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A Socio-Legal Study of Swedish Online Doctors

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Peter Bergwall

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Exploring Paths of Justice in the Digital Healthcare – A Socio-Legal Study of Swedish Online Doctors

Abstract
Online doctor services, healthcare provided via smartphone apps, have gone from being peripheral to seriously challenging the conventional Swedish way of providing healthcare services. The accessibility of online doctors is unsurpassed but all patient groups have not gotten better access to healthcare thanks to online doctors.

The aim of this study was to investigate how perceptions of the online doctor service Kry influence the willingness to use said service. This has been achieved through two online surveys conducted in 2016 and 2017, generating two study samples of 1,264 and 882 cases, respectively. Survey items operationalised perceptions of justice as well as benefits and risk beliefs associated with Kry. Statistical modelling was performed, applying PLS path analysis.

Inspired by the meta-theoretical perspective of critical realism, the aim was also to explain the underlying mechanisms that cause online doctors as a Swedish healthcare phenomenon. This has been achieved through a descriptive analysis based on, for instance, legal documents, governmental reports, regional recommendations, statistics, and newspaper articles. The descriptive study has been guided by Alan Norrie's sociology of law and the theoretical figure of law's architectonic, where the legal is always also the ethico-legal, the juridico-political, and the socio-legal.

Results from the surveys and the subsequent statistical modelling showed that the willingness to use Kry was predicted by perceptions of distributive justice, i.e., whether the service was perceived as accessible and inclusive (equality), and whether it was perceived as providing value for time and money spent (equity). Furthermore, perceptions of equality and equity were mediated by perceptions of perceived trust and interest in Kry. Perceptions of procedural justice did not impact the willingness to use Kry to the same extent.

The descriptive study showed that Swedish online doctors as a phenomenon has emerged in a health system shaped by ethico-legal, juridico-political, and what I call econo-legal conflicts. Swedish healthcare law is based on the principle stating that those in most need of care should receive care first and on the overarching goal stating that the healthcare should strive towards an equal healthcare for the entire population. With the free choice of care reform, implemented in 2010, the Swedish health system was transformed into a quasi-market and the principle of demand, stating that the patient should receive healthcare when she demands it rather than when she needs it, has entered the health system under the label free choice. This ethical and normative ambivalence is found in and expressed through healthcare law.

Unlike the health system at large, online doctors are well equipped for a healthcare that is becoming increasingly consumer-driven. This may explain why distributive justice predict the will to use Kry. Much like the online marketplace experience, patients are judging the online doctor experience based on value for time and money spent.

Key words: critical realism, distributive justice, ethical principles in healthcare, free choice, healthcare demands, healthcare law and ethics, healthcare needs, Kry, latent variables, mHealth, Alan Norrie, online doctors, online survey, PLS path modelling, PLS-SEM, privacy calculus, procedural justice, retail health, SmartPLS, sociology of law, Swedish healthcare, telehealth, quasi market.

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Till Olga, av hela mitt hjärta.

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Acknowledgements

Glossary

Contracting region/home region: a regional council authorizing healthcare providers to conduct healthcare within that region is referred to as a contracting region. Home region refers to the region where a patient is resident.

Digital health contact: SALAR (2018b) describes digital health contacts (*digitala vårdkontakter*) as distance contacts facilitated through information and communication technology[1]. In contrast, "physical healthcare" in this thesis refers to health contacts where doctor and patient are not spatially separated.

Distance contact: a health contact where patient and healthcare professional are spatially separated is called a distance contact (*distanskontakt*), conducted through the transmission of sound, of sound and images, or of written text (SoS 2017a).

Health contact: generally speaking, when a patient seeks care and a healthcare service is provided, this is referred to as a health contact (*vårdkontakt*) (SoS 2017b).

Health system: according to WHO (2020), a health system (*hälso- och sjukvårdssystem*) consists of government healthcare organizations and agencies at central, regional and local levels, the healthcare providers, and service users.

Healthcare: within the Swedish context, healthcare (*hälso- och sjukvård*) is defined under the Health and Medical Service Act as efforts to medically prevent, assess and treat diseases and injuries, transport of patients, and care for the deceased (2 ch. 1 § 1-3 SFS 2017:30)[2].

Healthcare authority: a healthcare authority (*sjukvårdshuvudman*) is either a regional council or a town council that is responsible for providing healthcare to the residents in a particular region or municipality (2 ch. 2 § SFS 2017:30).

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[1] Digital health contact is not a commonly agreed on definition For instance, The National Board of Health and Welfare refers "digital health services" (*digitala vårdtjänster*) (SoS 2018a).

[2] The definition in the Patient Act (SFS 2014:821) is wider and includes, in addition, activities regulated in the Dental Care Act (SFS 1985:125), the Act on Circumcision of Boys (SFS 2001:499) and the Act on Sales of Medicinal Products (SFS 2009:366).

Healthcare facility: healthcare facilities (*vårdenheter*) are organizational units where healthcare services are provided (SoS 2005). Examples of healthcare facilities include health centres (*vårdcentraler*), hospitals, wards, and clinics.

Healthcare professional: persons who practice medicine or other healthcare services as their occupation are healthcare professionals (*hälso- och sjukvårdspersonal*) (SoS 2007a). A healthcare provider can function as an employer of healthcare professionals, but these two roles may also coincide, not least in the case when healthcare professionals run their own private practice.

Healthcare provider: within a region or a municipality, one or several healthcare providers (*vårdgivare*) may conduct medical care. A healthcare provider is defined as a government agency, a regional council, a town council, or some other juridical person or private enterprise engaged in the practice of providing healthcare services (2 ch. 3 § SFS 2017:30).

Inpatient care: conducted twenty-four hours a day, inpatient care (*sluten vård*) is reserved for patients whose condition requires that they be admitted to a hospital. The criteria describing the conditions that require inpatient care may vary between different regions (SoS 2012b).

Online doctor: in the context of this thesis, online doctor (*nätläkare*) refers to a healthcare service where digital health contacts are provided via smartphone apps. In Sweden, these services include Kry, Doktor.se, and Min Doktor.

Outpatient care: basically, all healthcare that does not require admittance to a hospital is outpatient care (*öppen vård*) (2 ch. 4-5 §§ SFS 2017:30). Outpatient care is conducted during daytime and completed within a few hours. (SoS 2012a)

Primary care: the kind of basic outpatient care that does not require the healthcare's specialised resources is called primary care (*primärvård*) (prop. 2019/20:164). Primary care is typically provided by general practitioners, district nurses, midwives, and primary child healthcare professionals.

Specialty care: specialised medical treatments provided by medical specialists are referred to as specialty care (*specialiserad vård*), or secondary care (SoS 2004). Specialty care may require admittance to a hospital, but it is often provided at outpatient care facilities as well.

Introduction

Around 2016, I became aware of an emerging healthcare phenomenon: online doctors, i.e., healthcare providers that conduct medical care via smartphone applications. At the time, I already had an interest in socio-legal perspectives on online privacy in healthcare contexts. I was thinking a lot about what the digitization and the "social mediatization" of Swedish society was doing with our views on information privacy. I was also becoming interested in the Swedish healthcare, which has gone through significant structural changes during the last couple of decades. Online doctors seemed to embody this quite decisive moment in time.

When reading about online privacy, I came across an interesting study by Xu et al. (2010). The authors used something called a privacy calculus to describe the process preceding the decision to disclose personal information online in return for some benefit. The authors showed how it is possible to simultaneously have negative and positive beliefs about personal information disclosure and still be able to rationally decide for or against it. I found it particularly interesting how the ongoings in the privacy calculus were connected to perceptions of procedural and distributive justice. For instance, it was hypothesised that our awareness of state law and industry self-regulations as manifest aspects of procedural justice ultimately affect our willingness to act in a certain way. This approach, where experiences of the law and the social were almost seamlessly captured in the same theoretical concept, was attractive to me.

However, besides introducing me to justice theory and the privacy calculus, Xu et al. (2010) also opened the door to a kind of multivariate regression analysis called partial least squares path modelling (PLS-PM), which facilitates the visualisation of complex relationships between latent variables. Specifically, the methodologist Edward Rigdon (2016) approaches the measurement of latent variables from a realist, as opposed to empiricist, perspective. More on this later, but in a nutshell, the scientific realist approaches theoretical models, not as mirrors of reality but as constructs designed by the social scientist to make sense of unobservable phenomena. I grabbed on to this realist straw and went back to read about critical realism. Theories about justice and the privacy calculus would be operationalised in my empirical studies while critical realism would assist me in my attempt to explain my empirical findings.

Here, I feel compelled to anticipate events a little bit. As will be shown later, my empirical studies revealed things that made me somewhat reconsider my research focus along the way. At the pilot study stage, I realised that distributive justice appeared to be a more important predictor of the willingness to use an online doctor service (Kry) than I had first expected. On the other hand, the issue of online privacy appeared to be almost a non-issue. My interest therefore shifted towards the underlying mechanisms that could explain the strong performance of distributive justice. This shift in focus created a kind of unintentional hermeneutical spiral with the consequence that the thesis does not start with the beginning, so to speak. However, what is perhaps lost in this reshuffle in terms of chronological linearity is hopefully gained in the end in terms of a deeper understanding of online doctors as a real-world phenomenon.

Research Problem

This study concerns the research problem of Swedish online doctors, a phenomenon that I intend to explain from the perspective of sociology of law. Online doctors are sometimes described as a particularly accessible type of healthcare service. However, the accessibility provided to patients using online doctors has arguably not led to better accessibility in the healthcare at large. This phenomenon has been generated by mechanisms, in turn caused by deeply situated socio-historical structures underneath the health system. The phenomenon of online doctors has, for instance, been shaped by ideologically charged reforms changing the way healthcare is provided in Sweden. This is the *juridico-political* side of the problem. At the same time, the healthcare is guided by sometimes conflicting ethical principles, expressed in Swedish healthcare law as well. This is the *ethico-legal* side of the problem. Lastly, the Swedish healthcare is largely governed through economic norms, a kind of normativity I have labelled the *econo-legal*. This ethical, political, and economic reality shapes online doctors into what they are. Naturally, these mechanisms must also influence our perceptions of online doctors and whether we perceive them as fair and valuable.

Aims, Research Questions, and Objectives

The first aim was to investigate the relationship between perceptions of justice and the willingness to use the online doctor service Kry and, in addition, whether this relationship is mediated by confidence and enticement beliefs and/or risk beliefs in a so-called privacy calculus.

This first aim led to the following research questions:

1. Do perceptions of justice predict the willingness to use Kry?
2. Does the privacy calculus mediate the relationship between perceived justice and the willingness to use Kry?

The first aim was achieved through the following objectives:

a. Two online surveys were conducted with one year apart. Each survey was distributed to approximately 1,000 respondents, aged 20-50 years, who had been recruited by a survey panel company.
b. The structured questionnaire consisted of items measuring perceptions of distributive, procedural, interpersonal, and informational justice, risks and benefits (the privacy calculus), and the willingness to use Kry.
c. Survey results were used as data in PLS path modelling, using the SmartPLS software; analyses of predictive impact and mediation were conducted.

The second aim was to describe the mechanisms that cause online doctors as a phenomenon and to explain how these causal mechanisms affect the perceptions of justice which, in turn, predict the willingness to use Kry.

This led to the following research questions:

3. What has caused Swedish online doctors as a phenomenon to be what it is?
4. What causes the willingness to use Kry to be predicted by perceptions of justice?

The second aim was achieved through the following objectives:

d. Norrie's (2017) figure of law's architectonic was applied in a descriptive study of the socio-historical context in which Swedish online doctors have emerged.
e. The descriptive study was conducted with a primary focus on legal documents, government reports, recommendations and agreements, newspaper articles, and official statistics, but also with reference to academic scholars within the fields of healthcare ethics, law, and economics.
f. Results from PLS path modelling and the socio-historical descriptive study were discussed, and retroductive reasoning, a mode of logical inference often applied within critical realist research, was applied.

Scope

The thesis specifically addresses online doctor services, i.e., digital health contacts where healthcare is provided through a smartphone app, often facilitated by a webcam or a chat function. The research has been conducted within the subject of sociology of law with a mixed methods design. By studying a Swedish online doctor service, Kry, the relationship between perceived justice and the willingness to use Kry has been examined. Two quantitative online surveys were conducted in 2016 (n=1,264) and 2017 (n=882). The data were used in a PLS path model, designed with the software package SmartPLS (Ringle et al. 2015). The empirical findings informed a qualitative, historical description of the legal as well as the ethical, the political, and the economic context of Swedish online doctors, with an emphasis on the last two decades of political and legal healthcare reform. Although the geographical location is Sweden, comparisons with other countries occur. The meta-theoretical framework surrounding the entire project is critical realism (see, e.g., Bhaskar 2008b; Archer et al. 1998). The theoretical concepts used in the surveys were inspired by social-psychological theories about perceived justice and the privacy calculus (see, e.g., Colquitt et al. 2013; Dinev and Hart 2006). The research has in particular been informed by Alan Norrie's sociology of law (see, e.g., Norrie 2010). The surveys focused the individual perspective, while the historical exposé was conducted from a societal perspective of online doctors.

Online Doctors: Background

Sweden is often described as one of the healthiest countries in the world (WHO 2019; Miller and Lu 2019). Life expectancy is high, infant mortality is low and vaccination rates within the free-of-charge and voluntary childhood vaccination programme is above 95%. About 10% of all Swedes are everyday smokers, the lowest percentage in the EU, and while the obesity rate among Swedes is going up, it remains below the EU average. Few Swedes have unmet healthcare needs due to costs, travel distance or waiting times. (OECD 2019a) Still, differences in self-reported health due to sex, income, and education level have increased over the last decade[3]. Only 67% of Swedes in the lowest income quintile report being in good health, compared to 87% in the highest income quintile. Furthermore, according to the Swedish Agency for Health and Care Services Analysis[4], the establishment of new primary care facilities has been slow compared to other countries and today geographical location is regarded as being the most important source of health inequality in Sweden[5]. Traditionally, many Swedish outpatient care facilities close at 5 or 6 p.m. and remain closed during the weekend. During these hours, some patients turn to the emergency departments instead. Indeed, the threshold into the primary and specialty care is higher in Sweden compared to other comparable countries (Doty et al. 2020). Arguably, this is due to the primary care's share of the Swedish healthcare being relatively small, which might explain why Swedes are generally more satisfied with their hospitals than they are with their primary care. (Vårdanalys 2017b; OECD 2019a) In an international perspective, the Swedish healthcare is of very high quality. Nevertheless, the conditions vary a lot across the country and the demand for a more accessible healthcare is steadily increasing.

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[3] The life expectancy for a lower educated, 30-year old man is almost seven years shorter than for a higher educated, 30-year old woman. (OECD 2019a)

[4] The Swedish Agency for Health and Care Services Analysis (*Myndigheten för vård- och omsorgsanalys*) is a government agency commissioned to follow up and analyse healthcare reforms and initiatives from the perspective of patients and citizens. (Vårdanalys 2021).

[5] In 2016, between 80% and 93% of the patients were offered a doctor's appointment within 7 days, depending on which region they lived in. However, some sparsely populated areas had health centres where only 50-60% of people seeking care were offered a doctor's appointment within 7 days. (Vårdanalys 2017b)

The Emergence of Online Doctors in Sweden

Video-based technology has been utilised within healthcare for quite some time (Essén and Conrick 2007; Jönsson and Willman 2009). Video has not least been seen as a viable alternative when providing healthcare to patients living in remote areas (Olver 2000; Lounsberry et al. 2010), or when treating patients suffering from various forms of mental illnesses (Weger et al. 2013; Thorp et al. 2012; Litwack et al. 2014). What has in some sense revolutionised Sweden's digital healthcare, however, is the combination of an advanced digitization of society and pocket-sized smartphones with excellent camera features. Ninety-eight percent of the Swedish population have access to internet at home and 92% own a smartphone. Even so, more than one million Swedes do not use the internet on a daily basis and almost a third of all persons over the age of 76 do not use the internet at all (IIS 2019b). During recent years, the number of annual online doctor consultations has skyrocketed in Sweden. According to the Swedish Association of Local Authorities and Regions (SALAR 2020a), this number went from around 20,000 in 2016 to 1.2 million in 2019. Accelerated by the global COVID-19 pandemic, which to date has led to 2.8 million deaths, the increase during 2020 was even faster; nearly 1.7 million Swedish digital health contacts had been conducted by the end of September (Karlsson 2020a). Nevertheless, digital health contacts still make up just a small portion of the primary care and about 1% of its total costs (SALAR 2019b). Notwithstanding, the trend is sharply upward; between 2016 and 2019 the regional healthcare authorities' total cost for online doctor services increased from €3.9 million to €50.0 million a year[6].

The Online Doctor's Appointment

Online doctor services are typically provided through a smartphone app. In practice, the patient books a doctor's appointment in the app, for instance, with a physician or a psychologist. A Swedish BankID[7] is required to log in to the service. Next, the patient fills in background information about themselves or their child and answers questions about pain, discomfort, or other symptoms; it is also possible to enclose images, for instance, of wounds or rashes. The patient is then directed to the right healthcare level. If it is assessed that the patient needs to see a healthcare professional, the contact is usually initiated through chat. If needed, the contact may proceed via video, facilitated

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[6] In 2020, this figure will probably be closer to €100 million due to the COVID-19 pandemic.

[7] BankID is the most widespread form of eID (electronic identification) in Sweden. Eighty-four percent of the Swedish population have BankID (IIS 2019a).

through the patient's smartphone camera and microphone, with the healthcare professional typically using a webcam on a personal computer. During the video meeting, the patient and the healthcare professional can see and hear each other during the entire call, and the health professional can examine the patient visually. Different online doctors offer video meeting as a means of communication to a varying extent. While some services have offered video consultations as default, the current trend is to provide digital health contacts primarily through text-based communication. Kry, the online doctor service surveyed in this thesis, offers video consultations as default.

Users of Online Doctor Services

Shorter waiting times is often valued as the most important aspect for patients considering online doctors as an alternative to physical healthcare (Vårdanalys 2020). Nine patients out of ten are under the age of 50 and more than two thirds of patients between 18-65 years are women[8] and 16% of all online doctor consultations concerns children between 0 and 5 years old (SALAR 2020a). The Swedish Internet Foundation reported that less than 5% of persons over 65 years had ever consulted an online doctor (IIS 2019b); SALAR (2020a) reported that less than 2% of all contacts were made by patients in this age group. Within the physical primary care, the relationship is reversed; the average number of visits per person increases with age (Vårdanalys 2020). This is in line with Peterson et al. (2016) who found that although patients of all ages generally do not mind video-meetings, young patients tend to have a more positive attitude. Evidently, the share of internet non-users is shrinking for each year, especially among the elderly[9], and more people will gradually feel comfortable with using digital health contacts. Meanwhile, digital illiteracy as a social determinant of health remains an issue. Here, the findings of McGrail et al. (2017) is interesting. The authors found that first-time meetings with doctors conducted face-to-face positively affected the patient's will to consult the same doctor online at a later occasion[10]. This strategy, where first-time visits are restricted to physical meetings, is the path taken by Norway (SoS 2018b). Similarly, in Denmark, video-based contacts are primarily used for follow-ups and for long-term monitoring of patients with chronical diseases (SoS 2018a).

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[8] About 60% of one-time users are women – among more frequent users, the overrepresentation of women seems to be even larger (Gabrielsson-Järhult et al. 2019; IIS 2019b).

[9] See, e.g., IIS (2019b). This trend is also seen in the use of online doctors, measured as the number of digital health contacts made per 1,000 inhabitants. Among people over the age of 60, this number increased from 0.4 in 2016, to 4.0 in 2017 and 7.0 in 2018. (Vårdanalys 2020)

[10] In Vårdanalys (2020), 2,446 Swedish physicians responded to a questionnaire. About half of them stated that first visits are never conducted via digital health contacts at their workplace.

Geographical Differences

Most users of online doctor service are living in one of Sweden's three metropolitan areas[11]. In terms of visits per 1,000 inhabitants, an overwhelming majority of the municipalities in the top decile are located in Region Stockholm. This also happens to be municipalities where accessibility to physical health centres is generally good. Conversely, the bottom decile consists of municipalities that, with a few exceptions, are located in sparsely populated or depopulated areas where accessibility to physical healthcare facilities is below the national average. (SALAR 2020a; SALAR 2020b) In 2019, Region Stockholm spent almost four times as much money per citizen on online doctor services compared to Region Norrbotten, the least densely populated region in Sweden[12].

Socioeconomic Factors

IIS (2019b) reported that the percentage of online doctor users among high-income earners was more than three times higher than among low-income earners[13]. This has been observed also in previous research noting that online doctors are used mainly by young, healthy, and urban individuals with relatively high socioeconomic status (Ellegård and Kjellson 2019). Vårdanalys (2020) reports that education level and income, previous experience with online doctors, and being accustomed to searching for health information online, are variables that are associated with a will to consult online doctors. In contrast, a study by Vårdanalys (2017b) indicated that socioeconomic background did *not* seem to affect access to physical primary care. Arguably, these findings might suggest that online doctors are not drivers towards a more equal healthcare but rather the opposite. However, the profile of online doctor users (young, healthy, well-educated, and urban) matches the profile typically associated with early adopters of new technology (SOU 2019:42). Hence, it is not clear whether this "structural exclusion" will remain or if online patients as a group will become more diverse as these services become less of a technological novelty.

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[11] In 2017: Region Stockholm (43% or 39 visits per 1,000 inhabitants); Region Västra Götaland (16% or 20 visits per 1,000 inhabitants); and Region Skåne (14% or 21 visits per 1,000 inhabitants). (SoS 2018a).

[12] The statistics were obtained directly from Region Sörmland and refer to the period: January through October 2019.

[13] The percentage of users among Swedes with more than €72,000 in yearly household income was 17% compared to 5% for those with a yearly household income of less than €29,000 (IIS 2019b).

Attitudes of Healthcare Professionals

More and more healthcare providers offer services online (SoS 2018a). A survey by Vårdanalys (2020) indicates that 34% of primary care physicians apply video consultation[14]. However, some healthcare professionals accuse online doctors of commercializing healthcare and for neglecting the importance of the physical meeting (Löfmark et al. 2018). Others are concerned about the lack of evidence-based methods or claim that the patients are treated as Guinea pigs (Almgren and Svensson 2018a, 2018b). When Vårdanalys (2020) asked Swedish physicians about benefits and risks that they associated with digital health contacts, the greatest benefits were perceived to be less travel (72%) and time and money saved (63%) for patients. Overexploitation of the healthcare (87%) followed by deteriorating quality of services (75%) were perceived as the greatest risks; only 16% believed that digital health contacts would lead to higher quality of healthcare. Physicians already offering digital health contacts tended to value the benefits higher and downplay the negative aspects more than other physicians. Interestingly, physicians under 35 years seemed to have a more sceptical attitude towards digital health contacts compared to older colleagues. (Vårdanalys 2020)

Online Doctors and Patient Safety

Patient safety has been a contested issue in relation to online doctors. Possible risks of misdiagnoses, over-prescription of antibiotics, and worsened medical conditions in absence of physical examinations have been debated. Several complaints against online doctors have been filed to the Health and Social Care Inspectorate (IVO). However, after investigating 13 different online doctor services, IVO (2019) concluded that digital health contacts can be conducted without compromising patient safety, that online doctors refer patients to physical healthcare providers when necessary, and that the prescription of medications generally follows existing guidelines. Nevertheless, some healthcare services are regarded as less suitable for online doctors. Prescription of antibiotics for treatment of certain skin diseases or severe types of respiratory tract infections is not permitted without a physical examination (Strama 2019). In some regions, prescription of addictive drugs or the issuing of certificates for long-term sick leave are not permitted by way of distance contacts (SoS 2018b). Also, some healthcare providers do not accept referrals to the specialty care if they have been issued by an online doctor (SoS 2019).

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[14] Compared to Australia (25%), USA (21%), Canada (16%), Norway (12%), France (10%), New Zealand and UK (9%), and Germany, Switzerland and the Netherlands (4%) (Vårdanalys 2020).

Online Doctors and Different Patient Groups

The healthcare must be able to adapt their services to the needs of each individual patient (prop. 2017/18:83). Rognes et al. (2016) divide patient needs into four categories: simple, complicated, chronical, or complex healthcare needs (Figure 1).
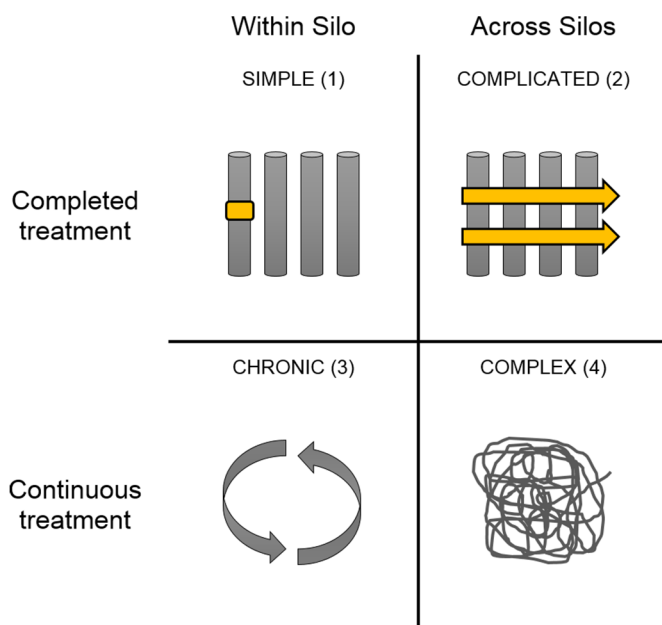
Figure 1: Four patient categories (Rognes et al. 2016).

Patients with simple needs (1) are benefiting from a highly accessible and efficient healthcare. The majority of all patients are found in this category and the cost per patient is relatively small. Patients with complicated needs (2) are benefiting from collaborations between, e.g., hospitals and the primary care. Patients with chronic needs (3) benefit from preventive care, patient participation, and monitoring of chronic conditions. Patients with complex needs (4) are often suffering from multimorbidity and are benefiting from continuity and teamwork. Although these patients account for a large part of the healthcare's costs, the healthcare is poorly equipped to care for them (Rognes et al. 2016). Simple and chronic needs are usually attended to by a single healthcare professional from a within-silo perspective while complicated and complex needs usually require the attention of several competencies or different healthcare teams, i.e., from an across-silos perspective.

The primary care must be prepared to care for all patient groups. Online doctors are accessible but they also have the potential to provide continuity, for instance, when

monitoring chronic conditions for patients in need of continuous treatment. (SOU 2019:42) They are less suitable for taking care of complicated or complex needs. According to the Management for a More Equal Healthcare inquiry, online doctors have prioritised simple patient needs, e.g., rashes, colds, eye infections, prescription renewals, and so forth[15], which is reflected by the time spent on each patient; the typical physical healthcare visit takes three times longer than a digital health contact (SOU 2019:42)[16]. Paradoxically, 94% of all digital health contacts in 2018 were conducted by physicians, compared to 34% within the physical primary care where most health contacts were instead conducted by nurses (Vårdanalys 2020) From one perspective, one would expect things to be the other way around, i.e., that a focus on simple needs would not require the competencies of online physicians to such a great extent. On the other hand, it is important to note that, until recently, online consultations with nurses, psychologists, or other healthcare professions besides physicians was not that common. Nevertheless, the cost-effectiveness of having the most expensive category of healthcare professionals taking care of the least complicated conditions is questionable.

Before Theory…

In this chapter, I have attempted to introduce online doctors as a Swedish healthcare phenomenon. Sweden is a rich country with a relatively healthy population and the digitization of Swedish society is far gone. These are aspects that provide a good breeding ground for online doctor services. Still, the Swedish health system has some beauty spots. In the later chapter *The Legal Architectonic of Swedish Online Doctors* I will provide a thicker description of the ethico-legal, the juridico-political, and the social-legal dimensions of online doctors in a Swedish context. The legal architecture, as put to work in that chapter, is a theoretical figure that I have borrowed from Professor Alan Norrie (2017). Before I proceed with the more empirically oriented parts of the thesis, I will provide the reader with the theoretical framework within which these empirical excursions have been taking place.

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[15] Of digital health contacts provided to Stockholm patients in 2017, 20% concerned skin diseases, 17% concerned respiratory tract infections, and 12% concerned other infections (SoS 2018a).

[16] According to Kry, they spend on average 8 minutes on every contact, while primary care physicians responded in a 2015 survey that they spend on average 24 minutes per healthcare visit.

Theoretical Framework

The theoretical framework of this dissertation is presented as three-fold. First, critical realism will be presented. Critical realism is not a theory *per se* but rather a meta-theory or a philosophy of science with a strong focus on ontological aspects of the world. The approach of critical realism is largely a historical approach and a critical realist sociology of law understands law as an emerging socio-historical form. Conducting research from a critical realist position not only has important theoretical and methodological implications, but it also involves challenging the distinction between factual and normative aspects of social science head-on. The fact-value distinction has traditionally been a central problem for social science, not least within sociology of law. Second, Alan Norrie's dialectical critical realist theory of sociology of law is presented. Norrie argues that within the liberal legal system, law attempts to obscure the fact that it is intimately connected to its socio-historical environment. Methodological implications of critical realism are discussed before theoretical concepts applied in the empirical study are presented. These concepts are brought from theories of justice and they have been used to investigate whether potential users of the Swedish online doctor service Kry perceive the service as fair, and whether this might affect their willingness to use the service. The theoretical underpinnings of an analytical tool, the privacy calculus, is also presented. The rationale behind the privacy calculus is that individuals may harbour sceptical attitudes towards disclosing information about themselves in online settings and still decide to disclose this information. Justice has a given place in the privacy calculus, as applied here, and perceptions of justice are, in turn, suitable indicators of whether the healthcare is organised in a fair way.

Meta-Theory: Critical Realism

The history of the philosophy of social science is in many ways a history of clashing schools of thought. This has led to, as Danermark et al. (2003) put it, some unfortunate dichotomies; structure versus agency, qualitative versus quantitative, objectivism versus subjectivism, and so on. Proponents of these different schools often disagree on matters of ontology, i.e., questions regarding what the world must be like for science to be

possible. Positivism, hermeneutics, and poststructuralism are just a few examples of philosophical perspectives that have been highly influential within the social sciences but whose take on ontology and weight given to ontological issues differ considerably from one another. Another example is *critical realism* (CR), which is the philosophico-scientific point of departure for this dissertation.

CR is primarily associated with Roy Bhaskar (2008a), who laid the foundation for a certain kind of realist theory of science in the 1970s before taking a particular interest in the philosophy of the social sciences (Bhaskar 2005). As a meta-theory, CR rests on three fundamental assumptions of the world and the possibilities of achieving knowledge about it (Danermark et al. 2003; Hartwig 2007):

- Ontological realism
- Epistemic relativism
- Judgmental rationality

Ontological realism refers to the standpoint that there is an objective reality, a world that exists unaffected by its observer. Since no one can reasonably claim to know all there is to know about this world, knowledge[17] is necessarily changeable and fallible. This is what *epistemic relativism* amounts to. In consequence, no scientific theory or methodology can be seen, on beforehand, as superior to other theories or methodologies. Hence, critical realists generally (but not always) have an open attitude in respect to methodology and generally encourage inter-disciplinary research. At the same time, judgmental relativism, the idea that all knowledge claims are equally true/untrue, is rejected. CR instead adhere to *judgmental rationality*, assuming that, although absolute truth is unattainable, it is possible and in fact necessary to rationally decide which knowledge claims that are more valid than others. Of course, sticking to their epistemologically relativistic guns, critical realists must acknowledge that these claims too are fallible and may be subject to change. Science is an infinite project.

Some Central Concepts in CR

Realism as a philosophical term means different things in different contexts. Within metaphysics, for instance, realism refers to a belief in the existence of a mind-independent reality (Khlentzos 2016), whereas scientific realism usually refers to a belief in the possibility of examining unobservable aspects of the world (Chakravartty 2017). Building on scientific realism, Bhaskar (2008a) developed what he labelled *transcendental realism*. It is transcendental for two reasons: first, it pertains to an order

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[17] Here, *knowledge* refers to both scientific knowledge and "unscientific" everyday knowledge.

of objective reality that may always transcend or surpass the limits of human knowledge, i.e., absolute truth remains out of reach; and, second, it involves the application of transcendental deduction, i.e., the use of certain strictly *a priori* concepts, such as time, space and causality, concepts without which it would be impossible for us to make sense of the world. (Norris 2007) However, Bhaskar (2005) thenceforth specifically argued for a *critical naturalism* in the social sciences. Epistemologically, naturalism generally entails the argument that nature and human life can be explained scientifically in essentially the same way, and that philosophy has little or no autonomy from science. However, critical naturalism goes on to state that although nature and social life may both indeed be explained scientifically, society is a very different study object compared to nature and the social sciences thus requires research methods of a very different kind than those applied within the natural sciences. (Hartwig 2007) Much like nature, social structures provide conditions for human agency. But unlike nature, social structures can only by reproduced and changed through the intentional actions of critically reflecting human beings. The term critical realism then emanated in the 1980s when followers of Bhaskar wanted to refer to transcendental realism and critical naturalism as a unit. CR as a label simply refers to the combination of the two.

Reality from the perspective of critical realists is characterised by *intransitivity*, *transfactuality* and *stratification*. Consequently, CR entails a view that reality consists of real objects, structures, and generative mechanisms (intransitivity), that causal tendencies are universal and operate across and independently of closed systems (transfactuality), and that reality is differentiated, layered and multi-dimensional (stratification). CR is immanently critical, dialectical and moves from issues about science and objectivity to normative and subjective issues of freedom. (Hartwig 2007) Furthermore, assuming ontological realism and epistemic relativism, critical realists in their scientific endeavours distinguish between two dimensions, an *intransitive* dimension of science (ID) and a *transitive* dimension of science (TD) (Bhaskar 2008a).

> Science is *about* something, and about something that exists independently of science /…/. The 'results' of scientific inquiry at any time are a set of theories about the nature of the world, which are presumably our best approximation of truth about the world /…/. [The] work of science at any time takes theories as its *raw material*, and seeks to transform them into deeper knowledge of the world. These theories are its *transitive* object /…/. [Its] aim is knowledge of its intransitive object, the world that exists independently of it. (Collier 1994: 50-51)

The ID is synonymous with ontology (*being*) while the TD is synonymous with epistemology (the *process of inquiry into being*) (Hartwig 2007). Importantly, there is nothing innately eternal or unchanging about the intransitive dimension of an object.

Intransitivity entails that an object is what it is and not something else at any given point in time and space; it does *not* mean that it stays that way forever.

In line with their insistence on stratification, critical realists see reality as consisting of three different domains: the *real*, the *actual*, and the *empirical*. The real is the domain of generative mechanisms, the "causal powers of things" (Bhaskar 2008a: 40). Generative mechanisms trigger (series of) events to happen in the domain of the actual. Our experiences of these actual events, whether as scientists or as participants in everyday life, occur in the domain of the empirical. Of course, something may happen although it is not being experienced by us directly; the event has nevertheless occurred. The real, the actual, and the empirical are viewed by critical realists as three overlapping domains of reality. Hence, the actual comprises the empirical, and the actual and the empirical are both contained within the domain of the real. The empirical can never grasp the actual in its entirety, and the real story behind underlying causes in the world never unfold to us completely through mere establishing of actual events.

> The world consists of mechanisms not events. Such mechanisms combine to generate the flux of phenomena that constitute the actual states and happenings of the world. They may be said to be real, though it is rarely that they are actually manifest and rarer still that they are empirically identified by men. (Bhaskar 2008a: 37)

CR addresses what Bhaskar (2008a) claims to be the fundamental problems of western philosophy: *ontological actualism* and the *epistemic fallacy*. Ontological actualism means to disregard the multi-dimensionality of the world and to reduce the real world to series of events. Under ontological actualism, the real is exhausted by the actual, i.e., by "an actuality comprised either of events and states of affairs /…/ or of concepts and signs" (Hartwig 2007: 15). The epistemic fallacy, on the other hand, results from the denial of an objective world, existing independently of our thoughts about it. When the epistemic fallacy is committed, science is reduced to discourse, ontology to epistemology, and the three domains of reality have collapsed into one. The ID has been discarded and objects of knowledge are restricted to the TD. (Danermark et al. 2003) Under the epistemic fallacy, what we see is what we get, and what we get is all there is.

Society in CR Terms

From a CR perspective, society is seen, not as a flat, two-dimensional space, but as a differentiated, stratified, and deep-dimensional realm. This *ontological depth* exists in nature as well, although unlike natural strata, social strata are always mediated by human agency. (Bhaskar 2005) Natural objects are socially defined but naturally

produced, while social objects are socially defined *and* socially produced (Danermark et al. 2003). Nature proceeds without human interference, while precisely the opposite is true of society. The implication of ontological social depth is to realise that merely scraping the surface is not enough. To reveal the mechanisms causing the "happenings of the world" (Bhaskar 2008a: 37), scientific theory and critical reflection is essential.

It should be obvious by now that critical realists to a large extent are concerned with *causality* in society. Nothing happens without a cause and causes have causes too; "there are no 'first causes' on earth" (Collier 1994: 126). CR refers to the conditions under which causes operate as *tendencies*. Under certain such conditions, a social mechanism has the tendency to cause certain effects in society (Collier 1994). However, CR causality is anti-deterministic; just because *A* tends to cause *B*, we cannot state that *A* will *always* cause *B*. However, manifested or not, the tendency persists. Whether an event *do* take place or not ultimately depends on human intentional action. Human action is never determined but merely conditioned by social structures (Danermark et al. 2003). According to Archer (1995: 198), "structure necessarily pre-dates the action(s) which transform it, and /…/ structural elaboration necessarily postdates those actions". Hence, structure is irreducible to agency, but human beings either reproduce or transform social structures through their actions. Nothing happens in society without human interaction; without it, social structures would never transform. However, acting intentionally does not necessary mean to act with the expressed intention to change or uphold social structures *per se*.

CR and the Fact-Value Distinction

According to Sayer (2011), when we insist on the distinction between is and ought, we tend to overlook the missing middle. That is, we are living in a world of fact-value entanglement. Few non-trivial claims about the social world can reasonably be regarded as completely value-free and we would not be able to make sense of value statements unless they were somehow connected to our rational, fact-based understanding of the world. From a social science perspective, Sayer (2004) argues for what he calls a *qualified ethical naturalism*.

> It is ethically naturalist in that it considers that the very meaning of good or bad cannot be determined without reference to the nature of human social being. /…/ It is a *qualified* ethical naturalism because it also acknowledges that these capacities are always culturally mediated and elaborated /…/. (Sayer 2004: 102)

The kind of ethical naturalism proposed by Sayer indicate the subscription to *moral realism* of some form. Generally speaking, a moral realist believes that moral claims can

be true or false and that some of these moral claims are in fact objectively true (Sayre-McCord 2017). If the tenets of moral realism were correct, what we ought to do would follow logically from moral facts, and these moral facts would be possible to discover through science. Although Sayer (2011) does not subscribe to this radical kind of moral realism, he still maintains that moral judgments refer fallibly to things that exist independently of our subjective ideas. Just like knowledge claims are about something, moral beliefs too are about something. These are aspects that are just as real as other aspects of human life. Importantly, objectivity as understood in CR should *not* be equated with neutrality or absence of values. By objectivity, critical realists mean the description most true to the object of description. In such case, the most objective description could also be the most value-laden one[18]. (Hartwig 2007; Porpora 2017).

Critical Realism and Sociology of Law

To understand law, we must explain its socio-historical causes. As previously mentioned, CR is not a readymade social theory and it does not tell us the exact nature of the structures or mechanisms that the world is made of. This, Outhwaite (1998) argues, is a matter for the individual sciences to find out. As an ontology of the nature of society, CR is very general; as the basis for a possible socio-legal ontology, even more so. In accordance with Outhwaite (1998), it must therefore be the task of sociology of law to formulate its own, CR-informed theories. As a critical lawyer and a legal philosopher working in the CR tradition, Alan Norrie has devoted a considerable amount of work to think and write about this task.

Law's Architectonic

Norrie (2005) is interested in the way that law is rooted in and shaped by its social context. To understand law, it must be related to the underlying social and historical context in which it is embedded; law must in other words be treated as a socio-historical form. Norrie places law at the intersection of social relations, political governance and ethics (Figure 2) (Norrie 2005, 2017). This location renders three dimensions, whose relations to law can be referred to as the socio-legal, the juridico-political, and the

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[18] Here is an often cited example by Bhaskar (2009a: 83) that he borrowed from Isaiah Berlin: "Contrast the following statements of what happened in Germany under Nazi rule. *(α)* 'The country was depopulated.' *(β)* 'Millions of people died.' *(γ)* 'Millions of people were killed.' *(δ)* 'Millions of people were murdered.' All four statements are true but *(δ)* is not only the most evaluative, it is also the best (i.e. the most precise and accurate) description of what happened."

ethico-legal. As a unit, these dimensions and relations to law constitute what Norrie (2017) refers to as *law's architectonic*. Norrie (2018) argues that the creation of the legal architectonic is an attempt to demarcate the legal sphere from the moral and political spheres. That is, it is an attempt to draw a sharp line between legal questions and normative questions. This is a mistake, however, as such an attempted demarcation would deny law of its true character as a socio-historical form. Instead, Norrie (1998) emphasises what he calls law's relationality, i.e., the fact that law is not separated from but closely related to the social, the political, and the ethical. Furthermore, this attempt to deny law of its socio-historical identity "excludes intrinsic connections between matters of formal and substantive morality in a way that is highly problematic"[19] (Norrie 2000b: 8). Of the three relations, it is not least the ethico-legal relation to which Norrie has devoted his work.
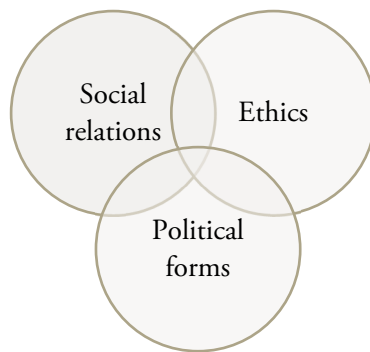
Figure 2: Law's architectonic (Norrie 2017:5)

Notwithstanding its interdependence with these extra-legal dimensions, there is still something uniquely legal about law, namely what Norrie refers to as law's morality of form. Inspired by Barthes (1970), Norrie (2011: 450) describes the morality of form as the "core truth of legal morality"[20]. The morality of form does not pertain to some specific moral content or expressed political goal. With some help from Barthes (1970), I interpret Norrie's use of the term as a way for him to address the fact that even though the normative content of law stems from extra-legal sources, there is still something moralistic about the very form of law, a kind of inherent morality that it is simply not

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[19] Here, *substantive* has the same meaning as in *real*, *material*, or *firmly based in reality*.

[20] In the preface to Barthes (1970: xviii), Susan Sontag writes that Barthes argued that it is not possible for an author to place literature at the service of a social group or an ethical end. Correspondingly, law is not merely instrumental for a social group during a specific point in time. Law also has a socio-historical and moralistic past that cannot be written off, and which defines law's morality of form in the present.

possible for the practicing lawyer, the legal philosopher or the sociologist of law to completely disregard. It comes with the package, so to speak. Norrie (2017) claims that the morality of form is based on formal and universal attributes of human agency and takes the individual person as its key normative figure. Under the morality of form, the free individual is personally responsible for her actions, effectively cut off from the social context in which she acts. That law is this way is not a self-evident fact, a must; it is the result of a value-laden socio-historical process. Indeed, the morality of form gives law its specificity, its "lawness"; but viewed on its own, as separated from the social, the political, and the ethical, the morality of form deprives law of its socio-historical context (Norrie 2017). If this were the whole story to law, it would mean that the legal subject, and thus law, was cut off from society. To Norrie (2017), this is a false image of law and not a sufficient basis for critical realist explanations in sociology of law.

An Immanent Critique of Liberal Law

The morality of law's form also lies at the heart of the kind of legal theory that Norrie associates with liberal ideology more generally. Kennedy (2017: 577) has written of Norrie that he employs a socio-historical method to characterise our contemporary condition, "finding both value and ethical barrenness in modern liberalism". Indeed, the frequent subject to Norrie's dialectical critique is *liberal law*, the law of Western, liberal democracies, and its companion: liberal legal theory (Norrie 2017). According to Norrie (2017), liberal law is typically formulated in general terms and stays clear of formulations targeting specific groups or individuals. To prevent arbitrary interpretations, liberal law is also formulated with a high degree of specificity. Under liberal law, the freedom of individuals must always be respected, and law must not be applied retroactively. Naturally, these features must generally be regarded as positives. The other side of the coin, says Norrie (2017), is that liberal law also has a tendency to obscure power relations and social conflicts. Furthermore, the protection and, thus, the upholding of market economy relations seems to be in its DNA, and although liberal law guarantees liberty and equality, it does so at a minimum (Norrie 2017). "While [law] defends liberty in modern society, it does so in a social context (an actuality) that is liberty threatening, for that is the nature of modern society" (Norrie 2013: 77). So, while Norrie (2017) genuinely acknowledges liberal law as the backbone of Western democracy, he also sees it as harbouring a latent potential for oppression.

Law is Real

However, liberal law, including the good parts, is *real*, and when people experience liberal law they are not being tricked or deceived. It is the theories of law and their

content that are fallible and questionable[21]. As a critical realist, subscribing to a view of the world as one of openness, Norrie (2017) questions the portrayal of law as formal and autonomous, wherein legal subjects are abstracted from their natural environment. Granted, law has got some degree of autonomy, but this is actually a kind of quasi-autonomy, argues Norrie (2017).

> There is a real, intrinsic, relation of the individual terms together with a real, relative, autonomy as between them. It is this sense, of autonomy-within-dependence that generates the sense with law /…/ that it enjoys a quasi-autonomy, meaning exactly an autonomy to that with which it is intrinsically connected (the social, the political, the ethical). (Norrie 2017: 15)

However, this does not retract from the impression that law gives of itself as a formally closed system. All forms of social organization in modern societies, such as the law and the healthcare system, are typically operating under what Danermark et al. (2003) call pseudo-closed conditions. These conditions are expressions of power of higher strata, exercised in order to achieve regularity (closure), and thereby predictability and control at lower social strata. But if forms for social organizations were completely closed, they would not be successful in organizing much at all. Law is highly dependent on, as well as intimately engaged with, the totality of social life. From this perspective, law would not be able to operate were it not for its openness and extra-legal connections.

> The starting point for the sociology of law must therefore be the connection between what law claims that it is, but is not, an internally regulated, self-reflexive, formally rational system, and what law claims that it is not, but is, an engaged and contradictory practice inseparable from the social and historical forces which operate by and through it. (Norrie 1998: 733)

A Dialectical Approach to Sociology of Law

Norrie's approach to sociology of law is dialectical (Norrie 2005). Accordingly, law is viewed not only as consisting of its current state *as is*, but also of its history, as well as its emergent potential to become something different. Antinomy, the apparent state of incompatibility of two laws, is a constant target for Norrie's dialectical critique. Thinking and acting in contradictions seem inherent in our state of being, says Norrie (2005), and since law is such an integrated part of being, law is expressed antinomially as well. However, this antinomialism is the product of a false separation in legal

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[21] The fact that the social world is falsely categorised and that some people believe these categories or theories to be true proves that such beliefs are both false and necessary at the same time. They are epistemic, albeit contained within ID. These beliefs are examples of what Bhaskar (2008b) refers to as *false necessities*.

terminology, most strongly expressed through the formal/informal opposition in Weber's sociology of law (Ewing 1987), and resulting in a series of dichotomies (Norrie 2000, 2005). "These include form and substance, the legal (or bureaucratic) and the popular, the indigenous and the statal, the local and the national, the rational and the irrational, and the individual and the social" (Norrie 2005: 33). As antinomial legal concepts, such pairs are treated as notoriously incompatible. The point that Norrie (2005) wishes to make is that antinomial legal concepts are, on the contrary, closely related, interdependent and part of a common social and legal totality. It is these relations that liberal law fails to recognise, according to Norrie.

> The problem with the partiality and one-sidedness in each of the 'law terms' in these pairs (internality, positivism, formalism, form, universality) is seen in that they are never enough in themselves to do the law's work. The external, the moral, the informal, context or substance, the particular are also invoked within and by legal argument. (Norrie 2005: 195)

A legal system that can separate the external from the internal presupposes a social world where closure is possible. From a CR perspective, law cannot be a closed system since such system hardly exist at all. However, Collier (1994: 121) argues that our world is one "in which we can produce closed systems *at some strata*. The 'lower' the strata in the hierarchy of rootedness and emergence, the closer we get to a closed system". Does law occur on low strata? No. The roots of law go deep, spreading across a myriad of lower strata. The legal strata are located high up in the social stratosphere and at this altitude, real closure is virtually impossible. Accordingly, Norrie (2005) calls for an approach to sociology of law that considers process, connection and the dialectical contradictions in law[22].

The Is, the Ought, and the Ethico-Legal Constellation

To Norrie (2005), the separation of *is* and *ought* in legal philosophy is a profound mistake. Law never was just *law*, but is, and has always been, part of a rational and moral totality. The basic prerequisite here is that social science cannot be evaluatively neutral (Norrie 2010), and this we must assume applies to sociology of law as well. The incapacity for value-neutrality at the same time provides social science with its

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[22] A dialectical contradiction is "a form of internal contradiction where a thing, idea or practice discloses an internal, or intra-, relationship with something else. The two entities appear to be, but are not, distinct. They are dialectically connected and, within that connection, there also inheres contradiction" (Norrie 2010: 70). From this perspective, seemingly contradictory legal elements are inherently interconnected rather than antinomial.

emancipatory capacity. According to Bhaskar (2009a), the world into which we enter is always already moralised and the point is to remoralise or emancipate it. However:

> …social science is already steeped in normativity, so that the facts it constructs are never just facts, but are always value-implicated. There can never be a fact-value gap because the way it is formulated involves a false premise. This indicates that Bhaskar's approach does not involve a straight resolution of the fact-value gap, but rather a sense that its terms are falsely constituted, or hypostatized[23] /…/. [The] distinction between facts and values would appear to be just the kind of split, antinomy or false dichotomy that exists in theory and the world by virtue of the kind of world it is. (Norrie 2010: 129)

These last few sentences are important because they suggest that Norrie subscribes rather to the kind of ethical naturalism of, for instance, Sayer (2011) or Lawson (2015), than to the more radical as well as controversial and criticised stance represented by Bhaskar (2009b)[24]. Refuting Hume by proving that it is possible to derive *ought* directly from *is*, is not at stake here. Instead, from the ontological standpoint that Norrie (2010) represents, it is the fact-value distinction that is problematised in favour of a recognition of the dialectical and constellational relationship between factual and normative claims. According to Norrie (2005), moral realism is concerned with the ethical status of moral concepts, while ethical naturalism explains how such concept come about[25]. From that perspective, moral realism is an ontological claim, while ethical naturalism is an epistemology. However, since dialectical critical realism is anti-foundationalist[26], it does not provide prefabricated ethical best practice or readymade answers regarding which moral concepts that are the most ethically correct (Norrie 2007).

Law as a specific type of social structure must be understood as related to specific social, political and ethical contexts. Norrie (2017) conceives of law's constellation as basically the underlying relation between law and ethics, or as an *ethico-legal constellation*. The legal is also always the ethico-legal (as well as the socio-legal and the juridico-political); it is at the same time an individual entity and part of a whole. In order to grasp the part that the legal plays in the whole, Norrie (2017) uses the concept of the constellation. Law's constellation is not just a theoretical model or an ideal type, *pace* Weber, but very

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[23] *Hypostatised*: treated as a concrete reality.

[24] See, e.g., Lacey (2007) and Elder-Vass (2010) for criticisms of Bhaskar's ethical naturalism.

[25] From an ethical naturalist perspective, there is no "unbridgeable logical gulf between" facts and values (Hartwig 2007: 323); they are seen as parts of the same social reality. Ethical naturalism, thus, ascribes that moral concepts exists in the same reality as, e.g., social and legal concepts.

[26] *Anti-foundationalism* rejects the possibility to establish *firsts*, i.e., whether the one or the other came first into being (*foundationalism*). Critical realists believe that we are thrown into a world characterised by an already ongoing epistemological dialectic or process.. (Hartwig 2007)

much connected to the real world; law is real, ethics is real and so is the ethico-legal constellation that contain them. To paraphrase Adorno (2004), it is the task of sociology of law to blast ethics, the hidden truth, out from behind the formal categories of law. The constellation may be a way to operationalise the conceptual distinction between ID and TD. This distinction may sometimes be a matter of perspective – perhaps because it probably is.

Law's Broken Dialectic

In a collection of essays, Norrie (2017) addresses what he terms law's broken dialectic, an unresolved split between legal and ethical judgment in the modern legal system. This break results from the fact that law is, on one hand, abstract and formal, while it is also, on the other hand, constructed in a social, political and ethical environment. A constellational strategy aims to reveal the connectedness between the legal and the ethical under liberal law. To deny values their realness is to rob them of their righteous place in law. Norrie (2017) argues that the ethico-legal constellation makes law uncomfortable because it forces us to think more broadly and systematically about ethics in relation to law. Also, while Norrie (2017) uses the ethico-legal constellation to discuss legal and moral responsibility primarily in the context of criminal law, I argue that the concept can be used in other contexts within sociology of law as well; the constellational unity between law and ethics is general. It applies not least to the context of Swedish healthcare law, which is guided by and constructed around ethical principles (SOU 1995:5).

Methodological Implications of Critical Realism

As argued by Danermark et al. (2003), the social ontology that researchers subscribe to is crucial for the methodological decisions that they have to make. However, CR is a meta-theory without an accompanying methodology. There is therefore a lack of consensus among critical realists on how to interpret and apply CR philosophy in concrete research situations. Arguably, this is the result of the assumption of epistemic relativism professed to by critical realists and which, at best, results in an open methodological mind. On the other hand, there has been considerable disagreement within CR, for instance, on the benefits of statistical modelling. One part of the analysis in this dissertation relies on PLS path modelling (PLS-PM), a kind of multivariate regression analysis, which I argue is compatible with a critical realist philosophy of science. In the following, I will attempt to justify this claim.

The CR Criticism of Statistical Modelling

Nowadays, so called non-parametric approaches, such as PLS-PM, seem to be met with greater approval by CR scholars compared to the conventional parametric methods[27] (Downward 2007). Furthermore, although statistical modelling may still be met with suspicion, the CR literature leaves me with the impression that the attitudes were more hostile a couple of decades ago. For instance, Bhaskar (1998) once wrote that statistical models should be totally discarded, and Archer (1998) too has expressed strong scepticism towards this kind of analyses. Typically, this scepticism within CR originated in a not erroneous presumption of statistical modelling as generally associated with positivism and empiricist science.

> The implicit philosophy of statistical modelling is inherently empiricist. That is, it largely restricts itself to analysing empirically available quantitative data rather than going beneath the surface to explain the mechanisms that give rise to empirically observable events. It embodies a view of causation that is successionist rather than generative, that is based on the Humean conception of constant conjunctions of events /…/. No other form of causation can be inferred from statistically significant results – they only imply association. (Mingers 2006: 206)

In PLS-PM, observable variables (indicators) are used to gain knowledge of unobservable or latent variables. However, Cruickshank (2003) rightly points out that variables cannot reflect facts. In a similar vein, Scott (2007b: 141) holds that indicators "refer to reified and not real properties of both structures and agents" and, thus, they "do not refer to causal objects and entities". However, Scott (2007a: 15; 2007b) argues that if indicators are able to capture "the intersection /…/ of agential and structural objects", this type of statistical modelling may be not entirely useless. Cruickshank (2003) also repeats the often stated claim that correlation between variables does not imply causation, a claim made by Mingers (2006) as well. This, of course, goes without saying; correlation is not causation – it is correlation.

Manicas (1998: 313), in his defence of a theoretically grounded social science, argues for a distinction between social *science*, on the one hand, and social *research*, "the effort to develop data about society", on the other. Manicas (1998) conceives of statistical modelling as an exercise where observable variables are analysed "one by one, sub-set by sub-set, until whole systems of variables are understood" (Stroud, 1984, p. 92). Of

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[27] Parametric methods are applied when variables assume a certain *probability distribution*, such as the normal distribution. Non-parametric approaches are suitable for "distribution-free" populations (the probability distribution is unknown, or parameters of the model are not fixed).

course, this is not a proper description of multivariate techniques[28]. Also, since explanation of causes is the main purpose of CR, Manicas (1998) rejects statistical prediction on the grounds that prediction is not explanation. This, other than stating the obvious, is beside the point, or as stated by Porpora (2001: 262):

> In its use of analytical statistics, positivism mistakenly conflates evidence and explanation, but there is no reason for realism not to disentangle the two. When they are disentangled, analytical statistics emerge not, as Andrew Sayer (1992) characterizes them, as 'primitive tools as far as explanation is concerned' for the simple reason that statistics are not explanatory tools at all. Rather than being explanatory tools, analytical statistics – including regression – are evidently tools, enabling assessment of explanations.

To Mingers (2006: 205), it "is clear from a CR perspective that the role of modelling should definitely be that of explanation and understanding rather than prediction". This would effectively rule out statistical modelling as a viable research method since finding explanations straight from data is not the reason for building these models in the first place. Benton (1998) argues that, obviously, prediction is always prediction *under some description*[29]; we do not simply "discover" prediction in data. This, however, Benton (1998) sees not as an epistemological problem, but as a methodological problem for the researcher to deal with.

The CR Embrace of Statistical Modelling

> What distinguishes realism from positivism is not that they run regressions and we do not but how we run regressions and the significance we attach to them. (Porpora 2001: 262)

> [It] is important to realize that theories expressed in linguistic form can often be given a mathematical form and vice versa. (Pratschke 2003: 22)

For Porpora (2001), there is no question about whether analytical statistics are compatible with CR. Even if statistical models, contrary to positivist belief, cannot provide evidence for universal laws, they may serve as indicative of active mechanisms (Porpora 2001). Furthermore, Porpora (2001: 263) emphasises that if critical realists

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[28] *Simple regression* involves one dependent and one independent variable; *multiple regression* involves one dependent variable and multiple independent variables; *multivariate analysis* is the simultaneous analysis of multiple dependent and independent variables.

[29] *Under a description* is a term coined by Anscombe (1979), originally referring to the description under which an agent's actions are intentional. In this present context, I interpret Benton (1998) as expressing that prediction is contextual – some conditions predict an event *under a description*.

are truly epistemic relativists, "it is probably a mistake to seek distinctly realist methods of research. That way is the road to foundationalism". The sharp distinction made between the natural and social sciences in terms of experimental closure has also been criticised for being unrealistic; in another context, Benton (2001) even talks of "naturephobic sociology". Just as the openness of society grants people the freedom to choose their own course of action, the partial or temporary closure of society gives them the ability to contemplate where we might be heading next. Benton (1998) has pointed to several disciplines within natural science where experimental closure is not attainable. Still, these disciplines have been able to uphold their status as *sciences* through important accomplishments by way of non-experimental, empirical research. There is no reason to believe that this would not be possible within social science as well. As argued by Ron (2002), since experimental control is seldom possible in social science, statistical procedures such as regression analyses can act as statistical control in the place of experiments.

Porter (2015) criticises Bhaskar's (2005) statement that the social sciences are, in principle, deprived of decisive test situations. On a similar note, Benton (1998) points out that these test situations are actually quite rare within the natural sciences as well. "It is a matter of scale", says Porter (2015: 69); "In relation to macro-social structures, Bhaskar is correct in stating that experimental closure is impossible. However, in terms of micro-social interactions, experimentation is perfectly possible" (ibid.). This echoes Sayer (1992), who maintains that quasi-closure can be achieved "if we restrict our research spatially and temporally based on the specific contextual factors that affect our conditions. Hence, it is up to the social scientist to construct the conditions of closure in order to get closer to the real mechanisms" (Zachariadis et al. 2013: 863). This also echoes the pseudo-closed conditions, described by Danermark et al. (2003) as a characteristic of societal organizations (the judiciary, the health system, etc.), exercising social control. Furthermore:

> Openness is relative. Uncontrolled, nonexperimental situations, not just in astronomy, may be closed enough to deliver regularities of varying degrees of precision and reliability. Conversely, no experiment is perfectly immune to outside influences. Closure too is relative. And, in large measure, closure is secured using regularities readily at hand in the world of instruments. (Hoover 2002: 160)

Also, although critical realists insist on the openness of the social, they do not deny that social systems have boundaries, be they actual or conceptual, and that these boundaries separate them from their environment (Mingers 2007). Ron (2002) states that an open world does not mean that stable regularities cannot occur, and when they do, we can learn something from them. The purpose of statistical modelling is to experiment with

models, not *ad hoc* but guided by theory, with the purpose of revealing a certain underlying mechanism that the researcher believes is the cause of variations in observed data (Ron 2002). From this perspective, prediction is not unthinkable. For some social scientists, this kind of pseudo-closed statistical modelling is essential in their field of research. For Pratschke (2003), the critical realist way to assess hypotheses regarding causal mechanisms is by investigating their observational effects. "[It] is only to the extent that generative mechanisms have observable effects that theoretical knowledge of them is possible /…/. Bhaskar's notion of explanation relies on a causal account of the relationship between unobservable and observable entities" (Pratschke 2003: 16-17). Or as Ron (2002: 121) puts it, the "gist of successful regression analysis is not to be able to offer a law-like statement, but to bring forth evidence of an otherwise hidden mechanism". Some scholars, such as Downward et al. (2002), Nash (2005) and Benton (2001), view the division between quantitative and qualitative methodologies as unfortunate (and I agree). Nash (2005) argues that the positivist tenets often associated with statistical techniques can be surmounted. The assumptions of positivism are not inherent to quantification itself and statistical techniques may be used to enhance realist explanations. Statistical models should not be seen as explanations in themselves, but as "sources of information more or less useful in the construction of complex explanatory narratives" (Nash 2005: 200).

Realism and Latent Variables

Rigdon et al. (2019) advocate an approach to PLS-PM that is firmly rooted in scientific realism, i.e., the belief in the possibility of unobservable objects, existing unaffected by our beliefs about them. The kind of statistical modelling that these authors promote is theory-driven as well as ontologically committed to realism. They refer to unobservable variables as conceptual variables and locate these conceptual variables *outside* the statistical model. "From a realist perspective, the theoretical model is a literal statement of what the scientist believes, based on available evidence" (Rigdon et al. 2019: 438). Since the conceptual variable is unavailable to the researcher, proxy variables are developed based on theoretical assumptions regarding the relationship between the conceptual variable and its indicators, which *are* empirically available to us (Rigdon et al. 2017). The point is not whether latent variables may be observable in the future, but that causality constitutes the relationship between latent variables and their indicators (Borsboom et al. 2003). Borsboom (2008) suggests that the difference between observables and unobservables is less than we commonly think. "The difference in handling observed and latent variables in actual data analysis cannot be defended by referring to the surplus meaning of latent variables as theoretical constructs, for observed variables carry such surplus meaning just as well" (Borsboom

2008: 29). This position fits nicely with the CR assumption of epistemic relativism; just as our theoretical concepts are fallible, so are our observations, and the distinction between latent and observed variables is purely epistemological. We should not assume that the distinction between latent and observed variables is an *ontological* distinction. The conceptual distinction is created by us as researchers. (Borsboom 2008)

Theoretical Concepts in the Empirical Study

The surveys that make up the empirical part of the thesis are constructed based, on the one hand, on theories of justice and, on the other, the analytical tool called the privacy calculus. Note that in the organizational justice literature, the terms "justice" and "fairness" are often used interchangeably. Goldman and Cropanzano (2015) have argued that, psychometrically speaking, the two concepts are related, although distinct. "'Justice' denotes conduct that is morally required, whereas 'fairness' denotes an evaluative judgment as to whether this conduct is morally praiseworthy" (Goldman and Cropanzano 2015: 313). Regarding the privacy calculus, Culnan and Armstrong (1999) have defined it as the individual decision process prior to disclosure of personal information. Subsequently, Dinev and Hart (2006) extended Culnan and Armstrong's (1999) model to refer specifically to a person's willingness to provide personal information when conducting transactions online. The privacy calculus should be seen primarily as an analytical tool rather than a theory. However, although the concept has developed from empirical research, this development has been theory-driven as well, mainly within the fields of social psychology and the behavioural sciences.

Four Dimensions of Justice

In the beginning of the 1970's, justice research was mainly devoted to a branch of *distributive justice* theory labelled equity theory, which paid certain attention to the procedure of organizing the distribution of resources in ways perceived as fair by the relational parties involved in the process (Greenberg 1987). However, Thibaut and Walker (1975) drew up the lines for the concept of *procedural justice*, which much justice research, directly or indirectly, has been referring to ever since. Thibaut and Walker (1975, 1978) were influenced by the continental European law tradition in their theories on how people will react to decision-making procedures; more specifically, they hypothesised that verdicts resulting from procedures offering process control to involved parties will be perceived as more fair compared to verdicts resulting from procedures where process control is denied (Greenberg 1987). While Thibaut and

Walker (1978) virtually equated procedural justice with process control of legal procedures, it was Leventhal et al. (1980) that extended that theory to non-legal contexts, and in doing so, they broadened the list of determinants of justice (Colquitt et al. 2001). Thus, new approaches to the study of procedural justice, with a special focus on perceptions of justice within organizations, began to emerge in the 1980's. Nevertheless, Greenberg (1987) has emphasised that none of these theories were formulated specifically with organizations in mind – they should be understood as general theories of social behaviour. Bies and Moag (1986) introduced a new justice dimension, *interactional justice*, which has sometimes been regarded as a "social aspect of procedural fairness" (Cropanzano and Greenberg 1997: 330), and at other times as a third category separated from distributive justice and procedural justice. Interactional justice focuses "on the importance of the quality of interpersonal treatment people receive when procedures are implemented" (Colquitt et al. 2001: 426). Later, theories of interactional justice began to develop in two different directions of interpersonal treatment: *interpersonal justice*, which reflects the treatment's degree of politeness, dignity, and respect by those executing the procedures, and *informational justice*, which focuses on provided explanations that convey information to people about why procedures were used in a certain way or why outcomes were distributed in a certain fashion (Greenberg 1990, 1993; Colquitt et al. 2001).

There has been a lot of debate about the necessity of a distinction between distributive and procedural justice, and to an even greater extent, about the distinction between procedural justice and interactional justice (Colquitt et al. 2001). Concerning interpersonal and informational justice, Greenberg (1993) has suggested that they should be kept conceptually separated because they are logically distinct and have been shown to have independent effects. Furthermore, as argued by Colquitt et al. (2001: 427), interpersonal justice acts "primarily to alter reactions to decision outcomes, because sensitivity can make people feel better about an unfavourable outcome", while informational justice "acts primarily to alter reactions to procedures, in that explanations provide information needed to evaluate structural aspects of the process". Colquitt et al. (2001) argue that interpersonal and informational justice are distinct enough for not being lumped together under the label of interactional justice. Also, the authors found that when considered separately, interpersonal, and informational justice were powerful predictors of procedural justice perceptions, while being not as powerful when considered in conjunction with other procedural justice facets. Consequently, the authors call upon justice researchers not to combine procedural, interpersonal, and informational justice into a single variable since they have different correlates. Measuring them separately allows for a more complete examination of the differences among the different justice dimensions. By including multiple justice dimensions,

Colquitt et al. (2001) claim that researchers can explain more outcome variance since each dimension contribute uniquely to perceptions of fairness. The authors also stress the importance for justice researchers to address both structural and interactional facets of justice, not least since their most robust finding, they argue, was the interaction between the procedural and distributive justice dimensions (Colquitt et al. 2001).

Procedurally Fair Healthcare Priorities

In publicly funded, universal health coverage systems, the available resources will always be limited. Some sort of priority setting therefore becomes necessary. Accordingly, prioritising within the healthcare is about how to distribute healthcare resources in a fair way (Licht 2011). In Sweden, like in several other countries, attempts have been made to define a fair process for limit-setting instead of searching for general distributive principles. All just societies meet healthcare needs fairly, but they do so under reasonable resource constraints. Daniels and Sabin (2009b: 2) argue that a just health system is one where healthcare services are provided based on need, not the ability to pay, which further underscores that "a just health system should use its resources wisely". This needs principle serves as an ethical justification for universal health coverage or insurance schemes, as opposed to consumer-driven health markets (Daniels and Sabin 2009a). A central component of the Swedish healthcare is that healthcare services are provided equally. Specifically, the provision of healthcare is equal when it is both horizontally *and* vertically fair (Vårdanalys 2017b). Horizontal fairness means that people with similar needs have the same access to healthcare regardless of, for instance, sex or socioeconomic background. Vertical fairness means that people with greater needs of care are prioritised before people with less needs. In conclusion, if the healthcare meets the principles of horizontal and vertical fairness, it is considered to be equal (Vårdanalys 2017b).

One consequence of a horizontally and vertically fair healthcare system is that the final decision regarding who gets healthcare first cannot be left to the individual patient to make. For such a system to be resilient, it must enjoy the legitimacy of the citizens. The legitimacy of a health system, under which it is not up to the individual but to the medical profession to decide whether healthcare should be provided or not, presupposes a societal consensus that such a system is understandable, reasonable, and fair. Naturally, when available resources are not enough to satisfy all needs all at once, there will be different opinions regarding what it means to allocate resources fairly and reasonably. Accordingly, decision-making in healthcare organizations often involves deciding between conflicting interests and may result in moral uncertainty about what ought to be done in each specific case (Gibson et al. 2008). At any given time, there is a myriad of healthcare needs present, and it is not possible to specify in advance the

exact order according to which those needs should be taken care of[30]. As an alternative strategy, some general criteria, designed to facilitate decision-making and priority-setting in the healthcare, may be developed. Applying such a strategy means a shift in focus from *distributively fair outcomes* in each individual case, to *procedurally fair decisions* when prioritising.

Justice Rules

Based on a review of the previous justice literature, Colquitt and Rodell (2015: 189) have formulated fifteen rules that "govern actions in some resource allocation or conflict resolution environment". These *justice rules* have been applied in a wide variety of research contexts and Colquitt and Rodell (2011) do not view them as static or unalterable. On the contrary, theoretically motivated new additions and adjustments based on the specific research context are welcomed by the authors. Each of the justice rules are attributed to one of the four justice dimensions. The justice rules serve as the basis for the items in the surveys conducted within this dissertation. The justice rules are divided between the four distinct justice dimensions (procedural, distributive, interpersonal and informational justice). Justice rules associated with *procedural justice* concern whether individuals are given the opportunity to influence a procedure and its outcomes. Furthermore, they consider whether procedures are predictable and consistent, neutral and unbiased, representative and ethical, and whether individuals have the possibility to appeal outcomes of a procedure. Justice rules associated with *distributive justice* concern whether outcomes are allocated in parity to contribution, if they are allocated equally, and whether they are allocated according to need. Justice rules associated with *interpersonal justice* focus on the enactment of procedures and whether they are sincere and polite and refrain from improper language and degrading remarks. Finally, justice rules associated with informational justice concern whether explanations of procedures are honest and thorough. Within the context of this study, these justice rules serve as the basis for most of the items in the survey.

Theoretical Foundations of the Privacy Calculus

The principle behind the online privacy calculus is based on two primary components of Ajzen's (1988) theory of planned behaviour – beliefs and behavioural intention.

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[30] Attempts to create ordered lists of different medical conditions have been made, for instance, in the American state of Oregon in the 1990s. There, the aim was to maximise health benefits and cost-effectiveness by drawing a line between treatments that were covered by the Medicaid program and those treatments that individuals had to fund out-of-pocket. However, where to draw this line in a value-neutral way turned out to be difficult. (Tinghög 2011)

According to Dinev and Hart (2006), the beliefs that influence the intention to act in a certain way can be contrary and may together comprise a set of elements in a calculus or decision process. One belief may override another to favour a specific behavioural intention over others. However, the strength of the overriding belief's influence does not necessarily eliminate the importance of the contrary belief; it is possible for individuals to simultaneously have strong beliefs about more than one thing. Within the behavioural sciences, Laufer and Wolfe (1977) first explained a calculus of behaviour, generally, as a decision-making process preceding information disclosure. Subsequently, Culnan and Armstrong (1999) argued that in a more specific context of purchasing products and services, individual decision processes involve a privacy calculus too. Although several studies have referred to Culnan and Armstrong's concept in studies of online privacy (e.g., Keith et al. 2014; Cichy et al. 2014; Kordzadeh et al. 2016), Dinev and Hart (2006) are credited with being first in applying the privacy calculus analytically to online environments. Accordingly, when online consumers are informed about information practices and perceive the online vendor as fair, their willingness to disclose personal information is positively affected. Furthermore, Dinev and Hart refer to expectancy theory, which states that individuals will strive to maximise positive outcomes and minimise negative outcomes. Individuals are expected to disclose personal information if the assessed risk is lower than, or at least balanced by, the perceived overall benefits.

Dinev and Hart (2006) proposed three construct categories that the privacy calculus consists of[31]: *willingness to act*, *risk beliefs*, and *confidence and enticement beliefs*. The willingness to act is about a person's willingness to provide personal information required in an online context. Risk beliefs are related to the risks associated with opportunistic online behaviour involving the disclosure of personal information, while confidence and enticement beliefs reflect trust, confidence, and personal interest associated with such behaviour. One valuable addition to Dinev and Hart's (2006) analytical tool is the connection of the privacy calculus to perceptions of justice, as proposed by Xu et al. (2010). More specifically, their privacy calculus model also included items on *governmental regulations* and *industry self-regulation*, reflecting procedural justice, and items on outcomes or *compensation*, reflecting distributive justice (Figure 3).

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[31] The term construct can be understood as proxy for a conceptual variable, as described by Rigdon et al. (2017).
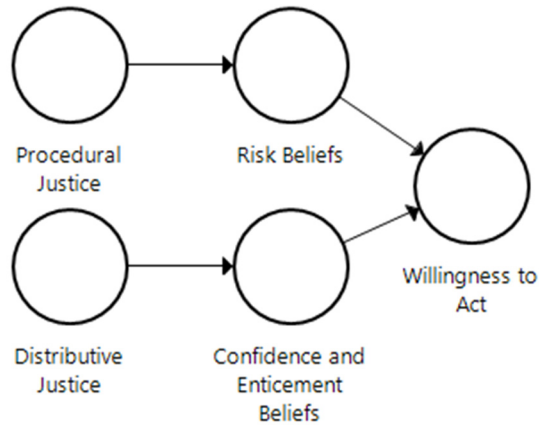
Figure 3: The Privacy Calculus (Xu et al, 2010)

After Theory…

Equipped with a theoretical framework, we can now proceed with the more empirically oriented parts of the thesis. However, this does not mean that the theoretical framework is put to rest. As aforementioned, a critical realist sociology of law cannot view legal matters as isolated from its historical and social context. As a social phenomenon, law is open – not closed. It affects and is affected by ethics, politics, and social relations. Next, this theoretical understanding of law and of sociology of law will be applied to the study of the ethical, political, and socio-historical context of Swedish online doctors.

The Legal Architectonic of Swedish Online Doctors

In this section, I will describe the socio-historical context of Swedish online doctors from three different but interlinked perspectives. In doing so, I make use of Alan Norrie's (2017) figure of law's architectonic, where the legal is always also the *ethico-legal*, the *juridico-political*, and the *socio-legal*.

> The legal architectonic is accordingly the historical point of fusion of a structured set of concepts and practices in, and out of, an engagement with a social, political, economic and ethical environment from which it emerges, and which it helps constitute. (Norrie 2017: 6)

A law completely divorced from ethics would be in lack of a moral compass (Norrie 2017). No regulatory social system, law included, can ever be completely value neutral. A law that does not take a stand, that supports nothing, would be non-sensical and ultimately illegitimate. Ideas of right or wrong are indeed codified by and expressed through law, but the moral force of such ideas is woven into the socio-historical fabric from which the garment of law is also made. This is the ethico-legal dimension. According to Bhaskar and Norrie (1998), the ethical has normative primacy over the political and the normative thus provides politically governed organizations, such as the Swedish healthcare, with ethical guidance. However, it is necessary here to address the distinction between normative and descriptive ethics. While normative ethics is concerned with the formulation of moral standards or principles guiding our behaviour, descriptive ethics is concerned with the investigation into such standards and principles within particular social settings (Fisher 2004). In my investigation of the ethical underpinnings of the law regulating Swedish online doctors, I am concerned with ethics strictly from a descriptive perspective. That is, here I am primarily attempting to identify and describe these ethical underpinnings – not formulating a critique of them.

Turning next to the juridico-political, which Norrie (2017) refers to broadly as political governance. Different authors have dealt with the juridico-political in different ways. In Marxist terminology, for instance, political power, law, and the state are conceptually

contained within the juridico-political, which is located in the superstructure together with ideology (Harnecker 1980, 1979). For Habermas (1988), the more informal part of the political sphere provides meaning to the positivistic side of law, which would otherwise be incomprehensible[32]. Derrida (1992), on his part, thought of the juridico-political as a field (the political), which intervenes in another field (law) and from which law cannot be separated. Similarly, Bryan et al. (2016: 1) describe the juridico-political as emphasizing "the interconnection, rather than the separation, between reflection upon law and politics". The juridico-political acknowledges the inseparability of law and politics. Specifically, the juridico-political dimension presently under investigation concerns the process wherein policy and legal reform, albeit unintentionally, has paved the way for online doctors in Sweden.

Lastly, the socio-legal is conceived of by Norrie (2017) as the social and historical dimension of law (although, surely, the ethico-legal and the juridico-political must be socio-historical too). The socio-legal is constituted by different forms of social relations. Here, I have decided to focus on one specific type of social relations, namely, those of the economic kind. According to Norrie (2017), liberal law has been designed to protect and uphold market economy and the economic conditions we live under are part of the socio-legal. Still, the figure of law's architectonic does not say much about economic life[33]. However, economic relations within the Swedish health system channel a great deal of normative power. They constitute what Edelman and Stryker (2005) would label social mechanisms through which legal and economic action become part of a causal dynamic. In fact, within the context of this study, economic activity is arguably the most important mechanism in explaining online doctors as a Swedish healthcare phenomenon. It is also the section that receives the most attention from me in this chapter. To underline the economic specificity of the social relations, accordingly, I will refer to the three dimensions of law's architectonic in this present context as the ethico-legal, the juridico-political, and the *econo-legal*.

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[32] Habermas (1998) divides the political sphere in a formal part and an informal part, where institutions like the parliament and the judiciary belong to the former part and different kinds of interest groups or political associations belong to the latter.

[33] Economic life, understood as instituted process (Polanyi 1957), rather than in the formal, rational sense advocated, for instance, by Friedman (2007: 173); "What does it mean to say that 'business' has responsibilities? Only people can have responsibilities".

The Ethico-Legal Dimension of the Swedish Healthcare

The Swedish health system is ethically rooted in the political project of the modern welfare state. The organization of the healthcare has thus been shaped by certain ideas about what constitutes a good society. These ideas are reflected not least in the overarching goal for the healthcare: good health and healthcare on equal terms for the entire population (3 ch. 1 § 1 sec. SFS 2017:30; prop. 1981/82:189). Of course, these values were cherished even before their codification. The perceived need to make such values explicit through law was caused by an economic recession in the 1970s and a concern that an increasingly decentralised healthcare sector would expand in an economically unsustainable way. It was deemed necessary to define goals that held on to universal healthcare as a core principle while, at the same time, keeping expenditure under control. In different health systems, financed, e.g., through private health insurances or out-of-pocket payments, "there is nothing resembling a global budget, and there is no mechanism for setting limits to health-sector resources through a democratic political process" (Daniels and Sabin 2009a: 19). Advocates of such systems might argue that the collectivistic Swedish healthcare model does not sufficiently respect the individual's right to decide on matters regarding their own health. But that alternative view *too* reflects certain ideas and values about a good society. Next, we will have a closer look at the ethical underpinnings of the Swedish healthcare; first, through a brief account of the basic right to healthcare, followed next by a presentation of two categories of principles that are serving as ethical guidelines in the healthcare. The first category consists of a set of three principles: the human dignity principle, the needs and solidarity principle, and the cost-effectiveness principle. The second category consists of only one principle: the freedom of choice. As we will see, the first set of principles is sometimes in direct conflict with the freedom of choice, something that becomes especially clear in the case of online doctors.

The Basic Right to Healthcare

In 1948, the United Nations declared that everyone has the right to medical care (art. 25 (1) UN Resolution A/RES/217). Also, the International Covenant on Economic, Social and Cultural Rights, provides that everyone has the right to the highest attainable standard of physical and mental health (art. 12 UN Resolution 2200A I). The right to health is further protected under the European Social Charter (art. 11 CoE 1996) and, for EU citizens, under the Charter of the Fundamental Rights of the European Union (art. 35 The Charter 2016). Although Sweden is covered by these rights-based international legal documents, Swedish healthcare law should essentially be understood

as obligation-based as opposed to rights-based[34]. While society is *obliged* to provide healthcare, citizens cannot claim a *legal right* to healthcare. For instance, the Swedish constitution stipulates that society shall provide the individual with social conditions that promote a good health (1 ch. 2 § 2 sec. RF 1974), but it does not mention healthcare as a citizens-right. In Sweden, healthcare is sometimes referred to instead as a collective, goal-oriented right that society is obliged to provide. However, according to Rynning (2011), healthcare belongs neither to the category of legal rights, nor to the category of goal-oriented rights, but are instead examples of what she calls *quasi-rights*. The term refers to the social rights one has as a member of society, e.g., the right to healthcare on the same terms as other members of society. Claiming one's quasi-right in court is not possible, but other forums are typically available. In Sweden, there are the regional patient boards who consider complaints and opinions of patients but with no authority to review or change decisions made by healthcare professionals. Instead, their task is to "describe, inform, find out and explain" in order to make patients and healthcare providers understand each other in a better way (IVO 2015). Patients can also complain to the Health and Social Care Inspectorate (IVO), for instance, if a patient has suffered an injury while receiving care. Patients cannot appeal decisions made by IVO, hence underlining the difference between quasi-rights and legal rights[35]. In general, a Swedish citizen can appeal almost any disadvantageous decision made by any public authority. Although healthcare authorities are indeed public authorities, healthcare services are typically not considered to be exercises of authority[36] (*myndighetsutövning*). Hence, medical assessments are not possible to appeal to an administrative court like other decisions made by public authorities. This means that administrative litigation is absent and case law plays no role in the development of the health system. The healthcare law is present, but not in action.

The Swedish Ethical Platform

In the 1990s, a severe downturn in the Swedish economy led to several years of financial struggle in the public sector. Policy-makers wanted to curb healthcare expenditure by

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[34] The Social Services Act is an example of a Swedish piece of legislation that is rights-based (SFS 2001:453)

[35] Before 2011, patients could file disciplinary complaints to The Medical Responsibility Board (HSAN) as well as appeal HSAN's decisions to an administrative court. However, this system was abolished with the Patient Safety Act (SFS 2010:659).

[36] For an act carried out by a public agency or authority to be considered an exercise of authority, it typically needs to be carried out against someone's will or based on a decision that the individual disagrees with. Since it is not legal to provide a medical treatment against someone's will (except for in a few special cases), healthcare is essentially not considered to be an exercise of authority.

implementing clearer criteria for how to make sound priorities in the healthcare (Tinghög 2011). It was argued that a lack of centralised control had created arbitrariness and cost-ineffectiveness. Cost-control had to be tightened but in a way that did not harm the "ethical spirit" of the system. Eventually, an *ethical platform* was subsequently adopted by the Riksdag. Ever since, healthcare priorities must always adhere to three ethical principles (SOU 1995:5; prop. 1996/97:60):

1. *the human dignity principle*,
2. *the needs and solidarity principle*, and
3. *the cost-effectiveness principle*.

The human dignity principle ranks higher than the needs and solidarity principle, which in turn ranks higher than the cost-effectiveness principle. The human dignity principle is fundamental but not independently sufficient as a basis for priorities within the healthcare. The Swedish healthcare is obliged to treat all patients with dignity and in the same way. However, conditions of scarcity within the healthcare entail that patients cannot get what they want at any given time, even though they may be entitled to it. Hence, the needs and solidarity principle, which stipulates that those with the greatest needs shall receive healthcare first. The solidarity part means to take into special consideration the interests of those who may not be aware of their own human dignity or those who are less capable than others to make their voices heard. In the third instance, the cost-effectiveness principle shall be adhered to. This means that healthcare providers must prioritise between different measures, services, and medical treatments. The objective is to balance costs against effects in terms of improved health status and heightened quality of life. (prop. 1996/97:60)

> Since the needs and solidarity principle is superior to the cost-effectiveness principle, severe diseases and substantial deterioration of life quality shall be prioritised over milder cases, even though difficult conditions require significantly more resources. Therefore, the cost-effectiveness principle cannot be used to defend why the dying, the seriously or long-term sick, the old, the demented, the mentally disabled, people with severe disabilities, or others where healthcare would not 'pay off', would not be cared for or receive healthcare services of lower quality. (prop. 1996/97:60: 18; my transl.)

The platform has been described by Gustavsson et al. (2013) as containing elements of distributive justice, as it departs from people's healthcare needs and weigh them against the benefits of possible interventions, *and* elements of procedural justice, as the process preceding priority-making must be reasonable and fair. Besides the needs principle, non-binding recommendations on how to prioritise between needs were developed in the form of four priority groups (prop. 1996/97:60):

- *Priority group I*: life-threatening, acute diseases; serious chronical diseases; palliative care and end-of-life care; care of people with impaired autonomy.

- *Priority group II*: evidence-based preventive care; rehabilitation and habilitation, e.g., for persons with permanent disabilities.

- *Priority group III*: less serious acute and chronical diseases.

- *Priority group IV*: care for other reasons than disease or injury, e.g., near-sightedness surgery, cosmetic surgeries, social snoring treatment, and vaccinations before traveling abroad.

The priority groups have been criticised for not considering sufficiently the fact that the severity of many conditions, as well as the efficiency in treating them, may vary greatly on an individual level. The National Board of Health and Welfare and The Swedish National Council on Medical Ethics (Smer) have even stated that the priority groups should be discarded. (SOU 2019:29) The three ethical principles, on the other hand, have been incorporated into the Health and Medical Service Act (3 ch. 1 § 2 sec. and 4 ch. 1 § SFS 2017:30). Furthermore, with the 2017 revision of said act, it was emphasised that it is not just the management and organization of the healthcare, but the healthcare as a whole, that must be conducted in a way that promotes cost-effectiveness (4 ch. 1 § SFS 2017:30; prop. 2016/17:43). In other words, doctors and nurses must be just as cost-effective as managers and controllers. Naturally, this must be interpreted as an ambition on the part of the government to attach greater weight than before to the principle of cost-effectiveness[37].

Invalid Grounds for Making Healthcare Priorities

It is explicitly forbidden to make healthcare priorities based on chronological age, sex, one's ability to take initiatives, education level, ability to pay, nationality, cultural differences or the nature or duration of a disease (prop. 1981/82:97; prop. 1996/97:60). Priorities cannot be based on self-inflicted injuries or diseases allegedly related to lifestyle. Another principle considered when the ethical platform was drawn up was the *principle of self-determination*, which is about providing a great extent of autonomy for the individual when decisions on their healthcare are made. Indeed, all healthcare shall be conducted in consultation with the patient and with respect for their wishes and personal capacities (5 ch. SFS 2014:821). However, the government feared that adhering to a self-determination principle would, for instance, lead to unfair

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[37] The meaning of "cost-effective" is perhaps not entirely clear. Vårdanalys (2017b) refers to internal effectiveness, or productivity, which is about achieving goals with as little use of resources as possible, and external effectiveness, which is achieved when the most important tasks are also given the highest priority. Thus, these two aspects must be balanced against each other for cost-effectiveness to be achieved.

consequences for people who lack the same capacity as others to decide what is in their best interest or act strategically to get what they want; as such, the self-determination principle was seen as being in conflict with the needs and solidarity principle and was rejected. (prop. 1996/97:60). Furthermore, some people may desire healthcare although they do not need it. This is associated with the *principle of demand*, which centres on self-perceived health status and one's confidence in the healthcare's ability to improve that status (Carlsson and Waldau 2013). Although the healthcare must take a person's preferences seriously, one cannot demand to be given patient status (at least not at society's expense). The government has argued that priorities based on patient demand might drive up healthcare costs uncontrollably and ultimately deprive people with less ability to manoeuvre in a demand-driven system of much needed healthcare. So, the principle of demand was rejected as well. (prop. 1996/97:60) Here, it is important to emphasise that *demanding* healthcare is not equivalent to *needing* healthcare (Hodgson 2007). Healthcare needs are not always expressed by the individual, while healthcare demands always are. Furthermore, while the relationship between income level and healthcare need is negative, the relationship between income level and healthcare demand is positive (Nyman 1999; Hossoy et al. 2020).

Criticism of the Ethical Platform

Gustavsson et al. (2013) argue that the ethical platform does not give enough weight to collective benefits, i.e., how to ethically arrange the healthcare so that it serves the good of society. Good health is unevenly distributed between different socio-economic groups as well as between men and women (prop. 2016/17:43). In line with Gustavsson et al. (2013), it could be argued that not enough resources are allocated to promote good health on a population level, which, in turn might affect individuals belonging to certain social groups more negatively than others. As argued by Palier (2006), a strong focus on preventive care would likely promote better public health and reduce healthcare costs. Furthermore, awareness of the ethical platform appears to be low (SoS 2007b; Broqvist 2018; Garpenby and Bäckman 2016). If so, this might be due to perceptions of the ethical principles as too abstract; indeed, Tinghög (2011) has criticised the principles for being vague and difficult to implement. Garpenby and Bäckman (2016: 892) have claimed that "formal and explicit priority setting remains controversial among regional authorities as it is considered too complicated, politically risky and time consuming to be attractive". It has also been argued that the sheer size of the patient group with less serious needs motivates a higher priority of this group, not least since it is here that early or preventive measures can be the most cost-effective. This criticism has resulted in a call for a general reconstruction of the healthcare that includes a re-evaluation of the ethical platform where a higher priority of the primary care should be considered. (SOU 2019:42)

The Freedom of Choice

In short, freedom of choice is the idea that, faced with a choice, we become freer the more options that are available for us to choose from. However, mere quantity is not a sufficient criterion for assessing freedom of choice. Being offered ten rotten apples does not necessarily lead to more freedom of choice compared to being offered two apples of which one is rotten and the other is fine. Personal preference must be taken into account; we would not be able to evaluate social goods without considering what people would prefer if given the opportunity to choose (Sen 1991). There is also a difference between being forced to do what one would have preferred to do anyway, compared to being forced to do something that one absolutely do not want to do[38] (Dowding and Van Hees 2009). If a local regulation requires me to visit a particular health centre, which happens to be just around the corner from where I live, the absence of free choice is perhaps not that important. However, if I were required to travel for an hour to my designated health centre, *despite* having one just around the corner, I would probably have appreciated a greater freedom of choice.

The Freedom of Choice as Guiding Principle in the Swedish Healthcare

Already in the early 1990s, there was growing interest in free choice as a cornerstone in the reorganization of the Swedish welfare sector. However, free choice really took centre stage with the 2010 free choice of care reform (prop. 2008/09:74), codified through the Act on Systems of Choice (SFS 2008:962). The purpose was to promote patient empowerment by introducing free choice of healthcare provider. It became mandatory for healthcare authorities to open the primary care for private but publicly funded service providers. By creating more options in this way, patient influence would be strengthened, and the quality of services would be higher. This would, not least, benefit the elderly and people with functional disabilities. Patients who were not satisfied with their service provider would be free to change, at any time and as often as they wanted. Since the compensation for provided services would follow the patient while the patient fee stayed the same, competition would be based on quality and not on prices. Service providers who did not measure up and deliver what patients demand would eventually be eliminated from the market. Hence, it was emphasised that the freedom to opt out was just as important as the freedom to choose[39].

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[38] A so-called no-choice situation, where there is only one option and, hence, no choice involved.

[39] In an international perspective, this unrestricted freedom of choice is quite unique. In countries with similar systems, there are often geographical restrictions or a cap on how many patients a healthcare provider can admit. No such restrictions exist in Sweden. (SOU 2019:42)

Criticism of Free Choice in the Healthcare

Sjögren (2008) has stated that while scientific advances constantly raise the bar for what is medically possible to do, this progress also leads to a widening gap between our expectations on the healthcare and what it can realistically deliver. Here is an ethical dilemma, which consists of the difficulty in reconciling free choice with the needs and solidarity principle (Sjögren 2008). As aforementioned, just because a patient demands healthcare does not mean that they need it, or someone else might need it more. It has been argued that some restrictions of free choice will be necessary or real freedom of choice will not be the end result (SOU 2019:42). Currently, it is questionable whether all patient groups have the same opportunity of free choice of healthcare (Swedish NAO 2014). Some people lack the cognitive capacity to obtain and understand necessary information about all available options. Furthermore, the inconvenience associated with changing service provider may cause patients with complex or chronical conditions to exercise their right to opt out to a lesser extent. Reportedly, some patient representatives even regard the reform as irrelevant for the patients they represent. (SOU 2019:42) Legally, the Act on Systems of Choice has been described as decoupled from the rest of the legal framework in the healthcare (SOU 2019:42). The health system has even been described as *de facto* governed by two different norm systems[40]: one built around the ethical platform and one around values of free choice and self-determination (Smer 2020). Perhaps tellingly, while preparatory works for the ethical platform were characterised by numerous ethical considerations, similar discussions are largely absent in the preparatory works preceding the free choice of care reform[41].

Online Doctors – A Collective Action Problem?

A collective action problem is a social dilemma where members of a community revert to competition although, collectively and individually, they would all benefit from cooperating with each other to achieve a common end (Olson 1971). One version is the free-rider problem where the free rider enjoys the benefits of a public good without sharing the responsibility for the costs (Pasour 1981). The question is, as formulated by Barnes (1990): why do people, at least sometimes, act collectively instead of constantly engaging in free-riding? For welfare states, it is a matter of legitimacy.

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[40] See, for instance, professor in public law Lotta Vahlne Westerhäll in Smer (2020).

[41] To illustrate, when consulted on the proposed Act on Systems of Choice, The Court of Appeal for Western Sweden suggested that freedom of choice should not be used in the name "since it is a value-laden term" (prop. 2008/09:29: 64). On a rare occasion, The Inquiry on the Patient's Rights (SOU 2008:37) stated that there is little evidence suggesting that patient empowerment will create a domino effect where other values such as quality of services, economic efficiency, and equality would be positively affected as well, at least not without serious goal conflicts.

Welfare states will continue to enjoy popular legitimacy as long as they are able to provide high-quality public services in return for tax money. In welfare states, quasi-markets are typically created as a response to a perceived citizen demand for more alternatives of a particular service to choose from. Herein lies a paradox. When more private (but publicly funded) choices *do* become available, expectations are raised on public services to provide the same experience as private actors provide. If the public sector is not able to meet these expectations, the legitimacy of the welfare state might be undermined.

The Swedish health system has allowed online doctors to offer more or less instant healthcare services free-of-charge[42]. This is appealing to patients with simple healthcare needs that the physical healthcare providers are not able or willing to prioritise. However, a risk of over-consumption and an inflated provider-induced demand presents itself (Hossoy et al. 2020). If a physician communicates through ads or commercials that I need healthcare, I will take it more seriously than if a shoe salesman tells me that I need new shoes. The informational and skill asymmetry[43] is much less significant in relation to my shoe salesman than in relation to my physician, which is why provider-induced demand is a more serious issue in a universal healthcare system compared to competitive markets. There is simply no way for me to know whether my healthcare need is real without the assistance of a healthcare professional. And if the online doctor service is risk-free, cost-free, and easily accessible, I do not have to think twice before using it. (Hodgson 2007) Here, the online doctor companies find themselves in a social trap (Rothstein 2011). Since they are currently in an expansive phase, one of them cannot afford to "act collectively" while the others manoeuvre to conquer new market shares. However, in the long run, their behaviour might be self-destructive if unchecked by society. One online doctor simply will not submit to the system unless it can be guaranteed that the others will do the same. Thus, they are trapped.

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[42] In other words, offering a service on a quasi-market for €0 although the price is fixed at €10.

[43] That is, the knowledge and information about the product that I possess in relation to the knowledge and information about the product that the seller possesses.

The Juridico-Political: Legal Healthcare Reforms

Online doctors have not emerged in a political vacuum. The Swedish health system is a Beveridge model[44] where basically all healthcare is financed through taxes (Or et al. 2010). The health system is also shaped by the Swedish principle of local self-government, which grants municipalities and regions a rather high degree of autonomy vis-à-vis the state. However, there has been political ambitions to hybridise tax-funded healthcare with free enterprise. The reforms resulting from these ambitions have been essential for the emergence of online doctors. Here, to reflect on the juridico-political means to reflect on the process wherein political ambitions have been realised through legal reforms and, specifically, how this process has set the stage for online doctors.

The Organization of the Swedish Health System

Like the Swedish government system, the Swedish health system consists of three administrative levels. At the national level, the Ministry of Health and Social Affairs is responsible for overarching healthcare policies, which are implemented nationally by several government agencies. Locally, Sweden's 290 municipalities are responsible for elderly care and healthcare for persons with certain functional disabilities (12 ch. SFS 2017:30). However, most healthcare is the legal responsibility of the 21 regional councils[45] at the intermediate level (2 ch. 2 § SFS 2017:30). For healthcare affecting several regions, the healthcare is divided into six geographical coordination regions (*samverkansregioner för hälso- och sjukvård*) [46] (3 ch. 1 § SFS 2017:80). A regional council may hand over some healthcare affairs to a coordination region[47] but the region's legal responsibility can never be delegated[48]. Figure 4 gives a geographical overview of municipalities, regions, and coordination regions.

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[44] Countries with Beveridge-modelled health systems include the Scandinavian countries and the UK. Health systems, for instance, in France and Germany are instead organised as insurance-based Bismarck models. However, Or et al. (2010) point out that the Beveridge and Bismarck models are not as different as they used to be.

[45] Legally, a region is a type of (secondary or regional) municipality (1 ch. 7 § RF 1974). In effect, regional councils do not have legal authority over municipalities.

[46] Umeå, Uppsala-Örebro, Stockholm, Gothenburg, Linköping, and Lund-Malmö. Before 2020, the term healthcare region (*sjukvårdsregion*) applied, a term that is often still used in practice.

[47] Legally, a coordination region is a type of local federation (*kommunförbund*) (3 ch.8 § SFS 2017:725).

[48] The Swedish Health and Social Care Inspectorate (IVO 2016) argued that the poor quality of services delivered by a private contractor was ultimately the responsibility of the contracting regional council, i.e., the healthcare authority.

Figure 4: Sweden's 290 municipalities, 21 regions (regional councils), and 6 coordination regions (local federations).

Healthcare as a Political Welfare Project

Public healthcare has existed in Sweden since the 17th century although today's modern health system began to take shape in the 1930s. The expansion of the healthcare in the 1950s and 1960s was part of a greater vision of a welfare state where all citizens were taken care of. Despite an increasing regionalization during the 1960s, by the 1970s, the healthcare was still large-scale, guided by national directives, and conducted according to five-year plans (Siverbo 2019). As the healthcare expanded, it became increasingly complex and difficult to manage nationally. As a reaction, a period characterised by decentralization of governance followed in the late 1970s and early 1980s. To a large extent, healthcare policy and decision-making migrated to the regional and clinical levels. At the same time, the primary care moved out to local health centres. (Siverbo 2019) With the Health and Medical Service Act of 1983, the management of the healthcare became more goal oriented. For the first time, an overarching goal for the Swedish healthcare, good health and healthcare on equal terms for the entire population, was explicitly expressed through legal provisions (2 § SFS 1982:763). However, it was up to the regional healthcare authorities how to realise this goal in practice. Over the years, Swedish governments have tried in different ways to make the healthcare more personalised and more accessible. Amidst the 1990s recession, ideas about implementing market efficiency in the healthcare began to take root. Competition with private enterprise was supposed to make the healthcare sector more cost-effective. Healthcare authorities were expected to act as clients who procured healthcare services on a market[49]. However, this client-provider model was afflicted with some problems[50]. Today cost-effectiveness is strived for through collaboration rather than competition (Siverbo 2019). These "organizational trends" over the years have created a somewhat fragmentised health system. For instance, OECD (2019a) views the decentralised structure of the Swedish healthcare as potentially inhibiting for reaching the goal of a good healthcare for the entire population. Next, I will present some central reforms that has led up to this current situation.

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[49] The basic idea was that clients should not pay for production of healthcare that they did not actually need. However, this created an incitement for providers to increase their productivity, i.e., to treat as many patients as possible to maximise profits. This led, at least initially, to shorter waiting times for patients. But since providers were reimbursed per patient and the demand for healthcare is basically infinite, the overall healthcare costs still increased in the end. (Siverbo 2019)

[50] According to Palier (2006), the power given to the healthcare apparatus to create its own demand, while at the same time creating the supply, is a fallacy. The principle of free medical practice, i.e., the healthcare provider's freedom of establishment, the patient's free choice of physician, the relatively unrestricted freedom of doctors to prescribe drugs, is not compatible with a publicly funded health system where reimbursements are (incorrectly) perceived as unlimited.

Significant Swedish Healthcare Reforms

Healthcare reforms in the 2000s aimed to improve the accessibility and freedom of choice for patients. However, freedom of choice first entered the stage as a potential guiding principle in the modern Swedish healthcare through the family doctor reform in the 1990s. Before that, patients seeking care had been referred to the nearest health centre. The family doctor reform created the possibility for patients to choose a family doctor (*husläkare*) of their own choice (5 § SFS 1982:763). The reform targeted problems in the healthcare such as a lack of continuity, impersonal treatment, and long waiting times (prop. 1992/93:160). However, the Act on Family Doctors (SFS 1993:588) was criticised for infringing too much on regional self-governance. Family doctors could establish private practices wherever they wanted while being reimbursed with public funds. This type of unregulated free establishment, funded by tax money, was criticised at the time – even before the reform had been implemented (prop. 1992/93:160).

> The main criticism is that public healthcare authorities have no control over the resources and that a nationally regulated system of free establishment implies an excessively detailed control over the public healthcare's funding and organization of the outpatient care. Some also argue that the system does not lead to the desired effects, e.g., the allocation of medical resources all over the country and making outpatient care practice more attractive, but that the effects might be the exact opposite. (prop. 1992/93:160: 58; my transl.)

Under the social democratic Carlsson II cabinet, the Act on Family Doctors was repealed in 1996. However, the obligatory for regions to make sure that its residents can choose a permanent health contact (*fast vårdkontakt*)[51] was retained, as was the possibility for patients to seek primary care outside of their home region[52].

The Free Choice of Care Reform

Approximately one decade after the family doctor reform, the so-called free choice of care reform (*fritt vårdval*) was initiated by the liberal-conservative Reinfeldt cabinet. This time, the government wanted to broaden the range of healthcare services offered to patients acting as consumers on a market.

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[51] *Fast vårdkontakt*; "Depending on which medical and other needs the patient has, a permanent healthcare contact can be a healthcare professional, e.g., a doctor, nurse or psychologist, but it can in some cases also be someone with a more administrative role who coordinates the care of the patient" (prop. 2013/14:106: 99; my transl.).

[52] See 7 ch. 3 § 1 sec. and 8 ch. 3 § 1 sec. of the Health and Medical Service Act (SFS 2017:30).

The government wants to make it easier for municipalities and counties to give individuals the possibility to choose service provider within the elderly care, the disability support services, and the healthcare. /…/ Inviting external service providers to compete with their private enterprises in municipalities and counties will, in the opinion of the government, lead to improved quality and efficiency of these services. (prop. 2008/09:29: 18; my transl.)

The objective was to allow more private actors in the healthcare and thereby increase the number of health centres that patients could choose from. The reform was introduced in two steps. First, the Act on System of Choice (SFS 2008:962) was enacted. Accordingly, any provider of outpatient care that meets some pre-set criteria is authorised to offer their services within a regional system of choice (*valfrihetssystem*), for which the service provider will be reimbursed with public funds. Patients can pick any service provider that has been authorised anywhere in the whole country (1 ch. 1 § 2 sec. SFS 2008:962). In the second step, it became mandatory for regions to implement systems of choice in the primary care[53] (7 ch. 3 § 2-3 sec. SFS 2017:30). Prior, the regions could decide for themselves whether to implement systems of choice or not. Today, that is not an option.

The Healthcare Guarantee

For a very long time, the Swedish healthcare has been plagued by long waiting times (SOU 1958:15). In 2010, a healthcare guarantee (*vårdgaranti*) was enacted to guarantee that healthcare is provided within certain time limits[54] (prop. 2009/10:67). Since 2019, it is not necessarily a healthcare visit that is guaranteed, but a medical assessment (*medicinsk bedömning*). By focusing on *assessment*, the government wanted to emphasise the qualitative content compared to the more passive term *visit*.

In going from a visit-based guarantee to an assessment-based guarantee, the healthcare becomes more needs-based regarding the healthcare's means of communication. /…/ If appropriate, the retrieval of information, and in some cases even the medical examination, can be conducted remotely by way of some technical solution, and the

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[53] The obligation does not apply to inpatient care or other types of services not provided specifically within the primary care, although the healthcare authority is free to create systems of choice for other outpatient care services as well.

[54] Patients should be able to get in contact with the primary care on the same day as the contact is taken; receive a medical assessment from a primary care professional within 3 days; get to visit specialty care within 90 days after referral; and receive planned care within 90 days from the date when the decision was made. The healthcare guarantee does not apply when a patient seeks care outside of their home region. (6 ch. 1 § 1-4 ; 2 § 1 sec. 2 SFS 2017:80).

assessment of diagnosis and/or need of care can in a similar manner be communicated at a distance (prop. 2017/18:83: 30; my transl.).

Although the government emphasised that, in a near future, most people will probably continue to prefer physical visits as their first choice of health contact, the shift to an assessment-based guarantee nevertheless appears to be a conscious effort to bring attention to new ways of providing healthcare services where content is prioritised over location. This can, for instance, be by way of digital health contacts.

Problems with the Reforms

According to the Swedish Competition Authority (2007), a healthcare based on free choice would require a supply of healthcare services that is larger than the demand for those services. Otherwise, long waiting times will continue to be a problem. Also, for private healthcare providers to be profitable, their customer base needs to be large enough. The Swedish Competition Authority (2007) saw a risk for patients living in large but sparsely populated regions would lose out in systems of choice since it is hard for private actors to turn a profit in those regions. Largely, this concern has turned out to be justified (SOU 2019:42).

Burström et al. (2017) claim that the free choice of care reform might not have led to a more equal healthcare at all. The reform initially led to a 19% increase in the number of health centres. In recent years, however, the total number of health centres has even decreased somewhat. (SOU 2019:42) In urban areas with a lot of well-educated, high-income earners and few residents over the age of 70, the increase of new health centres has been larger compared to other areas (Swedish NAO 2014). In some urban regions, the number of health centres has increased faster than the population. In other more sparsely populated regions, the number of health centres has decreased, without a corresponding decline in the population. (Swedish Competition Authority 2014) In a survey conducted by Vårdanalys (2013), one third of the residents of Region Dalarna and Region Jämtland Härjedalen, respectively, claimed that they had not changed health centres simply because there were no alternatives to change to.

The total number of health contacts has increased since the reform, but not specifically in patient groups with the greatest needs. (SOU 2019:42) Fredriksson (2013) argues that in a choice-based health system, patients are expected to act rationally as customers *and* as citizens. However, what is rational for an individual customer (patient) might not be rational at all from the perspective of a voting, tax-paying citizen. Fredriksson (2013) claims that the current health system is customer-driven rather than citizen-driven. It has also been put into question whether competition from private enterprise leads to better quality. Vengberg et al. (2019) show that although healthcare providers

do indeed compete for sought-after skilled personnel, they are not that concerned about losing patients to competitors; new patients will always be waiting around the corner. Some even express relief over having fewer patients under their responsibility.

Regarding the healthcare guarantee, it has not succeeded in shortening the waiting times, although this is an area where online doctors have been more successful than their physical counterparts[55]. The healthcare guarantee has also been criticised for focusing too strictly on the time aspect and not enough on the possible benefits from treating some patient groups more urgently than others (Swedish NAO 2014). Also, since it is typically not possible to appeal healthcare decisions, the law offers no help to patients who have not received care within the legally binding time limits. Consequently, harsh criticism has been directed towards the Patient Act, which was enacted not least to strengthen the patient's legal standing (Burström et al. 2017; Vårdanalys 2017a). The act is to a considerable degree a case of parallel or even triple regulation, as some provisions reappear in the Health and Medical Service Act and/or the Patient Safety Act (SFS 2010:659) as well. This renders a fragmentised structure and unclearly expressed goals[56], which was pointed out already at the review stage in a quite acidic remark by the Council on Legislation:

> In essence, the act contains only a few novelties and consists mainly of a compilation of provisions that are currently already found in other acts /…/. The choice of legislative technique gives the act a fragmentised impression. Furthermore, it is difficult to understand the motives behind why implementation of double regulation has been deemed justified in some cases, while more or less comprehensive references [to other acts] have been proposed in other cases /…/. Considering the application problems and other inconveniences that double regulation from experience leads to, the Council on Legislation is of the opinion that the extent of double regulation here proposed is not motivated. A better option would have been to consider a combination of applicable provisions into a single act. (prop. 2013/14:106: 190-91; my transl)

Vårdanalys (2017a) has argued that this lack of legal clarity has even led to the *weakening* of the legal standing of patients. If the legal standing of patients has been strengthened, it is likely due to other factors than the Patient Act (Vårdanalys 2017a).

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[55] Generally, the northern regions with a lot of sparsely populated areas struggle more than the densely populated southern regions with large metropolitan areas to live up to the guarantee. Moreover, 94% of online doctors succeeded in providing timely medical assessments compared to 78% among physical healthcare providers. These statistics refer to the time period of January through October 2019 (SALAR 2020b)

[56] For instance, the Patient Act stipulates that healthcare must not be provided without the consent of the patient, and that a child's opinion must be respected in the healthcare. However, according to Vårdanalys (2017a), the law does not say *who* is responsible for fulfilling these requirements.

Online Doctors and the Econo-Legal

The free choice of care reform created what Glenngård and Anell (2017) have referred to as a quasi-market (Le Grand 1991). In fact, every regional council creates its own quasi-market with its own criteria for actors operating within that regional system of choice (Forssell and Norén 2018). Prices on quasi-markets are fixed. In the Swedish health system, prices are set by the healthcare authorities and service providers compete for patients based on the quality of services. In this section, I will begin with a brief account of how the Swedish healthcare is funded, followed by a description of the economic relations between Swedish online doctors and the healthcare authorities. This is followed by a presentation of the most prominent Swedish online doctor services and the companies behind these services. Finally, Swedish online doctors as a phenomenon are placed in the context of a global trend where healthcare services are incorporated into vertically integrated retail chains.

Funding of the Swedish Healthcare

Under the Swedish constitution[57] it is provided that the municipalities handle local and regional matters of public interest. Among the most important of these matters is the right to collect taxes (1 ch. 2 § SFS 2017:725). Residents of a municipality pay local taxes of which roughly two thirds go to the municipality and one third goes to the region wherein the municipality is located (SCB 2018). However, as articulated by Garpenby and Bäckman (2016: 891):

> Although formally independent, the regional authorities cannot be described as equal partners with central government, as the latter can always use its legislative power /…/. One effect of this system of fiscal decentralization and central government regulation has been a chronic deficit in the finances of the regional bodies.

The expansion of the Swedish healthcare during the second half of the 20th century was financed through a steady increase of the local tax outtake, in turn made possible by the post-war economic boom. In 1950, the average municipal income tax was 10%; since 1990, the average has constantly been above 30%. (Ekonomifakta 2019) The healthcare's share of Sweden's GDP has increased from around 3% in the 1960s to 11% in 2018, the fifth largest share in the OECD[58] (prop. 2016/17:43; OECD 2019b). The total revenue for all Swedish regions was €35.5 billion in 2018. Approximately

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[57] See 14 ch. 2 § of the Instrument of Government (RF 1974).

[58] The top four: U.S. (17%), Switzerland (12%), Germany (11%) and France (11%) (OECD 2019b).

70% came from local taxes, 20% from governmental subsidies and less than 4% from patient fees[59] (SALAR 2019c). Total regional expenses amounted to €34.7 billion[60], of which healthcare made up approximately 90%.

Economic Relations: Online Doctors – Healthcare Authorities

Healthcare providers are reimbursed by the contracting region. If a patient resides outside of the contracting region, the bill is forwarded to the patient's home region[61]. This is called reimbursement for extra-regional care (*utomlänsvård*), which is regulated in regional agreements that apply to all healthcare providers within systems of choice (SALAR 2018b). Extra-regional reimbursements are flat rates, dimensioned for emergency care or specialised care not offered by the home region, traditionally the typical types of extra-regional care (Lindgren 2019). However, the flat rates have not been dimensioned for digital health contacts, whose costs are considerably lower (SOU 2019:42). In 2016, the reimbursement per visit varied considerably between the regions. Region Jönköping County charged the highest amount (€223), making the region attractive to online doctors and many became subcontractors for health centres in the region[62]. When the popularity of online doctors increased, so did the extra-regional reimbursement costs, and other regions soon complained about this. This prompted SALAR to recommend a uniform and nationwide reimbursement level, which is currently set at approximately €47 for an online doctor's appointment[63] (SOU 2019:42). In effect, this has also increased the difference between reimbursements for digital and physical extra-regional care quite dramatically[64]. As of 2020, all regions comply with these new recommendations.

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[59] High-cost protection (*högkostnadsskydd*) is a statutory upper limit for the total amount of fees that patients have to pay during the course of one year after which healthcare becomes free of charge (17 ch. 6 § SFS 2017:30). Currently, the high-cost protection amounts to approximately €112 per person and year (SALAR 2020c).

[60] As a comparison, the Swedish government's expenses, all expenditure items included, was roughly €96.6 billion in 2018 (Regeringen 2019).

[61] However, the responsibility for the quality of the healthcare provided is always with the contracting region where the online doctor is authorised to conduct healthcare (SALAR 2018b).

[62] As it stands today, subcontractors are reimbursed in the exact same way as general contractors.

[63] During the course of a couple of years, SALAR (2019a) lowered the recommended reimbursement from €125 in January 2017, to €67 in May 2017, and then to €47 in June 2019. The initiative came from the member regions. This was seen as somewhat remarkable since the regions usually do not want any unnecessary central interference into their self-governance (SALAR 2019a).

[64] As of 2021, extra-regional reimbursements for a *physical* primary care appointment with a physician range from €171 to €224.

With many different healthcare providers and subcontractors, it can be difficult to understand who is responsible for providing the service and who is responsible for the cost. The patient's home region (the payer) has no direct contact with the patient, the contracting region, the general contractor, or the subcontractor when a digital health contact is provided as extra-regional care. Figure 5 illustrates this detour of sorts.
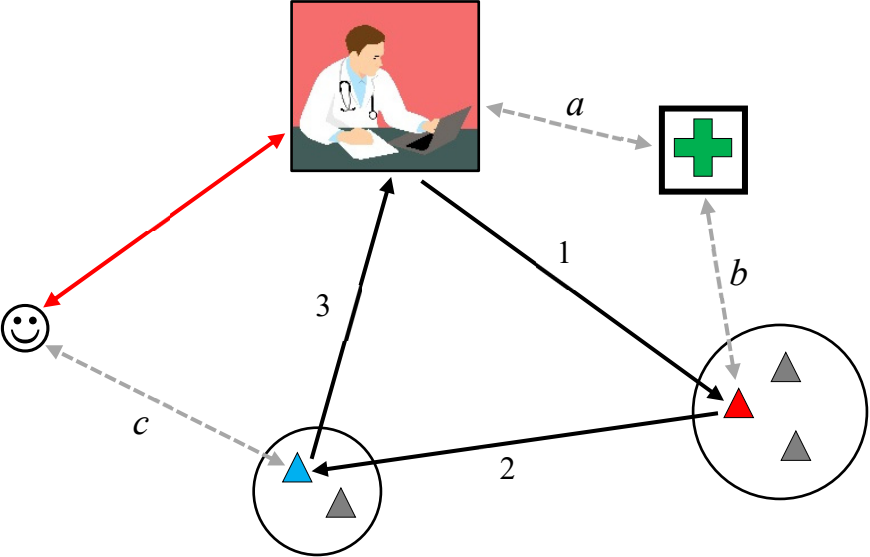
Figure 5: Path of extra-regional reimbursement for online doctor consultation.

The dotted double-headed arrows *a* to *c* represent relationships between different healthcare actors. The solid arrows 1 to 3 represent the path of the reimbursement for the service. The red double-headed arrow represents a digital health contact between a smiling patient and a doctor being busy in front of his computer. The doctor's employer is an online doctor company who acts as a subcontractor to fictitious local health centre, The Green Cross (*a*). In this hypothetical example, The Green Cross has been authorised by Region Jönköping County (red triangle) to conduct healthcare within Jönköping's system of choice (*b*). The online doctor therefore sends the bill to Region Jönköping County (1). Region Jönköping County is part of the Linköping coordination region but the smiling patient lives in Stockholm (blue triangle), which is part of the Stockholm coordination region (*c*). Thus, the digital health contact is a case of extra-regional care and Region Jönköping County forwards the bill to the patient's home region (2). Lastly, Region Stockholm reimburses the online doctor (3). The smiling patient, meanwhile, is probably unaware of this whole procedure.

Dodging the Patient Fee

As aforementioned, the current Swedish health system can be described as a type of quasi-market (Glenngård and Anell 2017). A basic principle of quasi-markets is fixed prices. In Sweden, essentially all patients between 18 and 85 years old are charged a patient fee when they visit the primary care. It is these patient fees that are fixed. For the healthcare providers, the regionally set patient fees are mandatory – they *must* charge the fees – and currently range from €10 to €30 for a doctor's appointment. According to SALAR (2018a), the size of the patient fee plays a more significant role for digital health contacts than it does for physical health contacts. This is not least true for patients who are normally healthy but who have fallen temporarily ill. In a survey reported by Vårdanalys (2020) it was shown that the respondents preferred physical healthcare services and were willing to pay more for them than for online doctor consultations[65]. To compete and be able to turn a profit, online doctors have therefore had to figure out other ways to make digital health contacts more attractive to patients. Here, the patient fee is key. Indeed, patient fees are fixed, but they are only fixed *regionally* within each system of choice.

When digital health contacts are being reimbursed as extra-regional care, the patient fee gets subtracted from the total reimbursement amount, and the patient's home region covers the remaining part. The smaller the patient fee, the higher the amount paid by the home region. Before 2017, the patient fee was around €25 in Region Jönköping County and, accordingly, this was the patient fee charged by most online doctors since they were based in Jönköping. However, in 2017, Region Sörmland became the first region to abolish patient fees in the primary care. For online doctors who had seen their revenue reduced thanks to SALAR's new recommendations, Sörmland suddenly emerged as an opportunity. Said and done, the online doctors relocated to Region Sörmland. Authorised to operate within Sörmland's system of choice, they could offer their services, free-of-charge, to patients all over Sweden while receiving full reimbursements (SALAR 2018b). Of course, being able to offer healthcare "for free" while being reimbursed in full is good for business but more problematic from a fiscal perspective. So, SALAR (2018a) decided to recommend a minimum patient fee for all types of digital health contacts. Since 2020, all regions, including Sörmland, charge this "digital patient fee", which currently stands at €10. All

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[65] It was also shown that long waiting times have a negative effect on the willingness to pay for healthcare. Still, the respondents preferred physical healthcare services even though one of the most obvious advantages of online doctor services is shorter waiting times.

regions and municipalities are members of the Swedish Association of Local Authorities and Regions (SALAR)[66].

However, due to a loophole in Sörmland's regulations, online doctors can refrain from charging patient fees for digital health contacts other than those that are conducted through "moving images and sound", i.e., digital health contacts conducted via video. As a direct result, most online doctors have begun to offer text-based health contacts instead of video meetings as their default option. In this way, they can continue to offer healthcare free-of charge while being reimbursed in full[67].

Listing: A Parallel System for Getting Paid

A peculiar feature of the Swedish healthcare is the act of "listing" (*lista sig*). The term is a remnant from the family doctor reform and the requirement for family doctors to keep records (lists) over their patients (SOU 2019:42). To list oneself means to choose which primary care provider one wants to visit when seeking care. Listing has not been legally defined and healthcare providers do not have any additional obligations towards listed patients compared to unlisted patients (SOU 2019:42). Primarily, listing serves the purpose of facilitating the allocation of resources to the right healthcare provider. In a capitation model, the most common compensation model in the Swedish primary care, reimbursements follow the patients regardless of where they are listed (7 ch. 3 § 2 sec. SFS 2017:30). Healthcare providers cannot refuse to put someone on their list. At the same time, unlisted persons will most likely be asked to list themselves before being accepted as patients[68]. For the patient, on the other hand, there are no economic incentives or other benefits associated with being listed[69].

It is only possible to be listed with a physical healthcare provider. Thus, the online doctor companies have expanded on the physical healthcare market through establishing new health centres or acquiring existing ones (Cederberg 2019, 2020c, 2020a). This has upset other private physical healthcare providers, who argue that they

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[66] *Sveriges kommuner och regioner (SKR)*. SALAR is a politically governed association. It is an interest organization and, at the same time, Sweden's largest employer organization.

[67] It is unclear if patient fees are charged for video consultations as well. In January 2021, I asked the customer support of Kry, Doktor.se and Min Doktor whether they charge patient fees for video meetings. Kry responded that they did while Doktor.se and Min Doktor did not.

[68] Questions have been raised whether this procedure is compatible with Swedish law (SOU 2019:42); it is hard to know, since it is not possible to appeal a healthcare provider's decision not to receive a patient who refuses to list herself with the particular healthcare provider.

[69] One exception is Region Västra Götaland where patients are charged a higher fee for so called infidelity visits. The share of infidelity visits varies a lot between the regions, from less than 3% in Region Dalarna to more than 20% in Region Stockholm. Infidelity visits are usually more common among private service providers. (SOU 2019:42)

have lost listed patients who unknowingly have been relisted with an online doctor. While online doctors are not able to offer services to listed patients free-of-charge, they will be eligible for capitation and other forms of reimbursements that follow with having listed patients.

As an illustration of how economic incentives shape the Swedish healthcare organization, listing can be compared to the obligation to provide patients with a permanent health contact, i.e., a healthcare professional who serves as the patient's main contact with the healthcare. Unlike listing, the obligation to provide patients with the possibility to choose a permanent health contact is stipulated by legal provisions (6 ch. 1-4 §§ SFS 2014:821; 7 ch. 3 § SFS 2017:30). But while there are economic incentives for applying listing, there are no such incentives associated with the statutory permanent health contact. All patients are effectively listed somewhere but, in 2016, only 39% of all patients had a permanent health contact[70].

Three Major Swedish Online Doctor Companies

In 2019, three of the four most downloaded and most consulted online doctor services in Europe were Swedish (Darrah 2019). London-based Babylon Health started in 2013 and has been the leading European online doctor service ever since[71]. Besides dominating the British market, Babylon Health is expanding in Africa, North America, and Asia. The Swedish online doctor companies, which are all currently in an expanding phase, are not far behind, though. We will now have a look at the three online doctor companies that are dominating the Swedish market.

Kry

Kry was founded in 2014 and accounted for 47% of all Swedish online doctor visits in 2019 (Cederberg 2020b). According to Darrah (2019), Kry is the most downloaded online doctor app and the second most consulted online doctor service in Europe. As a healthcare provider, Kry is based in Nyköping, Region Sörmland. Kry promotes their video meetings with nurses, physicians, and psychologists as free-of-charge. The venture capital firms Index Ventures and Creandum are the biggest minority shareholders in Kry International AB (Karlsson 2020c). Kry has attempted to break into other European markets for some time and has seen some success on the French, British, and German markets where the service goes by the name Livi. Furthermore, Kry has entered partnerships with the online pharmacy Meds, as well as with the

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[70] This was a drop from 42% before 2015 when the Patient Act entered into force.

[71] The Swedish investment company Kinnevik owns 16% of Babylon Health (Karlsson 2020c).

pharmacy chain Lloyds[72]. In some Lloyds stores, customers can visit "Kry rooms" and consult physicians for medical advice and prescription renewals (Lloyds Apotek 2020). In January 2020, Kry announced that they had raised €140 million in new capital to accelerate their growth on the European market[73] (Kry 2020). Furthermore, since 2019, Kry has successively expanded into the physical healthcare market as well and currently owns health centres in the regions of Skåne, Sörmland, Halland, Kronoberg, Stockholm, and Östergötland. Kry International AB reported a net turnover of €34.3 million in 2019, and a loss after financial items of €33.3 million (Allabolag.se 2020a). In the beginning of 2020, Kry was valued at €847.0 million (Karlsson 2020c).

Doktor.se

Doktor.se was founded in 2016 and accounted for 24% of all Swedish online doctor visits in 2019 (Cederberg 2020b). According to Darrah (2019), Doktor.se is the third most downloaded and the fourth most consulted online doctor app in Europe. As a healthcare provider, Doktor.se is based in Vingåker, Region Sörmland. Doktor.se offers digital health contacts free-of-charge, primarily with nurses who guide the patient further to physicians, medical specialists, psychologists, or physiotherapists if needed. The service uses chat, telephone, or video when meeting patients. Doktor.se is run by Doktorse Nordic AB, which owns health centres in the regions of Skåne, Stockholm, Sörmland, Uppsala, Västernorrland, and Västra Götaland. The largest minority shareholder is Oriola, a Finnish business corporation specializing in pharmaceuticals, healthcare, and welfare services on the Finnish and Swedish markets. Oriola is the sole owner of Kronans Droghandel Apotek AB (Kronans Apotek), the third largest pharmaceuticals retailer in Sweden and a partner of Doktor.se. In May 2020, Oriola was one of the leading investors in a venture round that raised €45.6 million for Doktor.se. The ambition is to expand in the field of physical healthcare and to break into international markets. (Karlsson 2020a) Doktorse Nordic AB reported a net turnover of €11.0 million in 2018, and a loss after financial items of €10.0 million (Allabolag.se 2020b). Doktor.se is valued at €161.0 million (Karlsson 2020a).

Min Doktor

Founded in 2013, Min Doktor is the oldest online doctor service in Sweden. The service accounted for 19% of all online doctor visits in Sweden in 2019 (Cederberg

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[72] Lloyds is run by Admenta Sweden AB, which is owned by McKesson Europe, which in turn is part of the McKesson Corporation, one of the largest companies in the U.S.

[73] The venture round was led by Teachers' Innovation Platform (TIP), the investment department of Canada's largest single-profession pension plan, Ontario Teachers' Pension Plan. TIP "focuses on late-stage venture and growth equity investments in companies that use technology to disrupt incumbents and create new sectors". (OTPP 2020)

2020b). According to Darrah (2019), Min Doktor is the fourth most downloaded and the third most consulted online doctor app in Europe. As a healthcare provider, Min Doktor is based in Nyköping, Region Sörmland and offers digital health contacts with physicians, midwives, psychologists, and physiotherapists free-of-charge[74]. The service uses chat, telephone, or video when communicating with patients. The company behind Min Doktor, MD International, initially received considerable financial backing from the venture capital firm EQT Ventures, which controls 17% of the company. With a holding of 43%, Apotek Hjärtat is the largest shareholder in MD International. Apotek Hjärtat is the second largest pharmaceuticals retailer in Sweden and wholly owned by the ICA Group[75]. MD International is also the owner of Minutkliniken, a chain of health centres located across Sweden. In the coming years, the ICA Group plans to open 12-15 digitally and physically integrated health centres yearly. The health centres will be located in close proximity to ICA supermarkets and Apotek Hjärtat pharmacies (Aftonbladet 2019). MD International intends to intensify its expansion and develop better services, e.g., for patients with chronical conditions. In November 2020, it was announced that the tech fund Ny Teknik[76] had acquired a position in the company, bringing €26.2 million with them in the process (Karlsson 2020b). MD International AB reported a net turnover of €17.8 million in 2019, and a loss after financial items of €18.6 million (Allabolag.se 2020c). Min Doktor is valued at €189.4 million (Karlsson 2020a).

"The future of healthcare is retail"

When looking at ownership structure and activities of the online doctor companies, there appears to be a tendency towards vertical integration[77]. This development is reminiscent of a current trend in the U.S. where so called retail clinics have become a burgeoning part of the health system. Online doctors serve an important role in this development (Nakagawa et al. 2018). Retail clinics are walk-in clinics that patients can visit without having to book an appointment. They are typically located in retail stores, supermarkets or pharmacies where patients can be treated for minor illnesses and get vaccinations and lab tests (KFF 2019). Retail clinics are typically open after office hours

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[74] Persons without a Swedish personal identity number are charged €52 for consultations with a nurse and €90 for consultations with a physician (Min Doktor 2020).

[75] ICA Group is the second largest retail company in the Nordic countries.

[76] Ny Teknik is managed by Swedbank Robur, a Swedish asset management firm.

[77] Here, vertical integration refers primarily to joint ownership of several links in a business chain, although the integration of businesses sometimes coincides with ambitions to vertically integrate different levels of care (primary, secondary, tertiary) in the same healthcare organization.

and charge less compared to conventional healthcare providers. Hence, they are becoming attractive options, not least among Americans with low income and who are enrolled in so called high-deductible health plans[78] or who have no health insurance at all. This development has prompted Perrin (2020) to proclaim that "the future of healthcare is retail". Interestingly, compared to online doctors, which are popular primarily among young Americans, retail clinics appear to attract in particular patients over the age of 50 (FAIR Health 2020)[79].

A Role Model: CVS Health

Serving here as an example, the CVS Health Corporation is one of the largest companies in the U.S. and in the forefront of vertically integrated healthcare (Fortune 2019). The CVS Health Corporation owns MinuteClinic, a chain of retail clinics that are typically located inside one of nearly 10,000 CVS Pharmacy stores. Using Teladoc's telehealth platform, MinuteClinic offers video-based consultations via a smartphone app[80]. Besides prescription and over-the-counter drugs, the CVS Pharmacies sell food, beverages, wellness products, cosmetics, and other fast-moving consumer goods – onsite as well as online at CVS.com. For $5 a month or $48 a year, CVS Pharmacy customers can enrol in a loyalty membership program and receive free home delivery of prescription drugs, access to a 24/7 pharmacy helpline, discount on CVS products and monthly rewards (PR Newswire 2019). CVS Health subsidiaries include CVS Caremark, a pharmacy benefit manager and mail order service[81], and CVS Specialty, a pharmacy service for people with chronic or complex medical conditions. In 2018, CVS Health acquired Aetna, a major health insurance company, an acquisition that cemented CVS Health as a vertically integrated giant on the insurance-based American healthcare market (Kish and Bhagat 2018). Although CVS Health is by no means unique, the company's strong focus on consumer-driven healthcare and retail clinics makes the company stand out in the American context (Figure 6).

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[78] A high-deductible health plan has relatively low premiums but the policy holder will in return have to pay more out-of-pocket when receiving healthcare (Caldwell 2019). "Retail clinics provide prices upfront for the uninsured. Average fees are 30-40% lower than a visit to a physician's office, and at least 80% lower than the [emergency room]" (Perrin 2020). According to Nord et al. (2019), patients visiting a retail clinic were charged $66-$89 per visit.

[79] These numbers are based on insurance claims from retail clinics; in other words, they do not tell us anything about the age among uninsured patients who consult online doctors or visit retail clinics.

[80] MinuteClinic employs nurse practitioners and physician assistants, but no doctors.

[81] PBMs are often contracted as third-parties by employers or health plans to optimise and contain drug expenditures of a health plan through negotiations with drug companies and through influencing the behavior of pharmacists, prescribing physicians and patients.

Figure 6: CVS vertical integration.

Enters Amazon

As more and more consumers choose to shop online, retail giants have been forced to think of new ways to fill the empty spaces in their stores. For instance, Walmart, the largest company in the world, are creating medical malls where customers can get primary care, vision tests, dental exams, X-rays, EKGs, and counselling at a price that Americans without a comprehensive health insurance can afford. (Time 2019) This

business opportunity, presenting itself on the health market, attracts a lot of attention, not only from big retail but recently also from Big Tech[82].

> Ultimately, health care is just too big for Google to ignore. The market is worth $3.5 trillion in the US alone, which is why tech companies like Microsoft, Amazon, and Apple are all piling in, hoping to become leaders in a new era of digital health care. (Vincent 2019)

Perhaps most talked about in this context so far is the creation of Haven Healthcare, a non-profit healthcare organization, founded by the largest online marketplace in the world, Amazon, together with the conglomerate Berkshire Hathaway and JPMorgan Chase, the largest bank in the U.S. The goal of Haven is to provide affordable physical, mobile and video-based healthcare of high quality for employees and "potentially, all Americans" (Haven 2018). When it became official that Amazon was entering the healthcare market, the stock of other health corporations plummeted[83] (Rapier 2018). However, CVS Health has since entered into a partnership with Haven (Minemyer 2019). Meanwhile, Apple has launched its subsidiary AC Wellness Network (Muoio 2018), Facebook has introduced its Preventive Health tool (Facebook 2019), Google is advancing their efforts in combining AI and electronic health records (Singer and Wakabayashi 2019), and Microsoft is focusing on cloud-based healthcare infrastructure (Kimmell 2019).

The Prospect of Vertical Integration in the Swedish Healthcare

As aforementioned, there appears to be a similar trend towards vertical integration in Sweden as well. For example, the ICA Group is developing a business strategy, where banking, supermarkets, a brand of health and wellness products, pharmacies, and physical and digital healthcare services are integrated (Figure 7). However, in Sweden, integration of healthcare and pharmacies is problematic. The Act on Sales of Medicinal Products provides that a Swedish license for pharmaceutical retailing cannot be issued to persons who are authorised to prescribe drugs (2 ch. 5 § 3 SFS 2009:366). Healthcare authorities cannot own and operate pharmacies since they both employ many prescribers and pay for most of the prescribed drugs. Here lies a potential conflict of

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[82] The term Big Tech usually refers to the largest companies within the information technology sector: Google, Apple, Facebook, Amazon, and Microsoft.

[83] This Amazon effect alludes to "amazonification", the process wherein Amazon transforms markets into something that is more like Amazon. For instance, "amazonification" of healthcare would entail that the patient's healthcare experience becomes more like shopping online on Amazon (Desjardins 2018). Since Amazon has the power and reputation required to enter new markets and "amazonify" them in full force, mere talk of Amazon entering a new market may affect pre-existing competitors in a negative way (Springborg 2018). Thus, the Amazon effect.

interest. Regarding private companies, the government has argued that no such conflict of interest exists since a license to prescribe drugs is tied to the individual prescriber, not to the company where the prescriber is employed. So, private companies are allowed to own and run pharmacies and health centres simultaneously, if the pharmacy does not influence what brand of drugs that is being prescribed at the health centre. (Swedish Medical Products Agency 2019)

Figure 7: ICA Group vertical integration.

However, the Swedish Medical Products Agency (2019)[84] has recommended the government to change the law so that companies that provide healthcare services will no longer be allowed to operate at the same time as a pharmaceutical retailer, or vice versa, that pharmacies will not be allowed to conduct healthcare. The agency also urges the government to consider whether arrangements where a parent company owns two sister companies, one being a pharmacy and the other being a health centre, should be permitted. Like the government in 2009, the Swedish Medical Products Agency (2019:

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[84] The Swedish Medical Products Agency's (*Läkemedelsverket*) mission is to ensure that patients and healthcare professionals have access to pharmaceuticals and medical devices that are safe and efficient (Swedish Medical Products Agency 2020).

3; my transl) considers the "unfortunate development in the form of vertical integration" to be a threat against a system based on healthcare needs and not on other, for instance, economic incentives. At present time, it is not clear whether the government intend to go forward with any of the agency's recommendations. If any of them become law, however, it might be difficult to pursue any strategy that builds on vertical integration, for instance, in a manner illustrated in Figure 7.

The Legal Architectonic: Concluding Remark

Of course, ethics, politics, and economy do not necessarily have to conflict with each other. Still, I believe that this chapter has made it evident that, not only are there frictions between these three dimensions, but also *within* each dimension. The freedom of choice, the dominating ideology in the Swedish healthcare during the last decades, is sometimes hard to reconcile with the principles of the ethical platform. Especially the needs principle, stating that those in most need of healthcare should be taken care of first, does not always go hand in hand with the right to choose freely. To enhance the freedom of choice, governments have launched reforms designed to make the healthcare as accessible as possible on a national level. Meanwhile, the responsibility for making this happen in practice, and not least the economic responsibility, lies heavily on the backs of the regions. This might be one reason for why the normative struggle between online doctors and healthcare authorities appears to take place mostly on the economic battlefield. That is, regional councils cannot change the law, so they rule instead by "economic decree". Online doctors then adjust accordingly to optimise their profit margins, which leads to new soft regulations, and so it goes on and on.

I will now leave the helicopter perspective and proceed to the methodology that serves as the basis for the empirical study in this project.

Methodology

The empirical study of this thesis was designed as a quantitative online survey, followed by a statistical modelling stage. I begin the chapter with a presentation of methods used for data collection, including a description of study participants, a discussion of sampling bias and weights, data management, and a presentation of the questionnaire. Then, I will account for how I dealt with missing data. The chapter ends with an introduction to PLS path modelling, which is the method that was applied at the statistical modelling stage.

Data Collection

Data were collected by way of an online survey consisting of items about perceptions of and willingness to use the Swedish online doctor service Kry. A standardised questionnaire was constructed using the EasyResearch online survey tool, developed by QuestBack[85]. Respondents were recruited by the survey panellist company Cint[86] who also handled the data collection. After conducting a small pilot study, revisions of the questionnaire were made. The survey was replicated after one year, partly to monitor the development of online doctors as a social phenomenon, but also because replication is a good way to validate previous findings. The first full-scale survey was conducted in October 2016 and the second one in October 2017. It was not possible for panellists participating in the first survey to be invited to the second one.

Study Participants

Respondents had to be between 20 and 50 years old to be eligible for participation. Healthcare services are free for persons under 20 in most Swedish regions and by setting the lower age limit at 20, we targeted persons who have begun to take responsibility for

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[85] https://www.questback.com/uk/ 2021-03-06

[86] https://www.cint.com/ 2021-03-02

their contacts with the healthcare and their healthcare costs. Regarding the upper age limit, the extent of smartphone usage among Swedish citizens is relatively high for all age groups, but it is indeed lower among Swedes in the older age groups. (European Commission 2016) The upper limit was set to 50 years to avoid the recruitment of panellists with higher levels of smartphone skills than what would be expected for their age. Panellists who did not meet the age criterion were screened out in the recruitment process. Besides the age criterion, Cint were also instructed to draw a geographically spread-out sample with an even distribution between female and male participants.

Sampling Bias and Weights

When certain groups in the population are underrepresented in the study sample, sampling bias is introduced, and the generalizability of the results is threatened. Some degree of sampling bias is to be expected in any survey (Nulty 2008). It was expected that persons who were born outside of Sweden, and especially outside of the EU, would be underrepresented in the online survey. Panellists might, e.g., decline to participate or fail to complete the survey due to language issues. There is also the risk of systematic underrepresentation if Cint's panel does not accurately represent the demographics of Sweden. A higher probability for some groups to be included in a survey is a case of *self-selection bias*. This is not least a problem when samples are drawn from panels as participation is conditioned on panel membership. If the panel is not representative of the population, and the survey company does not adjust for this, there is an inherent risk of biased survey results. Conversations with QuestBack confirmed that no such adjustments had been made, thus indicating that self-selection bias might be an issue.

Also, if we have reason to believe that persons who have declined to participate in the survey would display a significantly different response pattern compared to the survey respondents, this might be an issue of *non-response bias*. This is a kind of bias that is difficult to assess as we know nothing about those who declined or their reasons for declining. However, by conducting a drop-off analysis of responses from respondents who either did not complete the survey (dropped off) or that displayed an obvious disinterest in the questions asked, it might be possible to gain information about whether non-response bias is an issue. To remedy problems of underrepresentation, weights were calculated based on the auxiliary variables age, sex, and birth country. These weights were used in all statistical calculations. Weights were calculated by comparing the observed frequency distribution of an auxiliary variable with its population distribution (Bethlehem 2009). Persons who were underrepresented received a weight that was larger than 1 and persons that were overrepresented received a weight that was smaller than 1. When weights are applied, each case in the sample is

weighted to compensate for sampling bias and to mimic the true population distribution.

Data Management and Ethical Considerations

The data files with responses were stored at QuestBack. Each respondent was given a unique respondent ID, which consisted of a series of random letters and numbers. Each respondent ID was connected to an email address of a panellist at Cint, which neither QuestBack nor the researcher had access to. Cint could see which survey a panellist had participated in but they could not connect specific responses to an identifiable panellist. When the survey was completed, the respondent IDs were erased from the files, both at QuestBack and at the researcher's workplace. Since it is not possible to identify any of the respondents, the data cannot be classified as personal data. A permit from the Swedish Ethical Review Authority has thus not been necessary.

The Questionnaire

The questionnaire consists of 82 items (Appendix 1).Background variables included age, sex, birth country, occupation, access to a smartphone, self-assessed health status, and stated confidence in the Swedish healthcare. A pilot study involving 100 respondents was conducted between the 12 and 18 September 2016 and included evaluation questions where the respondents were asked to reflect and comment on the survey. Exploratory factor analysis (EFA) and preliminary statistical modelling were carried out and items performing poorly were eliminated.

The Likert scales

Of the 82 questionnaire items, 71 are five-point Likert items, forming eight Likert scales. Neutral middle alternatives are sometimes treated as non-responses and are excluded based on the view that they do not contribute with any quantitative information. Alternatively, scales with an even number of points may be applied to force respondents to have an opinion. However, it is debatable whether these two strategies are fruitful. For instance, O'Muircheartaigh et al. (2001: 1) conclude that offering a middle alternative reduces the random measurement error and increases reliability while not negatively affecting the validity of measurements. Krosnick and Presser (2010) found that omitting the middle alternative led respondents to randomly select one of the scale points closest to where a midpoint would appear, suggesting that offering midpoints is desirable. Also, scales without a neutral category are strictly speaking not equidistant, which is problematic in analyses where interval or equidistant

ordinal scales are required (Hair et al. 2018)[87]. Also, a neutral or divided attitude is not equal to not having an opinion. Thus, it was decided that midpoints should be included in further analyses. Also, a "Do not know/No opinion" option was added for genuinely indifferent or incognizant respondents while, at the same time, it was not possible to skip items (Figure 8).

Do not agree at all				Agree completely	Do not know/No opinion
1	2	3	4	5	
☐	☐	☐	☐	☐	☐

Figure 8: Design of Likert items

Layout

The items were presented in twenty sections. While the order of the sections was fixed, the item order within each section was randomised for each respondent. The respondents were introduced to the topic of the survey through a shortened version of one of Kry's promotional videos (length: 45 seconds). Screen-dumps from within the Kry app were used to create a feeling of "being there", not least for respondents who had never used a similar service. The design of the online questionnaire, including the alternating between survey items and images, intended to create an environment reminiscent of the experience that patients get when using the Kry app. While constructing the survey, the questionnaire was repeatedly tested on actual smartphones to optimise the settings for smartphone view. Another aim of utilizing the strategy with screen-dumps was to mimic the way that Kry communicates with their users.

Survey Items: The Privacy Calculus

The privacy calculus is measured by four items representing *risk beliefs* (concerns and perceived risk), four items representing *confidence and enticement beliefs* (trust and personal interest), and two items representing *willingness to act* (will to consult and provide personal information to an online doctor). These items were inspired by Dinev and Hart (2006). In addition, two items represent *regulation* (law and industry self-regulation), inspired by Xu et al. (2010). The privacy calculus is measured twice: first, at the beginning of the survey, focusing on health apps in general; and second, at the

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[87] Likert scales are often treated as equidistant ordinal scales. That is, although it is not possible to claim that the distance is the same between each level of our ordinal Likert scale, it is close enough in order for us to treat the scale as if it was interval scales in the statistical model.

end of the survey, focusing specifically on Kry. This allows for comparisons of attitudes towards Kry and online doctors in general.

Survey Items: Perceived Justice

Items measuring perceived justice were constructed based on the justice rules as formulated by Colquitt and Rodell (2015). Accordingly, the Likert scale procedural justice is measured by items PROC_1-8 (Ethics and Regulations section). These items correspond to the justice rules *consistency*, *bias suppression*, *accuracy*, *correctability*, *representativeness*, and *ethicality* and focus on perceptions of Kry as a fair and ethical service, based on sound values, and whether the service is properly regulated. The Likert scale interpersonal justice is measured by items INTP_1-8 (Personal Treatment section). These items correspond to the justice rules *respect* and *propriety* and focus on perceptions of Kry as polite and respectful service, and whether there is a risk of experiencing the service as disrespectful or prejudiced. The Likert scale informational justice is measured by items INFO_1-7 (Information and Communication section). These items correspond to the justice rules *truthfulness* and *justification* and focus on perceptions of the information provided by Kry as comprehensive, relevant, and easy to understand. Finally, the Likert scale distributive justice is represented by two sections in the questionnaire. The first section, Target Groups, is measured by items EQL_1-6, representing the justice rule *equality*. These items focus on whether Kry is perceived as an accessible service or if it excludes some groups of patients from using it. The second section, Advantages and Benefits, is measured by items EQT_1-6, representing the justice rule *equity*[88]. These items focus on whether respondents perceive Kry as worth the time and money required to use the service.

Survey Items: Information Control

The section Control over Personal Data in the questionnaire represents the justice rules *process control* and *decision control*, which are measured by items CTRL_1-5. Here, this Likert scale is referred to as *information control*. In the literature, these justice rules are associated with procedural justice (Colquitt and Rodell 2015). However, the pilot study revealed a lack of correlation between the CTRL items and other procedural justice items. Rather than discarding them and potentially lose some valuable insights, the CTRL items were instead used to create a separate scale measuring information control,

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[88] The pilot study revealed that the distributive justice construct, although being an important predictor for the willingness to use Kry, displayed low factor loadings and poor discriminant validity. This could be the result of the items not being operationalised well enough. It could also be the result of the distributive justice dimension not being as clearly theoretically defined as the other three dimensions. Equality and equity, as worded in the surveys, possess quite different meanings. This possible dual character of distributive justice must be further investigated.

specifically. The five CTRL items are about perceptions of being in control over one's personal information disclosed when using Kry and the power to influence how that information is used.

Survey Items: Discrimination Grounds

Seven items represent the discrimination grounds under Swedish law (SFS 2008:567): sex, transgender identity or expression, ethnicity, religion, disability, sexual orientation, and age, found under the Negative Discrimination section. These items, collectively referred to here as *discrimination*, were originally thought of as representing the justice rules consistency, bias suppression, and representativeness (Colquitt and Rodell 2015). As such, they are associated with the procedural justice dimension. However, the discrimination items correlated poorly with other procedural justice items. Instead of discarding them, they were used to form a distinct discrimination construct. Specifically, for each of these items, the respondents are asked to rate on a scale to what extent they agree that some users of Kry might feel discriminated because of any of the seven grounds mentioned above.

Survey Items: Knowledge and Use of Kry

The questionnaire was concluded with three items about prior knowledge, prior use, and future use of Kry as well as a free text option for additional comments.

Missing Data Management

Ideally, researchers should always work with complete datasets while, in reality, researchers will have to deal with incomplete data more often than not. A few missing values may be of little concern while higher rates present more challenges. This is especially the case if the missing data mechanism is not truly random. For instance, missing data might be a consequence of the researcher's choice of method for data collection. If large amounts of data must be discarded due to incompleteness, this will necessarily lead to loss in statistical power. It is therefore essential to approach missing data economically, i.e., to not discard more data than necessary. Accordingly, a missing data strategy has been developed (Appendix 2).

Missing data are often referred to as either system missing or user missing. When values are literary absent from the data file, they are referred to as *system missing*. In most situations, especially when participation is anonymous, there is nothing the researcher can do to find out the reason behind a system missing value. When values are present in the dataset but excluded by the researcher for some reason, they are referred to as

user missing data. If respondents are given the option to respond, "I don't know" or "I have no opinion", those responses are sometimes treated as user missing since they are not possible to rank higher or lower than answers that *do* express an opinion. Importantly, this does not mean that user missing values are irrelevant. On the contrary, a lot of "don't know" answers might indicate unexpected problems with the survey that need to be investigated. Also, not having an opinion is not the same as being ambivalent or having a neutral attitude towards something.

Missing Data Mechanisms

Before deciding on how to deal with missing values, one needs to assess what type of missingness one is dealing with. This has implications for what kind of remedies that are available. In accordance with the classification system introduced by Rubin (1976) and further developed by R. J. A. Little and Rubin (2002), the mechanisms behind missing data are classified as being either *missing completely at random (MCAR)*, *missing at random (MAR)*, or *missing not at random (MNAR)*. Data are MCAR when the probability of missing data on a variable X is unrelated to other measured variables and to the values of X itself; in other words, missingness is completely unsystematic (Baraldi and Enders 2010). MCAR is considered to be a special case of MAR, which is the missingness assumed by most missing data methods (Cameron and Trivedi 2005). Data are MAR if the missingness is related to other measured variables in the analysis model, but not to the underlying values of the incomplete variable itself [89]. According to Jamshidian and Yuan (2013), both MCAR and MAR are often referred to as ignorable missingness. When data are MNAR, the missing data mechanism is non-ignorable, which means that a case's absence on a variable depends on the variable itself (Kline 2015). For instance, if respondents refrain from responding to questions on their current job situation out of shame over being unemployed, this is an example of MNAR.

In general, testing for MCAR is the first step of an analysis of incomplete data. Testing the MCAR assumption is possible by conducting Little's MCAR test (R. J. A. Little and Rubin 2002). For the MCAR assumption to hold, Little's MCAR test should not be significantly different from zero. If MCAR can be established, several options are viable. However, if the MCAR assumption does not hold, the next question is whether data are MAR or MNAR. This is difficult since MAR and MNAR mechanisms depend

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[89] The word "random" might be confusing here since the MAR mechanism is not really random at all (Baraldi and Enders 2010).

on unobserved data[90]. Furthermore, Baraldi and Enders (2010) point out that missing data mechanisms are not characteristics of an entire dataset, but assumptions that apply to specific analyses. "Consequently, the same dataset may produce analyses that are MCAR, MAR, or MNAR depending on which variables are included in the analysis" (Baraldi and Enders 2010: 8).

Dealing with Missing Data

PLS-PM will be applied in the subsequent data analysis. However, the PLS algorithm cannot handle missing data and must receive some input concerning what to do when encountering a missing value in the data file. The SmartPLS software used for data analysis offers three different missing data approaches: mean replacement, casewise deletion, and pairwise deletion. However, all three methods have been criticised. Garson (2016), for instance, discards all three of them. Not least the mean replacement method has received plenty of criticism (Kristensen and Eskildsen 2010; Graham et al. 1994; Graham et al. 1996; Enders 2001; Rigdon et al. 2011; Hair et al. 2016). As an alternative, *casewise deletion*, or *listwise deletion*, simply means that cases with missing values are excluded from further analysis altogether. One backside of this approach is obviously the potential loss of substantial amounts of data (Rigdon et al. 2011). With the third alternative, *pairwise deletion*, or *available-case analysis*, a case with a missing value is excluded only from analyses where that missing value is needed and included in all other analyses. It thus minimises the number of cases deleted in any given analysis. However, pairwise deletion can produce biased standard errors, which is problematic since bootstrapping, the procedure used in significance testing in PLS-PM settings, is based on standard errors (Enders and Bandalos 2001).

Multiple Imputation

Compared to the previously mentioned methods, imputation methods have the advantage of providing a complete dataset and can be justified when data are either MAR or MCAR (O'Loughlin and Coenders 2004). In *multiple imputation*, a model including both the complete and the incomplete data is defined. The missing values are then replaced (imputed) with estimated values based on these models. (Kline 2015) This process is replicated *m* number of times and each replication produces a different set of imputed values[91]. Jamil and Shaharanee (2015) have suggested that multiple

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[90] According to Baraldi and Enders (2010), verifying MAR or MNAR is even impossible. Jamshidian and Yuan (2013), although agreeing that MNAR tests are generally not possible, they claim that testing the MAR assumption can be done even if it is difficult.

[91] Multiple imputation is an extension of the expectation-maximization algorithm (EM), which iterates through a sequence of data estimations as if there were no missing values. Based on the observed data

imputation is the best choice for handling missing data in PLS path models[92]. When multiple imputation is performed on missing data that are assumed to be MAR, it is necessary to carefully control the imputation results. Properly imputed data will have similar distributions as observed data. The distributions do not need to be identical, but dramatic differences will need to be addressed. (Buuren 2015) Furthermore, the point with multiple imputation is lost if the procedure does not involve a sufficient number of imputations (*m*). There does not seem to be consensus in the literature on what is a "sufficient number", however. According to Cameron and Trivedi (2005), *m* does not necessarily have to be very high[93]. However, others have argued that 10 to 20 imputed datasets yield satisfactory results (Schafer and Graham 2002). Graham et al. (2007) recommend a minimum of 40 imputed datasets when 50% of the values are missing. T. D. Little (2013) goes even further when he states that 100 imputed datasets may be needed for large datasets in order for the results to have reasonable precision. White et al. (2011) have suggested that *m* should be greater than or equal to the percentage of missing observations[94].

Post-Processing: Artificial Neural Network

The term neural network applies to a loosely related family of models, descending from studies of brain functioning. Neural networks can modify their behaviour in response to their environment. They facilitate their experience from pervious examples when applied to new situations. (Jamil 2012) In the context of missing data, an artificial neural network (ANN) can be trained on data without missing values and then use this experience to impute missing values in another dataset (Wilmot and Shivananjappa 2003). Unlike linear regression, ANNs make minimal demands on model structure and assumptions, so relationships between independent and dependent variables do not have to be specified in advance. Instead, the ANN determines the form of the relationships during the learning process. Two variants of neural networks are available in SPSS Statistics: multilayer perceptron (MLP) and radial basis function (RBF).

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and the estimated parameters, EM finds the conditional expectations of the missing values, which are then substituted for the missing values. (Jamil and Shaharanee 2015)

[92] This finding was based on data with MCAR missingness. Nevertheless, my interpretation is that, since MCAR is a special case of MAR, the results should be applicable for MAR since it assumes that the missingness depends exclusively on the observed data and not on systematic non-randomness (Cameron and Trivedi 2005).

[93] "[With] as few as three imputations the efficiency can be as high as 97% with 10% missing data, and 86% with 50% missing data. With 10 or more imputations the relative efficiency exceeds 95% with 50% missing data" (Cameron and Trivedi 2005: 935).

[94] Larger models may require more imputations. "This is so because a large imputation model results in increased [standard errors] /…/. Therefore, for a large model, additional imputations are needed to offset the increased [standard errors]" (Dong and Peng 2013: 7).

Overall, RBFs are considered more robust when the goal is prediction, but not as good as MLP models for applications[95].

In Jamil (2012) and Jamil and Shaharanee (2015), a hybrid of multiple imputation and neural network post-processing for PLS-PM settings is introduced. After the mandatory data screening process and assessments of missing data mechanisms, the multiple imputation of missing data proceeds. Upon completion, all the imputation datasets (*m*) are used as input in the ANN, which will produce a complete dataset, based on the experience from training on the imputation datasets. The values of the neural network set are then entered into the empty slots where the missing values were supposed to have been. This imputed and post-processed set is then used as input in the PLS path model estimation. The backside of Jamil's approach is that it is cumbersome and can be time-consuming. The imputed and post-processed data will probably have to be entered into the original file manually since there is no guarantee that the neural network has replicated all the observed values correctly.

Statistical Modeling: PLS Path Modeling

As aforementioned, partial least squares path modelling (PLS-PM) is a type of multivariate analysis, i.e., a statistical method used to simultaneously analyse multiple dependent and independent variables[96] (Hair et al. 2017). Within social science, multivariate regression is used to analyse data obtained from surveys, observations, or secondary data. First-generation multivariate techniques include cluster analysis, factor analysis, analysis of variance (ANOVA), and logistic regression. SEM belongs to a second-generation multivariate techniques that allow researchers to incorporate unobservable variables, indirectly measured by observable indicator variables. (Hair et al. 2017)

CB-SEM and PLS-PM

PLS-SEM or PLS-PM is a variance-based method and is often compared to covariance-based SEM (CB-SEM). The variance refers to the variability of a data distribution and

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[95] Rossi et al. (2007) claim that while MLP networks perform better than RBF networks, they need about 200 times more computational time compared to an RBF network.

[96] In least squares regression, the sum of the squared distance between the observed and estimated values of the dependent variable assumes the smallest possible value (Pedace 2013). *Partial* least squares regression reduces the predictors to a smaller set of uncorrelated components and performs least squares regression on these components instead of on original data (Minitab 2019).

can, for instance, give us information about how far apart the observations are from their expected values. The covariance, on the other hand, is a measure of how two random variables will change together and is used to calculate the correlation between variables. Simply put, the covariance is the shared variance between two variables. The different properties of CB-SEM and PLS-PM make them differently well suited for different research objectives.

> CB-SEM is primarily used to confirm (or reject) theories (i.e., a set of systematic relationships between multiple variables that can be tested empirically). It does this by determining how well a proposed theoretical model can estimate the covariance matrix for a sample dataset. In contrast, PLS-SEM is primarily used to develop theories in exploratory research. It does this by focusing on explaining the variance in the dependent variables when examining the model. (Hair et al. 2017: 4)

There is also a difference between CB-SEM and PLS-PM in terms of measurement philosophy. Within CB-SEM, the goal is to fit a theoretical model to a dataset, i.e., to confirm (or reject) the model based on observed data. From this perspective, good fit indicates that an accurate representation of an empirical reality. For proponents of PLS-PM, however, the theoretical model is a space where observable variables are projected to latent structures (S. Wold et al. 1986). These latent structures are not treated as "empirical discoveries" but rather as reflection of what is empirically out of reach. Model fit, a crucial quality criterion in evaluation of CB-SEM models, is thus of marginal interest in PLS-PM settings. "In fact there is always a large validity gap between the concept a researcher intends to measure and the concrete construct used to measure a particular concept" (Hair et al. 2017: 16).

For some time, a heated and sometimes infected debate has been going on between these two methodological schools (Rigdon et al. 2017). CB-SEM was introduced by Swedish statistician Karl Gustav Jöreskog in 1973 (Hair et al. 2017). Ever since, CB-SEM has had a big impact on many academic disciplines that draw heavily on statistics, not least through the success of the statistical software package LISREL, developed by Jöreskog (Jöreskog and Sörbom 2006). Herman Wold, Jöreskog's mentor, believed that the rigorous statistical assumptions of CB-SEM did not sit well with the kind of "soft" or "fuzzy" data of the social sciences (Dijkstra 2010). This inspired Wold to develop PLS regression as a basis for what he referred to as "soft models", as opposed to the "hard" or "heroic" models based on CB-SEM (H. Wold 1982; Apel and Wold 1982). However, Lohmöller (1989) has pointed out that "soft" in this context applies only to the distributional assumptions (PLS-PM is a distribution-free approach), not to the concepts, models, or estimation techniques. So, the two methods were developed by researchers who worked closely together, something that is sometimes hard to

understand when one follows the debates between the two camps. Proponents of PLS-PM, such as Jöreskog and Wold (1982), Chin (2010), and Hair et al. (2011), have "emphasized the method's prediction-orientation and capabilities to handle complex models, small sample sizes, and formatively specified constructs" (Rigdon et al. 2017: 6). Critics of PLS-PM, represented for instance by Rönkkö et al. (2016), Goodhue et al. (2012), and Rönkkö and Evermann (2013), claim that "PLS-SEM is not a (factor-based) latent variable method, producing biased and inconsistent parameter estimates" (Rigdon et al. 2017: 6).

Measuring Unobservable Variables

Measurement, the process of assigning numbers to a variable based on a set of rules, is naturally key in PLS-PM. For some variables, the rules for assigning numbers to them are straightforward and easy to follow. However, it becomes more difficult if we want to measure more abstract concepts, such as trust, satisfaction, or fairness. Incidentally, this kind of abstract concepts often happens to be the focus of interest for many social scientists. One way to approach abstract concepts could be to conduct qualitative interviews where interviewees are asked to elaborate on how they experience, e.g., fairness. Within quantitative research, on the other hand, a different approach may be to measure abstract concepts indirectly through a set of indicators that we, based on theory, believe are reflecting our abstract concept. Each indicator thus represents one specific aspect of the abstract concept. This is what is happening in PLS-PM. To illustrate, Hair et al. (2017) use the example of satisfaction after a restaurant visit. By measuring the guest's experience of the food, the speed of service, the knowledge level of the staff, the background music, the value compared to the price, etc., a researcher may gain deeper knowledge and more fully capture the different qualities of a restaurant visit compared to if restaurant satisfaction had been measured by a single variable.

Path Models

In PLS-PM, the researcher is interested in the structural relationships or paths between concepts, commonly referred to as constructs. Constructs are latent, unobservable variables that are not measured directly. Instead, they need to be measured indirectly through indicators, i.e., manifest variables that are observable and hence measurable. Therefore, a PLS path model consists of two sub-models: the structural model, represented by the constructs and the relationships between them, and the measurement model, represented by the relationships between the constructs and their indicators. Theory informs the structural model and is tested through empirical measurement in accordance with the measurement model.
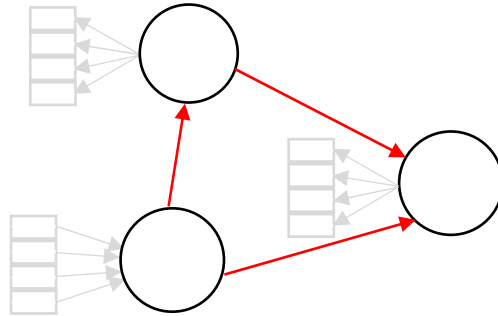
Figure 9: The structural model with constructs.

In Figure 9, the circle-shaped constructs, connected by the red arrows, symbolise a structural model. Figure 10 instead shows the measurement models where the red arrows connect each construct to its specific rectangle-shaped indicators. In PLS-PM, constructs are always visualised by circles while indicators are always visualised by rectangles. Before the structural model can be assessed and evaluated, the measurement models need to be properly established and critically examined.
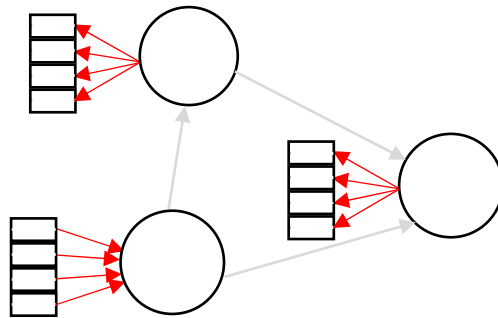
Figure 10: The measurement models with indicators.

Data Distribution Assumptions

PLS-PM is a nonparametric statistical method, which means that unlike, e.g., CB-SEM, it does not require data to be normally distributed (Figure 11). There are many different types of distribution but researchers applying PLS-PM only need to distinguish normal from non-normal distributions. Normal distributions are generally desirable, especially when working with CB-SEM. In contrast, PLS-PM basically makes no assumptions about data distributions; it is a distribution-free method. (Hair et al. 2017) Notwithstanding, extreme non-normality is problematic since it will inflate

standard errors[97], which are essential for the bootstrapping procedure used in PLS-PM to test whether relationships and effects are statistically significant. If standard errors are inflated, effects may be assessed as significant although they are not (Hair et al. 2011; Henseler et al. 2009). Therefore, before estimating a path model, the researcher needs to verify that data are at least not extremely non-normally distributed.
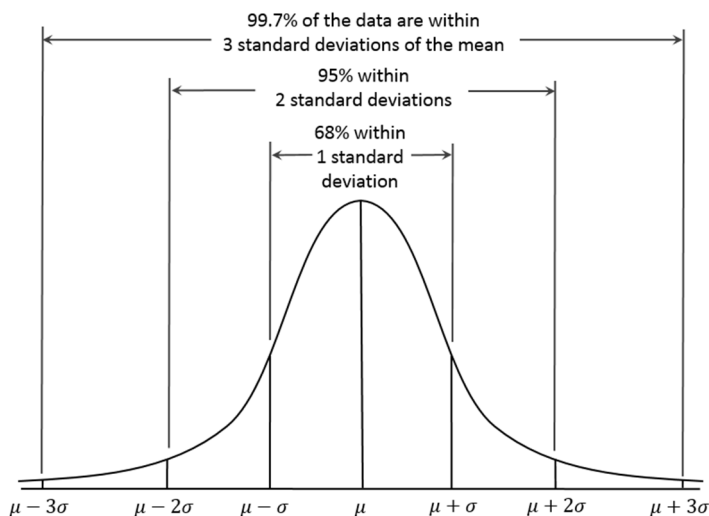
Figure 11: The normal distribution.

So, when does non-normality become extreme? The often-used Kolmogorov-Smirnov test and the Shapiro-Wilks test do not tell the researcher how far the data are from being normally distributed. Instead, Hair et al. (2017) argue that researchers should examine skewness and kurtosis. According to Goodhue et al. (2012), PLS-PM is fairly robust against small to moderate skew or kurtosis. Skewness assesses the extent to which a variable's distribution is symmetrical. If the distribution of responses for a variable stretches toward the left or right tail of the distribution, then the distribution is characterised as skewed (Figure 12).

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[97] Like the standard deviation (*SD*), the standard error (*SE*) is a measure of spread. The *SD* provides descriptive information about the variability of the population from which the sample was drawn. The *SE* is a statistic, used for inferential purposes, measuring the precision of the sample mean (or median). The *SE* of the sample mean (or median) depends on the *SD* as well as on the sample size. As the sample size increases, it becomes more "similar" to the population. This does not affect the *SD* significantly. The *SE*, however, becomes smaller since the extent of chance variation is reduced when the sample becomes larger. (Altman and Bland 2005)
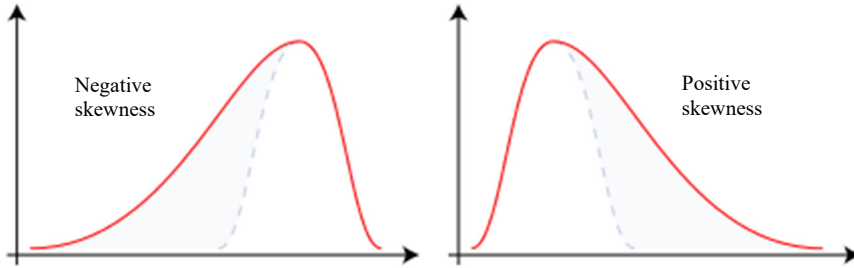
Figure 12: Negative and positive skewness.

On the other hand, the term positive kurtosis refers to a distribution that is too peaked, i.e., most of the responses are concentrated in the centre, while negative kurtosis refers to a distribution that is too flat, i.e., the responses are very evenly spread, relative to the normal distribution (Figure 13).
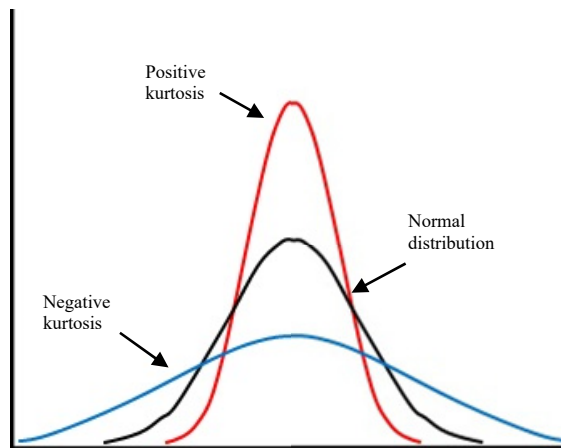
Figure 13: Kurtosis and the normal distribution.

The thresholds defined by Goodhue et al. (2012) are ±1.1 for moderate skewness and ± 1.6 for moderate kurtosis. Furthermore, the authors refer to ±1.8 and ±3.8, respectively, as indications of extreme skewness and kurtosis. Under these conditions, PLS-PM, like other tested techniques, will suffer "a substantial and statistically significant loss of power" (Goodhue et al. 2012: 990). However, Goodhue et al. (2012) examined two small samples (n=40, and n=90, respectively). In this study, where analyses were based on datasets with n>800 observations, distributions approaching extreme levels of skewness (±1.8) or kurtosis (±3.8) were treated as problematic.

Scales of Measurement

The PLS algorithm generally requires metric data measured on a ratio or interval scale. However, according to Hair et al. (2017: 27), "the method also works well with ordinal scales with equidistant data points (i.e., quasi-metric scales) and with binary coded data". Although an ordinal scale allows for rank order, it is normally not possible to claim that the distance between categories ranked 1st and 2nd is the same as, for instance, the distance between categories ranked 3rd and 4th. However, some ordinal scales can be referred to what Sarstedt and Mooi (2014) call quasi-metric scales. The Likert scale (Likert 1932), frequently used in survey questionnaires, is commonly treated as a quasi-metric scale and data points are treated as if they were equidistant. On a five-point Likert item, the distance between "do not agree at all" and "mostly do not agree" is hypothesised to be the same as the distance between "agree completely" and "mostly agree". This is also how the PLS algorithm treats data in its estimations.

Sample Size Requirements

Regarding minimum sample size, researchers building PLS path models can rely on guidelines provided by Cohen (1992) regarding statistical power for multiple regression models, provided that measurement models are of acceptable quality. Accordingly, when the maximum number of independent variables in the measurement and structural models is five, one would need 45 observations to achieve a statistical power of 80% for detecting weak but significant predictive power. (Hair et al. 2017) However, to detect significant indirect effects, e.g., when conducting mediation or moderation analyses, much larger sample sizes are usually required. For instance, according to Kenny (2015), a sample size of $n=316$ is needed in order to detect a strong moderator effect ($f^2=.025$) with 80% statistical power. Simply put, from a power perspective, more complex models require more data than less complex models.

Statistical Significance Testing: Bootstrapping

As previously mentioned, PLS-PM is a distribution-free approach. Hence, parametric significance tests commonly used in regression analysis cannot be applied. "Instead, the research has to derive a distribution from the data using bootstrapping, which is then used as a basis for significance testing" (Hair et al. 2017: 87). When bootstrapping is applied, a large number of samples are drawn with replacement (Davison and Hinkley 1997; Efron and Tibshirani 1986).

> Therefore, an observation for any bootstrap sample can be selected more than once or may not be selected at all for the sample. Each bootstrap sample has the same number of observations (often termed bootstrap cases) as the original sample. /.../ The number of bootstrap samples should be high but must at least be equal to the number of valid

observations in the dataset. As a rule, 5,000 bootstrap samples are recommended. (Hair et al. 2017: 149)

Thus, when 5,000 samples are used, 5,000 PLS path models are being estimated. Using the standard error derived from the bootstrap distribution, a Student's t test can be calculated to test whether the null hypothesis (H_0) can be rejected. This means that the test statistic follows a t distribution, which generally works well for sample sizes with more than 30 observations. The critical t value is 1.96 at a significance level of 5%. For instance, when bootstrapping produces t values above 1.96, estimated path coefficients can be assessed as significantly different from zero. (Hair et al. 2017) Probability (p) values are typically reported, although not essential in a PLS-PM context. Conditional on the H_0 being supported, the p value equals the probability of obtaining an empirical t value at least as extreme as the one observed when the same test is repeated multiple times[98]. The p value is the probability of erroneously assuming a significant effect when no effect is present. A significance level of 5% requires the p value to be less than .05 for the relationship under consideration to be regarded as statistically significant.

Reporting Confidence Intervals

In addition to t and p values, Hair et al. (2017) urge researchers to report the bootstrap confidence intervals[99]. The confidence interval provides additional information on the stability of a coefficient estimate and is the range within which the true population parameter will fall on repeated testing, assuming a certain level of confidence (e.g., 95%). The wider the confidence interval, the less stable the estimate. A confidence interval that does not contain 0 is usually interpreted as support for rejecting the H_0. Importantly, even if H_0 has been rejected, we must still decide whether the estimate is stable enough for our purposes. If a path coefficient above a certain threshold is important, a too wide CI perhaps does not provide an estimate of sufficient stability.

The Structural Model

In PLS path models, the relationships (the paths) between the constructs are based on theoretical assumptions. The sequence of the structural model is always from left to right. Constructs on the left generally serve as independent variables and constructs on

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[98] As an example, if the empirical t=2.50 and p<.05, this is interpreted as a probability of less than 5% of H_0 having been erroneously rejected.

[99] In PLS-PM, the researcher should calculate the type of confidence intervals referred to as bias-corrected and accelerated (BCa) bootstrap confidence intervals, introduced by Efron (1987). The BCa confidence intervals have been introduced as a remedy against the potential risk of coverage error, i.e., the situation where, e.g., a 95% CI is in fact a 90% CI. (Hair et al. 2017)

the right generally serve as dependent variables. The underlying logic is that the constructs on the left precedes or predicts the constructs on the right. Constructs may serve simultaneously as independent and dependent variables. When a construct serves only as an independent variable, it is referred to as an exogenous construct. When a construct serves only as dependent variable, or simultaneously as an independent and a dependent variable, it is referred to as an endogenous constructs (Figure 14). (Hair et al. 2017) Thus, while endogenous constructs may both predict and be predicted, exogenous constructs serve exclusively as predictors.

Exogenous construct *A*   Endogenous construct *B*   Endogenous construct *C*
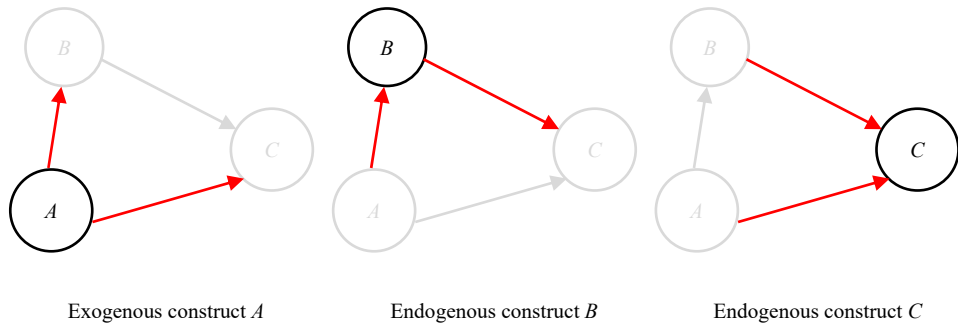
Figure 14: The exogenous and endogenous constructs.

Mediating Effects

When a third variable intervenes in the relationship between two related constructs, this may cause indirect or *mediating effects*. (Hair et al. 2017) In Figure 15, there is a direct effect between an exogenous construct (*A*) and an endogenous construct (*B*). But there is also a direct effect between *A* and a third mediator variable (*Md*), as well as between *Md* and *B*, causing an indirect, mediating effect between *A* and *B*.
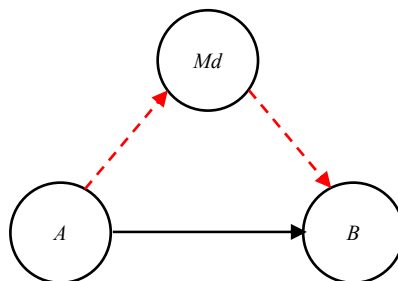
Figure 15: The mediating effect

When mediation is present, the relationship between *A* and *B* must change significantly when *Md* is omitted from the model, tested through the bootstrapping procedure. If the effect is indeed significant, its magnitude can be expressed by calculating the variance accounted for (VAF) by the mediator. Full mediation has been established when the mediator accounts for 80% or more of the variance in the endogenous construct. Partial mediation has been established when VAF is more than 20% but less than 80%. When the VAF is below 20%, this indicates that there is no mediating effect present in the model. (Hair et al. 2014)

The Measurement Models

The measurement models are also referred to as the outer models since they are positioned outside of the constructs. A distinction is made between reflective and formative measurement models. In reflective models, the relationships go from the construct to its indicators, as shown on the left side of Figure 16. In formative models the direction is reversed. Here the relationships go from the indicators to their construct, as shown on the right side of Figure 16. Reflective and formative measurement models are sometimes referred to as scales and indices, respectively.
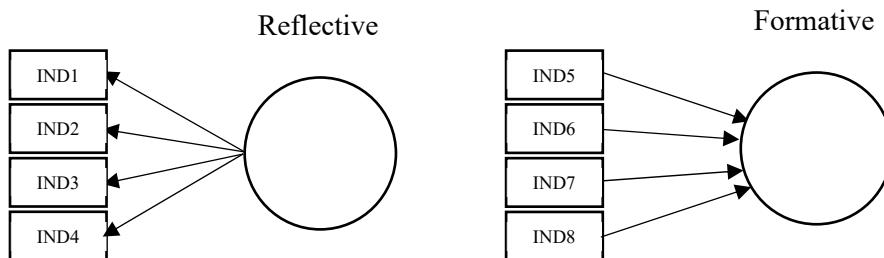
Figure 16: The reflective and formative measurement models with their indicators (IND).

The philosophy behind reflective measurement models is rooted in classical test theory, which states that "measures represent the effects (or manifestations) of an underlying construct" (Hair et al. 2017: 46). Survey results consist of two parts: a true score, and error. Gregory (2013) describes the true score as representing the true amount of the attribute one is trying to measure, while error represents the undesirable but unavoidable error of measurement. The smaller the error, the more reliable the instrument of measure. In reflective measurement models, it is assumed that the effects of the indicators are caused by the same underlying construct; the effects of the construct are *reflected* on its indicators. The indicators should therefore be highly correlated with each other. Furthermore, if the construct is sufficiently reliable, it

should be possible to change or leave out a poorly performing indicator without changing the meaning of the construct. In formative measurement models, however, removing an indicator changes the construct's meaning as each formative indicator is assumed to represent a unique aspect of the construct; the indicators *form* the construct. Also, while there is practically no limit for how many reflective indicators one can connect to the same construct, in formative measurement models, the average weight of each indicator will decline when more indicators are added to the model and new indicators will likely also be statistically non-significant. In this study, all measurement models are reflective, and in the following, I will therefore not account for evaluation of formative models.

Evaluating Reflective PLS Path Models

Assuming a value between 0 and 1, *internal consistency reliability* is a measure of how well an instrument is measuring what it is supposed to measure. While Cronbach's alpha (α) tends to underestimate reliability in PLS-SEM contexts, composite reliability (CR) tends to overestimate it. Hence, Dijkstra and Henseler's (2015) reliability coefficient (ρ_A), which Mourad and Valette-Florence (2016) refers to as the only consistent reliability measure for PLS construct scores. As a benchmark, reliability coefficients above .70 but below .90 are generally desirable[100]. *Convergent validity* is a measure of whether the indicators of a (reflective) construct share a high proportion of variance. Convergent validity is established through the assessment of the outer loadings of the indicators. Outer loadings can assume a value between 0 and 1 and represent the strength of the relationships between the underlying construct and its indicators (Figure 17). Outer loadings of .70 and above are desirable[101].

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[100] A threshold of .60 is usually accepted in exploratory research settings. Hair et al. (2017: 112) have argued that values above .90 "and definitely above .95" are not desirable.

[101] In general, the researcher should consider removing indicators with outer loadings between .40 and .70, but only if deleting the indicator improves internal consistency reliability or the AVE. Indicators with loadings below .40 should always be deleted.
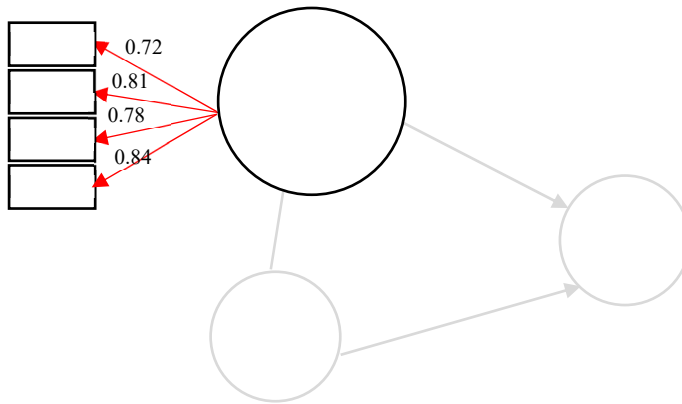
Figure 17: The outer loadings of reflective indicators.

The AVE is another measure of convergent validity, specifically, how much variance in the indicators that can be explained by the underlying construct. An AVE of .50 or more indicates that, on average, the underlying construct explains 50% or more of the variance in its indicators, while an AVE below .50 indicates that more variance is due to error than what can be explained by the construct. The AVE should therefore be .50 or higher[102]. *Discriminant validity* measures the uniqueness of a construct and the extent to which it captures phenomena not represented by other constructs in the model (Hair et al. 2017). Henseler et al. (2015) suggest that researchers assess the heterotrait-monotrait ratio (HTMT) as a test of discriminant validity. The HTMT can assume a value between 0 and 1 and, for constructs that are conceptually very similar, HTMT values higher than .90 indicate a lack of discriminant validity. When constructs are conceptually distinct, a threshold of .85 is instead suggested.[103] (Henseler et al. 2015) Indicators that correlate poorly with other indicators measuring the same construct may be eliminated. If removing indicators is not possible, the latent variable scores for problematic constructs can be calculated and used in place of the indicators that might be causing the lack of discriminant validity. (Hair et al. 2017)

Evaluating the Structural Model

Collinearity is the situation in which two independent variables are highly correlated, a situation that will inflate variances in the model which, in turn, may lead to erratic

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[102] For single-item constructs, the AVE will always be 1 since 100% of the indicator's variance is explained by the underlying construct. From an empirical perspective, single-item constructs and their related indicator are identical.

[103] The HTMT approach is an estimate of what the true correlation between two constructs would be if they were perfectly reliable, also referred to as disattenuated correlation.

results. (Hair et al. 2017) Collinearity is assessed through calculating the variance inflation factor (VIF). A VIF value of 5 or more indicates a potential collinearity problem (Hair et al. 2011). Relationships between the constructs in the structural model are assessed by estimating the *path coefficients*, i.e., the direct effects on endogenous constructs. These have standardised values between -1 and 1, where values close to 1 or -1 represent a strong positive or negative relationship, respectively[104]. The significance of path coefficients is assessed through bootstrapping. For sample sizes up to about 1,000 observations, path coefficients above .20 are usually significant and those below .10 are usually not. (Hair et al. 2017) In order to assess the predictive power of the model, *coefficients of determination* (R^2) are assessed. R^2 is a measure of the variability in a dependent variable accounted for by the model. In the hypothetical model in Figure 18, the path coefficients display the relationships between three constructs. The strongest relationship is between constructs B and C (p_3=.80) while the weakest relationship is between constructs A and C (p_2=.20). The R^2 values of B and C are .25 and .60, respectively, implying that 25% of the variability of B and 60% of the variability of C is accounted for by the model.
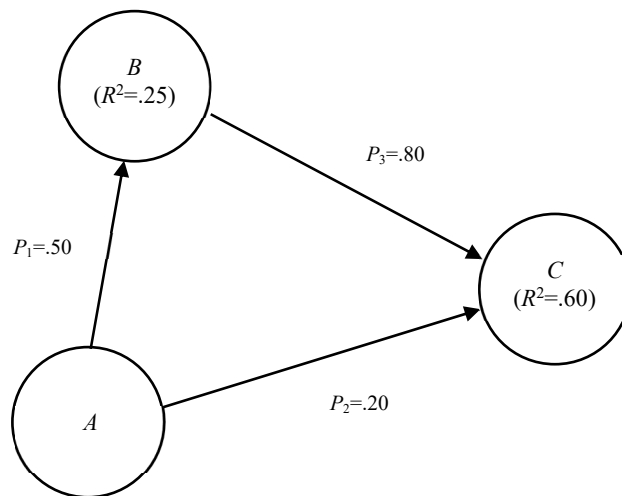
Figure 18: Path coefficients (p_i) and coefficients of determination (R^2).

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[104] Specifically, the path coefficients refer to how many standard deviations an endogenous construct will change with one standard deviation increase in the predicting variable. (Hair et al. 2017) A one-unit change in the exogenous construct changes the endogenous construct by the size of the path coefficient, everything else held constant.

Concerning sufficient R^2 levels, Hair et al. (2017: 199) states that it is difficult to provide rules of thumb "as this depends on the model complexity and the research discipline". Still, Hair et al. (2017) suggest as general thresholds that R^2 values of .75, .50, or .25, respectively, can be described as strong, moderate, or weak predictive power. The R^2 value will be affected by sample size and the *adjusted* R^2, which adjusts for large R^2 values due to many exogenous constructs in the model or large sample size, should therefore be reported when comparing PLS-PM results from different samples. (Hair et al. 2017) Furthermore, to assess the predictive power of exogenous constructs, the *direct effect size* (f^2) must also be calculated. The f^2 value is a within-sample measure of the change in an endogenous construct's R^2 value when an exogenous construct is omitted from the model. That is, how important is the omitted construct for predicting the endogenous construct (Figure 19)?
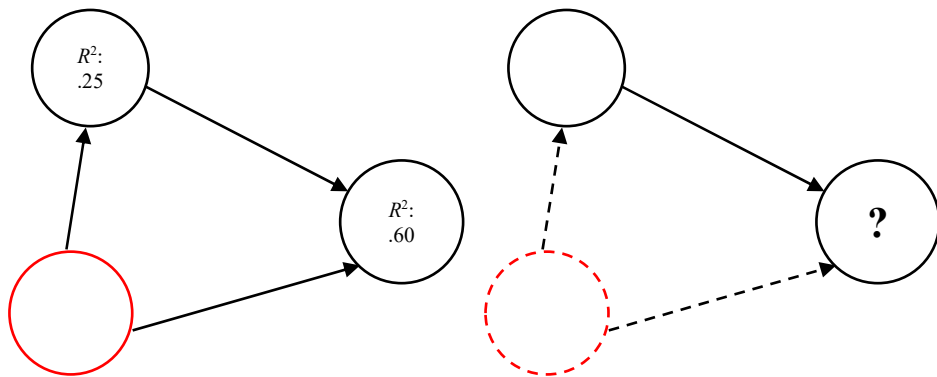
Figure 19: The effect size f^2 of the exogenous construct on the endogenous construct.

In addition to R^2, Stone-Geisser's Q^2 (Geisser 1974; Stone 1974) should be assessed. Q^2 mimics an out-of-sample assessment of the *predictive relevance* of a construct. A model exhibiting predictive relevance, accurately predicts data not used when estimating the model (Hair et al. 2017: 202). The Q^2 is obtained through *blindfolding*, where a specified proportion of data is left out from the PLS-PM analysis[105]. The remaining data are used to predict the omitted data as if they had been collected at a different occasion. Q^2 values larger than zero indicate predictive, out-of-sample

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[105] Omission distances (*D*) between 5 to 10 should be used in blindfolding i.e., every 5th to 10th data point of the endogenous construct's indicators should be omitted. The number of observations used in the model estimation divided by *D* cannot be an integer, or the same set of observations would be repeatedly omitted from the analysis. (Apel and Wold 1982; Hair et al. 2012)

relevance[106]. Furthermore, Q^2 values should be close to the R^2 values for a model to display good predictive relevance.

If predictive relevance has been established, the *predictive impact* of exogenous constructs on endogenous constructs can be assessed by manually calculating the effect size (q^2), i.e., the relative impact of Q^2. (Hair et al. 2017: 207) So, the q^2 effect size is to Q^2 what the f^2 effect size is to R^2. The R^2 and f^2 are calculated within-sample – the Q^2 and q^2 are calculated on a holdout sample. Following guidelines formulated by Cohen (1988), f^2 and q^2 values of .02, .15, and .35 represent small, medium, and large effects, respectively. However, effects of at least .15 are usually desired.

Importance-Performance Map Analysis (IPMA)

PLS-PM results can be visualised through an importance-performance map analysis (IPMA). In an IPMA, a construct's total effects (importance) on a target variable are contrasted with the average latent variable score (performance) of the construct. (Hair et al. 2017) The main purpose is to identify constructs that are perceived as important but whose performance leave room for improvement. IPMA was conducted in SmartPLS and the standardised results were used to plot diagrams as the one shown in Figure 20. In the IPMA diagram, the intersection of the means on the *x* and *y* axes are used to create a four-field where the position of a construct depends on the importance and performance of the construct in relation to the target variable. Constructs positioned to the upper left display high average latent variable scores but are not important in shaping the target variable. Constructs to the upper right are performing well *and* impact the shaping of the target variable. Constructs to the bottom right are important but perform poorly. These are often the constructs of most interest since improving them might be the most rewarding. Constructs to the bottom left perform poorly but are not important for shaping the target variable. Indicators of the constructs in a IPMA must point in the same direction. Thus, negatively worded indicators must be recoded before being used in an IPMA.

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[106] The Q^2 can be calculated through the *cross-validated redundancy* approach, where blindfolding builds on estimates of the structural model and the measurement models. In the *cross-validated communality* approach, only construct scores are estimated to predict omitted data points. Hair et al. (2017) recommend the use of the cross-validated redundancy approach in PLS path models.
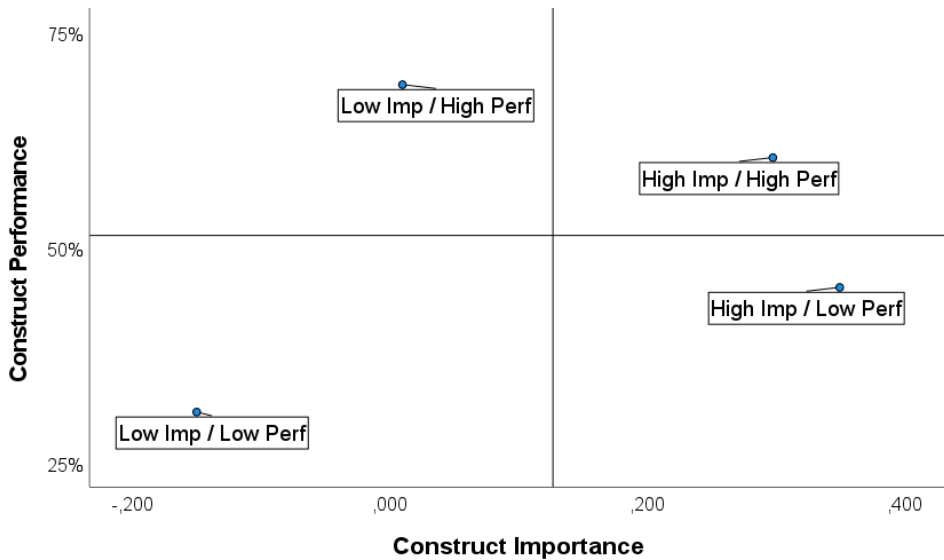
Figure 20: Importance-Performance Map Analysis (IPMA)

Limitations with PLS Path Modeling

PLS-PM cannot be applied when structural models contain causal loops or circular relationships between the latent variables (Figure 21). Another limitation is the lack of a global goodness-of-fit measure, i.e., a measure that simultaneously assesses the goodness-of-fit of the structural model *and* the measurement models. The lack of a global goodness-of-fit measure thus limits the suitability of PLS-PM for theory testing and theory confirmation. In addition, the parameter estimates of PLS path models are not optimal regarding consistency, i.e., the property of a procedure where the outcome comes closer to the true value as the number of observations increases. Lack of consistency is often referred to as PLS-SEM bias, although Hair et al. (2017) claim that this is an unfair critique, referring to simulation studies conducted by Reinartz et al. (2009) and Astrachan et al. (2014). Also, although not consistent in the strictest sense, H. Wold (1982) claimed that PLS-SEM was "consistent at large", i.e., the method's estimates are indeed consistent as long as both the number of indicators as well as the number of observations are sufficiently large.
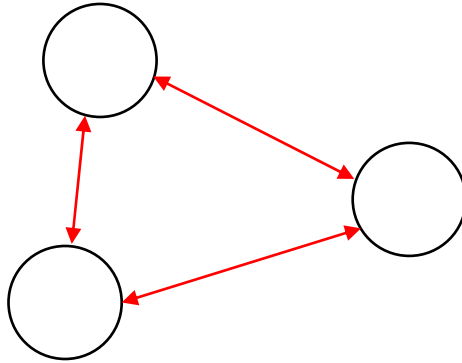
Figure 21: The circular relationship and causal loops.

Results

In the first section, descriptive statistics from the survey are reported, including a missing data report. Next, the Likert scales concerning prior knowledge, prior use, and willingness to use Kry are presented. The section ends with an analysis of excluded cases and a discussion on potential problems of self-selection and non-response bias. In the second section, results from PLS path modelling are presented. A specific sub-section is devoted to the results from an analysis of so-called extreme cases. The chapter ends with a summary of empirical findings.

See Appendix 3 for complete frequency tables over the survey responses.

Survey Results

Data collection for the first survey (Kry1) began on 6 October and ended on 18 October 2016. Of 1,816 contacted panellists, 1,722 (95%) responded to the survey. After removing 218 incomplete cases[107], 1,504 cases remained. The average time for completing Kry1 was 9 minutes. Ninety-four respondents engaging in straight-lining and 146 respondents answering "Do not know/No opinion" to 50% or more of the items were excluded[108], resulting in 1,264 cases included for further analysis.

Data collection for the second survey (Kry2) began on 16 October and ended on 25 October 2017. Of 1,291 contacted panellists, 1,216 (94%) responded to the survey. After removing 166 incomplete cases, 1,050 cases remained. The average time for completing Kry2 was 10 minutes. Thirty-two respondents engaging in straight-lining and 137 respondents answering "Do not know/No opinion" to 50% or more of the items were excluded, resulting in 882 cases included for further analysis. Data files of both surveys were retrieved from the EasyResearch server as SPSS files.

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[107] An incomplete case is a case where the respondent has not completed the survey.

[108] Straight-lining is a response pattern where the same response is marked for all or nearly all items (e.g., a straight line of 3s) and is usually indicative of a low level of interest with the respondent. The same is true for respondents who have no opinion regarding most questions.

Table 1: Sex

[SEX] I identify as:		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	Woman	627	49.6	445	50.5
	Man	626	49.5	433	49.1
	Other	8	.6	1	.1
	Do not want to state	3	.2	3	.3
	Total	1264	100.0	882	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .308

No statistically significant differences were observed for sex (Table 1). The median age in years was 33.0 in Kry1 and 34.5 in Kry2 (Table 2). Recoding of the age variable into three groups showed that the share of young respondents was larger in Kry1 while the "middle-aged" share was larger in Kry2. A Chi-Square test showed that these differences were statistically significant at the 95% confidence level (p=.004). More Kry1 than Kry2 respondents did not own a smartphone, a statistically significant difference at the 95% confidence level (p=.001). (Table 3).

Table 2: Age Groups

[AGE GROUPS]:		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	Young (20-28 yrs)	461	36.5	269	30.5
	Middle (29-39 yrs)	359	28.4	301	34.1
	Old (40-50 yrs)	444	35.1	312	35.4
	Total	1264	100.0	882	100,0

Kry1: 34.06 (mean); 33.00 (median).
Kry2: 34.82 (mean); 34.50 (median).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .004.

Table 3: Access to smartphone

[SMARTPHONE] Do you have a smartphone?		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	Yes	1221	96.6	872	98.9
	No	43	3.4	10	1.1
	Total	1264	100.0	882	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples:.001.

Table 4: Place of Birth

[COUNTRY] I was born:		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	In Sweden	1141	90.3	790	89.6
	In the EU/Nordic countries (excl. Sweden)	56	4.4	42	4.8
	Outside of the EU and the Nordic countries	63	5.0	47	5.3
	Do not want to state	4	.3	3	.3
	Total	1264	100.0	882	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .966

No statistically significant differences between the groups were observed for the variable place of birth (Table 4). However, as will be shown when the weights used in the survey are accounted for, persons born outside of Sweden, and especially persons born outside of the EU/The Nordic countries, were underrepresented in both surveys. Regarding stated occupation, there were som differences between the two surveys (Table 5). In Kry1, 64% of the respondents were either employed or ran their own business while, in Kry2, the corresponding percentage was 70%. At the same time, the share of pensioners was almost twice the size in Kry1 (although pensioners represented small percentages in both surveys). There was clearly a larger share of students in Kry1. A Chi-Square test revealed that these differences were statistically significant on the 95% confidence level ($p<.001$).

Table 5: Occupation

[OCCUPATION] My present occupation:		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	Employed	766	60.6	579	65.6
	Job-seeker	113	8.9	70	7.9
	Own business	46	3.6	36	4.1
	Pensioner	48	3.8	18	2.0
	Student	226	17.9	108	12.2
	Other occupation	59	4.7	62	7.0
	Do not want to state	6	.5	9	1.0
	Total	1264	100.0	882	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .000.

[HEALTH STATUS] How would you assess your general health status (1-7)?		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	Poor (1-4)	314	24.8	176	20.0
	Average (5-6)	737	58.3	533	60.4
	Very good (7)	213	16.9	173	19.6
	Total	1264	100.0	882	100.0

Kry1: 5.28 (mean); 6.00 (median); 1.317 (std. deviation).
Kry2: 5.41 (mean); 6.00 (median); 1.269 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .020

Concerning self-assessed health status, the Kry2 respondents assessed their health status somewhat higher than the Kry1 respondents (Table 6). More Kry1 respondents assessed their health status as poor while more Kry2 respondents assessed their health status as very good. A Chi-Square test revealed that these differences were statistically significant on the 95% confidence level (p=.020). No statistically significant differences between the surveys were observed concerning the respondents' confidence in the Swedish healthcare (Table 7).

Table 7: Confidence in the Healthcare

[CONFIDENCE] What level of confidence would you say that you have in the Swedish healthcare (1-7)?		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	Low (1-3)	146	11.6	106	12.0
	Average (4-5)	778	61.6	514	58.3
	High (6-7)	340	26.9	262	29.7
	Total	1264	100.0	882	100.0

Kry1: 4.48 (mean); 5.00 (median); 1.499 (std. deviation).
Kry2: 4.55 (mean); 5.00 (median); 1.566 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .290

Missing Data Report

Sixty-seven percent of the respondents in Kry1 and 72% in Kry2 responded "Do not know/No opinion" to at least one survey item. In this study, "Do not know/No opinion" is treated as a non-response, i.e., as *user missing*. Thus, 10% of all values in Kry1 and 18% of all values in Kry2 are user missing. Cases with *system missing* values

are incomplete and were excluded at the screening stage. From here on, when referring to missing values, I am referring strictly to *user missing* values.

Determining Missingness

The PLS algorithm does not assume normally distributed data. However, extremely non-normal data are problematic in PLS path models as well as when performing multiple imputation. Conducted normality tests did not reveal any issues of extreme skewness or kurtosis in the data. Little's MCAR test, performed to examine the nature of the missingness, was significantly different from zero thus indicating that data are not missing completely at random (MCAR). After inspecting the data, I ruled out systematic missingness, i.e., that data are missing not at random (MNAR). MNAR is especially unlikely since the incompleteness has largely been introduced by the researcher; "Do not know/No opinion" are treated as user missing values, a missingness introduced and decided by me. Thus, I concluded that data are missing at random (MAR), which is an acceptable assumption for the methods used to deal with missing data in the context of this study.

Multiple Imputation and Neural Network Post-Processing (MINN)

The multiple imputation and neural network post-processing method (MINN) has been utilised to deal with missing data. The MINN was first introduced by Jamil (2012) who combined multiple imputation and a post-process wherein imputed datasets are fed to an artificial neural network (ANN) to improve the imputation results. The literature suggests that the number of imputations (*m*) should be larger than the proportion of missing values. The percentages of missing values were 10% and 18% for Kry1 and Kry2, respectively. However, although cases with at least 50% missing data have been screened out, there are still cases with slightly less than 50% of data missing. So, I decided on *m*=50. Upon successful completion of the multiple imputation step, the 50 imputed datasets were fed into an ANN. Two variants of ANNs are available in SPSS Statistics: multilayer perceptron (MLP) and radial basis function (RBF). The MLP procedure proved to be compute-intensive and extremely time-consuming, so the RBF approach was used to create the ANN[109]. The order of the cases was randomised in the ANN[110]. Based on the 50 sets of imputed data, the ANN

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[109] Multilayer perceptron networks are often considered more sophisticated than radial basis function. However, for this purpose, with data measured mostly on five-point Likert scales, the radial basis function is not only faster but probably generating results that are comparable if not equal to results generated through the multilayer perceptron approach with the same data.

[110] Since the dataset generated through multiple imputation is basically the same dataset repeated 50 times (with some slight variations), there will be a symmetric pattern in the imputed dataset, which might bias the results. This is avoided if the cases are randomised.

predicted a new dataset, where all "Do not know/no opinion" options were imputed a new value between 1 and 5. Comparisons of the results before and after the MINN procedure, revealed no statistically significant distributional differences between the datasets. It was therefore concluded that the MINN procedure had been successful.

Results of the Likert Scales

The Likert scales are indices with varying theoretical minimum and maximum scores. Each index has therefore been transformed to a common five-point scale. Since non-responses (0) have been excluded, the theoretical minimum score was 5 on an index combining five items, 6 on an index combining six items, and so forth. Theoretical minimum scores on the indices thus ranged from 5 to 12 while the theoretical maximum scores ranged from 25 to 60.

The new common Likert scales have been calculated using the following formula:

$$(B - A) * \frac{x - a}{b - a} + A$$

where A is the minimum on the new common Likert scale (1), B is the maximum on the new common Likert scale (5), a is the minimum on the original index, b is the maximum on the original index, and x is the specific score being transformed (IBM 2020).

For instance, for a score on an index combining four items with a theoretical minimum of 4 and a theoretical maximum of 20, transforming a score of 15 gives us: A=1, B=5, a=4, b=20, and x=15. Hence:

$$(5 - 1) * \frac{15 - 4}{20 - 4} + 1 = 3.75 \approx 4$$

Thus, the score of 15 on the initial twenty-point index has been transformed to a score of 4 on the new five-point Likert scale.

The presentation of the frequency tables displaying the transformed Likert scales begins on the following page.

Table 8: Privacy Calculus (health apps)

			Kry1	Kry2
Privacy calculus, health apps: unfavourable – favourable (Likert scale)	1 Unfavourable	Count	18	16
		% within New Dataset	1.4%	1.8%
	2	Count	162	118
		% within New Dataset	12.8%	13.4%
	3 Neutral	Count	681	455
		% within New Dataset	53.9%	51.6%
	4	Count	366	246
		% within New Dataset	29.0%	27.9%
	5 favourable	Count	37	47
		% within New Dataset	2.9%	5.3%
Total		Count	1264	882
		% within New Dataset	100.0%	100.0%

Kry1: 3.19 (mean); 3.00 (median); .745 (std. deviation).
Kry2: 3.22 (mean); 3.00 (median); .808 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .066.

The Likert scale *Privacy Calculus* (*health apps*) measures the outcome of the privacy calculus in relation to health apps in general (Table 8). A high score on this Likert scale represents an outcome of the respondent's privacy calculus that indicates a favourable attitude towards submitting personal health information in health apps and towards the use of health apps in general. Scoring low represents an outcome that indicates an unfavourable attitude. A Chi-Square test revealed no statistically significant differences on the 95% confidence level between the two survey groups.

Table 9: Privacy Calculus (Kry)

		Kry1	Kry2
Privacy calculus, Kry: unfavourable – 1 Unfavourable favourable (Likert scale)	Count	24	20
	% within New Dataset	1.9%	2.3%
2	Count	115	82
	% within New Dataset	9.1%	9.3%
3 Neutral	Count	661	415
	% within New Dataset	52.3%	47.1%
4	Count	389	291
	% within New Dataset	30.8%	33.0%
5 Favourable	Count	75	74
	% within New Dataset	5.9%	8.4%
Total	Count	1264	882
	% within New Dataset	100.0%	100.0%

Kry1: 3.30 (mean); 3.00 (median); .790 (std. deviation).
Kry2: 3.36 (mean); 3.00 (median); .849 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .079.

The Likert scale *Privacy Calculus (Kry)* measures the outcome of the privacy calculus in relation to Kry in particular (Table 9). A high score on this Likert scale represents an outcome of the respondent's privacy calculus that indicates a favourable attitude towards submitting personal health information in Kry and towards the use of Kry in particular. Scoring low represents an outcome that indicates an unfavourable attitude. A Chi-Square test revealed no statistically significant differences on the 95% confidence level between the two survey groups. However, there was a tendency towards a less neutral and a more favourable attitude in Kry2 compared to Kry1.

Table 10: Procedural Justice

			Kry1	Kry2
The use of Kry is associated with procedural justice (Likert scale)	1 Do not agree	Count	5	1
		% within New Dataset	0.4%	0.1%
	2	Count	51	31
		% within New Dataset	4.0%	3.5%
	3 Neutral	Count	531	331
		% within New Dataset	42.0%	37.5%
	4	Count	613	461
		% within New Dataset	48.5%	52.3%
	5 Agree	Count	64	58
		% within New Dataset	5.1%	6.6%
Total		Count	1264	882
		% within New Dataset	100.0%	100.0%

Kry1: 3.54 (mean); 4.00 (median); .674 (std. deviation).
Kry2: 3.62 (mean); 4.00 (median); .667 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .094.

The Likert scale *Procedural Justice* measures the perceived procedural justice in relation to the use of Kry (Table 10). A respondent scoring high on this Likert scale indicates agreement with statements suggesting that the use of Kry is associated with the justice rules consistency, bias suppression, accuracy, correctability, representativeness, and ethicality. Scoring low indicates disagreement with these statements. A Chi-Square test revealed no statistically significant differences on the 95% confidence level between the two survey groups. However, a tendency towards a less neutral and a more agreeable attitude among Kry2 respondents compared to Kry1 respondents was observed.

Table 11: Interpersonal Justice

		Kry1	Kry2
The use of Kry is associated with interpersonal justice (Likert scale)	1 Do not agree Count	5	8
	% within New Dataset	0.4%	0.9%
	2 Count	30	17
	% within New Dataset	2.4%	1.9%
	3 Neutral Count	535	329
	% within New Dataset	42.3%	37.3%
	4 Count	549	403
	% within New Dataset	43.4%	45.7%
	5 Agree Count	145	125
	% within New Dataset	11.5%	14.2%
Total	Count	1264	882
	% within New Dataset	100.0%	100.0%

Kry1: 3.63 (mean); 4.00 (median); .730 (std. deviation).
Kry2: 3.70 (mean); 4.00 (median); .765 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .050.

The Likert scale *Interpersonal Justice* measures the perceived interpersonal justice in relation to the use of Kry (Table 11). A respondent scoring high on this Likert scale indicates agreement with statements suggesting that the use of Kry is associated with the justice rules respect and propriety. Scoring low indicates disagreement with these statements. A Chi-Square test revealed no statistically significant differences on the 95% confidence level between the two survey groups.

However, a tendency towards a less neutral and a more agreeable attitude among Kry2 respondents compared to Kry1 respondents was observed once again.

Table 12: Distributive Justice

		Kry1	Kry2
The use of Kry is associated with distributive justice (Likert scale)	1 Do not agree		
	Count	15	15
	% within New Dataset	1.2%	1.7%
2	Count	146	84
	% within New Dataset	11.6%	9.5%
3 Neutral	Count	631	394
	% within New Dataset	49.9%	44.7%
4	Count	445	360
	% within New Dataset	35.2%	40.8%
5 Agree	Count	27	29
	% within New Dataset	2.1%	3.3%
Total	Count	1264	882
	% within New Dataset	100.0%	100.0%

Kry1: 3.26 (mean); 3.00 (median); .732 (std. deviation).
Kry2: 3.34 (mean); 3.00 (median); .765 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .011.

The Likert scale *Distributive Justice* measures the perceived distributive justice in relation to the use of Kry (Table 12). A respondent scoring high on this Likert scale indicates agreement with statements suggesting that the use of Kry is associated with the justice rules equality and equity. Scoring low indicates disagreement with these statements. The same tendency that was observed for Procedural Justice and Interpersonal Justice was observed for Distributive Justice as well. Furthermore, a Chi-Square test revealed that these differences between the two survey groups were statistically significant on the 95% confidence level (*p*=.011).

Table 13: Informational Justice

			Kry1	Kry2
The use of Kry is associated with informational justice (Likert scale)	1 Do not agree	Count	10	9
		% within New Dataset	.8%	1.0%
	2	Count	69	53
		% within New Dataset	5.5%	6.0%
	3 Neutral	Count	584	337
		% within New Dataset	46.2%	38.2%
	4	Count	497	388
		% within New Dataset	39.3%	44.0%
	5 Agree	Count	104	95
		% within New Dataset	8.2%	10.8%
Total		Count	1264	882
		% within New Dataset	100.0%	100.0%

Kry1: 3.49 (mean); 3.00 (median); .756 (std. deviation).
Kry2: 3.57 (mean); 4.00 (median); .801 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000: .050.

The Likert scale *Informational Justice* measures the perceived informational justice in relation to the use of Kry (Table 13). A respondent scoring high on this Likert scale indicates agreement with statements suggesting that the use of Kry is associated with the justice rules truthfulness and justification. Scoring low indicates disagreement with these statements. A Chi-Square test revealed no statistically significant differences on the 95% confidence level between the two survey groups although the same tendency, i.e., that Kry2 respondents had a less neutral and a more agreeable attitude compared to Kry1 respondents, was observed here as well.

Table 14: Information Control

			Kry1	Kry2
Users of Kry control how their personal information is used by the service (Likert scale)	1 Do not agree	Count	31	55
		% within New Dataset	2.5%	6.2%
	2	Count	161	119
		% within New Dataset	12.7%	13.5%
	3 Neutral	Count	619	388
		% within New Dataset	49.0%	44.0%
	4	Count	383	246
		% within New Dataset	30.3%	27.9%
	5 Agree	Count	70	74
		% within New Dataset	5.5%	8.4%
Total		Count	1264	882
		% within New Dataset	100.0%	100.0%

Kry1: 3.24 (mean); 3.00 (median); .833 (std. deviation).
Kry2: 3.19 (mean); 3.00 (median); .982 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .000.

The Likert scale *Information Control* measures the perceived process and decision control in relation to the use of Kry (Table 14). A respondent scoring high on this Likert scale indicates agreement with statements suggesting that the use of Kry is associated with the justice rules process control and decision control. Scoring low indicates disagreement with these statements. Interestingly, a reversed tendency compared to previous scales was observed for Information Control, i.e., a tendency towards a less neutral and a more disagreeable attitude among Kry2 respondents compared to Kry1 respondents. Furthermore, a Chi-Square test revealed that these differences between the two survey groups were statistically significant on the 95% confidence level ($p<.001$).

Table 15: Discrimination

		Kry1	Kry2
Kry may be discriminating on the grounds of sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation, or age (Likert scale)	1 Do not agree		
	Count	312	250
	% within New Dataset	24.7%	28.3%
	2		
	Count	409	303
	% within New Dataset	32.4%	34.4%
	3 Neutral		
	Count	369	213
	% within New Dataset	29.2%	24.1%
	4		
	Count	139	89
	% within New Dataset	11.0%	10.1%
	5 Agree		
	Count	35	27
	% within New Dataset	2.8%	3.1%
Total	Count	1264	882
	% within New Dataset	100.0%	100.0%

Kry1: 2.35 (mean); 2.00 (median); 1.052 (std. deviation).
Kry2: 2.25 (mean); 2.00 (median); 1.069 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .073.

The Likert scale *Discrimination* measures whether the respondents perceive Kry as potentially discriminating against its users on any of the seven discrimination grounds under Swedish law (Table 15). A high score indicates agreement with statements suggesting that the Kry service might discriminate users because of their sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation, or age. Scoring low indicates disagreement with these statements. A Chi-Square test revealed no statistically significant differences on the 95% confidence level between the two survey groups regarding the seven discrimination grounds. Like the Information Control scale, a tendency towards a less neutral and a more disagreeable attitude among Kry2 respondents compared to Kry1 respondents was observed for Discrimination.

Knowledge and Use of Kry

A major difference regarding prior knowledge of Kry before participating in the survey was observed (Table 16). Among the Kry1 respondents, 25% stated that they had heard of Kry before participating in the survey. Among the Kry2 respondents, the corresponding figure was 65%. A Chi-Square test showed that this difference was statistically significant on the 95% confidence level ($p<.001$).

Table 16: Prior Knowledge of Kry

[PRIOR KNOWLEDGE] Had you heard of Kry before you participated in this survey?*		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	Yes	319	25.2	575	65.2
	No	913	72.2	280	31.7
	I do not know	32	2.5	27	3.1
	Total	1264	100.0	882	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .000.

Respondents who had not heard of or did not know whether they had heard of Kry prior to the survey were automatically screened out from the subsequent question regarding whether they had ever consulted Kry (Table 17). Consequently, this resulted in substantial amounts of system missing values for this item: 75% for Kry1 and 36% for Kry2. However, the percentage of Kry2 respondents who had consulted Kry was twice as large as the corresponding figure for Kry1. This difference was statistically significant on the 95% confidence level ($p<.001$).

Table 17: Prior Use of Kry

[PRIOR USE] Have you ever consulted Kry with a health related question concerning you or your child?		Kry1		Kry2	
		Freq.	%	Freq.	%
Valid	Yes	54	4.3	75	8.5
	No	261	20.6	488	55.3
	System missing	949	75.1	319	36.2
	Total	1264	100,0	882	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .000.

The last multiple-choice item of the questionnaire was a question regarding whether the respondents were willing to use Kry in case they needed to consult a doctor. In a comparison, the differences between the Kry1 responses and the Kry2 responses to this last question were small (Table 18).

Table 18: Willingness to Use Kry

[FUTURE USE] What is the probability that you will use a health app like Kry if you needed to get in contact with a doctor?	Kry1		Kry2	
	Freq.	%	Freq.	%
Valid 1: Very low probability	184	14.6	139	15.8
2: Rather low probability	212	16.8	151	17.1
3: Neither low, nor high probability	391	30.9	259	29.4
4: Rather high probability	341	27.0	233	26.4
5: Very high probability	97	7.7	81	9.2
6: Do not know/No opinion	39	3.1	19	2.2
Total	1264	100.0	882	100.0

Kry1: 2.96 (mean); 3.00 (median); 1.170 (std. deviation), "Do not know/No opinion" excl.
Kry2: 2.96 (mean); 3.00 (median); 1.210 (std. deviation), "Do not know/No opinion" excl.
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .663.

Analysis of Excluded Cases

Analyses of responses from excluded respondents are important but often difficult to conduct. Comparisons of included and excluded cases can reveal important differences between participants and non-participants and whether these differences are systematic. If they are systematic, the results may be biased and affect what kind of conclusions that are possible to draw based on the data. Chi-Square tests have been performed to check for statistically significant differences between included and excluded respondents regarding background variables and questions regarding prior knowledge, prior use, and willingness to use Kry. Descriptive statistics for the excluded cases are reported in full in Appendix 4. Potential problems of self-selection and non-response bias are discussed next.

Self-Selection Bias

Neither one of the two survey samples were representative of the Swedish population at large regarding sex, age, and birth country. Therefore, weights have been calibrated, which will be applied in statistical analyses (Appendix 5). Population statistics for these background variables were retrieved from Statistics Sweden (SCB) for 2016 and 2017. Weights have not been calibrated for fifteen respondents in Kry1 and seven respondents

in Kry2, either because these respondents had not stated their sex or place of birth or because they identified as "other" regarding sex. These respondents are weighted as 1.

Non-Response Bias

Appendix 3 contains descriptive statistics of the excluded respondents. The distributional differences between included and excluded respondents accounted for here are all statistically significant ($p<.05$). Differences between included and excluded cases were found for occupation and for prior knowledge of Kry and willingness to use Kry in both surveys. A larger share of the respondents excluded from Kry1 reported having low confidence and a smaller share reported having high confidence in the healthcare compared to the respondents included in Kry1. A larger share of the respondents excluded from Kry2 (5%) stated that they did not have access to a smartphone compared to the respondents included in Kry2 (1%). Pensioners and job-seekers were overrepresented among excluded respondents, especially in Kry1, while students were underrepresented. Finally, significantly fewer respondents excluded from the surveys had prior knowledge of Kry and they also assessed the probability of using Kry in the future lower compared to included respondents.

Analysis of Excluded Cases: Concluding Remarks

The observed differences indicate that the mechanism behind the missingness among excluded respondents can be labelled missing not at random (MNAR), which is a non-ignorable type of missingness. MNAR is, for instance, problematic when multiple imputation is applied. This justifies excluding these respondents from further analyses. Indeed, excluded respondents generally appears to be more sceptical and perhaps even more negative towards health apps like Kry. At the same time, they also state lower levels of knowledge and interest in health apps compared to included respondents. Some of those individuals would perhaps benefit from more accessible healthcare services such as, for instance, online doctors. If persons who tend to respond more negatively to the type of questions asked in this survey are more likely to be screened out from participation, this would indicate a potential problem of non-response bias. This must be taken into consideration in further analyses and when interpreting the results.

PLS Path Modelling: Results

In the PLS path models illustrated in Figures 22 and 23, the two justice rules representing distributive justice, i.e., Equality (EQL) and Equity (EQT), are modelled as distinct constructs as initial analyses indicated that the two perform better when separated. This is an interesting observation which needs to be discussed further.

In the models, the outer loadings are represented by the values over the arrows from the constructs (circles) to their indicators (rectangles). All outer loadings displayed satisfactory levels, indicating convergent validity of the measurement models. The exception was the indicator EQT_2[111], which is about the price for using Kry. This item is important, and I decided to retain the variable as an indicator of Equity.

Interpersonal Justice, Informational Justice, and Informational Control performed poorly as constructs. Empirically, they did not display predictive power or relevance and were therefore discarded from the model[112]. Theoretically, it could be argued that interpersonal and informational justice are not conceptually distinct from procedural justice but rather facets of said construct.

The privacy calculus was measured twice in the questionnaire; first, focusing on online doctors in general and, second, focusing specifically on Kry. The focus on this comparison, although important, is quite different from the one on justice and willingness to use Kry. The more general privacy calculus items were therefore discarded. Items on governmental regulations (LAW) and industry self-regulation (INDREG) are modelled not as indicators of a distinct regulation construct but as indicators of Procedural Justice. This decision can be justified theoretically as Xu et al. (2010) thought about regulation as reflective of procedural justice.

Will Kry is composed by three items: the item concluding the survey about self-assessed probability of using Kry, plus the two privacy calculus items measuring aspects of the same thing. Evaluation of the measurement models revealed discriminant validity issues for Will Kry and for EQT and Trust. This was remedied by calculating latent variable scores, which were used in place of the indicators for these three constructs[113]. Note that Risk is a single item construct not due to discriminant validity issues but because it in fact consists of only one indicator.

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[111] The indicator: "I think the price for a meeting with a doctor using Kry (SEK 299) is at a reasonable level" displayed an outer loading of .575 and .566 for Kry1 and Kry2, respectively.

[112] They did not affect the predictive power or relevance of the model to a significant extent.

[113] SmartPLS produces latent variable scores for each construct when the PLS algorithm is run. The latent variable score can then be used in place of the indicators as a single-item construct.

Finally, a few words on Discrimination, which as a Likert scale was based on the seven grounds for discrimination under Swedish law (1 ch. 1 § SFS 2008:567). The relevance for each discrimination ground was tested and four had enough in common to be considered as a construct: transgender identity or expression, ethnicity, disability, and age. However, the role of Discrimination in the model is theoretically unclear and including it this stage would be a *post hoc* analysis that I would prefer to avoid. Nevertheless, I do intend to return to the role of Discrimination for exploratory purposes in later mediation analyses.

Evaluation of the Measurement Models: Results

Levels of average variance extracted (AVE) above 50% were accomplished for all constructs in both models, indicating convergent validity of the models. Moreover, Cronbach's alpha (α), reliability coefficient (ρ_A), and composite reliability (CR) levels were satisfactory. Indeed, the α of Concern (Kry1) was a bit low (α=.698) and the CR for Interest and Procedural Justice was a bit high in both models[114]. However, the ρ_A, which is the recommended reliability coefficient to consider in this setting, was above .70 and below .90 for all constructs, except for Procedural Justice in Kry2 (ρ_A=.902). These results, displayed in Table 19, indicate that convergent validity and internal consistency reliability has been established. Results of the HTMT tests, including bias-corrected and accelerated bootstrapped confidence intervals (BCa 95% CI), are displayed in Table 20 and Table 21. HTMT values were below .90 for all constructs in the final models, thus indicating that discriminant validity has been established.

Table 19: Internal Consistency Reliability and Average Variance Extracted (AVE)

Construct	Kry1				Kry2			
	α	ρ_A	CR	AVE	α	ρ_A	CR	AVE
Concern	.698	.726	.830	.621	.764	.767	.864	.679
EQL	.802	.810	.863	.558	.829	.839	.879	.594
EQT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Interest	.812	.818	.914	.841	.828	.833	.921	.853
Proc Just	.890	.894	.914	.602	.902	.902	.922	.629
Risk	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Trust	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Will Kry	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

[114] Interest (Kry1): CR=.914; Procedural Justice (Kry1): CR=.914; Interest (Kry2): CR=.921; Procedural Justice (Kry2): CR=.922.
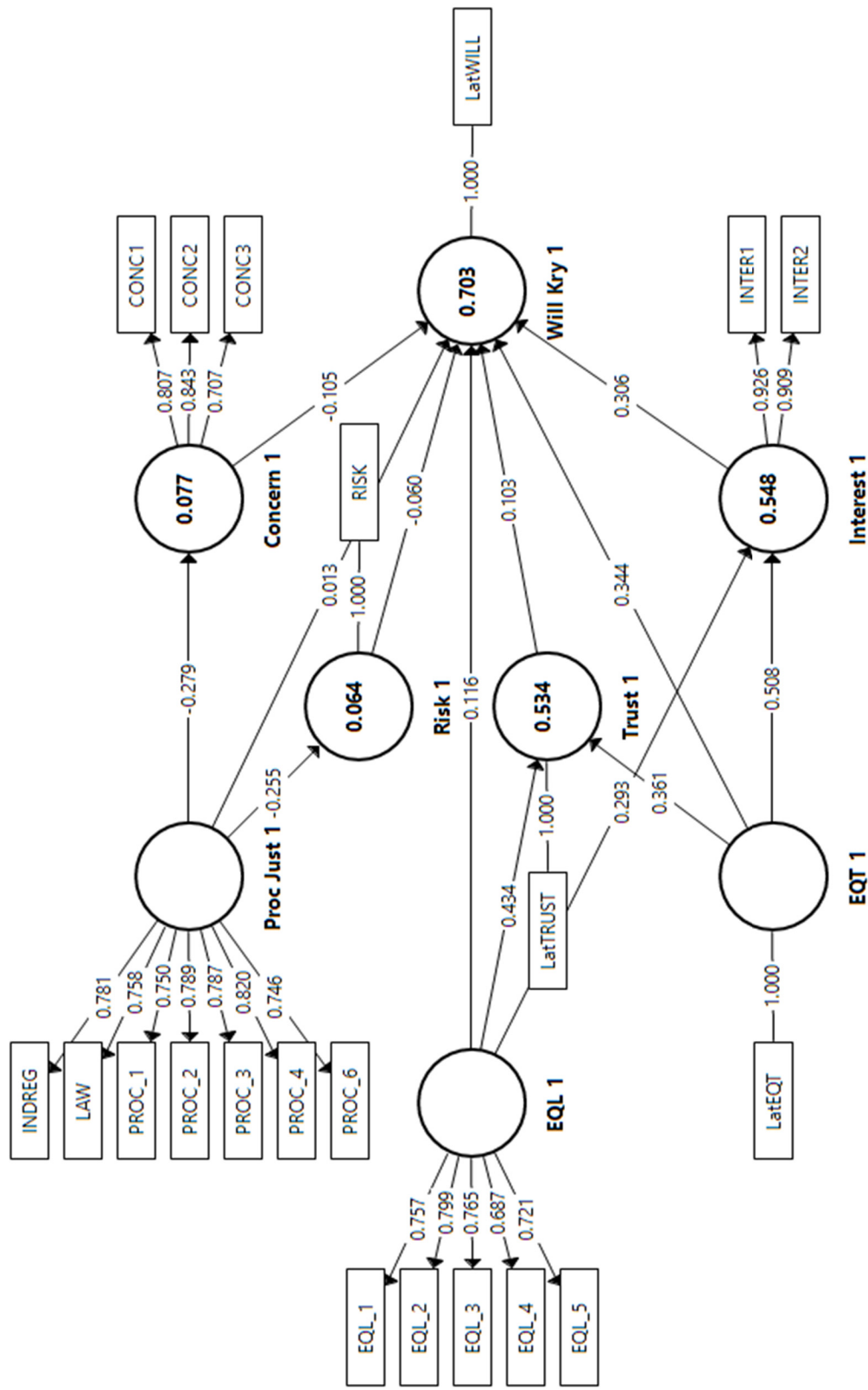
Figure 22: PLS Path Model - Kry1
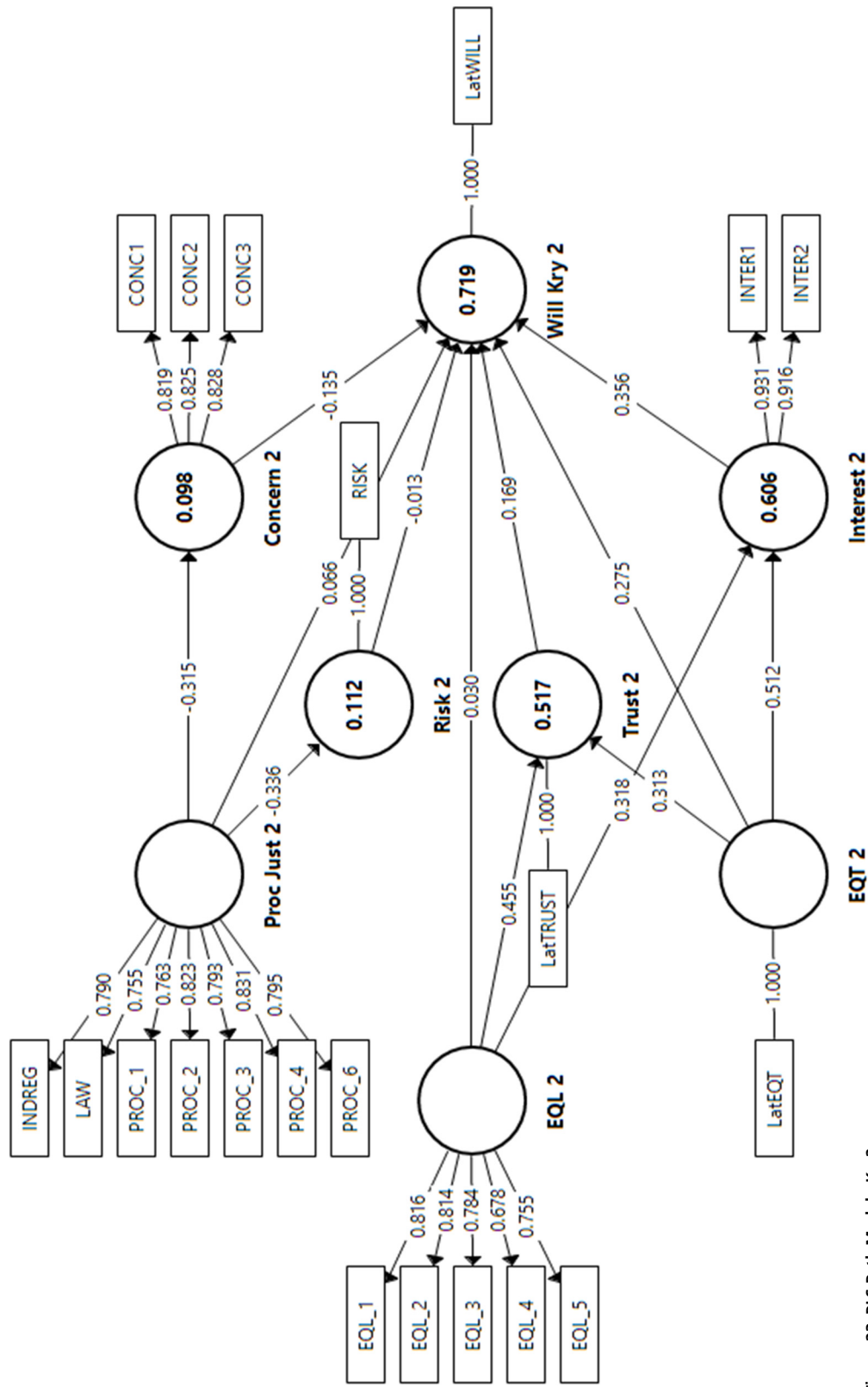
Figure 23: PLS Path Model - Kry2

Table 20: Discriminant Validity (Kry1)

Kry1	Heterotrait-Monotrait Ratio (HTMT): Bias-Corrected and Accelerated Bootstrap of 95% Confidence Intervals (BCa 95% CI)						
Construct	Concern1	EQL1	EQT1	Interest1	Proc Just1	Risk1	Trust1
EQL1	.368						
2.5%	.262						
97.5%	.472						
EQT1	.353	.767					
2.5%	.261	.716					
97.5%	.444	.808					
Interest1	.437	.788	.786				
2.5%	.332	.728	.743				
97.5%	.539	.843	.824				
Proc Just1	.337	.852	.676	.695			
2.5%	.228	.788	.611	.588			
97.5%	.443	.894	.725	.764			
Risk1	.715	.189	.189	.181	.266		
2.5%	.655	.096	.104	.097	.168		
97.5%	.770	.284	.273	.273	.356		
Trust1	.359	.761	.661	.750	.771	.234	
2.5%	.260	.711	.602	.701	.728	.147	
97.5%	.455	.804	.709	.793	.807	.320	
Will Kry1	.485	.741	.760	.826	.651	.287	.672
2.5%	.402	.688	.720	.785	.565	.209	.606
97.5%	.567	.785	.794	.866	.708	.368	.726

Kry2 — Heterotrait-Monotrait Ratio (HTMT): Bias-Corrected and Accelerated Bootstrap of 95% Confidence Intervals (BCa 95% CI)

Construct	Concern2	EQL2	EQT2	Interest2	Proc Just2	Risk2	Trust2
EQL2	.316						
2.5%	.209						
97.5%	.431						
EQT2	.287	.813					
2.5%	.177	.773					
97.5%	.385	.851					
Interest2	.394	.838	.822				
2.5%	.257	.785	.781				
97.5%	.505	.882	.858				
Proc Just2	.379	.846	.701	.725			
2.5%	.265	.789	.636	.634			
97.5%	.483	.889	.749	.784			
Risk2	.773	.260	.212	.220	.353		
2.5%	.710	.164	.117	.105	.259		
97.5%	.824	.356	.299	.318	.446		
Trust2	.254	.752	.653	.708	.753	.228	
2.5%	.141	.695	.597	.634	.704	.132	
97.5%	.355	.799	.702	.769	.790	.319	
Will Kry2	.444	.749	.749	.853	.696	.302	.680
2.5%	.352	.704	.704	.809	.647	.219	.621
97.5%	.528	.790	.790	.891	.739	.377	.729

Evaluation of the Structural Models: Results

Since this study involves two samples of different sizes, the adjusted coefficient of determination (Adj R^2) is reported; sample size may affect the conventional R^2 values, and the Adj R^2 adjusts for this. In Table 22, Adj R^2 values, together with t values, p values, and bias-corrected and accelerated bootstrapped confidence intervals (BCa 95% CI) are presented. All constructs display Adj R^2 values with t values above the critical threshold of 1.96 and p values that were significant on the .05 level. Will Kry displays Adj R^2 of .703 and .719 in Kry1 and Kry2, respectively, indicating a moderate to strong predictive power of the model in explaining the willingness to use Kry.

Table 22: Predictive Power (Adj R^2)

Kry1				BCa 95% CI	
Construct	Adj R^2	T	P	2.5%	97.5%
Concern1	.077	3.076	.002	.033	.129
Interest1	.548	21.544	.000	.494	.596
Risk1	.064	2.758	.006	.025	.115
Trust1	.534	16.497	.000	.464	.592
Will Kry1	.703	36.397	.000	.659	.736

Kry2				BCa 95% CI	
Construct	Adj R^2	T	P	2.5%	97.5%
Concern2	.098	3.317	.001	.046	.158
Interest2	.606	22.676	.000	.548	.654
Risk2	.112	3.641	.000	.059	.178
Trust2	.517	14.681	.000	.444	.582
Will Kry2	.719	34.107	.000	.669	.753

Variance inflation factor (VIF) values indicate whether a PLS path model may suffer from issues of collinearity. When collinearity is a problem, two independent variables are highly correlated, which might lead to biased results. VIF values above 5 indicate problems of collinearity. Assessments of the measurement models (outer VIF values) and the structural models (inner VIF values) indicated no issues of collinearity (Table 23).

Table 23: Variance Inflation Factor (VIF)

Kry1

Outer VIF Values		Inner VIF Values	
CONC1	1.410	Concern 1 -> Will Kry 1	1.755
CONC2	1.371	EQL 1 -> Interest 1	2.008
CONC3	1.333	EQL 1 -> Trust 1	2.008
EQL_1	1.681	EQL 1 -> Will Kry 1	2.853
EQL_2	1.765	EQT 1 -> Interest 1	2.008
EQL_3	1.737	EQT 1 -> Trust 1	2.008
EQL_4	1.435	EQT 1 -> Will Kry 1	2.734
EQL_5	1.665	Interest 1 -> Will Kry 1	2.427
INDREG	2.008	Proc Just 1 -> Concern 1	1.000
INTER1	2.024	Proc Just 1 -> Risk 1	1.000
INTER2	2.024	Proc Just 1 -> Will Kry 1	2.917
LAW	1.868	Risk 1 -> Will Kry 1	1.640
LatEQT	1.000	Trust 1 -> Will Kry 1	2.851
LatTRUST	1.000		
LatWILL	1.000		
PROC_1	2.097		
PROC_2	2.431		
PROC_3	2.225		
PROC_4	2.490		
PROC_6	2.075		
RISK	1.000		

Kry2

Outer VIF Values		Inner VIF Values	
CONC1	1.578	Concern 2 -> Will Kry 2	2.043
CONC2	1.472	EQL 2 -> Interest 2	2.375
CONC3	1.410	EQL 2 -> Trust 2	2.375
EQL_1	2.096	EQL 2 -> Will Kry 2	3.290
EQL_2	1.994	EQT 2 -> Interest 2	2.375
EQL_3	1.847	EQT 2 -> Trust 2	2.375
EQL_4	1.443	EQT 2 -> Will Kry 2	3.253
EQL_5	1.871	Interest 2 -> Will Kry 2	2.938
INDREG	2.237	Proc Just 2 -> Concern 2	1.000
INTER1	2.136	Proc Just 2 -> Risk 2	1.000
INTER2	2.136	Proc Just 2 -> Will Kry 2	3.220
LAW	2.212	Risk 2 -> Will Kry 2	1.928
LatEQT	1.000	Trust 2 -> Will Kry 2	3.021
LatTRUST	1.000		
LatWILL	1.000		
PROC_1	1.978		
PROC_2	2.712		
PROC_3	2.354		
PROC_4	2.402		
PROC_6	1.974		
RISK	1.000		

All direct effects were significantly different from zero, except for the effect of Procedural Justice (Proc Just) on Willingness to Use Kry (Will Kry). In addition, in Kry 2, the effects of Equality (EQL) and Risk on Will Kry were non-significant. (Table 24). In both surveys, the strongest direct effects were observed for Equity (EQT) on Interest as well as for Equality on Trust.

Table 24: Direct Effects

Kry1				BCa 95% CI	
Path	Path Coeff.	T	P	2,5%	97,5%
Concern 1 -> Will Kry 1	-.105	3.911	.000	-.159	-.053
EQL 1 -> Interest 1	.293	7.040	.000	.208	.373
EQL 1 -> Trust 1	.434	11.754	.000	.361	.505
EQL 1 -> Will Kry 1	.116	2.811	.005	.038	.197
EQT 1 -> Interest 1	.508	14.022	.000	.436	.579
EQT 1 -> Trust 1	.361	8.872	.000	.277	.441
EQT 1 -> Will Kry 1	.344	7.514	.000	.253	.431
Interest 1 -> Will Kry 1	.306	7.595	.000	.228	.385
Proc Just 1 -> Concern 1	-.279	6.307	.000	-.358	-.186
Proc Just 1 -> Risk 1	-.255	5.661	.000	-.340	-.162
Proc Just 1 -> Will Kry 1	.013	.329	.742	-.062	.087
Risk 1 -> Will Kry 1	-.060	2.184	.029	-.113	-.007
Trust 1 -> Will Kry 1	.103	2.032	.042	.000	.198

Kry2				BCa 95% CI	
Path	Path Coeff.	T	P	2,5%	97,5%
Concern 2 -> Will Kry 2	-.135	4.078	.000	-.200	-.071
EQL 2 -> Interest 2	.318	8.464	.000	.239	.388
EQL 2 -> Trust 2	.455	10.697	.000	.369	.537
EQL 2 -> Will Kry 2	.030	.756	.450	-.051	.107
EQT 2 -> Interest 2	.512	15.106	.000	.447	.580
EQT 2 -> Trust 2	.313	7.051	.000	.224	.398
EQT 2 -> Will Kry 2	.275	6.919	.000	.200	.355
Interest 2 -> Will Kry 2	.356	9.295	.000	.282	.431
Proc Just 2 -> Concern 2	-.315	6.867	.000	-.402	-.220
Proc Just 2 -> Risk 2	-.336	7.564	.000	-.422	-.246
Proc Just 2 -> Will Kry 2	.066	1.587	.113	-.016	.150
Risk 2 -> Will Kry 2	-.013	.401	.688	-.080	.049
Trust 2 -> Will Kry 2	.169	4.134	.000	.090	.249

Direct effect sizes (f^2), indicating the power of constructs to predict other constructs in the model, are displayed in Table 25. Although even small effects may be significantly different from zero with sufficiently large samples, effects that are at least moderate (f^2=.15 or higher) are preferable. The predictive power of Equity on Interest as well as Equality on Trust again display the strongest effects in both models.

Table 25: Direct Effect Size (f^2)

Kry1				95% CI	
Direct Effect	f^2	T	P	2.5%	97.5%
Concern 1 -> Will Kry 1	.021	1.877	.061	.006	.049
EQL 1 -> Interest 1	.099	3.172	.002	.050	.172
EQL 1 -> Trust 1	.211	4.967	.000	.141	.308
EQL 1 -> Will Kry 1	.017	1.401	.161	.001	.046
EQT 1 -> Interest 1	.298	6.144	.000	.211	.400
EQT 1 -> Trust 1	.146	3.820	.000	.079	.230
EQT 1 -> Will Kry 1	.153	3.609	.000	.079	.244
Interest 1 -> Will Kry 1	.126	3.645	.000	.068	.203
Proc Just 1 -> Concern 1	.085	2.806	.005	.039	.156
Proc Just 1 -> Risk 1	.070	2.563	.010	.028	.133
Proc Just 1 -> Will Kry 1	.000	0.069	.945	.000	.010
Risk 1 -> Will Kry 1	.007	1.083	.279	.000	.025
Trust 1 -> Will Kry 1	.013	0.933	.351	.000	.050
Kry2				95% CI	
Direct Effect	f^2	T	P	2.5%	97.5%
Concern 2 -> Will Kry 2	.033	1.974	.048	.009	.073
EQL 2 -> Interest 2	.114	3.645	.000	.063	.185
EQL 2 -> Trust 2	.191	4.366	.000	.118	.291
EQL 2 -> Will Kry 2	.001	0.279	.780	.000	.013
EQT 2 -> Interest 2	.295	6.350	.000	.212	.396
EQT 2 -> Trust 2	.090	3.171	.002	.044	.155
EQT 2 -> Will Kry 2	.089	3.303	.001	.046	.150
Interest 2 -> Will Kry 2	.163	4.172	.000	.097	.250
Proc Just 2 -> Concern 2	.110	2.949	.003	.053	.199
Proc Just 2 -> Risk 2	.127	3.188	.001	.064	.221
Proc Just 2 -> Will Kry 2	.005	0.709	.479	.000	.027
Risk 2 -> Will Kry 2	.000	0.094	.925	.000	.012
Trust 2 -> Will Kry 2	.041	2.056	.040	.011	.087

*f^2 values of .02, .15, and .35 indicates weak, moderate, and strong effects, respectively. f^2 values of less than .02 indicates no effect

The predictive relevance (Q^2) of a model is produced through blindfolding, which mimics a PLS-PM analysis conducted on new, out-of-sample data. In a model displaying predictive relevance, the Q^2 values should be fairly similar to the Adj R^2 values, which was the case for both Kry1 and Kry2. Positive, non-zero Q^2 values tells us that the model is relevant for predicting an endogenous construct, but they tell us nothing about the predictive impact of each preceding construct. The q^2 effect size is calculated for this purpose. As shown in Table 26, Equity and Equality moderately predicts Trust and, in the case of Equity, also Interest. But, in Kry2, we can also see that Trust and Interest, in turn, display a stronger predictive impact in relation to Will Kry than Equity and Equality do.

Table 26: Predictive Impact (q^2)*

Kry1					
Construct	Conc 1	Risk 1	Trust 1	Inter 1	Will 1
Predictive Relevance (Q^2)**	0,083	0,100	0,523	0,417	0,709
Proc Just 1					-0,007
EQL 1			0,174	0,060	0,017
EQT 1			0,161	0,170	0,168
Concern 1		0,014			0,072
Risk 1	0,001				0,000
Trust 1				-0,069	0,076
Interest 1			-0,002		0,144
Kry2					
Construct	Conc 2	Risk 2	Trust 2	Inter 2	Will 2
Predictive Relevance (Q^2)***	0,082	0,113	0,602	0,562	0,740
Proc Just 2					-0,008
EQL 2			0,171	0,094	-0,004
EQT 2			0,146	0,185	0,081
Concern 2		-0,016			0,115
Risk 2	0,000				-0,008
Trust 2				0,112	0,158
Interest 2			0,000		0,165

*q^2 values of .02, .15, and .35 indicates weak, moderate, and strong effects, respectively. q^2 values of less than .02 indicates no effect.
** Omission distance (D)=7.
*** Omission distance (D)=8.

Mediation Analysis: Results

A mediating effect occurs when a third variable intervenes in the relationship between two other variables. When full mediation is observed, the direct effect between two constructs is non-significant while the indirect effect, mediated by the third variable, is significant. If full mediation is present, there is no way of detecting the indirect effect when the third variable is omitted from the model. Mediation can also be partial, i.e., the direct effect is significant but enhanced or suppressed by a third variable.

Mediating effects were observed in the present study. In Figure 24, two examples from Kry2 are illustrated[115]. On the left, the direct effect between Equality and willingness to use Kry (.043) is non-significant. At the same time, the indirect effect, mediated by Interest (.134), is significant. In fact, 100% of the variance in the relationship between Equality and willingness to use Kry is accounted for by this indirect effect, indicating full mediation. On the right, the direct effect between Equity and willingness to use Kry (.289) is significant and so is the indirect effect mediated by Interest (.189). Here, 65% of the variance in the relationship between Equity and willingness to use Kry is accounted for by this indirect effect, indicating partial, complementary mediation[116].
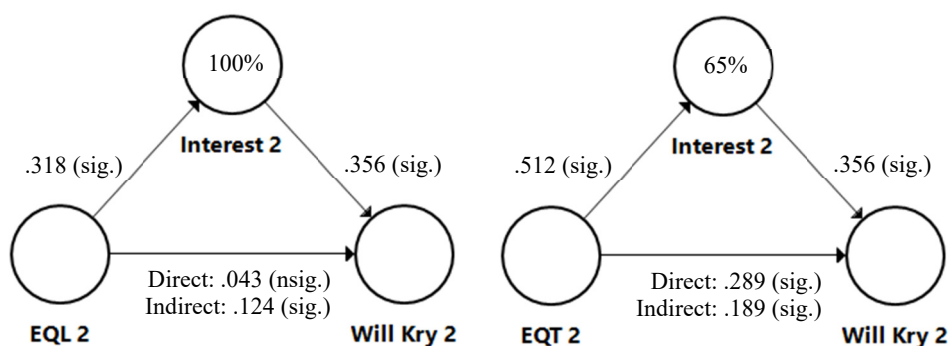
Figure 24: Full and Partial Mediation

Table 27 displays significant mediating effects in the models. As shown, it is primarily Interest and Trust that mediates the indirect relationships between the two distributive justice constructs Equality and Equity and the willingness to use Kry.

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[115] Although illustrated here in isolation, mediation analysis has been conducted with the constructs as integrated parts of the fully specified model (Figure 23: PLS Path Model - Kry2).

[116] When the partial mediating effect is complementary, the direct and indirect effects point in the same direction. Partial mediation can also be competitive, which is when the direct and indirect effects point in different directions.

Table 27: Mediating Effects

Kry1

Mediation Path	Specific Indirect Effects	T	P	95% CI 2.5%	95% CI 97.5%	Direct Effects	T	P	95% CI 2.5%	95% CI 97.5%	VAF*
EQL 1 -> Interest 1 -> Will Kry 1	.091	5.533	.000	.111	.194	.118	3.542	.000	.054	.185	.771
EQT 1 -> Interest 1 -> Will Kry 1	.149	7.192	.000	.010	.071	.361	10.373	.000	.290	.427	.413
EQL 1 -> Trust 1 -> Will Kry 1	.040	2.533	.011	.010	.072	.118	3.542	.000	.054	.185	.339

Kry2

Mediation Path	Specific Indirect Effects	T	P	95% CI 2.5%	95% CI 97.5%	Direct Effects	T	P	95% CI 2.5%	95% CI 97.5%	VAF*
EQL 2 -> Interest 2 -> Will Kry 2	.134	5.674	.000	.091	.185	.043	1.078	.281	-.036	.118	3.116
EQT 2 -> Interest 2 -> Will Kry 2	.189	8.176	.000	.147	.239	.289	6.751	.000	.207	.375	.654
EQL 2 -> Trust 2 -> Will Kry 2	.080	4.093	.000	.046	.122	.043	1.078	.281	-.036	.118	1.860
EQT 2 -> Trust 2 -> Will Kry 2	.073	4.175	.000	.044	.112	.289	6.751	.000	.207	.375	.253
Proc Just 2 -> Concern 2 -> Will Kry 2	.041	3.055	.002	.018	.069	-.001	.016	.987	-.078	.078	-41.000

*VAF: Variance Accounted For.

Discrimination, representing the four discrimination grounds: transgender identity or expression, ethnicity, disability, and age, was not included as a construct in the final model. However, mediation analyses revealed an indirect effect of Procedural Justice on the constructs Risk and Concern caused by Discrimination.

The two examples in Figure 25 are both taken from Kry2[117]. In both cases, we are dealing with partial, complementary mediating effects as direct and indirect effects are both significant and pointing in the same direction. Procedural Justice has a negative direct effect on Concern and Risk. This effect is strengthened when a third variable, Discrimination, is added to the model. So, although perceptions of potential discrimination increase levels of risk beliefs, these beliefs are suppressed by perceptions of Procedural Justice. This mediating effect accounts for 33% of the variance in the relationship between Procedural Justice and Concern and for 27% of the variance in the relationship between Procedural Justice and Risk.

33%   Discr 2
-.187 (sig.)   .338 (sig.)
Proc Just 2
Direct: -.219 (sig.)
Indirect: -.072 (sig.)
Concern 2

27%   Discr 2
-.187 (sig.)   .357 (sig.)
Proc Just 2
Direct: -.248 (sig.)
Indirect: -.067 (sig.)
Risk 2
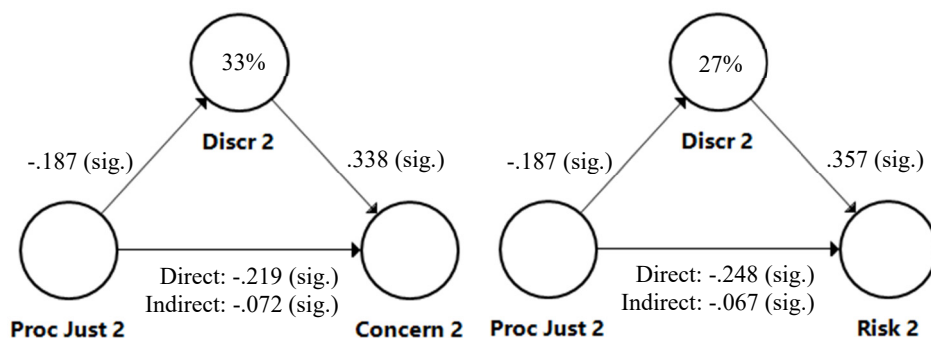
Figure 25: Discrimination as Mediating Effect

Analysis of Extreme Cases

Danermark et al. (2002) argue for the study of extreme cases because it can then become clearer why certain phenomena are perceived negatively by some and positively by others. I therefore decided to create two sub-groups. Kry Low consists of respondents from Kry1 and Kry2 who assessed their health status to be poor and who had low confidence in the Swedish healthcare ($n=126$). The second sub-group, called Kry High, consists of respondents who assessed their health status to be very good and who had high confidence in the Swedish healthcare ($n=175$).

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[117] Although illustrated here in isolation, mediation analysis has been conducted with the constructs as integrated parts of the fully specified model (Figure 23: PLS Path Model - Kry2).

Descriptive statistics about Kry Low and Kry High are provided in Table 28. There are some obvious differences between the sub-groups and other respondents. Almost two thirds of Kry Low are women while the opposite is true of Kry High, where 62% of the respondents are men. The average respondent in Kry Low is older (md=36 yrs) and the average respondent in Kry High is younger (md=31 yrs) compared to other respondents (md=34 yrs). Job-seekers, pensioners, and "other occupation" are over-represented occupation categories in Kry Low, while students are over-represented in Kry High. More respondents in Kry Low stated that the probability that they will use Kry is low (41%). Conversely, more respondents in Kry High stated that the probability that they will use Kry is high (43%).

Table 28: Descriptive Statistics – Extreme Cases

		Kry Low (*n*=126)		Kry High (*n*=175)		Other (*n*=1,845)	
Variable		freq	%	freq	%	freq	%
Sex	Woman	81	64.3	66	37.7	925	50.1
	Man	43	34.1	109	62.3	907	49.2
	Other	1	.8			8	.4
	Do not want to state	1	.8			5	.3
Age	20-28 yrs	39	31.0	75	42.9	616	33.4
	29-39 yrs	39	31.0	39	22.3	582	31.5
	40-50 yrs	48	38.1	61	34.9	647	35.1
Place of birth	Sweden	111	88.1	147	84.0	1673	90.7
	EU or Nordic	6	4.8	10	5.7	82	4.4
	Outside of EU	9	7.1	18	10.3	83	4.5
	Do not want to state					7	.4
Occupation	Employed	50	39.7	111	63.4	1184	64.2
	Job-seeker	19	15.1	7	4.0	157	8.5
	Own business	5	4.0	11	6.3	66	3.6
	Pensioner	15	11.9	3	1.7	48	2.6
	Student	12	9.5	35	20.0	287	15.6
	Other occupation	24	19.0	8	4.6	89	4.8
	Do not want to state	1	.8			14	.8
Will use Kry	Low probability	51	41.1	51	30.4	584	32.5
	Neither low nor high	30	24.2	45	26.8	575	32.0
	High probability	43	34.7	72	42.9	637	35.5

Importance-Performance Map Analysis (IPMA): Results

IPMA was conducted on the original datasets as well as on Kry Low and Kry High. The Kry1 and Kry2 results were similar (Figure 26). Equality and Interest are important and perform well. Equity is the most important construct but under-performs, perhaps attributable to the fact that more than half the respondents did not think that the price for Kry (€31) was reasonable (EQT_2). Procedural Justice performs well but, on the other hand, is not important for the willingness to use Kry. Also, while the IPMA results suggest that Kry is not associated with Concern and Risk, or the absence thereof[118], these aspects have little impact on the willingness to use Kry. This would indicate that it is possible to have concerns or associate Kry with a certain level of risk and still be interested in using the service.
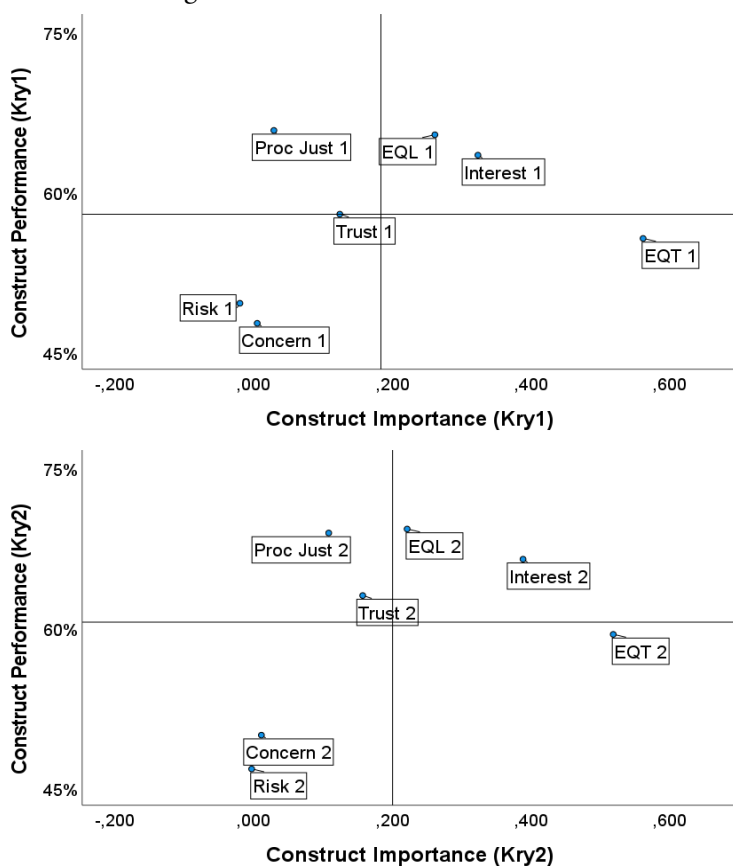
Figure 26: IPMA - Kry1 and Kry2

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[118] The coding of the indicators of Concern and Risk have been reversed for the IPMA.
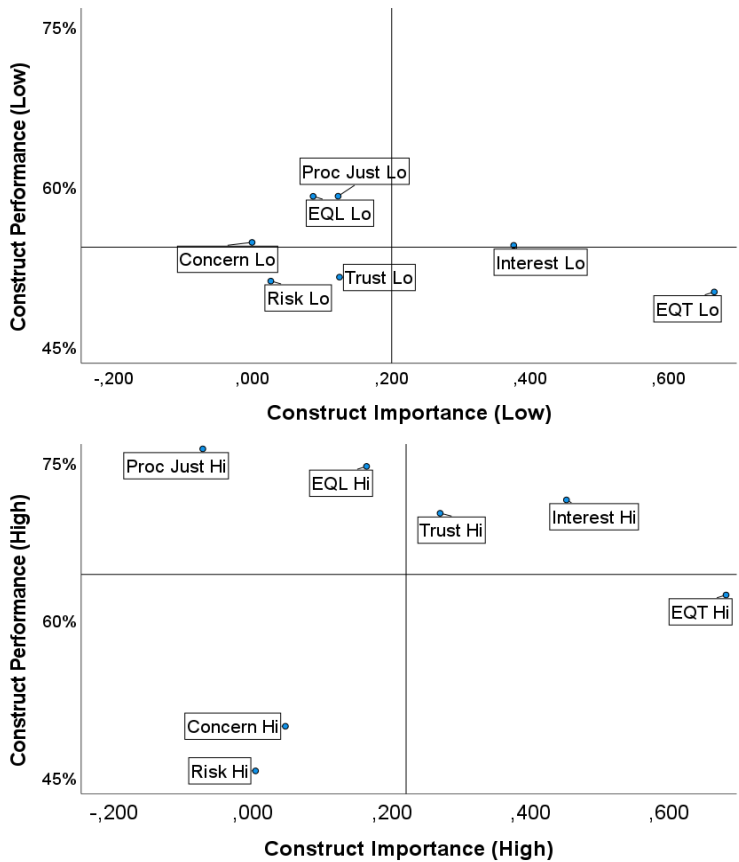
Figure 27: IPMA - Kry Low and Kry High

Unlike the Kry1 and Kry2 results, the IPMA results for Kry Low and Kry High were quite different from each other (Figure 27). Only two constructs perform above average in Kry Low: Procedural Justice and Equality. At the same time, these two constructs do not seem to impact theses respondents' willingness to use Kry. On the other hand, four constructs perform above average in Kry High, two of which also seem to positively impact the willingness to use Kry: Interest and, uniquely for Kry High, Trust. Kry High displays the strongest average total effects and the highest average variable scores of all the four analysed groups, with two exceptions: Concern and Risk, whose highest average latent variable scores were observed in Kry Low[119]. In all four groups, Equity impacts willingness to use Kry the most and performs below average.

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[119] Concern and Risk were recoded for the IPMA. Thus, high scores indicate *absence of* risk beliefs.

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Full model evaluation results of extreme cases are presented in Appendix 7. An inspection of confidence intervals reveals that less stable estimates in Kry Low and Kry High compared to Kry1 and Kry2 estimates, probably an effect of smaller sample sizes. The estimates for extreme cases should therefore be interpreted cautiously. Here, I choose to comment only on predictive impact (q^2). As shown in Table 29, Equity is a clear predictor of Interest in both groups. In Kry Low, Equity is also a predictor of Trust while Equality predicts Trust in Kry High. Furthermore, in Kry High, the willingness to use Kry is predicted by Equity and Interest. In Kry Low, willingness to use Kry is predicted primarily by Trust. This is interesting since no effect (f^2) was detected for this relationship (see Appendix 7: *Direct Effect Size (f^2) – Extreme Cases*).

Table 29: Predictive Impact (q^2)* – Extreme Cases

Kry Low					
Construct	**Conc Lo**	**Inter Lo**	**Risk Lo**	**Trust Lo**	**Will Lo**
Predictive Relevance (Q^2)**	.157	.617	.216	.696	.771
Concern Lo		.000	.001	.000	.017
EQL Lo	.000	-.016	.000	.056	-.013
EQT Lo	.000	.384	.000	.306	-.022
Interest Lo	.000		.000	.000	.079
Proc Just Lo		.000		.000	-.026
Risk Lo	.000	.000		.000	-.009
Trust Lo	-.011	-.003	.034		.157

Kry High					
Construct	**Conc Hi**	**Inter Hi**	**Risk Hi**	**Trust Hi**	**Will Kry Hi**
Predictive Relevance (Q^2)**	.044	.407	.091	.505	.686
Concern Hi		.000	.000	.000	.006
EQL Hi	.000	.034	.000	.291	.010
EQT Hi	.000	.261	.000	.107	.153
Interest Hi	.000		.000	-.002	.277
Proc Just Hi		.000		.000	.003
Risk Hi	.001	.000		.000	-.010
Trust Hi	.010	-.013	.020		.070

*q^2 values of .02, .15, and .35 indicates weak, moderate, and strong effects, respectively. q^2 values of less than .02 indicates no effect.
** Omission distance (D)=10.

Summary of Empirical Results

Results of the Likert scales revealed few differences between the Kry1 and Kry2 survey results. Thus, the second survey validated the results from the first survey. However, more respondents in Kry2 (44%) than in Kry1 (37%) did agree with statements associating Kry with distributive justice. At the same time, more respondents in Kry2 (20%) than in Kry1 (15%) *disagreed* with statements associating Kry with the granting of personal information control to their users. The most striking difference observed between the two study samples was the one regarding prior knowledge of Kry. Among the 2016 respondents, 25% had heard of Kry prior to participating in the survey. One year later, the corresponding percentage was 65%. Furthermore, the share of respondents who had used Kry was 4% in 2016 compared to 9% in 2017. This indicates a significant increase in the awareness of Kry among Swedish 20–50-year-olds between October 2016 and October 2017.

At the PLS-PM evaluation stage, it was decided not to include a construct reflecting the privacy calculus outcomes regarding online doctor services in general. It also became obvious that interpersonal justice, informational justice, and information control performed poorly as constructs and they were discarded from further PLS-PM analyses. Furthermore, the justice rules Equality and Equity performed better when modelled as two distinct constructs instead of as a single construct under the distributive justice label. A discrimination construct made up by the four discrimination grounds transgender identity or expression, ethnicity, disability, and age, was retained but only for mediation analyses. It turned out that perceptions of Kry as potentially discriminating on these four grounds seemed to intervene in the relationship between Procedural Justice and risk beliefs (Concern and Risk) as a partial, complementary mediating effect.

Regarding predictive power, the Kry1 and Kry2 models managed to explain 70% and 72%, respectively, of the variance in the target construct, i.e., the willingness to use Kry. Perceptions of distributive justice, represented in the model by the justice rules Equality and Equity, appeared to be a much stronger predictor of the willingness to use Kry than perceptions of Procedural Justice. In the privacy calculus, Trust and Interest appeared to have a much stronger impact on the willingness to use Kry than risk beliefs. Perceptions of Equality and especially Equity generally affected perceptions of Trust and Interest positively. Trust and Interest, in turn, predicted the willingness to use Kry. This was not least the case for respondents in poor health and with low confidence in the healthcare. For these respondents, Trust was the only construct with at least a moderate predictive impact on the willingness to use Kry. And for these respondents, Trust was clearly predicted by perceptions of Equity.

Discussion and Conclusions

In this chapter, I discuss the main results from previous chapters as well as try to explain them. I begin the chapter with a discussion of the empirical findings from the online surveys and the statistical modelling stage. This is followed by reflections on the legal architectonic of online doctors, which are related to the empirical findings. Next, methodological and theoretical implications of the study are discussed. I then move on to discuss the limitations of the study before I present suggestions for future research. The chapter ends with the conclusions of the thesis.

Discussion of Empirical Findings

I have shown that perceptions of distributive justice predict the study participants' willingness to use Kry. However, the two justice rules reflecting distributive justice – Equality and Equity – related to other constructs in the statistical model in slightly different ways. Generally speaking, perceptions of Equality seemed to predict Trust while perceptions of Equity appeared to predict both Trust and Interest. In turn, Trust and Interest predicted the willingness to use Kry; at least in Kry2.

Within the context of the present study, some elements of the privacy calculus have been shown to mediate the relationship between perceptions of justice and the willingness to use Kry. In Kry2, Interest in Kry fully mediated the relationship between perceived Equality and the willingness to use Kry. In other words, when Interest was taken out of the equation, the relationship between Equality and the willingness to use Kry became non-significant. These results indicate that confidence and enticement beliefs enhance perceptions of distributive justice and affect the outcome of the privacy calculus in a way that risk beliefs do not. This suggests that it is possible to have concerns about Kry or to perceive Kry as associated with risks and still be sufficiently interested to consider using the service. Also, mediating effects are particularly interesting from a critical realist perspective. Effects caused by "third variables" illustrate the intransitivity, transfactuality, and stratification of the social realm. There is more beneath the surface, and it is hardly possible to essentialise the objects under study.

Indeed, judging by the results from the PLS path analyses, Interest appeared to be the main driver behind the willingness to use Kry. This can be compared to the justice rule Equity, whose strong impact on the willingness to use Kry contrasted with its low performance levels. In other words, the respondents did not perceive Kry as particularly equitable which, from Kry's perspective, is a problem since Equity was the most important aspect for the respondents' willingness to use the service. One possible explanation for the poor performance of Equity may be the fact that many respondents did not think that the patient fee for using Kry (€31) was reasonable (item EQL_2). The patient fee has since been reduced and it is possible that a survey conducted today would result in a better performance by Equity. The size of the patient fee matters more in the context of online doctors (SALAR 2018a), which might explain the poor performance of Equity in 2016 and 2017. Equality, the other distributive justice rule, performed better than Equity but did not have the same impact on the willingness to use Kry as Equity did. These subtle but distinct nuances are important for the understanding of the relationship between perceived distributive justice and the willingness to use online doctor services.

Judging by the results from the statistical model, perceptions of Procedural Justice no doubt had a suppressing effect on risk beliefs. That is, perceiving Kry as procedurally fair seemed to lead to lower levels of Concern and Risk in association to the service. Concern and Risk were somewhat overshadowed by Interest and Trust in the privacy calculus. However, one needs to consider what would happen in a situation where risk beliefs dominated the decision-making process. All respondents, including Kry Low respondents, seemed to associate Kry with Procedural Justice although this did not seem to impact their willingness to use the service. However, perceptions of Procedural Justice can potentially suppress both risk beliefs and perceptions of potential discrimination. This is a valuable insight; in healthcare situations characterised by anxiety and/or fear, the presence of procedural justice in the minds of the service users could be important.

Danermark et al. (2002) suggest that we study extreme cases from a survey as this may reveal underlying causes and internal relations. I defined two groups of extreme cases, one group consisting of respondents with poor self-assessed health status and with low confidence in the healthcare (Kry Low), and one group consisting of respondents with very good self-assessed health status and with high confidence in the healthcare (Kry High). Analyses indicated that, while Kry Low respondents seemed to be generally unimpressed with Kry, Kry High respondents were more positive. This can be interpreted as further empirical support for what is essentially already known: people who would probably benefit the most from more accessible healthcare services are less drawn to online doctors. For Low Kry respondents, the impact of Equity on Interest

and Trust was relatively strong. Also, Trust was the only construct that predicted the willingness to use Kry, at least moderately. This is an important finding. If online doctors would target less advantaged patients, trust-building might be a success factor. In sum, although extreme and ordinary cases did not differ that much in terms of how the constructs are positioned on the IPMA maps, the differences were larger in terms of performance levels and impact. Kry High respondents were enthusiastic. Kry Low respondents, not so much.

The Legal Architectonic of Online Doctors: Reflections

The attempt at retroductive reasoning carried out in this section has been inspired by an explanatory model proposed by Danermark et al. (2002). The authors state that retroduction should be preceded by description, analytical resolution, and theoretical redescription (abduction). Accordingly, in the chapter *Online Doctors: Background*, online doctors were described within a Swedish context in a relatively atheoretical way. In the two online surveys, online doctors were placed within a theoretical context of justice theory and theories about the privacy calculus. At the statistical modelling stage, these theories were accompanied by methodological perspectives influenced by scientific realism and latent variable theory. The phenomenon was then lifted (abducted) from the theoretical justice framework and placed within the theoretical context of law's architectonic. The phenomenon of online doctors has been redescribed and reinterpreted against this figure. Specifically, in the chapter *The Legal Architectonic of Swedish Online Doctors*, the ethico-legal, the juridico-political, and the econo-legal dimensions of the online doctor phenomenon were investigated from a socio-historical perspective. Next, I wish to discuss what might have produced this phenomenon at the empirical level.

The Ethico-Legal

I have no reason to question that Kry and other online doctor services adhere to the human dignity principle. It would also be downright false of me to suggest that Kry selectively downgrades patients with, for instance, complicated or chronical healthcare needs. At the same time, it cannot be denied that online doctors seem to be attracting primarily patients that are relatively young, urban, well-educated, and healthy. The access to healthcare for those in most need of healthcare has not been improved thanks to the Swedish online doctor boom. Likewise, online doctors do not seem to make a difference for patients with little or no capacity to use online doctor services without

assistance, i.e., the patients that the needs and solidarity principle was designed to protect. When it comes to the cost-effectiveness principle, it is arguably and perhaps implicitly the principle that is at once the one most associated with online doctors ("online doctors will save money") and the one least associated with them ("online doctors are cost drivers"). Although the potential of online doctors to contribute to a more cost-effective healthcare is probably enormous, it needs to be emphasised that, paradoxically, the Swedish health system has not been designed to serve this purpose. Organised as a quasi-market, it has instead created incentives for private healthcare actors to attract as many patients with mild conditions as possible. The result has been rising annual costs but without a corresponding improvement of health among patients with large healthcare needs. Generally speaking, we are spending more money on healthcare without improving the health of those in most need of care.

From an ethico-legal standpoint, this situation is not coincidental. With the free choice of care reform, the freedom of choice principle became the law. Free choice *per se* is not incompatible with the healthcare's overarching goal or the ethical platform; an expanded freedom of choice for patients with poor access to healthcare would obviously be desirable. However, the kind of freedom of choice promoted in the Swedish healthcare, through law, is largely driven by the principle of demand, once rejected as a valid guiding principle for healthcare priorities. This is not a qualified freedom of choice targeting the least free but quantitative and blunt. Although online doctor services are available regardless of where the patient resides, advertising campaigns are often targeting urban and socio-economically strong geographical areas. The current trend, with online doctors "going physical", occurs primarily in cities. Meanwhile, the growth in new health centres, for instance, in sparsely populated regions has been negative. Of course, this shift towards a consumer-driven healthcare was not caused by online doctors. It is the other way around. This development was politically and legally sanctioned and it affects how healthcare is provided and, ultimately, how we perceive of healthcare services. The ideologically charged free choice of care reform managed to turn the health system into a bleeding quasi-market while simultaneously introducing into the healthcare an ethical dilemma between real healthcare needs and personal wishes. Under these conditions, it is hardly possible to separate the morally right thing to do from the most rational thing to do. This is the reality of fact-value entanglement (Sayer 2011).

The Juridico-Political

In critical realist terms, free choice as a principle is transfactual, simultaneously operating on different strata of the health system. Although described here primarily as

an ethico-legal principle, freedom of choice permeates the juridico-political as well. This is not least characterised by the tug of war between central government and the regions. A bit pointedly, when Swedish governments want to appear proactive, they propose a new law. The free choice of care reform has arguably been the most important political and legal healthcare reform during the last couple of decades. It has given patients nationwide access to the health system while the responsibility for making the system work has remained with the regions. Initially, this was not a problem since patients mostly seek physical care near their home anyway. With the rapid growth of online doctors, this has changed dramatically. Since online doctors operate across region borders, the regional councils need common rules and SALAR has become a strong normative force to be reckoned with. SALAR's recommendations are non-binding but all regions tend to abide by them. The recommendations can be regarded as a form of soft law which, in some sense, is more normative in action than is law. The fact that Swedish healthcare law is widely perceived as a fragmentised patchwork simply adds further weight to SALAR's recommendations, which are more hands-on.

The Econo-Legal

Levels for reimbursements and patient fees are set regionally, based on SALAR's recommendations. In other words, the price of healthcare is fixed, a typical feature of a quasi-market. The online doctor companies have notoriously sought out partnerships that maximise their profit per treated patient. This has led to a cat-and-mouse chase where regions complain about the way the online doctors behave, followed by new recommendations issued by SALAR, which prompts online doctors to search for new loopholes, and so on. These claims of mine are not meant as criticism of online doctors for doing their best to establish their businesses and thrive. By now, we should be aware that they are certainly not alone; the entire Swedish welfare sector is one big quasi-market. This is counter-intuitive; the economy of the health system is dependent on individual healthcare actors that act collectively, at least during a sufficiently large part of the time. However, the health system is organised in a way that encourages individual rather than collective action. Again, this illustrates the stratified and transfactual nature of the social where social systems, such as the health system, operate under pseudo-closed conditions (Danermark et al. 2003), opened to influences from economic interests.

The econo-legal perspective is also key in understanding the strong predictive impact of distributive justice on the willingness to use Kry. Indeed, the organization of the healthcare as a quasi-market is a consequence of the kind of tax-funded health system that Sweden is. But online doctors often also constitute links in vertically integrated

retail chains, in this thesis best illustrated by the partnership between the ICA Group and Min Doktor. The purpose of vertically integrated business chains is to keep the customer under the same corporate umbrella during the entire shopping tour. In the U.S., where this trend originates, big corporations like Amazon and Walmart have begun to enter the healthcare market. Retail clinics, bringing affordable healthcare to Americans who cannot afford a decent health insurance, are popping up in shopping malls. In this development, online doctors serve as an important component. Although there are many differences between the Swedish and American health systems, the business model of vertically integrated healthcare is basically the same on both sides of the Atlantic. This hybrid of healthcare and retail could explain why we think of the fairness of online doctors so strongly in terms of distributive justice. We expect the healthcare experience to be like the experience we get when we swap and click on Amazon.com. The outcome on the online marketplace (buy/no buy) is predicted by perceptions of value for money (equity) and the customer's level of interest in the product that they are looking at.

The Uniquely Legal

Besides always being also the ethico-legal, the juridico-political, and the socio-legal, law is something uniquely legal (Norrie 2017). Swedish healthcare law is in some respects ambiguous; it has even been argued that two different norm systems are expressed through the same legal framework: one system pertaining to the principles of the ethical platform and one system pertaining to the principle of free choice (Smer 2020). Swedish healthcare law is sometimes regarded by non-lawyers as hard to decipher (Vårdanalys 2017a) and healthcare law does not evolve through litigation. Unlike some areas of administrative law where litigation is an important part of legal evolution, healthcare law is rather motionless. Still, there are rules and norms for everything in the healthcare. If a rule is missing, the healthcare will invent one[120]. Keeping "lists" of patients is not a legal obligation but this kind of norm is necessary for healthcare authorities in doing their duty to prioritise scarce resources wisely. Since regions lack legislative powers, they must govern primarily through economic norms.

The previous paragraph describes healthcare law as a matter of fact. However, in my opinion, the intransitive object of study for the sociology of law, i.e., what sociology of law is about, is not law as is but rather the causal forces that make law what it is. Retail health may be a future event about to happen, but the mechanisms causing this event (or not) are already in place. This is not to suggest that the destiny of the Swedish

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[120] A phenomenon described by Åström (1988) in the context of social services.

healthcare is sealed. The structures of Swedish society, law included, are in many ways not designed for a consumer-driven healthcare. This, I believe, is where the uniquely legal comes into play. Although fuelled by political ambitions, torn by ethical conflicts, and bamboozled by economic interests, the law must ultimately do what it knows best: draw a line; separate the wheat from the chaff; dichotomise the complex into the right and wrong. The ethical, the political, and the social provide law with substance, but as the ethico-legal, the juridico-political, and the socio-legal, they are all cast in law's morality of form (Norrie 2017). The current situation would not have been possible without law's broken dialectic, a break that separates the inseparable and provides us with at least a half-true sense of what is right and what is not. Importantly, my argument is that these events were not triggered by law, but by ethico-legal, juridico-political, and econo-legal mechanisms. Reshaped by law's morality of form, these mechanisms are manifested through actual law, itself an event that has emerged from a deep and layered socio-historical context. Under different conditions, the law might be a different kind of happening. There are alternatives, and that is a good thing.

Implications of the Study

In this section, I discuss some possible implications of the present study. First, methodological implications will be discussed with a focus especially on the advantages of PLS-PM as a statistical method. This is followed by a discussion on the theoretical implications for justice theory and the legal architectonic.

Methodological Implications

To the best of my knowledge, this thesis marks the first time that partial least squares path modelling (PLS-PM) has been applied in a published socio-legal study. The method's focus on latent variables makes PLS-PM a viable alternative for sociologists of law with an interest in empirically elusive phenomena. Compared to covariance-based SEM, which is suited for confirmatory research and theory testing, variance-based PLS-PM is better suited for exploratory research and theory development. This means that the analysis is theory-driven rather than guided by heuristics such as p values and model fit. The approach to PLS-PM adopted in this thesis is also inspired by the realist perspective represented by Rigdon (2016). For me, this perspective has facilitated a connection between statistical modelling and critical realism. As a missing data strategy, the MINN procedure, as proposed by Jamil (2012), was successful. Multiple imputation in combination with a post-process where imputed data are fed into an

artificial neural network can serve as a good alternative when researchers are dealing with non-ignorable amounts of missing data. In that way, loss of data can be minimised, which in turn prevents loss of statistical power. At the same time, the MINN procedure does not appear to affect model estimates negatively to an unacceptable extent. Easy-to-use commercial software, with a strong focus on visualisation of paths and relationships, further adds to the applicability of PLS-PM for mixed methods social science. However, as with all types of statistical modelling, PLS-PM is not sufficient on its own if the researcher's aim is explanation. All empirical results must be contextualised, as must results from PLS-PM. For this purpose, I have partly relied on retroductive reasoning, which is a method for connecting empirical and theoretical levels and to think about concepts and real-world phenomena in new ways.

Theoretical Implications

The empirical findings suggest a conceptual split of distributive justice into two distinct constructs: equity and equality. This may have implications for justice theory. The formulation of the survey items relating to equity and equality was informed by Colquitt and Rodell (2015), but these authors do not provide a discussion on the differences between the two specific justice rules. However, it is intuitively not hard to imagine that perceptions of equality might pertain to values relating to group interests while perceptions of equity might pertain to values relating to personal interests, and that these differences are substantial enough for this separation to be justified at least in some situations. Although equity and equality can both be understood as facets of distributive justice, they may still be quite different from one another, if described in the way that I have done here.

While the empirical findings indicated that perceptions of procedural justice do not impact the willingness to use Kry, the respondents nevertheless seemed to perceive Kry as a procedurally fair service. In a counter-factual situation, where respondents are *not* perceiving Kry in this way, would procedural justice still be unimportant for their willingness to use Kry? The present study tests the relationship between perceived procedural justice and the willingness to act; it does *not* test the relationship between perceived *absence* of procedural justice and the willingness to act. Therefore, it can hardly be concluded that procedural justice does not affect the willingness to consult online doctors, which is something that needs to be examined.

The addition of the econo-legal is an attempt on my part to specify economic relations as a specific category of social relations in law's architectonic (Figure 28). In all fairness, this is not really an adjustment of Norrie's (2017) theoretical figure. The borders around law and the three dimensions are basically fictional, which implies that the

content of either dimension can be neither fixed nor exhaustive. Thus, it would be impossible to study any of the dimensions in its entirety. Notwithstanding, it seems to me that the social relations dimension is vaster than the dimensions of ethics or political forms. For me, this meant that I had to carefully consider what kind of social relations specifically I was interested in before basing empirical investigations on the figure. This is important to keep in mind.
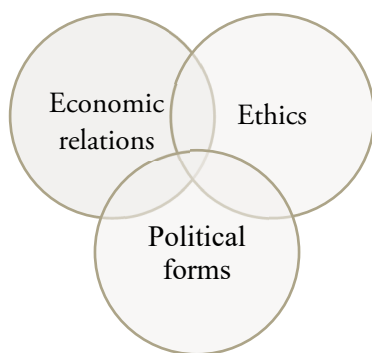
Figure 28: Law's architectonic

Limitations of the Study

The two online surveys were conducted in October 2016 and October 2017, respectively. Observed differences between the surveys, I attribute to the time factor; during the time between the surveys, the awareness about Kry increased significantly. Since then, public awareness about online doctors must have increased even more and the same survey conducted in 2021 would most likely generate different results. Although the aim of the study was not primarily to survey the awareness or opinions of Kry among the respondents, these probable changes in public opinion would most likely have affected the statistical modelling as well. In this perspective, the empirical data are a bit dated, which is a limitation of the study.

The fact that the survey respondents were recruited by a survey panellist company raises some questions about self-selection bias. Even with a panel sample that is representative for the population, there is zero chance for someone who is not a panellist to be recruited to the survey. Another limitation of the study is the presence of non-response bias, which arises when study participants refrain from responding to questions. The causes of non-response bias are difficult to examine. However, an analysis of excluded cases indicated that excluded respondents had more in common with respondents in poor health and with low confidence in the healthcare than with the average study

participant. This suggests that disadvantaged persons may be underrepresented in the survey and illustrates the importance of extreme cases analyses. However, it also illustrates a limitation of the online survey as a method as it might systematically exclude hard-to-reach groups.

The questionnaire was based on existing scales although they had not been applied in the context of online doctors. Hence, there is a risk that the concepts have not been properly operationalised for the specific research context. For instance, the discarding of interpersonal justice and informational justice from the PLS path models must be regarded as a failure. Model evaluations indicated satisfactory quality criteria for these justice dimensions, but they did not contribute significantly to explaining the model. This might be due to a failure to operationalise these two justice dimensions. Furthermore, since the two dimensions concern interaction between patient and doctor, other research methods, e.g., focus group interviews, may be a more appropriate choice than online survey.

One important lesson from the PLS-PM stage is that instrumental variables should be developed when constructing the questionnaire. Instrumental variables are developed to address problems of endogeneity, which refers to the situation where effects that are believed to be caused by exogenous variables are in fact caused by factors within the model. Instrumental variables were not included in the questionnaire and the issue of endogeneity has not been properly investigated. This is a limitation of the study.

Suggestions for Future Research

From a theoretical perspective, future research should further explore the difference between equity and equality in contexts where distributive justice is in focus. For instance, it needs to be clarified whether the difference observed in this study is typical for the online doctor context or if the separation of the two specific justice rules might be relevant in a more general distributive justice context.

Furthermore, the role of procedural justice in relation to online doctors needs to be examined further. In the PLS path analysis, procedural justice and distributive justice were both treated as exogenous variables. An alternative relationship, where procedural justice is instead modelled as an antecedent variable, affecting distributive justice as well as the willingness to act, should be explored (Figure 29). The rationale behind this suggestion is based on the observation that the study participants associated Kry with procedural justice although this did not impact their willingness to use Kry. What would happen in the absence of procedural justice?
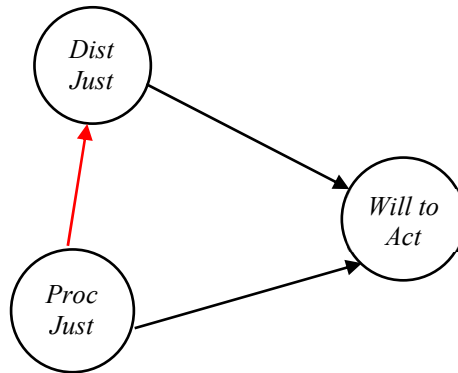
Figure 29: Procedural Justice as antecedent construct

Lastly, the target population in this study were 20-50-year-old persons who are accustomed to using smartphones. For this group, the threshold for starting to use online doctor services is probably lower compared to some other groups. Future research on online doctors should specifically target other groups such as the elderly, the chronically ill, and other hard-to-reach groups who would benefit from the improved access to healthcare that online doctors can provide in an ideal world.

Conclusions

Findings from two online surveys and statistical modelling using PLS-PM show that perceptions of distributive justice can predict the willingness to use the online doctor service Kry. The relationship between perceptions of distributive justice and the willingness to use Kry may, in turn, be mediated by confidence and enticement beliefs in a privacy calculus.

The cause of online doctors as a phenomenon can be traced to the reorganization of the Swedish healthcare, primarily represented by the 2010 free choice of care reform. This reform built an ethical conflict into healthcare law as the freedom of choice and pre-existing guiding principles are partly incompatible. The reform also created a nationwide quasi-market for healthcare services, while the legal responsibility for the healthcare remained with the regions.

Swedish online doctor companies have been able to take advantage of this new landscape as well as adjust when conditions change. The companies are also part of a trend where healthcare is becoming integrated with retail. This explains, I argue, why

perceptions of distributive justice are more dominant than perceptions of procedural justice – including law – in predicting the willingness to use Kry. However, online doctors are not the cause of this development and they do not necessarily indicate where we are going. On the contrary, online doctors tell us where we are coming from.

PLS path modelling (PLS-PM) has been applied in this study. PLS-PM is an excellent method for sociologists of law conducting mixed methods research. The PLS-PM approach works especially well when loosely defined relationships between latent variables are explored.

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Appendices

Appendix 1: The Questionnaire

Swedish (original)	English (preliminary)
Hej!	Hi!
I den här enkäten ställer vi frågor om människors inställning till att lämna ut personlig hälso- och sjukvårdsinformation i applikationer för mobiltelefoner (s.k. "hälsoappar").	In this survey we ask questions about people's preferences regarding submitting personal health information using applications for cell phones (so called "health apps").
Undersökningen är ett samarbete mellan Rättssociologiska institutionen på Lunds universitet och Webbhälsa AB, ett företag som har utvecklat en tjänst som gör det möjligt för patienter att träffa läkare genom videomöte på datorn eller i mobiltelefonen.	The survey is a collaboration between the Sociology of Law department at Lund University and Webbhälsa AB, a company that has developed a service which makes it possible for patients to meet doctors through video meetings on their computer or cell phone.
Enkäten tar cirka 10 minuter att besvara och din medverkan sker helt anonymt. Inga svar kommer att kunna kopplas till dig som person.	The survey takes about 10 minutes to complete and your participation is entirely anonymous. No responses will be possible to connect to your person.
Fram till dess att du avslutar undersökningen kan du när som helst gå tillbaka till tidigare frågor för att kontrollera eller ändra dina svar.	Until completion of the survey you can at any time go back to previous questions to check or change your responses.
Om du har frågor gällande undersökningen ber vi dig kontakta:	If you have questions about the survey, please contact:
Peter Bergwall	Peter Bergwall
Rättssociologiska institutionen, Lund	Sociology of Law department, Lund
peter.bergwall@soclaw.lu.se	peter.bergwall@soclaw.lu.se
046-222 87 36	046-222 87 36
Tryck eller klicka på "Nästa" för att starta enkäten!	Press or click "Next" to start the survey!
Bakgrundsfrågor:	Background questions:
1. ÅLDER Min ålder i år (lista: 15 – 65)	**AGE** My age in years (list: 15 - 65)
2. KÖN Jag identifierar mig som: ☐ Kvinna [1] ☐ Man [2] ☐ Annat [3] ☐ Vill ej uppge [4]	**SEX** I identify as: ☐ Woman [1] ☐ Man [2] ☐ Other [3] ☐ Do not want to state [4]
3. FÖDELSEOMRÅDE Jag är född: ☐ i Sverige [1] ☐ inom EU eller Norden (ej Sverige) [2] ☐ utanför EU och Norden [3] ☐ Vill ej uppge [4]	**PLACE OF BIRTH** I was born: ☐ in Sweden [1] ☐ in the EU or the Nordic countris (excl. Sweden [2] ☐ outside of EU and the Nordic countries [3] ☐ Do not want to state [4]
4. SYSSELSÄTTNING Min nuvarande sysselsättning: ☐ Anställd [1] ☐ Arbetssökande [2] ☐ Eget företag [3] ☐ Pensionär [4] ☐ Student [5] ☐ Annan sysselsättning [6]	**OCCUPATION** My present occupation: ☐ Employed [1] ☐ Job-seeker [2] ☐ Own business [3] ☐ Pensioner [4] ☐ Student [5] ☐ Other occupation [6]

☐ Vill ej uppge [7]		☐ Do not want to state [7]

5. TILLGÅNG TILL SMARTPHONE
Har du en mobiltelefon med möjlighet att ladda ned små program/appar (en s.k. smartphone)
- ☐ Ja [1]
- ☐ Nej [2]

5. ACCESS TO SMARTPHONE
Do you have a cellphone with the capability to download small programs/apps (a so-called smartphone)
- ☐ Yes [1]
- ☐ No [2]

6. HÄLSOTILLSTÅND
På en sjugradig skala (där 1 = mycket dåligt och 7 = mycket gott), hur skulle du uppskatta ditt allmänna hälsotillstånd?

6. HEALTH STATUS
On a seven point scale (where 1 = very poor and 7 = very good), how would you assess your general health status?

Mycket dåligt						Mycket gott	Very poor						Very good
1	2	3	4	5	6	7	1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

7. FÖRTROENDE FÖR SJUKVÅRDEN
På en sjugradig skala (där 1 = mycket lågt förtroende och 7 = mycket högt förtroende), hur högt förtroende skulle du uppskatta att du har för den svenska sjukvården?

7. CONFIDENCE IN THE HEALTHCARE
On a seven point scale (where 1 = very low and 7 = very high), what level of confidence would you say that you have in the Swedish healthcare?

Mycket lågt						Mycket högt	Very low						Very high
1	2	3	4	5	6	7	1	2	3	4	5	6	7
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

8. HANTERING AV PERSONUPPGIFTER I HÄLSOAPPAR
På en skala (1-5), ange i vilken usträckning du instämmer i följande påståenden[121]:

8. MANAGEMENT OF PERSONAL DATA IN HEALTH APPS
On a scale (1-5), state to what extent that you agree with the following statements[121]:

Instämmer inte alls			Instämmer helt		Vet ej/ingen åsikt	Do not agree at all			Agree completely		Do not know/No opinion
1	2	3	4	5		1	2	3	4	5	
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Jag skulle kunna tänka mig att lämna ut mina personuppgifter till en hälsoapp för att kunna använda en hälso- eller sjukvårdstjänst (APP_WILL1)	I can imagine submitting my personal data in a health app in order to be able to use a healthcare service (APP_WILL1)
Jag oroas av den digitala utvecklingen inom hälso- och sjukvårdsområdet (APP_CONC1)	I am worried about the digital development in the healthcare sector (APP_CONC1)
Svensk lagstiftning erbjuder förmodligen ett gott skydd av de personuppgifter som lämnas ut i hälso appar (APP_LAW)	Swedish legislation probably offer a good protection of personal data that have been submitted to health apps (APP_LAW)
Jag kan tänka mig att kommunicera med läkare via webbkamera eller en hälsoapp på mobiltelefonen (APP_WILL2)	I can imagine communicating with a doctor via a web cam or a health app on my cellphone (APP_WILL2)
Jag skulle vara orolig för vad som kan hända med mina personuppgifter om jag lämnade ut dem i en hälsoapp (APP_CONC2)	I would be worried about what might happen to my personal data if I submitted them in a health app (APP_CONC2)
Jag är orolig för att den personliga kontakten mellan patient och läkare ska försvinna om digitala hälsotjänster får för stor spridning (APP_CONC3)	I am worried that the personal contact between patient and doctor will disappear if digital health services become spread too widely (APP_CONC3)
Den digitala teknikutvecklingen kan bidra till att göra hälso- och sjukvården mer säker och tillförlitlig (APP_TRUST1)	The development of digital technology can contribute in making the healthcare safer and more reliable (APP_TRUST1)
Människor riskerar sin personliga integritet när de lämnar ut sina personuppgifter i hälsoappar (APP_RISK)	People risk their privacy when they submit personal data in health apps (APP_RISK)

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[121] This is the Likert scale used from section 8 and onwards, unless otherwise stated.

Leverantörer av hälsoappar tillämpar förmodligen bra regelverk för hantering av de personuppgifter som lagras i apparna (APP_INDREG)	Health app providers probably apply good regulations regarding management of the personal data stored in the apps (APP_INDREG)
Appar som tillhandahåller hälso- och sjukvårdstjänster är intressanta för mig (APP_INTER1)	Apps providing healthcare services are interesting to me (APP_INTER1)
Jag tycker att den digitala teknikutvecklingen inom hälso- och sjukvårdsområdet är spännande (APP_INTER2)	I think that the digital technology development within the healthcare sector is exciting (APP_INTER2)
Man kan lita på att hälsoappar hanterar personuppgifter på ett ansvarsfullt sätt (APP_TRUST2)	You can rely on health apps to handle personal data in a responsible manner (APP_TRUST2)
Nu följer frågor om Kry, en tjänst som tillåter patienter och läkare att mötas genom videosamtal på datorn eller i mobiltelefonen. Efter att ha loggat in med BankID i Kry kan patienter beskriva sina symptom eller besvär och boka tid för ett videomöte med en läkare. Användare har också möjlighet att bifoga bilder till sina symptombeskrivningar. När det är dags för videomötet så ringer läkaren upp patienten för ett videosamtal via dator eller mobiltelefon. Krys läkare kan erbjuda medicinsk rådgivning samt ställa diagnoser och skriva ut recept eller remisser till specialistsjukvården. Läkarmöten i Kry dokumenteras i patientjournaler precis som vid fysiska läkarbesök. Vi inleder med att visa ett kort filmklipp som demonstrerar hur Kry fungerar. Därefter varvas frågor med bilder som har hämtats direkt från Kry-appen. Observera att det inte går att logga in i Kry eller trycka, klicka eller svepa i filmen eller bilderna! Det inledande filmklippet varar i drygt 20 sekunder och saknar ljud.	Next, we will ask questions about Kry, a service that allow for patients and doctors to meet via video meetings on their computer or cell phone. After signing in to Kry using BankID (electronic identification), patients can describe their symptoms or problems and book an appointment for a video meeting with a doctor. Users also have the possibility to attach images with their symptom descriptions. When it is time for the video meeting, the doctor will call the patient for a video meeting via computer or cell phone. Kry's doctors can provide medical advice as well as make diagnoses and prescribe drugs or refer patients to the specialised healthcare. Appointments in Kry are documented in patient records in the same way as in physical doctor's appointments. We begin by showing a short film clip that demostrates how Kry works. Then, we will alter between asking questions and showing images taken directly from the Kry app. Please, note that it is not possible to log into Kry or press, click, or sweep in the film clip or the images! The introductiory film clip lasts for a little more than 20 seconds and is without sound.
9. KONTROLL ÖVER PERSONUPPGIFTER	**CONTROL OVER PERSONAL DATA**
Användare av Kry verkar själva avgöra vilka personuppgifter som samlas in av tjänsten (CTRL_1)	Kry users seem to decide for themselves which personal data that are collected by the service (CTRL_1)
Användare av Kry verkar själva bestämma på vilket sätt som tjänsten samlar in deras personuppgifter (CTRL_2)	Kry users seem to decide for themselves in what way the service collects their personal data (CTRL_2)
Användare av Kry verkar själva styra över vad Kry använder deras personuppgifter till (CTRL_3)	Kry users seem to control for what Kry uses their personal data (CTRL_3)
Det verkar vara enkelt att överblicka vilka uppgifter om ens person som sparas av Kry (CTRL_4)	It seems easy to overview what data concerning one's person that are being stored by Kry (CTRL_4)
Krys användare verkar överlag ha bra kontroll över sina personuppgifter som de har lämnat ut till Kry (CTRL_5)	Overall, Kry users seem to be in control over the personal data that they have submitted to Kry (CTRL_5)
10. ETIK OCH REGLERING	**ETHICS AND REGULATIONS**
Hälsoappar som Kry regleras förmodligen av svenska lagar (PROC_1)	Health apps like Kry are probably regulated by Swedish laws (PROC_1)
Kry verkar vara en tjänst som behandlar alla sina användare på ett rättvist sätt (PROC_2)	Kry seems to be a service that treats all its users fairly (PROC_2)

Det verkar vara personer eller aktörer med sunda värderingar som har utformat Kry (PROC_3)	It seems to be people with sound values that have developed Kry (PROC_3)
Kry verkar vara en tjänst som är utformad i enlighet med goda etiska principer (t.ex. enligt Läkarförbundets etiska regler) (PROC_4)	Kry seems to be a service that has been developed in accordance with good ethical principles (e.g., the ethical principles of The Swedish Medical Association) (PROC_4)
De flesta vuxna människor kan nog klara av att använda Kry (PROC_5)	Most adult persons would probably be capable to use Kry (PROC_5)
Jag tror att Kry bemöter alla användare på ett likvärdigt sätt (PROC_6)	I think Kry treats all users equally (PROC_6)
Det kunde framgå på ett tydligare sätt vilken värdegrund som Kry vilar på (negPROC_7)	It could be more clearly stated what values Kry is founded on (negPROC_7)
Hälsoappar som Kry är delar av en bransch som troligtvis är ganska oreglerad (negPROC_8)	Health apps like Kry are part of an industry that is probably not very regulated (negPROC_8)

11.	BEMÖTANDE	PERSONAL TREATMENT
	Kry tycks bemöta sina användare på ett artigt sätt (INTP_1)	Kry seems to treat their users politely (INTP_1)
	Kry verkar vara uppriktiga mot sina användare (INTP_2)	Kry seems to be sincere towards their users (INTP_2)
	Jag upplever Krys bemötande av sina användare som fritt från fördomar (INTP_3)	I perceive Kry's treatment of their users to be free from prejudice (INTP_3)
	Kry verkar bemöta sina användare på ett respektfullt sätt (INTP_4)	Kry seems to treat their users respectfully (INTP_4)
	Kry verkar bemöta sina användare på ett korrekt sätt (INTP_5)	Kry seems to treat their users properly (INTP_5)
	Det finns risk för att vissa användare upplever Krys bemötande som stötande (negINTP_6)	There is a risk that some users experience Kry's treatment as offensive (negINTP_6)
	Jag har förståelse för om vissa användare kan uppleva Krys bemötande som olämpligt (negINTP_7)	I can understand if some users may perceive Kry's treatment as inappropriate (negINTP_7)
	Vissa grupper av människor riskerar att bli diskriminerade av hälsoappar som Kry (negINTP_8)	Some groups of people risk being discriminated by health apps like Kry (negINTP_8)

12.	MÅLGRUPPER	TARGET GROUPS
	Appar som Kry kan bidra till en mer tillgänglig sjukvård (EQL_1)	Apps like Kry can contribute to a more accessible healthcare (EQL_1)
	Kry är en tjänst som möjliggör en mer jämlik sjukvård (EQL_2)	Kry is a service that enables a more equal healthcare (EQL_2)
	De flesta patienter som uppsöker läkare på en vårdcentral skulle kunna få en likvärdig service genom att använda Kry (EQL_3)	Most patients visiting a doctor at a health center could receive equivalent treatment by using Kry (EQL_3)
	Kry är en tjänst som riktar sig till användare i alla åldrar (EQL_4)	Kry is a service for users of all ages (EQL_4)
	Personer som ofta möter fysiska funktionshinder i vardagen kan ha stor nytta av en tjänst som Kry (EQL_5)	Persons who often encounter physical obstacles in everyday life due to some disability can benefit largely from a service like Kry (EQL_5)
	Människor med nedsatt syn eller hörsel eller andra kognitiva funktionsnedsättningar kan ha svårt att utnyttja fördelarna med en hälsoapp som Kry (negEQL_6)	Persons with impaired vision or hearing or other cognitive disabilities may have trouble utilizing the benefits of a health app like Kry (negEQL_6)

13.	NEGATIV SÄRBEHANDLING På en skala (1-5), ange i vilken usträckning du insämmer i påståendet att det finns risk för att vissa personer som använder Kry känner sig särbehandlade på grund av:	NEGATIVE DISCRIMINATION On a scale (1-5), state to what extent that you agree with the statement that there is a risk that some persons who use Kry will feel discriminated because of:
	Kön (GENDER)	Sex (GENDER)
	Könsöverskridande identitet eller uttryck (TRANSGEN)	Transgender identity or expression (TRANSGEN)
	Etnisk tillhörighet (ETHNICITY)	Ethnicity (ETHNICITY)
	Religion eller trosuppfattning (RELIGION)	Religion or other belief (RELIGION)

	Funktionsnedsättning (DISABIL)	Disability (DISABIL)
	Sexuell läggning (SEXORIEN)	Sexual orientation (SEXORIEN)
	Ålder (AGE_DISC)	Age (AGE_DISC)
14.	**INFORMATION OCH KOMMUNIKATION**	**INFORMATION AND COMMUNICATION**
	Krys information verkar heltäckande (INFO_1)	Kry's information seems to be comprehensive (INFO_1)
	Krys information verkar vara klar och tydlig (INFO_2)	Kry's information seems to be clear and distinct (INFO_2)
	Krys information verkar vara fullständig (INFO_3)	Kry's information seems to be complete (INFO_3)
	Det verkar vara lätt att få hjälp om man t.ex. har frågor eller problem med att använda Kry (INFO_4)	It seems easy to get help if one, for instance, has questions or trouble using Kry (INFO_4)
	Krys information ger ett trovärdigt intryck (INFO_5)	Kry gives a credible impression (INFO_5)
	Jag tycker att Krys information håller ganska låg kvalitet (negINFO_6)	I think that Kry's information is of pretty low quality (negINFO_6)
	Jag behöver mer klargörande information om Kry innan det skulle kunna vara aktuellt för mig att använda tjänsten (negINFO_7)	I need more clarifying information about Kry before I would consider using the service (negINFO_7)
15.	**FÖRDELAR OCH NYTTA**	**ADVANTAGES AND BENEFITS**
	De förberedelser som krävs för att använda Kry är rimliga i förhållande till vad som krävs inför ett läkarbesök på en vårdcentral (EQT_1)	The preparations required to use Kry is reasonable compared to what is required before a doctor's visit at a health center (EQT_1)
	Jag tycker att priset för ett läkarmöte hos Kry (299 kronor) ligger på en rimlig nivå (EQT_2)	I think the price for a meeting with a doctor using Kry (SEK 299) is at a reasonable level (EQT_2)
	Kry samlar troligtvis in mer information om sina användare än vad som egentligen är nödvändigt (EQT_3)	Kry probably collects more information about its users than what is actually needed (EQT_3)
	Personligen tycker jag att fördelarna med att använda Kry verkar vara fler än nackdelarna (EQT_4)	In my opinion, there seems to be more benefits than disadvantages with using Kry (EQT_4)
	Jag tror att en hälsoapp som Kry skulle kunna underlätta min vardag (EQT_5)	I believe that a health app like Kry could make my everyday life easier (EQT_5)
	En app som Kry känns överflödig för mig (negEQT_6)	For me, an app like Kry feels superfluous (negEQT_6)
16.	**HANTERING AV PERSONUPPGIFTER I APPEN KRY**	**MANAGEMENT OF PERSONAL DATA IN THE APP KRY**
	Jag skulle kunna tänka mig att lämna ut mina personuppgifter till Kry för att kunna använda appen (KRY_WILL1)	I can imagine submitting my personal data to Kry in order to use the app (KRY_WILL1)
	Jag oroas av den digitala utvecklingen som sker inom hälso- och sjukvårdsområdet och som tjänster som Kry är ett resultat av (KRY_CONC1)	I am worried about the ongoing digital development in the healthcare sector, which Kry is one example of (KRY_CONC1)
	Svensk lagstiftning erbjuder ett gott skydd av de personuppgifter som lämnas ut i Kry (KRY_LAW)	Swedish legislation offers a good protection of personal data that have been submitted to Kry (KRY_LAW)
	Jag kan tänka mig att kommunicera med läkare via videomöte i en app som Kry (KRY_WILL2)	I can imagine communicating with a doctor via video meeting in an app like Kry (KRY_WILL2)
	Jag skulle vara orolig för vad som kan hända med mina personuppgifter om jag lämnade ut dem i Kry (KRY_CONC2)	I would be worried about what might happen to my personal data if I submitted them in Kry (KRY_CONC2)
	Jag är orolig för att jag ska gå miste om den personliga kontakten mellan patient och läkare vid ett videomöte i Kry (KRY_CONC3)	I am worried about losing the personal contact between patient and doctor during a video meeting in Kry (KRY_CONC3)
	Utvecklingen av digitala hälsotjänster som Kry kan bidra till att göra sjukvården mer säker och tillförlitlig (KRY_TRUST1)	The development of digital health services like Kry can contribute in making the healthcare safer and more reliable (KRY_TRUST1)
	Krys användare riskerar sin personliga integritet när de lämnar ut sina personuppgifter i appen (KRY_RISK)	People risk their privacy when they submit their personal data in the app (KRY_RISK)

	Kry har förmodligen ett bra regelverk för hantering av de personuppgifter som lagras i appen (KRY_INDREG)	Kry probably applies good regulations regarding management of the personal data stored in the app (KRY_INDREG)
	Jag tycker att Kry är en intressant app (KRY_INTER1)	I think that Kry is an interesting app (KRY_INTER1)
	Jag tycker att den digitala teknikutvecklingen inom hälso- och sjukvårdsområdet, t.ex. i form av tjänster som Kry, är spännande (KRY_INTER2)	I think that the digital technology development within the healthcare sector, exemplified by services like Kry, is exciting (KRY_INTER2)
	Man kan lita på att Kry hanterar personuppgifter på ett ansvarsfullt sätt (KRY_TRUST2)	You can rely on Kry to handle personal data in a responsible manner (KRY_TRUST2)
17.	**TIDIGARE KÄNNEDOM** Hade du hört talas om tjänsten Kry innan du deltog i den här undersökningen? ☐ Ja [1] ☐ Nej [2] ☐ Jag vet inte [3]	**PRIOR KNOWLEDGE** Had you heard of Kry before you participated in this survey? ☐ Yes [1] ☐ No [2] ☐ I do not know [3]
18.	**TIDIGARE ANVÄNDANDE**[122] Har du någon gång använt tjänsten Kry för få hjälp med en hälsorelaterad fråga gällande dig eller ditt barn? ☐ Ja [1] ☐ Nej [2]	**PRIOR USE**[122] Have you ever consulted Kry with a health related question concerning you or your child? ☐ Yes [1] ☐ No [2]
19.	**ANVÄNDANDE I FRAMTIDEN** Hur stor är sannolikheten för att du skulle använda en hälsoapp som Kry om du fick behov av att komma i kontakt med en läkare? ☐ Väldigt liten sannolikhet [1] ☐ Ganska liten sannolikhet [2] ☐ Varken liten eller stor sannolikhet [3] ☐ Ganska stor sannolikhet [4] ☐ Mycket stor sannolikhet [5] ☐ Vet ej/ingen åsikt [6]	**FUTURE USE** What is the probability that you will use a health app like Kry if you needed to get in contact with a doctor? ☐ Very low probability [1] ☐ Rather low probability [2] ☐ Neither low nor high probability [3] ☐ Rather high probability [4] ☐ Very high probability [5] ☐ Do not know/No opinion [6]
20.	**AVSLUTANDE KOMMENTARER** Om du har några ytterligare kommentarer eller synpunkter på enkäten så får du gärna skriva dem här: [fritext]	**CONCLUDING REMARKS** If you have any additional comments or remarks about the questionnaire, please write them here: [free text option]
	Svaren har sparats, tack för din medverkan!	The responses have been saved, thanks for your participation!

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[122] Respondents who responded "No" or "I do not know" to 17. PRIOR KNOWLEDGE was screened out from 18. PRIOR USE and directed directly to 19. FUTURE USE.

Appendix 2: Missing Data Strategy

- In this study, five-point Likert scale will be used, and middle alternatives will be treated as having meaning and, thus, value. There will also be an alternative, "Do not know/No opinion". The middle alternatives will be included in the analyses. The "Do not know/No opinion" alternative will be treated as user missing values.
- Data screening:
  - Incomplete questionnaires will be excluded
  - Respondents with more than 50% "Do not know/No opinion" responses will be excluded
  - Identification of "straight-liners" through visual inspection and through examination of the standard deviation of each case's responses (SD of <.5 has been seen as problematic for 5-point scales although this is not a formal standard). Problematic straight-liners will be excluded
  - Drop-off analysis will be performed on the incomplete and excluded cases
- Distribution:
  - Kolmogorov-Smirnov test (normality test)
  - Skewness (±1.1 and ±1.8 thresholds for moderate/extreme skewness)
  - Kurtosis (±1.8 and ±3.8 thresholds for moderate/extreme kurtosis)
- Missing value analysis:
  - Try to define missing value mechanism (MCAR, MAR, or MNAR)
  - Little's MCAR test – data are MCAR if the result is not significant ($p \geq .05$)
  - If data are not MCAR, discuss possibility and cause of MAR (or MNAR) mechanism
- Multiple imputation:
  - Perform multiple imputation if missing mechanism allows for it
  - Use at least as many imputations as the total proportion of missing values
- Neural network:
  - Perform post-processing of the multiple imputation results
  - Use RDF method because of its much shorter calculation time compared to MLP, while still being suitable for missing data treatment and prediction
  - Replace missing values with imputed neural network results
- Report histograms of distributions before and after multiple imputation and neural network processing

Appendix 3: Survey Responses

01: I can imagine submitting my personal data in a health app in order to be able to use a healthcare service (APP_WILL1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	128	10.1	10.1
		2	174	13.8	23.9
		3	385	30.5	54.4
		4	372	29.4	83.8
		5 Agree completely	205	16.2	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	86	9.8	9.8
		2	108	12.2	22.0
		3	235	26.6	48.6
		4	287	32.5	81.2
		5 Agree completely	166	18.8	100.0
		Total	882	100.0	

Kry1: 3.28 (mean); 3.00 (median); 1.187 (std. deviation).
Kry2: 3.38 (mean); 4.00 (median); 1.202 (std. deviation).

02: I am worried about the digital development in the healthcare sector (APP_CONC1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	279	22.1	22.1
		2	355	28.1	50.2
		3	335	26.5	76.7
		4	186	14.7	91.4
		5 Agree completely	109	8.6	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	185	21.0	21.0
		2	250	28.3	49.3
		3	229	26.0	75.3
		4	141	16.0	91.3
		5 Agree completely	77	8.7	100.0
		Total	882	100.0	

Kry1: 2.60 (mean); 2.00 (median); 1.223 (std. deviation).
Kry2: 2.63 (mean); 3.00 (median); 1.224 (std. deviation).

03: Swedish legislation probably offer a good protection of personal data that have been submitted to health apps (APP_LAW)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	85	6.7	6.7
		2	167	13.2	19.9
		3	417	33.0	52.9
		4	440	34.8	87.7
		5 Agree completely	155	12.3	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	66	7.5	7.5
		2	111	12.6	20.1
		3	275	31.2	51.2
		4	312	35.4	86.6
		5 Agree completely	118	13.4	100.0
		Total	882	100.0	

Kry1: 3.33 (mean); 3.00 (median); 1.065 (std. deviation).
Kry2: 3.35 (mean); 3.00 (median); 1.094 (std. deviation).

04: I can imagine communicating with a doctor via a web cam or a health app on my cellphone (APP_WILL2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	224	17.7	17.7
		2	184	14.6	32.3
		3	283	22.4	54.7
		4	340	26.9	81.6
		5 Agree completely	233	18.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	137	15.5	15.5
		2	121	13.7	29.3
		3	199	22.6	51.8
		4	213	24.1	76.0
		5 Agree completely	212	24.0	100.0
		Total	882	100.0	

Kry1: 3.14 (mean); 3.00 (median); 1.358 (std. deviation).
Kry2: 3.27 (mean); 3.00 (median). 1.374 (std. deviation).

05: I would be worried about what might happen to my personal data if I submitted them in a health app (APP_CONC2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	112	8.9	8.9
		2	244	19.3	28.2
		3	363	28.7	56.9
		4	308	24.4	81.3
		5 Agree completely	237	18.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	89	10.1	10.1
		2	184	20.9	31.0
		3	265	30.0	61.0
		4	210	23.8	84.8
		5 Agree completely	134	15.2	100.0
		Total	882	100.0	

Kry1: 3.25 (mean); 3.00 (median); 1.217 (std. deviation).
Kry2: 3.13 (mean); 3.00 (median); 1.201 (std. deviation).

06: I am worried that the personal contact between patient and doctor will disappear if digital health services become spread too widely (APP_CONC3)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	120	9.5	9.5
		2	230	18.2	27.7
		3	347	27.5	55.1
		4	331	26.2	81.3
		5 Agree completely	236	18.7	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	109	12.4	12.4
		2	156	17.7	30.0
		3	213	24.1	54.2
		4	235	26.6	80.8
		5 Agree completely	169	19.2	100.0
		Total	882	100.0	

Kry1: 3.26 (mean); 3.00 (median); 1.226 (std. deviation).
Kry2: 3.23 (mean); 3.00 (median); 1.286 (std. deviation).

07: The development of digital technology can contribute in making the healthcare safer and more reliable (APP_TRUST1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	46	3.6	3.6
		2	116	9.2	12.8
		3	400	31.6	44.5
		4	482	38.1	82.6
		5 Agree completely	220	17.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	56	6.3	6.3
		2	94	10.7	17.0
		3	272	30.8	47.8
		4	307	34.8	82.7
		5 Agree completely	153	17.3	100.0
		Total	882	100.0	

Kry1: 3.56 (mean); 4.00 (median); .998 (std. deviation).
Kry2: 3.46 (mean); 4.00 (median); 1.091 (std. deviation).

08: People risk their privacy when they submit personal data in health apps (APP_RISK)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	76	6.0	6.0
		2	210	16.6	22.6
		3	416	32.9	55.5
		4	354	28.0	83.5
		5 Agree completely	208	16.5	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	76	8.6	8.6
		2	134	15.2	23.8
		3	307	34.8	58.6
		4	229	26.0	84.6
		5 Agree completely	136	15.4	100.0
		Total	882	100.0	

Kry1: 3.32 (mean); 3.00 (median); 1.114 (std. deviation).
Kry2: 3.24 (mean); 3.00 (median); 1.147 (std. deviation).

09: Health app providers probably apply good regulations regarding management of the personal data stored in the apps (APP_INDREG)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	78	6.2	6.2
		2	166	13.1	19.3
		3	494	39.1	58.4
		4	416	32.9	91.3
		5 Agree completely	110	8.7	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	63	7.1	7.1
		2	115	13.0	20.2
		3	294	33.3	53.5
		4	317	35.9	89.5
		5 Agree completely	93	10.5	100.0
		Total	882	100.0	

Kry1: 3.25 (mean); 3.00 (median); .997 (std. deviation).
Kry2: 3.30 (mean); 3.00 (median); 1.054 (std. deviation).

10: Apps providing healthcare services are interesting to me (APP_INTER1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	131	10.4	10.4
		2	200	15.8	26.2
		3	362	28.6	54.8
		4	357	28.2	83.1
		5 Agree completely	214	16.9	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	105	11.9	11.9
		2	131	14.9	26.8
		3	257	29.1	55.9
		4	245	27.8	83.7
		5 Agree completely	144	16.3	100.0
		Total	882	100.0	

Kry1: 3.26 (mean); 3.00 (median); 1.212 (std. deviation).
Kry2: 3.22 (mean); 3.00 (median); 1.229 (std. deviation).

11: I think that the digital technology development within the healthcare sector is exciting (APP_INTER2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	79	6.3	6.3
		2	107	8.5	14.7
		3	353	27.9	42.6
		4	429	33.9	76.6
		5 Agree completely	296	23.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	67	7.6	7.6
		2	80	9.1	16.7
		3	206	23.4	40.0
		4	305	34.6	74.6
		5 Agree completely	224	25.4	100.0
		Total	882	100.0	

Kry1: 3.60 (mean); 4.00 (median); 1.120 (std. deviation).
Kry2: 3.61 (mean); 4.00 (median); 1.177 (std. deviation).

12: You can rely on health apps to handle personal data in a responsible manner (APP_TRUST2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	134	10.6	10.6
		2	241	19.1	29.7
		3	520	41.1	70.8
		4	281	22.2	93.0
		5 Agree completely	88	7.0	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	93	10.5	10.5
		2	156	17.7	28.2
		3	318	36.1	64.3
		4	223	25.3	89.6
		5 Agree completely	92	10.4	100.0
		Total	882	100.0	

Kry1: 2.96 (mean); 3.00 (median); 1.056 (std. deviation).
Kry2: 3.07 (mean); 3.00 (median); 1.125 (std. deviation).

13: Kry users seem to decide for themselves which personal data that are collected by the service (CTRL_1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	111	8.8	8.8
		2	170	13.4	22.2
		3	526	41.6	63.8
		4	342	27.1	90.9
		5 Agree completely	115	9.1	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	112	12.7	12.7
		2	123	13.9	26.6
		3	334	37.9	64.5
		4	214	24.3	88.8
		5 Agree completely	99	11.2	100.0
		Total	882	100.0	

Kry1: 3.14 (mean); 3.00 (median); 1.049 (std. deviation).
Kry2: 3.07 (mean); 3.00 (median); 1.155 (std. deviation).

14: Kry users seem to decide for themselves in what way the service collects their personal data (CTRL_2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	122	9.7	9.7
		2	185	14.6	24.3
		3	533	42.2	66.5
		4	304	24.1	90.5
		5 Agree completely	120	9.5	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	108	12.2	12.2
		2	141	16.0	28.2
		3	340	38.5	66.8
		4	187	21.2	88.0
		5 Agree completely	106	12.0	100.0
		Total	882	100.0	

Kry1: 3.09 (mean); 3.00 (median); 1.070 (std. deviation).
Kry2: 3.05 (mean); 3.00 (median); 1.158 (std. deviation).

15: Kry users seem to control for what Kry uses their personal data (CTRL_3)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	115	9.1	9.1
		2	192	15.2	24.3
		3	520	41.1	65.4
		4	319	25.2	90.7
		5 Agree completely	118	9.3	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	113	12.8	12.8
		2	134	15.2	28.0
		3	344	39.0	67.0
		4	197	22.3	89.3
		5 Agree completely	94	10.7	100.0
		Total	882	100.0	

Kry1: 3.11 (mean); 3.00 (median); 1.064 (std. deviation).
Kry2: 3.03 (mean); 3.00 (median); 1.147 (std. deviation).

16: It seems easy to overview what data concerning one's person that are being stored by Kry (CTRL_4)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	70	5.5	5.5
		2	118	9.3	14.9
		3	472	37.3	52.2
		4	421	33.3	85.5
		5 Agree completely	183	14.5	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	58	6.6	6.6
		2	89	10.1	16.7
		3	285	32.3	49.0
		4	321	36.4	85.4
		5 Agree completely	129	14.6	100.0
		Total	882	100.0	

Kry1: 3.42 (mean); 3.00 (median); 1.026 (std. deviation).
Kry2: 3.42 (mean); 3.00 (median); 1.065 (std. deviation).

17: Overall, Kry users seem to be in control over the personal data that they have submitted to Kry (CTRL_5)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	4	.3	.3
		2	41	3.2	3.6
		3	597	47.2	50.8
		4	614	48.6	99.4
		5 Agree completely	8	.6	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	57	6.5	6.5
		2	82	9.3	15.8
		3	272	30.8	46.6
		4	323	36.6	83.2
		5 Agree completely	148	16.8	100.0
		Total	882	100.0	

Kry1: 3.46 (mean); 3.00 (median); .588 (std. deviation).
Kry2: 3.48 (mean); 4.00 (median); 1.077 (std. deviation).

18: Health apps like Kry are probably regulated by Swedish laws (PROC_1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	36	2.8	2.8
		2	84	6.6	9.5
		3	303	24.0	33.5
		4	535	42.3	75.8
		5 Agree completely	306	24.2	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	24	2.7	2.7
		2	39	4.4	7.1
		3	193	21.9	29.0
		4	376	42.6	71.7
		5 Agree completely	250	28.3	100.0
		Total	882	100.0	

Kry1: 3.78 (mean); 4.00 (median); .979 (std. deviation).
Kry2: 3.89 (mean); 4.00 (median); .959 (std. deviation).

19: Kry seems to be a service that treats all its users fairly (PROC_2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	27	2.1	2.1
		2	59	4.7	6.8
		3	352	27.8	34.7
		4	561	44.4	79.0
		5 Agree completely	265	21.0	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	21	2.4	2.4
		2	33	3.7	6.1
		3	250	28.3	34.5
		4	381	43.2	77.7
		5 Agree completely	197	22.3	100.0
		Total	882	100.0	

Kry1: 3.77 (mean); 4.00 (median); .904 (std. deviation).
Kry2: 3.79 (mean); 4.00 (median); .911 (std. deviation).

20: It seems to be people with sound values that have developed Kry (PROC_3)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	29	2.3	2.3
		2	59	4.7	7.0
		3	383	30.3	37.3
		4	566	44.8	82.0
		5 Agree completely	227	18.0	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	25	2.8	2.8
		2	40	4.5	7.4
		3	262	29.7	37.1
		4	378	42.9	79.9
		5 Agree completely	177	20.1	100.0
		Total	882	100.0	

Kry1: 3.71 (mean); 4.00 (median); .892 (std. deviation).
Kry2: 3.73 (mean); 4.00 (median); .928 (std. deviation).

21: Kry seems to be a service that has been developed in accordance with good ethical principles (e.g., the ethical principles of The Swedish Medical Association) (PROC_4)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	33	2.6	2.6
		2	69	5.5	8.1
		3	374	29.6	37.7
		4	551	43.6	81.3
		5 Agree completely	237	18.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	30	3.4	3.4
		2	52	5.9	9.3
		3	232	26.3	35.6
		4	371	42.1	77.7
		5 Agree completely	197	22.3	100.0
		Total	882	100.0	

Kry1: 3.70 (mean); 4.00 (median); .922 (std. deviation).
Kry2: 3.74 (mean); 4.00 (median); .981 (std. deviation).

22: Most adult persons would probably be capable to use Kry (PROC_5)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	54	4.3	4.3
		2	109	8.6	12.9
		3	279	22.1	35.0
		4	484	38.3	73.3
		5 Agree completely	338	26.7	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	24	2.7	2.7
		2	53	6.0	8.7
		3	182	20.6	29.4
		4	352	39.9	69.3
		5 Agree completely	271	30.7	100.0
		Total	882	100.0	

Kry1: 3.75 (mean); 4.00 (median); 1.074 (std. deviation).
Kry2: 3.90 (mean); 4.00 (median); .995 (std. deviation).

23: I think Kry treats all users equally (PROC_6)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	33	2.6	2.6
		2	96	7.6	10.2
		3	350	27.7	37.9
		4	504	39.9	77.8
		5 Agree completely	281	22.2	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	24	2.7	2.7
		2	42	4.8	7.5
		3	243	27.6	35.0
		4	361	40.9	76.0
		5 Agree completely	212	24.0	100.0
		Total	882	100.0	

Kry1: 3.72 (mean); 4.00 (median); .979 (std. deviation).
Kry2: 3.79 (mean); 4.00 (median); .953 (std. deviation).

24: It could be more clearly stated what values Kry is founded on (PROC_7)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	59	4.7	4.7
		2	113	8.9	13.6
		3	447	35.4	49.0
		4	430	34.0	83.0
		5 Agree completely	215	17.0	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	48	5.4	5.4
		2	90	10.2	15.6
		3	310	35.1	50.8
		4	298	33.8	84.6
		5 Agree completely	136	15.4	100.0
		Total	882	100.0	

Kry1: 3.50 (mean); 4.00 (median); 1.025 (std. deviation).
Kry2: 3.44 (mean); 3.00 (median); 1.042 (std. deviation).

25: Health apps like Kry are part of an industry that is probably not very regulated (PROC_8)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	89	7.0	7.0
		2	213	16.9	23.9
		3	520	41.1	65.0
		4	297	23.5	88.5
		5 Agree completely	145	11.5	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	62	7.0	7.0
		2	138	15.6	22.7
		3	370	42.0	64.6
		4	196	22.2	86.8
		5 Agree completely	116	13.2	100.0
		Total	882	100.0	

Kry1: 3.16 (mean); 3.00 (median); 1.059 (std. deviation).
Kry2: 3.19 (mean); 3.00 (median); 1.073 (std. deviation).

26: Kry seems to treat their users politely (INTP_1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	14	1.1	1.1
		2	29	2.3	3.4
		3	317	25.1	28.5
		4	577	45.6	74.1
		5 Agree completely	327	25.9	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	13	1.5	1.5
		2	30	3.4	4.9
		3	178	20.2	25.1
		4	376	42.6	67.7
		5 Agree completely	285	32.3	100.0
		Total	882	100.0	

Kry1: 3.93 (mean); 4.00 (median); .835 (std. deviation).
Kry2: 4.01 (mean); 4.00 (median); .891 (std. deviation).

27: Kry seems to be sincere towards their users (INTP_2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	19	1.5	1.5
		2	45	3.6	5.1
		3	370	29.3	34.3
		4	540	42.7	77.1
		5 Agree completely	290	22.9	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	17	1.9	1.9
		2	32	3.6	5.6
		3	235	26.6	32.2
		4	374	42.4	74.6
		5 Agree completely	224	25.4	100.0
		Total	882	100.0	

Kry1: 3.82 (mean); 4.00 (median); .876 (std. deviation).
Kry2: 3.86 (mean); 4.00 (median); .905 (std. deviation).

28: I perceive Kry's treatment of their users to be free from prejudice (INTP_3)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	22	1.7	1.7
		2	51	4.0	5.8
		3	362	28.6	34.4
		4	543	43.0	77.4
		5 Agree completely	286	22.6	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	19	2.2	2.2
		2	39	4.4	6.6
		3	234	26.5	33.1
		4	355	40.2	73.4
		5 Agree completely	235	26.6	100.0
		Total	882	100.0	

Kry1: 3.81 (mean); 4.00 (median); .891 (std. deviation).
Kry2: 3.85 (mean); 4.00 (median); .938 (std. deviation).

29: Kry seems to treat their users respectfully (INTP_4)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	22	1.7	1.7
		2	36	2.8	4.6
		3	332	26.3	30.9
		4	573	45.3	76.2
		5 Agree completely	301	23.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	18	2.0	2.0
		2	25	2.8	4.9
		3	182	20.6	25.5
		4	390	44.2	69.7
		5 Agree completely	267	30.3	100.0
		Total	882	100.0	

Kry1: 3.87 (mean); 4.00 (median); .868 (std. deviation).
Kry2: 3.98 (mean); 4.00 (median); .898 (std. deviation).

30: Kry seems to treat their users properly (INTP_5)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	21	1.7	1.7
		2	47	3.7	5.4
		3	317	25.1	30.5
		4	559	44.2	74.7
		5 Agree completely	320	25.3	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	17	1.9	1.9
		2	22	2.5	4.4
		3	186	21.1	25.5
		4	410	46.5	72.0
		5 Agree completely	247	28.0	100.0
		Total	882	100.0	

Kry1: 3.88 (mean); 4.00 (median); .888 (std. deviation).
Kry2: 3.96 (mean); 4.00 (median); .874 (std. deviation).

31: There is a risk that some users experience Kry's treatment as offensive (INTP_6)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	209	16.5	16.5
		2	285	22.5	39.1
		3	445	35.2	74.3
		4	206	16.3	90.6
		5 Agree completely	119	9.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	173	19.6	19.6
		2	218	24.7	44.3
		3	290	32.9	77.2
		4	122	13.8	91.0
		5 Agree completely	79	9.0	100.0
		Total	882	100.0	

Kry1: 2.80 (mean); 3.00 (median); 1.177 (std. deviation).
Kry2: 2.68 (mean); 3.00 (median); 1.194 (std. deviation).

32: I can understand if some users may perceive Kry's treatment as inappropriate (INTP_7)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	151	11.9	11.9
		2	210	16.6	28.6
		3	429	33.9	62.5
		4	300	23.7	86.2
		5 Agree completely	174	13.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	122	13.8	13.8
		2	167	18.9	32.8
		3	296	33.6	66.3
		4	175	19.8	86.2
		5 Agree completely	122	13.8	100.0
		Total	882	100.0	

Kry1: 3.11 (mean); 3.00 (median); 1.192 (std. deviation).
Kry2: 3.01 (mean); 3.00 (median); 1.223 (std. deviation).

33: Some groups of people risk being discriminated by health apps like Kry (INTP_8)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	189	15.0	15.0
		2	232	18.4	33.3
		3	395	31.3	64.6
		4	270	21.4	85.9
		5 Agree completely	178	14.1	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	180	20.4	20.4
		2	169	19.2	39.6
		3	259	29.4	68.9
		4	164	18.6	87.5
		5 Agree completely	110	12.5	100.0
		Total	882	100.0	

Kry1: 3.01 (mean); 3.00 (median); 1.249 (std. deviation).
Kry2: 2.84 (mean); 3.00 (median); 1.291 (std. deviation).

34: Apps like Kry can contribute to a more accessible healthcare (EQL_1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	29	2.3	2.3
		2	65	5.1	7.4
		3	234	18.5	25.9
		4	452	35.8	61.7
		5 Agree completely	484	38.3	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	31	3.5	3.5
		2	43	4.9	8.4
		3	146	16.6	24.9
		4	290	32.9	57.8
		5 Agree completely	372	42.2	100.0
		Total	882	100.0	

Kry1: 4.03 (mean); 4.00 (median); .990 (std. deviation).
Kry2: 4.05 (mean); 4.00 (median); 1.047 (std. deviation).

35: Kry is a service that enables a more equal healthcare (EQL_2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	73	5.8	5.8
		2	131	10.4	16.1
		3	448	35.4	51.6
		4	409	32.4	83.9
		5 Agree completely	203	16.1	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	59	6.7	6.7
		2	68	7.7	14.4
		3	287	32.5	46.9
		4	300	34.0	81.0
		5 Agree completely	168	19.0	100.0
		Total	882	100.0	

Kry1: 3.43 (mean); 3.00 (median); 1.058 (std. deviation).
Kry2: 3.51 (mean); 4.00 (median); 1.090 (std. deviation).

36: Most patients visiting a doctor at a health center could receive equivalent treatment by using Kry (EQL_3)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	100	7.9	7.9
		2	172	13.6	21.5
		3	397	31.4	52.9
		4	367	29.0	82.0
		5 Agree completely	228	18.0	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	75	8.5	8.5
		2	94	10.7	19.2
		3	245	27.8	46.9
		4	290	32.9	79.8
		5 Agree completely	178	20.2	100.0
		Total	882	100.0	

Kry1: 3.36 (mean); 3.00 (median); 1.157 (std. deviation).
Kry2: 3.46 (mean); 4.00 (median); 1.173 (std. deviation).

37: Kry is a service for users of all ages (EQL_4)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	126	10.0	10.0
		2	168	13.3	23.3
		3	307	24.3	47.5
		4	379	30.0	77.5
		5 Agree completely	284	22.5	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	76	8.6	8.6
		2	113	12.8	21.4
		3	194	22.0	43.4
		4	265	30.0	73.5
		5 Agree completely	234	26.5	100.0
		Total	882	100.0	

Kry1: 3.42 (mean); 4.00 (median); 1.248 (std. deviation).
Kry2: 3.53 (mean); 4.00 (median); 1.247 (std. deviation).

38: Persons who often encounter physical obstacles in everyday life due to some disability can benefit largely from a service like Kry (EQL_5)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	37	2.9	2.9
		2	52	4.1	7.0
		3	247	19.5	26.6
		4	501	39.6	66.2
		5 Agree completely	427	33.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	26	2.9	2.9
		2	34	3.9	6.8
		3	154	17.5	24.3
		4	333	37.8	62.0
		5 Agree completely	335	38.0	100.0
		Total	882	100.0	

Kry1: 3.97 (mean); 4.00 (median); .980 (std. deviation).
Kry2: 4.04 (mean); 4.00 (median); .987 (std. deviation).

39: Persons with impaired vision or hearing or other cognitive disabilities may have trouble utilizing the benefits of a health app like Kry (EQL_6)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	28	2.2	2.2
		2	63	5.0	7.2
		3	240	19.0	26.2
		4	498	39.4	65.6
		5 Agree completely	435	34.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	21	2.4	2.4
		2	43	4.9	7.3
		3	186	21.1	28.3
		4	347	39.3	67.7
		5 Agree completely	285	32.3	100.0
		Total	882	100.0	

Kry1: 3.99 (mean); 4.00 (median); .986 (std. deviation).
Kry2: 3.94 (mean); 4.00 (median); .970 (std. deviation).

40: On a scale (1-5), state to what extent that you agree with the statement that there is a risk that some persons who use Kry will feel discriminated because of: Sex (GENDER)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	493	39.0	39.0
		2	362	28.6	67.6
		3	245	19.4	87.0
		4	92	7.3	94.3
		5 Agree completely	72	5.7	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	364	41.3	41.3
		2	255	28.9	70.2
		3	141	16.0	86.2
		4	71	8.0	94.2
		5 Agree completely	51	5.8	100.0
		Total	882	100.0	

Kry1: 2.12 (mean); 2.00 (median); 1.172 (std. deviation).
Kry2: 2.08 (mean); 2.00 (median); 1.187 (std. deviation).

41: On a scale (1-5), state to what extent that you agree with the statement that there is a risk that some persons who use Kry will feel discriminated because of: Transgender identity or expression (TRANSGEN)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	410	32.4	32.4
		2	324	25.6	58.1
		3	317	25.1	83.1
		4	136	10.8	93.9
		5 Agree completely	77	6.1	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	307	34.9	34.9
		2	244	27.7	62.6
		3	195	22.1	84.7
		4	83	9.4	94.1
		5 Agree completely	52	5.9	100.0
		Total	882	100.0	

Kry1: 2.32 (mean); 2.00 (median); 1.204 (std. deviation).
Kry2: 2.24 (mean); 2.00 (median); 1.193 (std. deviation).

42: On a scale (1-5), state to what extent that you agree with the statement that there is a risk that some persons who use Kry will feel discriminated because of: Ethnicity (ETHNICITY)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	390	30.9	30.9
		2	270	21.4	52.2
		3	376	29.7	82.0
		4	157	12.4	94.4
		5 Agree completely	71	5.6	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	290	32.9	32.9
		2	239	27.1	60.0
		3	202	22.9	82.9
		4	95	10.8	93.7
		5 Agree completely	56	6.3	100.0
		Total	882	100.0	

Kry1: 2.41 (mean); 2.00 (median); 1.202 (std. deviation).
Kry2: 2.31 (mean); 2.00 (median); 1.212 (std. deviation).

43: On a scale (1-5), state to what extent that you agree with the statement that there is a risk that some persons who use Kry will feel discriminated because of: Religion or other belief (RELIGION)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	435	34.4	34.4
		2	329	26.0	60.4
		3	313	24.8	85.2
		4	123	9.7	94.9
		5 Agree completely	64	5.1	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	321	36.4	36.4
		2	275	31.2	67.6
		3	161	18.3	85.8
		4	77	8.7	94.6
		5 Agree completely	48	5.4	100.0
		Total	882	100.0	

Kry1: 2.25 (mean); 2.00 (median); 1.173 (std. deviation).
Kry2: 2.16 (mean); 2.00 (median); 1.157 (std. deviation).

44: On a scale (1-5), state to what extent that you agree with the statement that there is a risk that some persons who use Kry will feel discriminated because of: Disability (DISABIL)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	310	24.5	24.5
		2	215	17.0	41.5
		3	423	33.5	75.0
		4	211	16.7	91.7
		5 Agree completely	105	8.3	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	245	27.8	27.8
		2	193	21.9	49.7
		3	259	29.4	79.0
		4	113	12.8	91.8
		5 Agree completely	72	8.2	100.0
		Total	882	100.0	

Kry1: 2.67 (mean); 3.00 (median); 1.243 (std. deviation).
Kry2: 2.52 (mean); 3.00 (median); 1.246 (std. deviation).

45: On a scale (1-5), state to what extent that you agree with the statement that there is a risk that some persons who use Kry will feel discriminated because of: Sexual orientation (SEXORIEN)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	493	39.0	39.0
		2	337	26.7	65.7
		3	263	20.8	86.5
		4	108	8.5	95.0
		5 Agree completely	63	5.0	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	360	40.8	40.8
		2	263	29.8	70.6
		3	149	16.9	87.5
		4	60	6.8	94.3
		5 Agree completely	50	5.7	100.0
		Total	882	100.0	

Kry1: 2.14 (mean); 2.00 (median); 1.171 (std. deviation).
Kry2: 2.07 (mean); 2.00 (median); 1.165 (std. deviation).

46: On a scale (1-5), state to what extent that you agree with the statement that there is a risk that some persons who use Kry will feel discriminated because of: Age (AGE_DISC)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	300	23.7	23.7
		2	208	16.5	40.2
		3	421	33.3	73.5
		4	222	17.6	91.1
		5 Agree completely	113	8.9	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	246	27.9	27.9
		2	188	21.3	49.2
		3	231	26.2	75.4
		4	141	16.0	91.4
		5 Agree completely	76	8.6	100.0
		Total	882	100.0	

Kry1: 2.72 (mean); 3.00 (median); 1.252 (std. deviation).
Kry2: 2.56 (mean): 3.00 (median); 1.282 (std. deviation).

47: Kry's information seems to be comprehensive (INFO_1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	37	2.9	2.9
		2	103	8.1	11.1
		3	457	36.2	47.2
		4	481	38.1	85.3
		5 Agree completely	186	14.7	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	37	4.2	4.2
		2	68	7.7	11.9
		3	277	31.4	43.3
		4	331	37.5	80.8
		5 Agree completely	169	19.2	100.0
		Total	882	100.0	

Kry1: 3.53 (mean); 4.00 (median); .939 (std. deviation).
Kry2: 3.60 (mean); 4.00 (median); 1.015 (std. deviation).

48: Kry's information seems to be clear and distinct (INFO_2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	22	1.7	1.7
		2	67	5.3	7.0
		3	358	28.3	35.4
		4	542	42.9	78.2
		5 Agree completely	275	21.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	23	2.6	2.6
		2	43	4.9	7.5
		3	205	23.2	30.7
		4	353	40.0	70.7
		5 Agree completely	258	29.3	100.0
		Total	882	100.0	

Kry1: 3.78 (mean); 4.00 (median); .906 (std. deviation).
Kry2: 3.88 (mean); 4.00 (median); .971 (std. deviation).

49: Kry's information seems to be complete (INFO_3)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	35	2.8	2.8
		2	115	9.1	11.9
		3	438	34.7	46.5
		4	476	37.7	84.2
		5 Agree completely	200	15.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	33	3.7	3.7
		2	68	7.7	11.5
		3	271	30.7	42.2
		4	329	37.3	79.5
		5 Agree completely	181	20.5	100.0
		Total	882	100.0	

Kry1: 3.55 (mean); 4.00 (median); .956 (std. deviation).
Kry2: 3.63 (mean); 4.00 (median); 1.011 (std. deviation).

50: It seems easy to get help if one, for instance, has questions or trouble using Kry (INFO_4)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	25	2.0	2.0
		2	62	4.9	6.9
		3	384	30.4	37.3
		4	548	43.4	80.6
		5 Agree completely	245	19.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	19	2.2	2.2
		2	43	4.9	7.0
		3	267	30.3	37.3
		4	370	42.0	79.3
		5 Agree completely	183	20.7	100.0
		Total	882	100.0	

Kry1: 3.73 (mean); 4.00 (median); .895 (std. deviation).
Kry2: 3.74 (mean); 4.00 (median); .913 (std. deviation).

51: Kry gives a credible impression (INFO_5)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	25	2.0	2.0
		2	69	5.5	7.4
		3	346	27.4	34.8
		4	522	41.3	76.1
		5 Agree completely	302	23.9	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	26	2.9	2.9
		2	48	5.4	8.4
		3	216	24.5	32.9
		4	361	40.9	73.8
		5 Agree completely	231	26.2	100.0
		Total	882	100.0	

Kry1: 3.80 (mean); 4.00 (median); .932 (std. deviation).
Kry2: 3.82 (mean); 4.00 (median); .979 (std. deviation).

52: I think that Kry's information is of pretty low quality (INFO_6)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	255	20.2	20.2
		2	433	34.3	54.4
		3	357	28.2	82.7
		4	152	12.0	94.7
		5 Agree completely	67	5.3	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	209	23.7	23.7
		2	291	33.0	56.7
		3	223	25.3	82.0
		4	90	10.2	92.2
		5 Agree completely	69	7.8	100.0
		Total	882	100.0	

Kry1: 2.48 (mean); 2.00 (median); 1.101 (std. deviation).
Kry2: 2.45 (mean); 2.00 (median); 1.182 (std. deviation).

53: I need more clarifying information about Kry before I would consider using the service (INFO_7)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	89	7.0	7.0
		2	159	12.6	19.6
		3	303	24.0	43.6
		4	393	31.1	74.7
		5 Agree completely	320	25.3	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	109	12.4	12.4
		2	150	17.0	29.4
		3	227	25.7	55.1
		4	194	22.0	77.1
		5 Agree completely	202	22.9	100.0
		Total	882	100.0	

Kry1: 3.55 (mean); 4.00 (median); 1.195 (std. deviation).
Kry2: 3.26 (mean); 3.00 (median): 1.317 (std. deviation).

54: The preparations required to use Kry is reasonable compared to what is required before a doctor's visit at a health center (EQT_1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	54	4.3	4.3
		2	94	7.4	11.7
		3	400	31.6	43.4
		4	443	35.0	78.4
		5 Agree completely	273	21.6	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	34	3.9	3.9
		2	57	6.5	10.3
		3	251	28.5	38.8
		4	314	35.6	74.4
		5 Agree completely	226	25.6	100.0
		Total	882	100.0	

Kry1: 3.62 (mean); 4.00 (median); 1.036 (std. deviation).
Kry2: 3.73 (mean); 4.00 (median); 1.036 (std. deviation).

55: I think the price for a meeting with a doctor using Kry (SEK 299) is at a reasonable level (EQT_2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	412	32.6	32.6
		2	301	23.8	56.4
		3	299	23.7	80.1
		4	175	13.8	93.9
		5 Agree completely	77	6.1	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	229	26.0	26.0
		2	234	26.5	52.5
		3	225	25.5	78.0
		4	117	13.3	91.3
		5 Agree completely	77	8.7	100.0
		Total	882	100.0	

Kry1: 2.37 (mean); 2.00 (median); 1.236 (std. deviation).
Kry2: 2.52 (mean); 2.00 (median); 1.249 (std. deviation):

56: Kry probably collects more information about its users than what is actually needed (EQT_3)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	98	7.8	7.8
		2	210	16.6	24.4
		3	509	40.3	64.6
		4	291	23.0	87.7
		5 Agree completely	156	12.3	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	81	9.2	9.2
		2	162	18.4	27.6
		3	333	37.8	65.3
		4	180	20.4	85.7
		5 Agree completely	126	14.3	100.0
		Total	882	100.0	

Kry1: 3.16 (mean); 3.00 (median); 1.085 (std. deviation).
Kry2: 3.12 (mean); 3.00 (median); 1.146 (std. deviation).

57: In my opinion, there seems to be more benefits than disadvantages with using Kry (EQT_4)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	85	6.7	6.7
		2	148	11.7	18.4
		3	387	30.6	49.1
		4	399	31.6	80.6
		5 Agree completely	245	19.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	66	7.5	7.5
		2	92	10.4	17.9
		3	251	28.5	46.4
		4	267	30.3	76.6
		5 Agree completely	206	23.4	100.0
		Total	882	100.0	

Kry1: 3.45 (mean); 4.00 (median); 1.129 (std. deviation).
Kry2: 3.52 (mean); 4.00 (median); 1.173 (std. deviation):

58: I believe that a health app like Kry could make my everyday life easier (EQT_5)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	134	10.6	10.6
		2	175	13.8	24.4
		3	357	28.2	52.7
		4	387	30.6	83.3
		5 Agree completely	211	16.7	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	97	11.0	11.0
		2	96	10.9	21.9
		3	251	28.5	50.3
		4	257	29.1	79.5
		5 Agree completely	181	20.5	100.0
		Total	882	100.0	

Kry1: 3.29 (mean); 3.00 (median); 1.206 (std. deviation).
Kry2: 3.37 (mean); 3.00 (median); 1.234 (std. deviation):

59: For me, an app like Kry feels superfluous (EQT_6)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	177	14.0	14.0
		2	293	23.2	37.2
		3	356	28.2	65.3
		4	235	18.6	83.9
		5 Agree completely	203	16.1	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	135	15.3	15.3
		2	195	22.1	37.4
		3	234	26.5	63.9
		4	171	19.4	83.3
		5 Agree completely	147	16.7	100.0
		Total	882	100.0	

Kry1: 3.00 (mean); 3.00 (median); 1.273 (std. deviation).
Kry2: 3.00 (mean); 3.00 (median); 1.302 (std. deviation).

60: I can imagine submitting my personal data to Kry in order to use the app (KRY_WILL1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	129	10.2	10.2
		2	155	12.3	22.5
		3	363	28.7	51.2
		4	412	32.6	83.8
		5 Agree completely	205	16.2	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	86	9.8	9.8
		2	107	12.1	21.9
		3	220	24.9	46.8
		4	283	32.1	78.9
		5 Agree completely	186	21.1	100.0
		Total	882	100.0	

Kry1: 3.32 (mean); 3.00 (median); 1.184 (std. deviation).
Kry2: 3.43 (mean); 4.00 (median); 1.223 (std. deviation):

61: I am worried about the ongoing digital development in the healthcare sector, which Kry is one example of (KRY_CONC1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	210	16.6	16.6
		2	305	24.1	40.7
		3	383	30.3	71.0
		4	238	18.8	89.9
		5 Agree completely	128	10.1	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	182	20.6	20.6
		2	210	23.8	44.4
		3	230	26.1	70.5
		4	163	18.5	89.0
		5 Agree completely	97	11.0	100.0
		Total	882	100.0	

Kry1: 2.82 (mean); 3.00 (median); 1.211 (std. deviation).
Kry2: 2.75 (mean); 3.00 (median); 1.277 (std. deviation).

62: Swedish legislation offers a good protection of personal data that have been submitted to Kry (KRY_LAW)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	62	4.9	4.9
		2	116	9.2	14.1
		3	456	36.1	50.2
		4	444	35.1	85.3
		5 Agree completely	186	14.7	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	46	5.2	5.2
		2	79	9.0	14.2
		3	275	31.2	45.4
		4	327	37.1	82.4
		5 Agree completely	155	17.6	100.0
		Total	882	100.0	

Kry1: 3.46 (mean); 3.00 (median); 1.010 (std. deviation).
Kry2: 3.53 (mean); 4.00 (median); 1.046 (std. deviation).

63: I can imagine communicating with a doctor via video meeting in an app like Kry (KRY_WILL2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	144	11.4	11.4
		2	140	11.1	22.5
		3	319	25.2	47.7
		4	380	30.1	77.8
		5 Agree completely	281	22.2	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	102	11.6	11.6
		2	112	12.7	24.3
		3	197	22.3	46.6
		4	231	26.2	72.8
		5 Agree completely	240	27.2	100.0
		Total	882	100.0	

Kry1: 3.41 (mean); 4.00 (median); 1.262 (std. deviation).
Kry2: 3.45 (mean); 4.00 (median); 1.320 (std. deviation).

64: I would be worried about what might happen to my personal data if I submitted them in Kry (KRY_CONC2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	138	10.9	10.9
		2	275	21.8	32.7
		3	371	29.4	62.0
		4	293	23.2	85.2
		5 Agree completely	187	14.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	127	14.4	14.4
		2	174	19.7	34.1
		3	282	32.0	66.1
		4	182	20.6	86.7
		5 Agree completely	117	13.3	100.0
		Total	882	100.0	

Kry1: 3.09 (mean); 3.00 (median); 1.213 (std. deviation).
Kry2: 2.99 (mean); 3.00 (median); 1.230 (std. deviation).

65: I am worried about losing the personal contact between patient and doctor during a video meeting in Kry (KRY_CONC3)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	135	10.7	10.7
		2	208	16.5	27.1
		3	332	26.3	53.4
		4	319	25.2	78.6
		5 Agree completely	270	21.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	123	13.9	13.9
		2	133	15.1	29.0
		3	208	23.6	52.6
		4	230	26.1	78.7
		5 Agree completely	188	21.3	100.0
		Total	882	100.0	

Kry1: 3.30 (mean); 3.00 (median); 1.268 (std. deviation).
Kry2: 3.26 (mean); 3.00 (median); 1.326 (std. deviation).

66: The development of digital health services like Kry can contribute in making the healthcare safer and more reliable (KRY_TRUST1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	90	7.1	7.1
		2	141	11.2	18.3
		3	467	36.9	55.2
		4	386	30.5	85.8
		5 Agree completely	180	14.2	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	63	7.1	7.1
		2	97	11.0	18.1
		3	281	31.9	50.0
		4	286	32.4	82.4
		5 Agree completely	155	17.6	100.0
		Total	882	100.0	

Kry1: 3.34 (mean); 3.00 (median); 1.077 (std. deviation).
Kry2: 3.42 (mean); 3.50 (median); 1.116 (std. deviation):

67: People risk their privacy when they submit their personal data in the app (KRY_RISK)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	120	9.5	9.5
		2	250	19.8	29.3
		3	493	39.0	68.3
		4	264	20.9	89.2
		5 Agree completely	137	10.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	95	10.8	10.8
		2	173	19.6	30.4
		3	330	37.4	67.8
		4	180	20.4	88.2
		5 Agree completely	104	11.8	100.0
		Total	882	100.0	

Kry1: 3.04 (mean); 3.00 (median); 1.104 (std. deviation).
Kry2: 3.03 (mean); 3.00 (median); 1.142 (std. deviation).

68: Kry probably applies good regulations regarding management of the personal data stored in the app (KRY_INDREG)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	45	3.6	3.6
		2	111	8.8	12.3
		3	436	34.5	46.8
		4	471	37.3	84.1
		5 Agree completely	201	15.9	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	30	3.4	3.4
		2	63	7.1	10.5
		3	261	29.6	40.1
		4	343	38.9	79.0
		5 Agree completely	185	21.0	100.0
		Total	882	100.0	

Kry1: 3.53 (mean); 4.00 (median); .978 (std. deviation).
Kry2: 3.67 (mean); 4.00 (median); .994 (std. deviation).

69: I think that Kry is an interesting app (KRY_INTER1)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	97	7.7	7.7
		2	120	9.5	17.2
		3	272	21.5	38.7
		4	474	37.5	76.2
		5 Agree completely	301	23.8	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	84	9.5	9.5
		2	67	7.6	17.1
		3	213	24.1	41.3
		4	293	33.2	74.5
		5 Agree completely	225	25.5	100.0
		Total	882	100.0	

Kry1: 3.60 (mean); 4.00 (median); 1.169 (std. deviation).
Kry2: 3.58 (mean); 4.00 (median); 1.216 (std. deviation).

70: I think that the digital technology development within the healthcare sector, exemplified by services like Kry, is exciting (KRY_INTER2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	97	7.7	7.7
		2	111	8.8	16.5
		3	310	24.5	41.0
		4	448	35.4	76.4
		5 Agree completely	298	23.6	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	69	7.8	7.8
		2	83	9.4	17.2
		3	198	22.4	39.7
		4	299	33.9	73.6
		5 Agree completely	233	26.4	100.0
		Total	882	100.0	

Kry1: 3.58 (mean); 4.00 (median); 1.163 (std. deviation).
Kry2: 3.62 (mean); 4.00 (median); 1.193 (std. deviation):

71: You can rely on Kry to handle personal data in a responsible manner (KRY_TRUST2)

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	1 Do not agree at all	72	5.7	5.7
		2	127	10.0	15.7
		3	497	39.3	55.1
		4	398	31.5	86.6
		5 Agree completely	170	13.4	100.0
		Total	1264	100.0	
Kry2	Valid	1 Do not agree at all	46	5.2	5.2
		2	76	8.6	13.8
		3	304	34.5	48.3
		4	321	36.4	84.7
		5 Agree completely	135	15.3	100.0
		Total	882	100.0	

Kry1: 3.37 (mean); 3.00 (median); 1.022 (std. deviation).
Kry2: 3.48 (mean); 4.00 (median); 1.021 (std. deviation).

72: Had you heard of Kry before you participated in this survey?

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	Yes	319	25.2	25.2
		No	913	72.2	97.5
		I do not know	32	2.5	100.0
		Total	1264	100.0	
Kry2	Valid	Yes	575	65.2	65.2
		No	280	31.7	96.9
		I do not know	27	3.1	100.0
		Total	882	100.0	

Kry1: 1.77 (mean); 2.00 (median); .476 (std. deviation).
Kry2: 1.38 (mean); 1.00 (median); .545 (std. deviation).

73: Have you ever consulted Kry with a health-related question concerning you or your child?

Dataset			Frequency	Percent	Valid Percent	Cumulative Percent
Kry1	Valid	-111	4	.3	1.3	1.3
		Yes	54	4.3	16.9	18.2
		No	261	20.6	81.8	100.0
		Total	319	25.2	100.0	
	Missing	System	945	74.8		
	Total		1264	100.0		
Kry2	Valid	-111	12	1.4	2.1	2.1
		Yes	75	8.5	13.0	15.1
		No	488	55.3	84.9	100.0
		Total	575	65.2	100.0	
	Missing	System	307	34.8		
	Total		882	100.0		

Kry1: 1.83 (mean); 2.00 (median); .377 (std. deviation).
Kry2: 1.87 (mean); 2.00 (median); .340 (std. deviation).

74: What is the probability that you would use a health app like Kry if you needed to get in contact with a doctor?

Dataset			Frequency	Valid Percent	Cumulative Percent
Kry1	Valid	Very low probability	184	14.6	14.6
		Rather low probability	212	16.8	31.3
		Neither low. nor high probability	391	30.9	62.3
		Rather high probability	341	27.0	89.2
		Very high probability	97	7.7	96.9
		Do not know/No opinion	39	3.1	100.0
		Total	1264	100.0	
Kry2	Valid	Very low probability	139	15.8	15.8
		Rather low probability	151	17.1	32.9
		Neither low. nor high probability	259	29.4	62.2
		Rather high probability	233	26.4	88.7
		Very high probability	81	9.2	97.8
		Do not know/No opinion	19	2.2	100.0
		Total	882	100.0	

Kry1: 3.06 (mean); 3.00 (median); 1.266 (std. deviation).
Kry2: 3.03 (mean); 3.00 (median); 1.276 (std. deviation).

Appendix 4: Descriptive Statistics of Excluded Cases

[KRY1: AGE GROUPS]		Kry1		Kry1 (excluded)	
		Freq.	%	Freq.	%
Valid	Young (20-28 yrs)	461	36.5	81	33.8
	Middle (29-39 yrs)	359	28.4	76	31.7
	Old (40-50 yrs)	444	35.1	83	34.6
	Total	1264	100.0	240	100.0

Kry1: 34.06 (mean); 33.00 (median).
Kry1 (excluded): 34.60 (mean); 35.00 (median).
Monte Carlo Sig. (2-sided) Pearson Chi-Square. based on 10,000 samples: .560.

[KRY2: AGE GROUPS]		Kry2		Kry2 (excluded)	
		Freq.	%	Freq.	%
Valid	Young (20-28 yrs)	269	30.5	31	18.5
	Middle (29-39 yrs)	301	34.1	57	33.9
	Old (40-50 yrs)	312	35.4	80	47.6
	Total	882	100.0	168	100.0

Kry2: 34.82 (mean); 34.50 (median).
Kry2 (excluded): 37.43 (mean); 38.00 (median).
Monte Carlo Sig. (2-sided) Pearson Chi-Square. based on 10,000 samples: .002

[KRY1: SEX] I identify as:		Kry1		Kry1 (excluded)	
		Freq.	%	Freq.	%
Valid	Woman	627	49.6	129	53.8
	Man	626	49.5	107	44.6
	Other	8	.6	4	1.7
	Do not want to state	3	.2		
	Total	1264	100.0	240	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square. based on 10,000 samples: .164.

[KRY2: SEX] I identify as:		Kry2		Kry2 (excluded)	
		Freq.	%	Freq.	%
Valid	Woman	445	50.5	94	56.0
	Man	433	49.1	71	42.3
	Other	1	.1	1	.6
	Do not want to state	3	.3	2	1.2
	Total	882	100.0	168	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square. based on 10,000 samples: .096

[KRY1: COUNTRY] I was born:		Kry1		Kry1 (excl.)	
		Freq.	%	Freq.	%
Valid	In Sweden	1141	90.3	215	89.6
	In the EU/Nordic countries	56	4.4	9	3.8
	Outside the EU/Nordic countries	63	5.0	16	6.7
	Do not want to state	4	.3		
	Total	1264	100.0	240	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .553.

[KRY2: COUNTRY] I was born:		Kry2		Kry2 (excl.)	
		Freq.	%	Freq.	%
Valid	In Sweden	790	89.6	145	86.3
	In the EU/Nordic countries	42	4.8	11	6.5
	Outside the EU/Nordic countries	47	5.3	9	5.4
	Do not want to state	3	.3	3	1.8
	Total	882	100.0	168	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .100

[KRY1: OCCUPATION] My present occupation:		Kry1		Kry1 (excluded)	
		Freq.	%	Freq.	%
Valid	Employed	766	60.6	133	55.4
	Job-seeker	113	8.9	32	13.3
	Own business	46	3.6	8	3.3
	Pensioner	48	3.8	19	7.9
	Student	226	17.9	25	10.4
	Other occupation	59	4.7	15	6.3
	Do not want to state	6	.5	8	3.3
	Total	1264	100.0	240	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .000.

[KRY2: OCCUPATION] My present occupation:		Kry2		Kry2 (excluded)	
		Freq.	%	Freq.	%
Valid	Employed	579	65.6	112	66.7
	Job-seeker	70	7.9	17	10.1
	Own business	36	4.1	6	3.6
	Pensioner	18	2.0	6	3.6
	Student	108	12.2	12	7.1
	Other occupation	62	7.0	9	5.4
	Do not want to state	9	1.0	6	3.6
	Total	882	100.0	168	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .051.

[KRY1: SMARTPHONE] Do you have a smartphone?		Kry1		Kry1 (excluded)	
		Freq.	%	Freq.	%
Valid	Yes	1221	96.6	227	94.6
	No	43	3.4	13	5.4
	Total	1264	100.0	240	100.0

Exact Sig. (2-sided) Pearson Chi-Square: .137.

[KRY2: SMARTPHONE] Do you have a smartphone?		Kry2		Kry2 (excluded)	
		Freq.	%	Freq.	%
Valid	Yes	872	98.9	159	94.6
	No	10	1.1	9	5.4
	Total	882	100.0	168	100.0

Exact Sig. (2-sided) Pearson Chi-Square: .000.

[KRY1: HEALTH STATUS] How would you assess your general health status (1-7)?		Kry1		Kry1 (excluded)	
		Freq.	%	Freq.	%
Valid	Poor (1-4)	314	24.8	74	30.8
	Average (5-6)	737	58.3	130	54.2
	Very good (7)	213	16.9	36	15.0
	Total	1264	100.0	240	100.0

Kry1: 5.28 (mean); 6.00 (median); 1.317 (std. deviation).
Kry1 (excluded): 5.08 (mean); 5.00 (median); 1.391 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .146.

[KRY2: HEALTH STATUS] How would you assess your general health status (1-7)?		Kry2		Kry2 (excluded)	
		Freq.	%	Freq.	%
Valid	Poor (1-4)	176	20.0	45	26.8
	Average (5-6)	533	60.4	86	51.2
	Very good (7)	173	19.6	37	22.0
	Total	882	100.0	168	100.0

Kry2: 5.41 (mean); 6.00 (median); 1.269 (std. deviation).
Kry2 (excluded): 5.26 (mean); 5.00 (median); 1.358 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .063.

[KRY1: CONFIDENCE] What level of confidence would you say that you have in the Swedish healthcare (1-7)?		Kry1		Kry1 (excluded)	
		Freq.	%	Freq.	%
Valid	Low (1-3)	146	11.6	45	12.7
	Average (4-5)	778	61.6	142	59.2
	High (6-7)	340	26.9	53	22.1
	Total	1264	100.0	240	100.0

Kry1: 4.48 (mean); 5.00 (median); 1.499 (std. deviation).
Kry1 (excluded): 4.17 (mean); 4.00 (median); 1.678 (std. deviation).
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .006.

[KRY2: CONFIDENCE] What level of confidence would you say that you have in the Swedish healthcare (1-7)?		Kry2		Kry2 (excluded)	
		Freq.	%	Freq.	%
Valid	Low (1-3)	106	12.0	27	16.1
	Average (4-5)	514	58.3	100	59.5
	High (6-7)	262	29.7	41	24.4
	Total	882	100.0	168	100.0

Kry2: 4.55 (mean); 5.00 (median); 1.566 (std. deviation).
Kry2 (excluded):
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .195.

[KRY1: PRIOR KNOWLEDGE] Had you heard of Kry before you participated in this survey?		Kry1		Kry1 (excluded)	
		Freq.	%	Freq.	%
Valid	Yes	319	25.2	41	17.1
	No	913	72.2	181	75.4
	I do not know	32	2.5	18	7.5
	Total	1264	100.0	240	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .000.

[KRY2: PRIOR KNOWLEDGE] Had you heard of Kry before you participated in this survey?		Kry2		Kry2 (excluded)	
		Freq.	%	Freq.	%
Valid	Yes	575	65.2	90	53.6
	No	280	31.7	64	38.1
	I do not know	27	3.1	14	8.3
	Total	882	100.0	168	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .001.

[KRY1: PRIOR USE] Have you ever consulted Kry with a health related question concerning you or your child?		Kry1		Kry1 (excluded)	
		Freq.	%	Freq.	%
Valid	Yes	54	4.3	8	3.3
	No	261	20.6	33	13.8
	System missing	949	75.1	199	82.9
	Total	1264	100.0	240	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .030.

[KRY2: PRIOR USE] Have you ever consulted Kry with a health related question concerning you or your child?		Kry2		Kry2 (excluded)	
		Freq.	%	Freq.	%
Valid	Yes	75	8.5	8	4.8
	No	488	55.3	81	48.2
	System missing	319	36.2	79	47.0
	Total	882	100.0	168	100.0

Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .016.

[KRY1: FUTURE USE] What is the probability that you will use a health app like Kry if you needed to get in contact with a doctor?		Kry1		Kry1 (excl.)	
		Freq.	%	Freq.	%
Valid	1: Very low probability	184	14.6	53	22.1
	2: Rather low probability	212	16.8	37	15.4
	3: Neither low, nor high probability	391	30.9	65	27.1
	4: Rather high probability	341	27.0	15	6.3
	5: Very high probability	97	7.7	12	5.0
	6: Do not know/No opinion	39	3.1	58	24.2
	Total	1264	100.0	240	100.0

Kry1: 2.96 (mean); 3.00 (median); 1.170 (std. deviation), excl. "Do not know/No opinion".
Kry1 (excl.): 2.43 (mean); 3.00 (meidan); 1.181 (std. deviation), excl. "Do not know/No opinion".
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .000.

[KRY2: FUTURE USE] What is the probability that you will use a health app like Kry if you needed to get in contact with a doctor?		Kry2		Kry2 (excl.)	
		Freq.	%	Freq.	%
Valid	1: Very low probability	139	15.8	50	29.8
	2: Rather low probability	151	17.1	24	14.3
	3: Neither low, nor high probability	259	29.4	42	25.0
	4: Rather high probability	233	26.4	13	7.7
	5: Very high probability	81	9.2	8	4.8
	6: Do not know/No opinion	19	2.2	31	18.5
	Total	882	100.0	168	100.0

Kry2: 2.96 (mean); 3.00 (median); 1.210 (std. deviation), excl. "Do not know/No opinion".
Kry2 (excl.): 2.31 (mean); 2.00 (median); 1.222 (std. deviation), excl. "Do not know/No opinion".
Monte Carlo Sig. (2-sided) Pearson Chi-Square, based on 10,000 samples: .000.

Appendix 5: Weights

Kry1: Weights (N=1264)

SEX: Women (n=625)

BORN:	AGE: 20-28 years (n=246)				AGE: 29-40 years (n=172)				AGE: 41-50 years (n=207)			
	% of pop.*	n	n/N	Wt.	% of pop.*	n	n/N	Wt.	% of pop.*	n	n/N	Wt.
Sweden	12.1%	232	18.4%	.660	13.2%	152	12.0 %	1.100	12.6%	190	15.0%	.841
EU/Nordic	.7%	9	.7%	.962	1.3%	9	.7%	1.778	1.0%	7	.6%	1.815
Outside of EU	1.7%	5	.4%	4.239	2.2%	11	.9%	2.575	1.9%	10	.8%	2.360
Total	14.5%	246	19.5%		16.7%	172	13.6%		15.5%	207	16.4%	

SEX: Men (n=624)

BORN:	AGE: 20-28 years (n=203)				AGE: 29-40 years (n=205)				AGE: 41-50 years (n=216)			
	% of pop.*	n	n/N	Wt.	% of pop.*	n	n/N	Wt.	% of pop.*	n	n/N	Wt.
Sweden	12.8%	182	14.4%	.889	14.0%	176	14.0%	1.003	13.3%	201	15.9%	.837
EU/Nordic	.7%	8	.6%	1.031	1.4%	13	1.0%	1.379	1.1%	8	.6%	1.790
Outside of EU	2.6%	13	1.0%	2.502	4.7%	16	1.3%	3.675	2.8%	7	.6%	5.005
Total	16.0%	203	16.0%		20.0%	205	16.3%		17.2%	216	17.1%	

*The specific group's percentage of the Swedish population in 2016 (source: Statistics Sweden).

Kry2: Weights (N=882)

SEX: Women (n=445)

BORN:	AGE: 20-28 years (n=133)				AGE: 29-40 years (n=176)				AGE: 41-50 years (n=136)			
	% of pop.*	n	n/N	Wt.	% of pop.*	n	n/N	Wt.	% of pop.*	n	n/N	Wt.
Sweden	11.5%	126	14.3%	.804	13.0%	157	17.8%	.729	12.0%	116	13.2%	.910
EU/Nordic	.7%	2	.2%	3.027	1.3%	10	1.1%	1.117	1.0%	12	1.4%	.722
Outside of EU	2.2%	5	.6%	3.799	4.4%	9	1.0%	4.266	2.9%	8	.9%	3.200
Total	14.4%	133	15.1%		18.7%	176	19.9%		15.9%	136	15.5%	

SEX: Men (n=430)

BORN:	AGE: 20-28 years (n=132)				AGE: 29-40 years (n=147)				AGE: 41-50 years (n=151)			
	% of pop.*	n	n/N	Wt.	% of pop.*	n	n/N	Wt.	% of pop.*	n	n/N	Wt.
Sweden	12.1%	122	13.8%	.877	13.7%	128	14.5%	.944	12.6%	138	15.7%	.805
EU/Nordic	.7%	2	.2%	2.894	1.4%	8	.9%	1.576	1.1%	8	.9%	1.246
Outside of EU	2.5%	8	.9%	2.757	4.5%	11	1.3%	3.566	2.6%	5	.6%	4.628
Total	15.3%	132	14.9%		19.6%	147	16.7%		16.3%	151	17.2%	

*The specific group's percentage of the Swedish population in 2017 (source: Statistics Sweden).

Appendix 6: Basic PLS Path Models

Construct Reliability and Validity (basic models)

Construct	Kry1				Kry2			
	α	ρ_A	CR	AVE	α	ρ_A	CR	AVE
Concern	.698	.722	.830	.621	.764	.767	.864	.679
EQL	.802	.810	.863	.558	.829	.839	.879	.594
EQT	.737	.782	.835	.565	.762	.808	.848	.587
Interest	.812	.818	.914	.841	.828	.834	.921	.853
Proc Just	.890	.894	.914	.602	.902	.903	.922	.629
Risk	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Trust	.717	.725	.876	.779	.713	.716	.874	.777
Will Kry	.839	.842	.907	.764	.823	.827	.897	.744

Discriminant Validity: Kry1 (basic model)

Construct	Heterotrait-Monotrait Ratio (HTMT)							
	Conc1	EQL1	EQT1	Inter1	Proc1	Risk1	Trust1	Will1
Concern 1								
EQL 1	.368							
EQT 1	.392	.898						
Interest 1	.437	.788	.906					
Proc Just 1	.337	.852	.797	.695				
Risk 1	.715	.189	.202	.181	.266			
Trust 1	.420	.899	.912	.882	.914	.279		
Will Kry 1	.528	.814	.987	.903	.716	.308	.875	

Discriminant Validity: Kry2 (basic model)

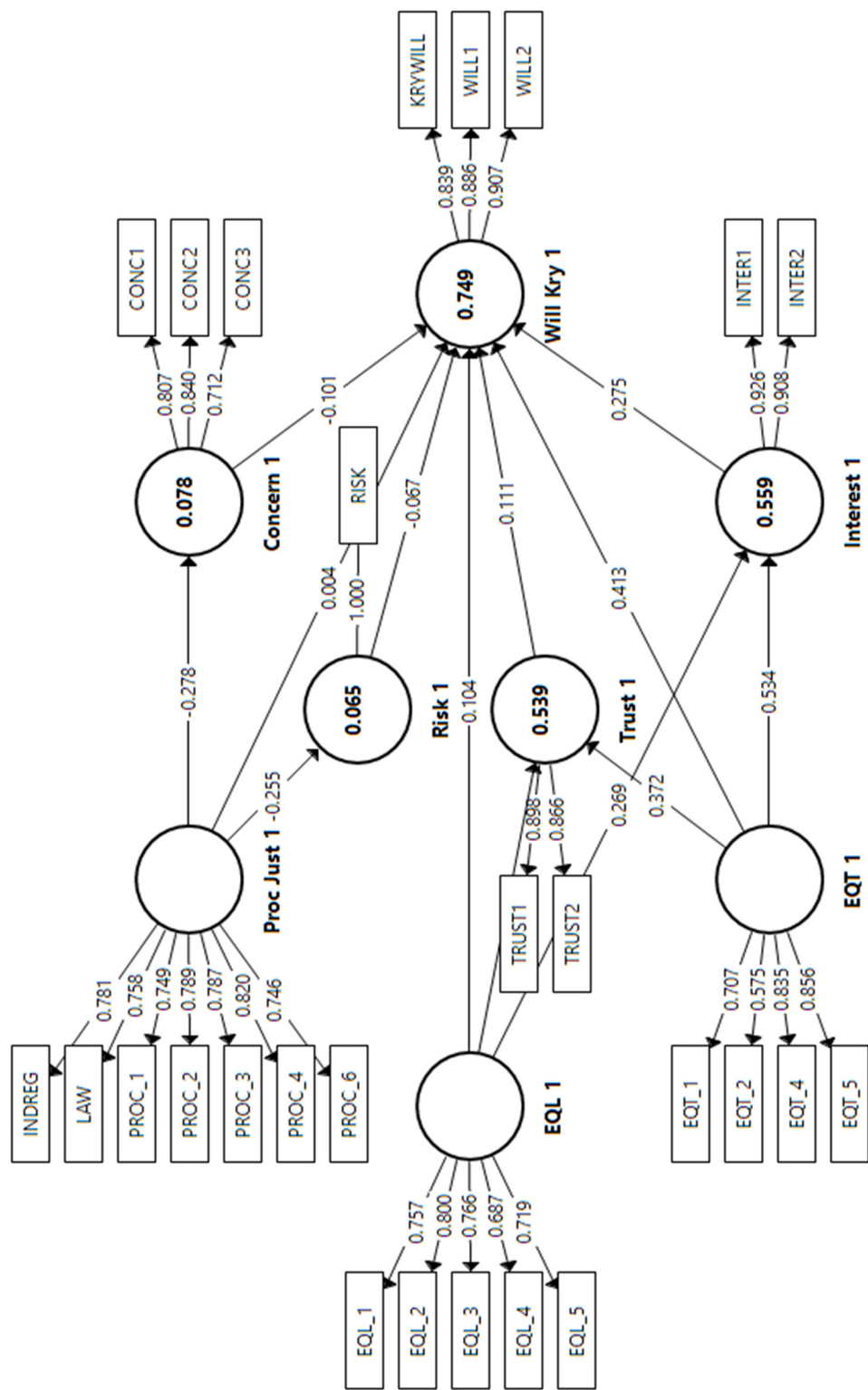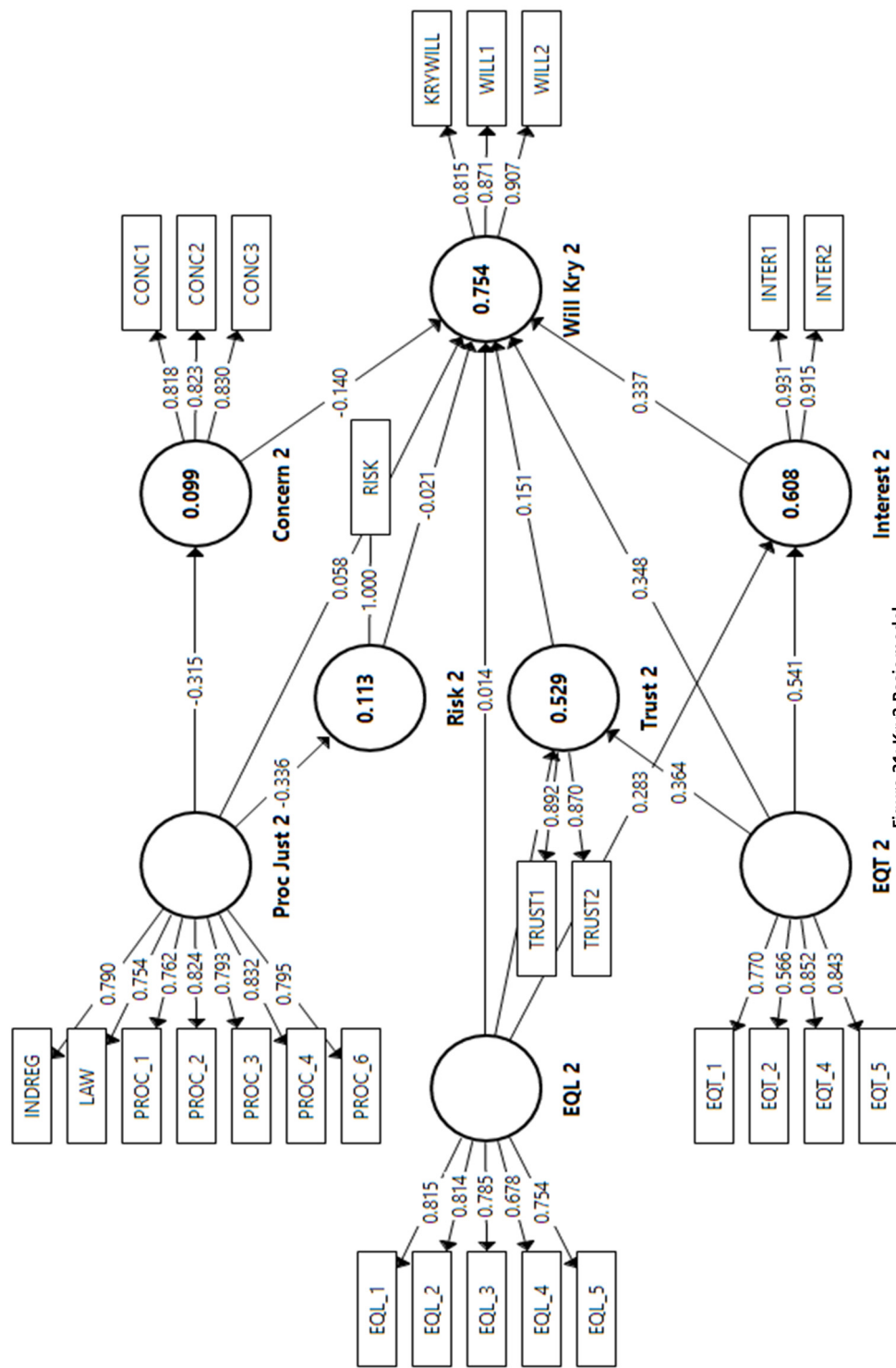| Construct	Heterotrait-Monotrait Ratio (HTMT)							
	Conc2	EQL2	EQT2	Inter2	Proc2	Risk2	Trust2	Will2
Concern 2								
EQL 2	.316							
EQT 2	.316	.936						
Interest 2	.394	.838	.916					
Proc Just 2	.379	.846	.810	.725				
Risk 2	.773	.260	.217	.220	.353			
Trust 2	.299	.890	.910	.838	.894	.273		
Will Kry 2	.487	.840	.965	.949	.777	.333	.894	

Figure 30: Kry1 Basic model

Figure 31: Kry2 Basic model

Appendix 7: Extreme Cases – Evaluation Results

Construct Reliability and Validity – Extreme Cases

Construct	Kry Low				Kry High			
	α	ρ_A	CR	AVE	α	ρ_A	CR	AVE
Concern	.743	.755	.852	.658	.783	.823	.869	.688
EQL	.884	.892	.915	.684	.793	.803	.858	.549
EQT	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Interest	.815	.819	.915	.844	.757	.780	.891	.803
Proc Just	.947	.951	.956	.758	.890	.898	.913	.600
Risk	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Trust	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Will Kry	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Discriminant Validity – Extreme Cases

Kry Low	Heterotrait-Monotrait Ratio (HTMT)						
Construct	Conc.	EQL	EQT	Inter.	Proc.	Risk	Trust
Concern Lo							
EQL Lo	.592						
EQT Lo	.593	.870					
Interest Lo	.687	.867	.947				
Proc Just Lo	.614	.922	.804	.843			
Risk Lo	.807	.379	.410	.454	.480		
Trust Lo	.604	.810	.822	.869	.837	.462	
Will Kry Lo	.654	.777	.834	.919	.768	.452	.781

Kry High	Heterotrait-Monotrait Ratio (HTMT)						
Construct	Conc.	EQL	EQT	Inter.	Proc.	Risk	Trust
Concern Hi							
EQL Hi	.311						
EQT Hi	.207	.692					
Interest Hi	.383	.735	.814				
Proc Just Hi	.303	.840	.608	.657			
Risk Hi	.806	.178	.223	.307	.313		
Trust Hi	.277	.764	.625	.747	.754	.272	
Will Kry Hi	.373	.594	.741	.898	.534	.341	.671

Predictive Power (Adj R^2) – Extreme Cases

Kry Low				BCa 95% CI	
Construct	Adjusted R^2	T	P	2.5%	97.5%
Concern Lo	.280	2.674	.008	.075	.470
Interest Lo	.732	16.924	.000	.631	.802
Risk Lo	.219	2.198	.028	.046	.422
Trust Lo	.696	12.692	.000	.565	.786
Will Kry Lo	.759	15.560	.000	.631	.832

Kry High				BCa 95% CI	
Construct	Adjusted R^2	T	P	2.5%	97.5%
Concern Lo	.068	1.453	.146	.001	.169
Interest Lo	.540	10.037	.000	.419	.632
Risk Lo	.084	1.753	.080	.010	.187
Trust Lo	.526	7.576	.000	.377	.651
Will Kry Lo	.713	14.476	.000	.580	.788

Direct Effects – Extreme Cases

Kry Low				BCa 95% CI	
Path	Path Coeff.	T	P	2,5%	97,5%
Concern Lo -> Will Kry Lo	-.097	1.235	.217	-.241	.067
EQL Lo -> Interest Lo	.116	.953	.340	-.120	.351
EQL Lo -> Trust Lo	.275	2.434	.015	.075	.512
EQL Lo -> Will Kry Lo	.009	.101	.919	-.170	.198
EQT Lo -> Interest Lo	.760	7.369	.000	.556	.952
EQT Lo -> Trust Lo	.597	5.175	.000	.354	.801
EQT Lo -> Will Kry Lo	.305	2.056	.040	.001	.584
Interest Lo -> Will Kry Lo	.344	3.598	.000	.158	.531
Proc Just Lo -> Concern Lo	-.535	5.399	.000	-.689	-.289
Proc Just Lo -> Risk Lo	-.475	4.464	.000	-.657	-.238
Proc Just Lo -> Will Kry Lo	.091	.942	.346	-.081	.306
Risk Lo -> Will Kry Lo	-.017	.215	.830	-.193	.114
Trust Lo -> Will Kry Lo	.119	.762	.446	-.178	.433

Kry High				BCa 95% CI	
Path	Path Coeff.	T	P	2,5%	97,5%
Concern Hi -> Will Kry Hi	-.081	1.187	.235	-.214	.053
EQL Hi -> Interest Hi	.217	2.209	.027	.019	.401
EQL Hi -> Trust Hi	.483	5.909	.000	.323	.644
EQL Hi -> Will Kry Hi	-.042	.579	.563	-.184	.103
EQT Hi -> Interest Hi	.582	7.113	.000	.415	.732
EQT Hi -> Trust Hi	.322	3.691	.000	.142	.489
EQT Hi -> Will Kry Hi	.338	4.236	.000	.181	.488
Interest Hi -> Will Kry Hi	.421	4.886	.000	.254	.590
Proc Just Hi -> Concern Hi	-.271	3.203	.001	-.422	-.078
Proc Just Hi -> Risk Hi	-.299	3.707	.000	-.448	-.130
Proc Just Hi -> Will Kry Hi	-.101	1.352	.176	-.245	.044
Risk Hi -> Will Kry Hi	-.064	.891	.373	-.219	.069
Trust Hi -> Will Kry Hi	.249	2.893	.004	.085	.426

Direct Effect Size (f^2)* - Extreme Cases

Kry Low				95% CI	
Direct Effect	f^2	T	P	2.5%	97.5%
Concern Lo -> Will Kry Lo	.018	.420	.675	.000	.148
EQL Lo -> Interest Lo	.017	.346	.729	.000	.175
EQL Lo -> Trust Lo	.083	1.201	.230	.009	.272
EQL Lo -> Will Kry Lo	.000	.007	.994	.000	.042
EQT Lo -> Interest Lo	.722	3.056	.002	.348	1.274
EQT Lo -> Trust Lo	.394	1.874	.061	.111	.906
EQT Lo -> Will Kry Lo	.071	.844	.398	.001	.310
Interest Lo -> Will Kry Lo	.124	1.613	.107	.023	.314
Proc Just Lo -> Concern Lo	.401	1.664	.096	.129	1.049
Proc Just Lo -> Risk Lo	.291	1.510	.131	.072	.811
Proc Just Lo -> Will Kry Lo	.007	.363	.717	.000	.071
Risk Lo -> Will Kry Lo	.001	.034	.973	.000	.061
Trust Lo -> Will Kry Lo	.014	.274	.784	.000	.188

Kry High				95% CI	
Direct Effect	f^2	T	P	2.5%	97.5%
Concern Hi -> Will Kry Hi	.011	.470	.639	.000	.086
EQL Hi -> Interest Hi	.063	.957	.339	.002	.248
EQL Hi -> Trust Hi	.302	2.394	.017	.121	.623
EQL Hi -> Will Kry Hi	.002	.193	.847	.000	.045
EQT Hi -> Interest Hi	.453	2.727	.006	.190	.824
EQT Hi -> Trust Hi	.134	1.650	.099	.026	.337
EQT Hi -> Will Kry Hi	.167	1.812	.070	.043	.402
Interest Hi -> Will Kry Hi	.256	2.017	.044	.079	.568
Proc Just Hi -> Concern Hi	.079	1.357	.175	.013	.240
Proc Just Hi -> Risk Hi	.098	1.608	.108	.018	.247
Proc Just Hi -> Will Kry Hi	.013	.600	.548	.000	.079
Risk Hi -> Will Kry Hi	.007	.355	.722	.000	.070
Trust Hi -> Will Kry Hi	.080	1.320	.187	.009	.241

*f^2 values of .02, .15, and .35 indicates weak, moderate, and strong effects, respectively. f^2 values of less than .02 indicates no effect

Predictive Impact (q^2)* – Extreme Cases

Kry Low					
Construct	**Conc Lo**	**Inter Lo**	**Risk Lo**	**Trust Lo**	**Will Lo**
Predictive Relevance (Q^2)**	.157	.617	.216	.696	.771
Concern Lo		.000	.001	.000	.017
EQL Lo	.000	-.016	.000	.056	-.013
EQT Lo	.000	.384	.000	.306	-.022
Interest Lo	.000		.000	.000	.079
Proc Just Lo		.000		.000	-.026
Risk Lo	.000	.000		.000	-.009
Trust Lo	-.011	-.003	.034		.157

Kry High					
Construct	**Conc Hi**	**Inter Hi**	**Risk Hi**	**Trust Hi**	**Will Kry Hi**
Predictive Relevance (Q^2)**	.044	.407	.091	.505	.686
Concern Hi		.000	.000	.000	.006
EQL Hi	.000	.034	.000	.291	.010
EQT Hi	.000	.261	.000	.107	.153
Interest Hi	.000		.000	-.002	.277
Proc Just Hi		.000		.000	.003
Risk Hi	.001	.000		.000	-.010
Trust Hi	.010	-.013	.020		.070

*q^2 values of .02, .15, and .35 indicates weak, moderate, and strong effects, respectively. q^2 values of less than .02 indicates no effect.
** Omission distance (D)=10.

Mediating Effects – Extreme Cases

Kry Low

Mediation Path	Specific Indirect Effects	T	P	95% CI 2.5%	97.5%	Direct Effects	T	P	95% CI 2.5%	97.5%	VAF*
EQT Lo -> Interest Lo -> Will Kry Lo	.244	2.965	.003	.006	.250	.254	1.762	.078	-.047	.517	.961
EQT Lo -> Trust Lo -> Will Kry Lo	.107	1.737	.083	.113	.441	.254	1.762	.078	-.047	.517	.421
Proc Just Lo -> Concern Lo -> Will Kry Lo	.091	2.496	.013	-.001	.171	.077	.910	.363	-.089	.244	1.182

Kry High

Mediation Path	Specific Indirect Effects	T	P	95% CI 2.5%	97.5%	Direct Effects	T	P	95% CI 2.5%	97.5%	VAF*
EQL Hi -> Interest Hi -> Will Kry Hi	.099	2.264	.024	.025	.196	-.054	.743	.457	-.197	.085	-1.833
EQL Hi -> Trust Hi -> Will Kry Hi	.113	2.575	.010	.037	.215	-.054	.743	.457	-.197	.085	-2.093
EQT Hi -> Interest Hi -> Will Kry Hi	.245	3.876	.000	.136	.389	.332	3.766	.000	.156	.496	.738
EQT Hi -> Trust Hi -> Will Kry Hi	.068	2.047	.041	.019	.153	.332	3.766	.000	.156	.496	.205

*VAF: Variance Accounted For.

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Exploring Paths of Justice in the Digital Healthcare

Online doctors, healthcare services provided via smartphone apps, have gone from being peripheral to seriously challenging the conventional way of providing healthcare in Sweden. The accessibility of online doctors is unsurpassed but all patient groups have not gotten better access to healthcare thanks to online doctors. Through two online surveys, this study investigated whether the respondents perceived the Swedish online doctor Kry as a fair healthcare service and how these perceptions influenced their will to use the service. Survey items were based on theories of perceived justice and the privacy calculus and PLS path modelling was conducted based on survey data.

Swedish healthcare law provides that the healthcare should strive towards an equal healthcare for the entire population and be guided, for instance, by the needs principle, which states that those in most need of care should receive care first. However, through political and legal reforms during the last decade or two, the healthcare has been reformed into a quasi-market with free choice as a guiding principle. Influenced by critical realism and Alan Norrie's sociology of law, it is showed that these reforms have introduced a conflict between the individual's right to choose freely, and the requirement for the healthcare to make priorities based on needs, solidarity, and cost-effectiveness. Swedish online doctors as a phenomenon have emerged in this context.

Unlike the health system at large, online doctors are well equipped for a healthcare guided by free choice and which is becoming increasingly consumer-driven. It is argued that the survey respondents perceive of the Kry experience in a way that resembles the experience of online shopping. Online doctors accommodate free choice, the right to receive healthcare when one demands it, but they do not seem to contribute to a more equal healthcare for the entire population. This discrepancy between ethical principles is built into the Swedish health system and into Swedish healthcare law.