

A Transforming Insurance Company and the 4 Types of Health Data Challenges that Arise: A Finnish Case Study

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ABSTRACT

This paper aims to identify the challenges of health data in the context of an insurance company that is transforming from a reactive company into a proactive one. Using 23 interviews from a case study of an insurance company in Finland, we revealed 4 key areas of challenges that arise during this transition. The identified areas were found to be the following: Access, Ownership, Sharing, and Use. These findings are then discussed in context of the shift towards a proactive paradigm for organizations. The customer experience is suggested to be pivotal for organizations to create value and for managing the 4 identified health data challenges.

CCS CONCEPTS

• CCS → Social and professional topics → Professional topics → Management of computing and information systems → Project and people management → Systems analysis and design

KEYWORDS

Health data, insurance, challenges in transformation, proactive.

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1 INTRODUCTION

There is a major paradigm shift occurring in the healthcare industry, largely due to the burden of an aging population, and increased healthcare costs. Historically, the provision of healthcare has carried a primarily reactive structure but is now shifting towards a more proactive paradigm [1-3]. The transformation of insurance companies is in alignment with the transformation of healthcare as Health Information Technology (HIT) has catalyzed change by enabling new and innovative forms of healthcare delivery [4].

In support of this transition is ‘Connected Health’, an umbrella term that encompasses innovations such as digitalization in movements for personal health records (PHRs). PHRs are used to empower individuals or employ big data analytics to decrease costs and improve efficacy [5-9]. Connected Health is defined as [9] “... a conceptual model for health management where devices, services or interventions are designed around the patient’s needs, and health related data is shared, in such a way that the patient can receive care in the most proactive and efficient manner possible. All stakeholders in the process are ‘connected’ by means of timely sharing and presentation of accurate and pertinent information regarding patient status through smarter use of data, devices, communication platforms and people.”

The insurance sector has always had an intrinsic stake in healthcare with a variety of services including health insurance and worker’s compensation. However, the landscape of insurance provision is changing as a result of the movements towards data-driven healthcare. Some incentives for insurance companies to embrace the transformation of Connected Health into a proactive organization include the reduction of hospital readmission for customers with chronic disease [10], and improved quality of life [11, 12].

However, there are many established challenges associated with health data. Data silos which occur as a result of health data being split across stakeholders. These stakeholders include: patients and customers, the private and public sector, researchers, policy makers, and healthcare professionals (such as doctors and

nurses) [13]. This fragmentation is related to another challenge of privacy. Concerns of an individual's privacy, as well as data security, is best protected by controlling information in segmented locations, which is stored in the silos across stakeholders [14].

Understanding the implications of these challenges and how they manifest is crucial for companies in the process of planning and navigating a proactive shift, as "... data does not bring value if it is not integrated with customer value through the business model" [15]. Accordingly, this paper seeks to answer the question of "*What are the health data challenges that arise in a transforming Finnish insurance company?*" This question is investigated through an exploratory case study of an insurance company in Finland that is currently traversing the proactive paradigm shift.

The paper proceeds as follows: Section 2 sets the background of data related challenges, Section 3 reviews the methodology behind the case study of the insurance company and framework method used to perform the analysis of the data, Section 4 describes the results for the 4 health data challenges, and finally, Section 5 discusses the results in an organizational transformation context for insurance companies and other stakeholders.

2 BACKGROUND

Big data offers capabilities for providing better healthcare services, quality of care, all while decreasing overhead costs [6]. Typically, big data is defined as having certain qualities, such as *volume* (quantity) of available data, the *velocity* (speed) of data being created, the *variety* (format) of structured and unstructured formats data takes, and the *veracity* (credibility) of data [16, 17]. Furthermore, certain instances of health data can be considered to fall within the definition and scope of big data due to it being voluminous, unstructured, and challenging to manage or analyze in the traditional manner [18]. Under the purview of personal data, health data is any type of information that directly or indirectly relates to or identifies a data subject's physical or mental health status across any period of time (past, present, or future) [19].

The potential power of big data analytics in healthcare include benefits for IT infrastructure, operational, organizational, managerial, and strategic support [20]. Advantages offered by big data in healthcare mesh with a holistic provider approach where using predictive analytics helps healthcare providers, such as insurance companies, to identify and enact optimized clinical pathways and financial facets [20, 21]. Allowing an insurance company to offer proactive personalized services that alter how a customer interacts with their personal health and wellness. Finding the right balance between technology dependence, engaging stakeholder roles, and market positioning, are key challenges of Connected Health that require navigation to reach a proactive healthcare paradigm [22].

In a systematic literature review by Kruse et al. [23], 9 challenges and 14 opportunities of big data in healthcare were identified. Of the 9 challenges identified, the 3 that were weighted most significantly were: 1) health data is mostly heterogenous and unstructured, 2) the confidentiality of the data subject requires strict security measures, and 3) fragmentation and interoperability

arise even within a self-contained company due to data standardization policies. Correspondingly, the 3 key opportunities slated to incentivize the management of the aforementioned challenges, are for improving tasks related to the 1) quality of care such as more positive outcomes or reduction of waste, 2) early detection and prevention of diseases, which is also tied to 3) the management of a healthy population [23].

Additionally, a challenge for any company within the European Union (EU), or any organization who treats or manages data from an EU resident, is the regulatory measures represented by the General Data Protection Regulation (GDPR) coming into force in May of 2018 [19]. The new regulation "aims to meet the current challenges related to health data protection, strengthen online privacy rights and boost Europe's digital economy" [24]. The implications imposed by the GDPR require compliance of protected data used by companies for adherence (with strict repercussions) which necessitates reflection upon strategic visions for data use and management of information systems to meet demands [24]. Despite this burden, the focus on data portability empowers data subjects to have access to and control of their personal and health data [25].

3 METHOD

3.1 The Case Study Context

The case study is situated in the context of a Finnish insurance company currently transitioning from a more traditional reactive organization, into a provider of proactive health and insurance services. For the purposes of this paper, the company will be referred to as 'Omega' for privacy and ease of reference considerations. In Finland, a traditional insurance provider typically covers 3 main areas for compensation: 1) life (e.g., people), 2) non-life (e.g., property), and 3) pension (e.g., workplace accident compensation).

A qualitative case study was chosen as a suitable approach to support the aforementioned research question as the study occurred in a real-life situation where the phenomenon was explored in detail, providing a potent empirical underpinning for conceptual generalization [26]. Finland was chosen for this single case study as it is currently traversing its second healthcare reform by promoting competition between public and private service providers, with the intention of empowering the patient to be more active in their health and wellness [27]. The ongoing reform focuses on a transfer from municipal responsibility, towards a larger and more centralized regional authority [28]. The insurance industry has not remained unscathed in the wake of the developments taking place in the Finnish society. Prompting Omega to enact necessary strategic movements to be 'more than just an insurance company', in an attempt to differentiate itself from the competition. Based on the availability of data, Omega now seeks to make further movements in the healthcare context – transitioning from a traditional reactive insurance organization (i.e. evaluating customer's claims and paying for health care services after the customer is injured). In order to become a

proactive partner for guiding and supporting their customers to live safer and happier lives.

In an organizational context, the concept of innovation is synonymous with change. An example of a more proactive service being enacted at Omega is referred to as the 'Digital Hospital'. The majority of customer health needs are solved through telehealth services. Additionally, a strategic vision has been implemented in Omega to guide their proactive transition, dubbed 'Holistic Life Insurance'. Omega's implementation of the Holistic Life Insurance covers not only the more traditional model of providing their customers with protection, but also life-long security for health and wellness, economy, and safety.

The movement from reactive to proactive service provision presents many novel challenges. In this case study, we principally intend to explore the challenges that Omega faces concerning health data during their ongoing transition from a reactive company, into a more proactive one, thus, making the Omega case suitable for this study.

3.2 The Framework Method

In order to answer the research question, a systematic approach was used; following the 7-steps of the Framework Method [30]. The researchers have interdisciplinary backgrounds across multiple countries, and the Framework Method lends rigor through systematic management of the qualitative data. Furthermore, this approach is highly suitable for this research as 23 semi-structured interviews were conducted in Omega (see Table 1. for interviewee details) of 24 respondents across multiple departments with different types of expertise. Semi-structured interviews using a dramaturgical model was elected as the method of data gathering to benefit both a purposeful interview process and leverage the power of the qualitative interview knowledge generation and exchange [31, 32]. The interviews were conducted by 2 researchers (the primary author and a separate researcher) with individual interviewees over the course of 6 months between early August 2017 and end of January 2018. They lasted between 60 and 90 minutes in length. The one exception to this structure was interview 06, the only interview to have 2 interviewees. For the purpose of that interview, we denoted the interviewees as 06a and 06b. Prior to the interviews, an interview guide was created, focusing on three main topics; 1) the change taking place in the organization, 2) value co-creation in digital services, and 3) health data. This interview guide ensured homogenous data but also enabled us to explore tangential topics in the interview process. Thus, the results are formulated through a basis of comparison across individuals with varying expertise levels and positions whom were asked similar questions. This is then used to find themes for challenges of health data in the context of the earlier outlined shift towards proactivity in the organization.

The Framework Method was executed using the following 7-steps: 1) Transcription, 2) Familiarization with the interviews, 3) Coding, 4) Developing a working analytical framework, 5) Applying the analytical framework, 6) Charting data into the framework matrix, and 7) Interpreting the data [30].

For step 1) the interviews 1-9 were fully transcribed using Dictapad and denaturalized, primarily in order to clarify any language idiosyncrasies that arose from the interviews being carried out in a non-native language to the interviewees. All text was kept as pure to verbatim as possible, giving grammatical structure whilst filtering out pauses, stuttering, word clarifications, and language ticks [33]. Interviews 10-23 were partially transcribed to compliment the iterative process in step 3) where the focus was on the interviewee responses that discussed the health data codes. Furthermore, for data sharing purposes, removal of sensitive data was redacted from the transcripts and denoted with a generic descriptor such as 'large Finnish hospital'.

Table 1. Summary of Interviewee Respondents

Interview	Interviewee Position	Area of Expertise
01	Unit Director	Business – Workplace Health and Safety
02	Unit Director	Business – Worker's Compensation
03	Development Manager	Customer Experience Research
04	Unit Director	New Business Development
05	Development Manager	Digital Healthcare Services
06a	Chief Digital Officer	Digital Healthcare Services
06b	Program Director	Digital Healthcare Services
07	Communications Manager	Public Relations
08	Development Manager	Corporate Business – Worker's Compensation
09	Development Manager	Data – Business Intelligence and Analysis
10	Unit Director	Claims
11	Analyst	Data
12	Development Manager	Customer Experience
13	Development Manager	Non-life Company
14	Senior Consultant	Traffic Prevention
15	Unit Director	Development
16	Unit Director	Strategy and New Services
17	Program Manager	Data Security
18	Marketing Technologist	Solution Architecture
19	Lawyer	GDPR

20	Unit Director	Customer Relationship Development
21	Leading Expert	Customer Development
22	Department Head	Social Media
23	Unit Director	ICT and Risk Management

In Step 2) the researchers familiarized themselves with the transcriptions by reading and reviewing the transcriptions, and the audio interview data was revisited when necessary to clarify the transcribed content. Analytical notes were taken during this process. Subsequently, step 3) was an iterative process where the data coding took place in two stages. First, a substantive approach through inductive open coding of the interviews in Dedoose for the first 9 interviews was carried out. The resultant codes were then reviewed by the researchers before employing a second round of deductive coding intended to specifically delve deeper into the health data themes for the same 9 interviews. The coding was then applied to the partial transcriptions of the remaining 14 interviews (10-23).

In step 4) as the second round of coding was concluded, both researchers reviewed the codes to construct the analytical framework, that consisted of four challenges: Access, Ownership, Sharing, and Use. This led to step 5) where the analytical framework was then applied to the remaining 14 interviews using Dedoose to assign the codes. In step 6), the data codes were charted from the framework into an actual table that was created in a Google Docs to summarize the categories found from coding to help paint a picture of the findings for the researchers.

Finally, in step 7), the codes were examined and discussed by the researchers based on the analytical framework. For instance, ‘ownership’ pertains not only to the organizational perspective of who owns health data, but also to the grey areas of owning types of health data and how ownership empowers the owner. Numerous discussions took place of both the results but also the context of which they are taking place. “Identifying areas that are not functioning well within an organization or system” [30] was key for interpreting the data into what was revealed to be the 4 health data challenges for Omega outlined below.

4 RESULTS

In this section, we reveal the challenges of health data for Omega in 4 key areas: 4.1) Access, 4.2) Ownership 4.3), Sharing and 4.4) Use.

4.1 Access

Omega recognizes that access to health data is of central importance for their company. The shift to being a proactive company is tied to being an enduring organization as well. “[...] if we look at the core insurance business, that is not a growth business in long-term. So, we have to figure out something else, if we want to be in business in let's say, for the next 100 years. And

then of course, if we look at what could be the options, health is definitely a growth business [...]” (18).

Access to health data is a competitive angle for Omega in the sense that it is a commodity in the overall competition for customers. *“This is something that we, as a company, in order to be competitive in the future, or competing for our clients in the future, we must be able to do the same.” (6b)* However, there is a contingency of being reliant upon having access to customer’s health data *“Yes, it would be very interesting to have that data! But of course, the customer will have to give us permission to have that data.” (08).*

Part of being competitive is also about providing value to the customers with digital services. *“I think that it would be an extra value that would add value to customers, a kind of service that would give us a competitive edge, and we could win new customers and keep the current customers... And make the profitability better.” (01)* Omega is entering into an established healthcare sector with contemporary competition as they are expanding into the healthcare industry. Part of the challenge is establishing Omega within the healthcare sector and to provide valuable digital services to their customers. *“We can put in more service, we can put [that] in our service premium. But if it is more expensive we have to sell it, and that's new. And there's a new competition then, because we are not only competing with the insurance companies but also competing with the other companies who've got the same kind of products and services.” (13).*

Respondents from Omega understand the value of having access to health data to form a symbiotic relationship in order to perpetuate value. Yet, there also needs to be a balance of providing digital services and having access to health data. The need for value from the customer side is based upon facilitating access to their health data but also that Omega should translate big data into value in return for themselves. *“[...] grant us a bit wider access to your data, and in return, we will give you this. [...] We will then understand, that, okay, the value for us is in that extra piece of data. Because then we might have one million people which the same dataset, and then we might be able to add value on top of that.” (06b)* The creation of good customer experience is understood to be reliant upon access to customer health data. *“How do we make the experience better to our customers, and how are we even able to take care of the relationship with our customers, because basically, it's not only about the quantity, but naturally also about the quality, [...] We should be proactively present for the customer [during] the whole relationship that we have with them. And basically, the only way we can do that is that we have the data and that we really use [it].” (20).*

However, since Omega’s future plans include the creation of services to utilize customers’ health information. Access to sensitive information requires the trust of the customer. *“We’ve got to get some new applications [because the customer] they are giving us new information, and we have to ensure that it is safe. And that we are using that in [a] way that we are telling our customers that we are not selling that information, but we are storing it safely, and we are using it for the purpose, that our clients, they know...” (23).* Omega’s access to their customer’s

data obligates them to protect their customer and ensure the purpose of access follows customer expectations. Where establishing trust is crucial for the relationship of an informed customer.

4.2 Ownership

All respondents agreed unilaterally that the ownership of health data is held by the customer or the individual of whom it pertains. *"But my private healthcare data is only, I own it. Every Finn owns it." (15) "Healthcare, if it's about my healthcare, my health, it's me who owns the data." (08) "It is the customer who owns the data." (01)* Revealed through this perception of ownership, is the empowerment behind the individual or customer, *"[...] it's not available until I tell somebody yes, you are allowed to see my data." (15) "[...] I make decisions to whom I can provide that data. Or, slices of that data. Like, I must have the rights and capabilities to choose what [entities] I provide [my data to], for example, to you, or to your colleagues." (06a).*

However, there is a grey side of ownership from Omega's perspective, where legislation supersedes the individual's health data power in consideration of facilitating pertinent business details to Omega. This occurs in such cases as making an accident claim decision after an incident. *"[...] we don't even have to ask for them because it's in the legislation that if something happens then we will get some data for them. They cannot restrict the data coming for us because we do the decision about [if we provide] coverage or not." (04).*

Additionally, Omega has particular rights for health data generated in workplace accidents. The customer owns this data but does not have the power to limit Omega's access due to legal rights in Finland for insurance companies. *"And in Finland, there's a law that data is available in those certain cases, for example in some legal healthcare data, which is mainly what happens if you get hurt or get sick during or on your way to work, or during the work time, or in [the] traffic. That healthcare data is available already for the insurance company." (15)* Omega suggests that customers may not be aware of this legislative power for insurance companies *"[...] it's in the law that we as an insurance company can ask the doctor to give that data and people don't know that we have the right already to get that." (10).*

4.3 Sharing

Respondents discussed their impressions of the customer's perceptions about sharing health data with the company which features the concern of the customer's health data being used against them by Omega (i.e. getting the stick). *"I think one reason is that if they share this information, they think that they don't get the payment for insurance is one thing." (10)* However, potentially unknown to the customer is that product pricing in insurance companies in Finland is legally regulated and thus cannot be based on the existing health status for the customer. *"And the law in Finland is very strict about that kind of data [...] because at least at the moment, we are not able to price our*

products based on the health state of the customer [...]" (12) Furthermore, the Director of New Business Development at Omega emphasized that their intentions around data sharing will not be to associate the singular customer with their health data *"[...] we are not collecting at individual level for 'us', we are not [linking it] to the pricing" (04)* but rather for the benefit of the customer's health and wellness *"They will have the benefit for the [healthy living], that's the reason why they are purchasing and sharing data [...]" (04).*

Sharing health data was identified to be an important consideration for Omega for developing their digital services. Efforts to reward or in other manners incentivize the customer is an approach which is prevailing when developing future digital services. *"It's yet to be seen that we are able to give the carrots [and] try to increase the number of people sharing data. And of course, we try to build the service that will lower the barrier to give the data. But it's very difficult at this point to say that." (04)* Of course Omega wishes to develop interesting services for their customers that will increase the perceived value of the data *"... breaking that barrier is to develop the services that the people want to share their data." (04)* which is further tied to Omega's perception of the customer's willingness to share their data if incentivized *"[...] but the customer can share the data to us if we offer something useful." (16)* The carrot, in the form of rewards or access to future services, is seen as the way to motivate customers to share their health data. *"[...] if they decide to share the data, they want to get some benefits of that, if we are not able to deliver the benefits or tell them when we are selling the service what is the benefit that you give the data, what we give back to them, then it's people... why will people [put in effort] to give the data?" (04).*

4.4 Use

When it comes to the use of customer data, there is great emphasis placed on the act of transparency that must take place between Omega and the customer for the customer to understand what their data is being used for. *"We have to be honest to our customers, and we have to tell the reason to our customers for why we are collecting your data, and what is the proposed cases [in which] we are using your data. In that sense, transparency is the issue..." (06b)* In an effort to understand how a customer experiences transparency, Omega has a new digital service for 'Smart-Life Insurance' which specifically targets customers who are willing to let Omega use their data. *"I think we have a smart insurance service available to some customers and the way that it is done is it is targeted towards customers that are okay with a company using their data, so it is very explicit, very clear that with optional service, we use your data to provide better services." (03).*

As validation for this effort, respondent (20) has joined the 'Smart-Life Insurance' as both a customer and a developer. This respondent outlines the willingness of Omega's customer to let the company use their health data, on the condition that they help the customer in a way they individually deem useful to their

health and overall experience. “[...] naturally there are different kinds of customers who have different kinds of expectations, but at least in some customer segments, it's like really clear expectations from them that they are like really saying 'use the data that you have about me and use it so that you are actually helping me!' For example, to live a healthier life. And I think that is something if we are able to do that one, the angle from which I am looking from is naturally that if that is the expectation and if we are able to proactively be present, like in our customer's life in that way, so that will have an impact on the experience.” (20).

Within Omega, where health data already exists, as in the claims department, there is a level of uncertainty of what Omega can actually do to use the health data. “That has been [an issue for a long time] for the claims side development, to dig into that health data, and how to really use it.” (01) Additional to the ‘what’ is the ‘how’ of health data where there is a requirement for making sure the health data that is used is also actionable. “It is one of the things that we use, get the right data, I think that it's the biggest thing to find the right data. What do we need, because there is lots of data [that we have] but only some of those things will tell something?” (11) As a result of this uncertainty for the ‘what’ and the ‘how’, discussions reverberate internally throughout Omega, theorizing around the potential use of health data. “I feel there is a big push towards using more data, personalized services, I feel that we are faced with this exact problem with using this data and I don't think it has been resolved yet, so we there are discussions all over the organization about how we should create our services and how can we combat this.” (03).

5 DISCUSSION

In this section, we will discuss 5.1) the implications of the health data challenges for organizations in transformation and 5.2) the limitations and future research.

5.1 The Challenges for Organizations in Transformation

The results of this paper indicate there are 4 key types of challenges around health data: Access, Ownership, Sharing, and Use. These challenges are considered in the context of a company that is transitioning towards a proactive service paradigm. When boiled down, however, the prevalence and importance of the experience of the customer is intrinsic to managing these data-related challenges. Especially when considering the creation of value for the customer and the organization.

Having access to health data is much like angling for a competitive advantage. At one time, having the technology itself was considered to give any organization a technical advantage in the market. Where the standard of technology ‘having’ is less about the actual presence of technology itself, but rather how it is employed or personalized [34]. “Firms in many traditional industries are exploiting new and existing data resources for competitive advantage” [35]. As data continues to propagate, perhaps the question is no longer just about data access itself, but

also how it can be aligned with a company’s business model so that it correspondingly brings the customer value [15].

Using actionable data to remain competitive by creating value is not only for the company, but for the customer as well. Actionable data has been foreseen to promote personalization using big data analytics techniques to offer real-time insights and knowledge. Leading to informed decision-making and improve the overall customer experience in health enhancement [36]. Additionally, topics such as co-creating value are aligned with the shift from a Goods-dominant logic practice to a Service-dominant perspective where organizations are offering experiences or ‘health enhancement’ instead of just ‘healthcare’ [37].

A major challenge for sharing is, as expressed from the organizational perspective, the customer’s perception of having their health data used against them. But in reality, constraints from a legal and technical standpoint are in place for both the protection of the customer and to enable fundamental rights for the company. Instead, the choice to explore incentivizing options by sharing through digital services not only brings value to the organization by moving data out of silos, but also contributes to the customer experience through empowerment [38]. In a study by Weitzman et al. [39] aimed to understand the willingness of patients who would share health data in order to receive better quality of care. The majority of the participants perceived value in the action of sharing on the contingency of how sensitive the health data was. However, the willingness of an individual to share their health data with an organization was also shown to be heavily dependent on the business of the organization. Insurance companies in particular were largely not trusted to use the customer data in ways that would benefit the individual [39].

Ownership and use challenges for health data are also tied to the customer experience in the form of transparency. Where being transparent with the customer regarding the use of their health data supports a better customer experience. The GDPR will enforce transparency in data collecting and managing organizations by supplementing protection and accountability regulations for the data subject (i.e. the customer) [24]. But how organizations then reflect that transparency in a meaningful way to a customer remains to be seen.

Since all 4 health data challenges are entwined into customer experience and digital services, it is also important to consider how opportunities unfold from the service designer stakeholder perspective. Previous research has indicated a positive contribution of Service Design (SD) towards organizational transformation of the insurance industry [40]. Apart from incorporating the customers’ experience, SD can also facilitate culture change in organizations [41] which is an imperative for the adjustment of mindset from reactive to proactive.

5.2 Limitations and Future Research

As with all research, this study is not without limitations. We conducted the case study in a single company. We might have identified additional challenges had we studied more insurance companies. In addition, our case study was focusing mainly on health data, and several of our findings are affected by this

specific type of data. However, herein lies the opportunities for further research by broadening the understanding of the challenges insurance companies are facing. As such, future research should study other industries that are transitioning to contribute to a more holistic understanding of the challenges that arise. How these challenges occur is of great potential interest, but also to learn how those challenges are overcome affords innovative learning opportunities. Furthermore, research should be aimed at understanding how the willingness or motivations to share data are connected to the perceived value or the values of the customer [42]. This is an important direction for future research to better understand how to connect companies to the customer experience using health data, but also to understand the role other stakeholders play in Connected Health such as service designers.

6 CONCLUSIONS

In conclusion, this paper identifies 4 health data challenges for a Finnish insurance company that is transitioning into a proactive organization. These challenges were found to be: Access, Ownership, Sharing, and Use of health data. The importance of access to the customer's health data is imperative for competitive advantage. Access may be achieved by incentivizing customers to share their health data through development of digital services they deem valuable. However, actions towards transparency and trust building need to be taken to reassure the customer that the data they are sharing will not be used against them.

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