM SWE, 2019).* • *"It may involve fear if welfare technology (care robots) stops working and we are not prepared for it" (PDM, SWE, 2019).*
Implementation of care robots	• *"Well, I have the impression that care robots are used very little. It could be used more, but there are several factors that prevent it. The first is that not enough is*

	known about welfare technology, it is quite expensive, and the processes are not advanced" (PDM FIN, 2019).

Table 4D. Dispositional trust citations (Personality Traits)

Optimal technology introductions	• *"Everyone wants changes but no one wants to change. People do not understand what it means to make these changes. They are afraid to leave "the old way of doing things"* (PDM SWE, 2019).

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