The effect of the Internet of Things on the customer relations aspect of business model innovation: a multiple case study of startups

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ABSTRACT

The Internet of Things or “IoT” is a technology that has been increasing in use in recent years. The main use case of IoT has been in B2B applications, particularly production. This has been heralded as the fourth industrial revolution or “Industry 4.0/Industrial Internet of Things” and is often praised for its potential for innovative new business models. Even though the IoT promises to bring about big changes its effects have mainly been analyzed on B2B firms, only little is known about its effects from the B2C perspective. Therefore, this research investigates IoT and its effects within the B2C sphere. Startups have been chosen as the research subject for this due to their innovative nature. The agile and responsive characteristics of startups make them more innovative than their larger counterparts and would potentially show the innovative effects of the IoT more readily. Customer relationships in particular are researched since it is one of the pillars of a business model and there is a lack of research on it in relation to the IoT. This research uses an abductive research design and conducts a multiple case study of 13 different firms with the majority in the smart home sector. This research created a framework based on academic literature through which the customer relationship of IoT based firms can be analyzed. This framework was developed by operationalizing the most important elements of these factors and their interrelation to each other. These factors have been categorized under the technology and relational umbrella with trust being a central point in both. Following this, the framework was applied to the cases. From this analysis became clear that a variety of confounding factors that play a role in the IIoT literature impact the B2C IoT sphere to varying degrees. As a result, the interviewees conducted their businesses in surprising ways deviating from the literature. In total 7 elements were found. In the technology domain: Privacy & Security, Familiarity, and Technology acceptance. In the relational domain: Interaction, Credibility, and Commitment. With Trust residing in both domains. Additionally, 13 confounding factors were founding in these elements. Finally, there does not seem to be a large disparity between the academic literature on the IIoT and IoT however further research needs to be conducted to verify this.

Keywords: Internet of Things, business model innovation, customer relations, startups, technology acceptance, commitment, trust, security and privacy, case study research.

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List of Abbreviations

CRM	Customer Relationship Management
GDPR	General Data Protection Regulation
IIoT	Industrial Internet of Things
IoT	Internet of Things
RFID	Radiofrequency Identification

Glossary

Business model	A business model has the purpose of representing a firm's value creation, delivery, and capture mechanisms (Teece, 2010).
Commitment	Commitment is defined as a customer's long-term ongoing attachment toward a relationship based on both an emotional bond to the relationship and on the conviction that remaining in the relationship will yield higher net benefits than terminating it. (Hennig-Thurau & Kee, 1997)
Customer relationship	Customer relations aim to describe how the firm reaches its customers and how it interacts with them. Specifically, the relations have the task of maintaining the target customers while promoting the value proposition (Osterwalder, 2004).
IIoT / Industry 4.0	Industrial IoT or Industry 4.0 is the industrial application of IoT technology. Often used for production or manufacturing.
Interaction	Interaction between startup and customer denotes the communication and inclusion of the customer in decision making and design making processes and shows the extent to which the consumers are a central element (Ramaswamy & Ozcan, 2016).
IoT	IoT currently is being used as an umbrella keyword to describe an embedded network of devices which are connected by information and communication technologies (Kopetz, 2011; Falkenreck & Wagner, 2017; Miorandi, Sicari, De Pellegrini, & Chlamtac, 2012).
Privacy	Privacy includes the concealment of personal information as well as the ability to control what happens with this information (Weber, 2010).
Security	Security in relation to IoT technology refers to the guarantee in terms of system-level confidentiality, authenticity, as well as the protection against malicious attacks (Miorandi, et al., 2012).
Technology acceptance	Technology acceptance refers to the customers willingness to come to accept and use a technology. (Legris, Ingham, & Collerette, 2003)
Trust	Trust is characterized by a trustor (customer) who is willing to rely on the actions of the trustee (firm) and is willing to accept the vulnerabilities based on positive expectations. (Rousseau, et al., 1998). Trust is a concept with regard to the belief and expectation on the reliability, integrity, security, ability, and other characters of a party (Yan, et al., 2014; Miorandi, et al., 2012).

1. INTRODUCTION

1.1.Relevance

Companies are constantly looking for new ways to achieve and sustain a competitive advantage (Barney, 1991). In the past years, the Internet of Things (hereafter IoT) has become more prevalent to the extent of its presence being around us in a variety of things and objects (Gubbi, Buyya, Marusic, & Palaniswami, 2013). This increased presence notes its potential and importance to firms as well as the regular household. The IoT is a term coined in 1999 by Kevin Ashton (Ashton, 2009) and has been used since, gaining more traction over the years. The term initially alluded to the use of radiofrequency identification (RFID) but has since become broader. When put broadly, IoT currently is being used as an umbrella keyword to describe an embedded network of devices which are connected by information and communication technologies (Kopetz, 2011; Falkenreck & Wagner, 2017; Miorandi, Sicari, De Pellegrini, & Chlamtac, 2012).

The IoT will have a major impact on the daily life and behaviors of consumers and businesses alike. While the businesses will be impacted primarily through automation and industrial manufacturing, logistics, business/process management, intelligent transportation of people and goods, the regular consumer will see changes through wearables, smartphones, smart living, a general increase in smarter environments and objects (Atzori, Iera, & Morabito, 2010). The IoT is slowly interwoven into consumers daily lives through internet enabled devices. One of those devices and arguably one of the most important one is the smartphone. In consumer IoT devices the smartphone often acts as a controlling device for their various IoT devices and services.

Simply put, an IoT device is a device that can connect to the internet and through this broadcast information out or communicate with other devices. An example of household IoT technology is the Chromecast product line of Google. This line of products allows you to, for instance, connect the device to your speakers through the Wi-Fi you have at home. This turns your speakers in a smart device which you can control through other devices, i.e. play music from your phone over the internet on your speakers without having to physically connect them. There is a myriad of devices with internet connectivity like this, the Amazon Alexa, Fitbit, smart home heating systems, carsharing application like Uber, Sonos wireless sound systems, and more. The application of IoT devices cover a wide spectrum of possibilities which is expanding to this day.

The increased use of the IoT goes hand in hand with other innovations like the development of 5G, increased data speeds will make smart cities and other high data goals plausible, autonomy, i.e. self-driving cars and driver assist technologies, artificial intelligence, and robotics (CES, 2017). The IoT is a highly promising concept, as shown by its growth rates. Inmarsat research (2017) confirmed that IoT is currently the most prominent technology in which companies are interested in. 82 per cent of their research respondents told them they will have adopted some form of IoT within the next two years. Additionally, the progress of other innovations like AI, machine learning, and augmented reality benefit from the information and sensors the IoT provides.

The diffusion of the IoT will lead to a large increase of available information for firms. Data is vital and a decisive factor in the profitability and success of every organization and plays a major role in decision making (Sidorova & Torres, 2015). This increase in data lets firms better understand customers, markets, and competitors. However, data theft is becoming more attractive for criminals and data breaches are an increasing risk for companies (Jing, et al., 2014). Research from Inmarsat (2017) shows that many companies struggle with shortages in the fields of data security, data science and technical support which is needed to manage the IoT.

This paper is an exploratory research regarding the effects of the IoT on business models. Currently, the IoT is employed in production companies under the moniker Industry 4.0. The use of IoT in the production sector enables manufacturers to entirely digitize and decentralize their value chains which helps them cope with shorter technology and innovation cycles (Kiel, Müller, Arnold & Voigt, 2017). A sharp increase in the spending and creation of the IoT over the last years can be seen (Dijkman, Sprenkels, Peeters & Janssen, 2015). It is projected that 8.4 billion connected devices will be in use worldwide in 2017, which is an increase of 31 percent from 2016, and will reach 20.4 billion by 2020 (Gartner, 2017). This prediction is relatively conservative with predictions reaching 26.4 billion or even 30.7 billion devices (Cisco, 2016; IHS Markit, 2016).

The distinction is being made here between B2B and B2C as they have different concerns regarding their viability in the market and influenced by different criteria. So are there differences in security, reliability, automations, interactability, customizability, and more. These factors can influence the customer relationship in different ways. The B2C side of IoT has yet to be explored by the academic literature and as such needs to be researched. Furthermore, B2B companies and B2C companies can have wildly different business models and for startups to properly exploit IoT it is essential for them to create new innovative business models (Schneider & Spieth, 2013).

Business models are an important means to the commercialization of innovations and as an extension, derive value from the IoT (Schneider & Spieth, 2013). Osterwalder (2004, p15) for instance, described business models as “A business model is a conceptual tool that contains a set of elements and their relationships and allows expressing a company's logic of earning money”. A business model has the purpose of representing a firm’s value creation, delivery, and capture mechanisms (Teece, 2010). To fully embrace the IoT, startups will have to build their business models around it and as such will have opportunities to bring about innovation within it.

While the value creation is the obvious element for the inclusion of the IoT, value delivery plays a large role in subverting the challenges and convincing the customers to use a firm’s product. The creation of a firm is a very complex and demanding task. The creation of a business model helps startups to make more informed decisions and work more structurally, thus increasing the chances of success (Trimi & Berbegal-Mirabent, 2012). Especially the customer relationship aspect of the business model in relation to the IoT will be explored due to its importance for a firms’ success and the lack of research on it within the academic literature.

The input from and communication with customers is essential in fast paced innovative industries. Customer relations are about the effective management of relationships, it involves finding, attracting, and retaining customers (Galbreath & Rogers, 1999). Basically, to optimize revenue and increase customer value and service quality through understanding and satisfying the individual customers' needs (Assimakopoulos et al., 2015). The quality of the customer information impacts the customer relations and overall firm performance (Soltani & Navimpour, 2016). Firms strive to gain a competitive advantage through the relationships they have with their companies (Navimipour, 2015). Therefore, it's important to maintain and nurture these relations.

Many challenges must be solved before the full diffusion of the IoT becomes possible. Companies need a way to guarantee trust, privacy, and security (Sicari, et al., 2015). The customer relations will play a large role here, and thus will be the focus of this study (Navimipour, 2015). The increase of IoT devices leads to an increase of IoT services and IoT consumer centric firms, firms with the purpose of providing a service or product to the customer through the application of the IoT. The IoT has been mainly applied for industrial purposes (CES, 2017). Though, the applications of IoT are numerous and there are a lot of ways this can be exploited for the benefit of consumers. There is an increasing number of firms looking to apply IoT in the realm of B2C.

Fortunately, startups are more flexible in changing and innovating as opposed to larger firms who suffer from structural inertia (Hannan & Freeman, 1984). Startups are more successful in business model innovation. Startups operating in high tech environments face constraints such as the need for large investments required to develop the product, or very short product life cycle, and copycat competitors. They function in an uncertain and evolving environment with many risks. Compared to an already existing and operating SME a startup undergoes risks which force it to be highly innovative as their failure would prove fatal and as such will lead to higher levels of innovation (Trimi & Berbegal-Mirabent, 2012). The focus of this research will be startups due to their importance in the technology market and their innovative nature.

A startup is an emerging company with high growth potential. These firms aim to grow fast so they can employ an exit strategy like (e.g. selling or going public). Startups face high uncertainty with high rates of failure and are typically created with a high risk, high reward mindset. When they do succeed, they tend to have a lasting impression. Traditionally, a distinction between established and young companies are made through age. However, research show that this is not applicable for startups (Oukes, 2018). Therefore, the age of the startup will be used to determine the experience and the degree to which it is established.

Innovation is mainly driven by startups which then often get bought by larger firms. An example of an IoT company is relayr who provides industrial IoT solutions and got bought out by a large company, Munich Re. The startups will have to differentiate themselves from the competition by innovating in the different aspects of a business model, including the customer relations, so they can grow accordingly and employ a successful exit strategy. The use of the IoT is still quite new to the market, especially IoT consumer service applications. However, outside of the Industry 4.0 and production applications, IoT influences are not as represented in the academic literature.

This coupled with the difficulty of business model innovation for larger firms due to rigidity, leads to business model innovation being driven primarily by the startup scene (Sabatier, Craig-Kennard & Mangematin, 2012). To enable the commercial exploitation of the emergence of the IoT, startups are being created. These startups must develop new types of business models to fully take advantage of new technologies (Dijkman, et al., 2015). Thus, startups are more likely to show the innovative effects of the IoT on customer relations. However, the definition as it is now seen in the eyes of the public and the media varies greatly from the established literature of the SME. Thus, the term startup has yet to be properly defined in academic literature.

1.2. Research goal and question

The value proposition is seen as one of the most important elements for IoT business models, followed by customer relationships and key partnerships (Dijkman et al., 2015). Furthermore, Kiel (2017) shows the importance of the customer orientation associated with the new business models created to facilitate the IoT and how the new business models focus on intensifying customer relationships. However, research on the impact of the IoT on the customer relations aspect of business model innovation, is still lacking within academic literature. There exists a general lack of academic literature showcasing the differences between IoT business models and business models for other purposes (Dijkman, et al., 2015).

Additionally, the academic literature on the IoT focuses largely on large enterprises (Müller, Buliga & Voigt, 2018). The existing literature on business model innovation within the IoT context focusses primarily on the industrial IoT (IIoT), the B2B segment. Furthermore, current literature emphasizes the value proposition leaving a gap with regards to the customer relation segment of business model innovation. The analysis of the impact of IoT on the customer relationship can further help entrepreneurs in this field to improve their future firm performance and strengthen their relationships. This insight can lead to new adapted strategies to handle the (positive or negative) impact and maybe even lead to advantage over other companies.

Hence, this study focusses on startups in the sphere of the IoT and leads to the following research question:

"How does the Internet of Things affect the customer relations aspect of business model innovation within consumer centric startups?"

In order to answer this research question, it is divided in several sub-questions. These questions will answer the main research question:

SQ1: Which elements of customer relationships are impacted by the IoT?

SQ2: How can these elements impact the customer relations of a firm?

SQ3: How do these elements impact the innovative actions of a firm with regards to their customer relations?

1.3. Practical and theoretical contribution

The research objective of this paper is to examine how the IoT affects customer relations and customer relationship innovation within startups. From existing literature on the IIoT and industry 4.0 we can derive that this positively affects the customer relations in B2B relationships due to the increase of information it provides. However, there are some downfalls with regards to trust and other relational and technological dimensions. It can be assumed that these dimensions will correspondingly affect common consumers as well. Therefore, this research will aim to find the relevant elements and analyze them in the context of the B2C market.

Due to the innovative disposition of startups they might use the opportunity of the IoT to innovate their customer relation aspect of their business models. Given the research on the effect of the IoT on customer relations in the business to consumer is still sparse, the objective of this study is to provide a more comprehensive understanding of the most prevalent consequences. Therefore, this study provides new insights into the impact of the IoT on startups as this has received little academic attention. Thus, this study contributes to the existing literary works through the use of empirical research.

The massive growth of the IoT and it's increasing usage and implications for the future means this study is an important contribution to firms looking to operate in the IoT market or firms which are already doing so. This study will be useful for startups that do work related to the IoT as well as large firms who can us the results of this study and apply changes to their existing customer relations. It will provide them valuable information about the way the IoT can impact their business's activities regarding their customer relations and how to innovate in this field.

2. THEORETICAL FRAMEWORK

Selected theories related to this research are described in this chapter. By linking them, a theoretical framework is built which will serve as a basis for the following research work. First the IoT is explored followed by its effect on business models in general and how it affects social interaction dimensions. These social interaction dimensions further influence customer relations. Finally, the effects of these elements as described in the current literature is explored.

2.1.The internet of things, a concept

The connection of devices and sensors to the internet makes it possible to access remote data and control devices from a distance. This data is mixed and is an amalgamation of different devices communicating (Kopetz, 2011; Gubbi, Buyya, Marusic & Palaniswami, 2013). This network of devices leads to the possibility of the IoT and a creation of an ecosystem of devices and sensors connecting digital and physical entities (Miorandi, Sicari, Pellegrini, and Chlamtac, 2012). From the conceptual standpoint, the IoT is about devices acting as creators and users of data related to the world. The focus is on data and information as opposed to direct communication. This is seen as the revolutionary next phase for the internet (Gubbi, et al., 2013; Atzori, Lera & Morabito, 2010).

The application of IoT technologies is very diverse and is increasing as IoT solutions are being created for all areas of everyday life (Al-Fuqaha, Guizani, Mohammadi, Aledhari, and Ayyash, 2015). The IoT has been identified as one of the emerging technologies according to Gartner's Hype Cycle and is currently in the peak of inflated expectations. It has been forecasted that IoT will take 5–10 years for market adoption (Gartner 2018). The concept of the IoT is possible through the integration of different technologies. This is based on the ability of devices that can identify themselves, communicate, and interact (Miorandi, et al., 2012). These objects are called smart objects and their complexity varies.

For the IoT to function, first there is a need for identification, sensing, and communication technologies (Atzori, Lera & Morabito, 2010; Al-Fuqaha, et al., 2015). These technologies generate massive amounts of data which must be stored, processed, and presented (Gubbi, et al., 2013). This information is typically gathered through sensors and can track such things as, location, temperature, weight, etc. These sensors blend seamlessly with the environment around us, and the information is shared across platforms (Gubbi, et al., 2013).

Often everyday objects are embedded with electronics to make them "smart" (Miorandi, et al., 2012; Al-Fuqaha, et al., 2015). Data is collected from these smart objects and shared. After which the data is then processed by software. This software plays an important role in restricting the information since there is a lot of data which is not pertinent to a developer (Atzori, Lera & Morabito, 2010). This layer of software is very important for simplifying the data since what is available is extremely large. This makes it possible for the programmers to develop applications enabled by the IoT infrastructure (Atzori, Lera & Morabito, 2010; Al-Fuqaha, et al., 2015). These applications provide the systems functionalities to the end user.

The main area in which IoT is applied is within the industry 4.0, a business to business concept. As is apparent the possible applications of the IoT are enormous. Currently only a very small part is available. Many of the applications would improve our life, at home, at work, or at the gym, just to name a few. However, this means that IoT and smart devices will invade every aspect of our life. These environments contain objects which will gain communicative capabilities in the future (Al-Fuqaha, et al., 2015; Atzori, Lera, and Morabito, 2010; Miorandi, et al., 2012). However, there are also commercial uses for IoT. The commercial uses of the IoT can be seen in retail, home automation, wearables, and entertainment.

The areas in which both the customers and businesses benefit from the IoT are plenty as well. These can be logistics, transportation, healthcare, utilities, government & public services, banking & insurance, education, and hospitality (Wortmann & Flüchter, 2015; Miorandi, et al., 2012; Atzori, Lera & Morabito, 2010; Gubbi, et al., 2013; Al-Fuqaha, et al., 2015). The environments in which the IoT can be applied have been grouped under four domains by (Atzori, Lera & Morabito, 2010). They use the following four classifications: Transportation and logistics, Healthcare, Smart environment (home, office), Personal and social domain.

IoT in the realm of T*ransportation and Logistics* can manifest itself through more advanced vehicles which have been outfitted with sensors, actuators, and processing power. The same goes for roads or transported goods which are tagged. These elements can send important information to traffic control sites and the vehicles to map a better road or even drive themselves, track the goods precisely, give better navigation, help the disabled, and more (Atzori, Lera & Morabito, 2010; Miorandi, et al., 2012). Intelligent transportation systems in general strive to achieve better reliability, efficiency, availability and safety of the transportation infrastructure and its participants (Al-Fuqaha, et al., 2015).

Improving the efficiency of *Healthcare* is one of the most challenging goals of modern-day society. Hospitals struggle to maintain quality care to patients while keeping the costs low. The IoT can develop technologies for aiding in the identification of people and deceases, tracking of objects and people, real-time monitoring, diagnosing, and more. This will make these processes a lot easier and less time-consuming (Catarinucci, et al., 2015; Atzori, Lera & Morabito, 2010). The shortages are a serious bottleneck and even cause a lot of unfortunate errors in practice. The IoT can be used to monitor physiological statuses of patients through sensors by collecting and analyzing data and then sending analyzed patient's data to doctors to make suitable actions (Al-Fuqaha, et al., 2015). However, the IoT also poses large threats for the healthcare industry.

A *Smart Environment* eludes to an area that makes use of the IoT and is outfitted with intelligent object. This can be the office, a home, industrial plant, or a whole city (Atzori, Lera & Morabito, 2010). For instance, a smart home has IoT services which contribute to making daily-life easier and more convenient. Home appliances and systems could be remotely monitored and operated. It could also work automatically by closing the blinds if it detects strong sunlight or automatically turning the lights on in the rooms where people are (Al-Fuqaha, et al., 2015). The smart environment category represents the biggest group of IoT devices for consumers.

The *Personal and Social* domain is focused on enabling social interactions. This can include social networks or systems that automatically trigger a message to a friend to allow them to know what we are doing or what we have done in the past (Atzori, Lera & Morabito, 2010). The most common use of this is through tracking technology in smartphones and sharing this. So can a user share a post with where they are and what they are doing. However, with the evolution of IoT, it is quite possible that connected devices, such as wearables, will update the status of a user automatically. This can already be seen in various health wearable IoT devices. This interactive way will change the way consumer are connected to each other as well as the way businesses interact with their customers both as a communication tool as well as a marketing tool.

One of the main applications of the IoT and how it is primarily used within the industry 4.0 is through advanced monitoring applications. This can increase the reliability of the production processes. The available sensors offer the opportunity to have real-time information available and share this with the manufacturers and customers if necessary. This real time information availability and sharing enables pattern analysis, can be used for decision making, and general monitoring (Falkenreck & Wagner, 2017). Additionally, the increased stream of information will lead to new business models in which selling data and dealing in data will be normal (Al-Fuqaha, et al., 2015). Especially with the IoT where data is of great importance will lead to new regulations in terms of data use and sale (Falkenreck & Wagner, 2017; Ng & Wakenshaw, 2017).

The connection between the different devices, promotes the emergence of an ecosystem between all the involved parties. This ecosystem will be compromised of a large amount of connected device that can share their information as well as consumers who use these devices. This includes the users, sensor providers, hardware providers, network providers, and other parties that might be involved, that interact, and share their products and services (Kiel, 2017). Furthermore, Atzori, Iera, Morabito, & Nitti (2012) argue that the cooperation caused by the IoT between different firms by interacting with their devices, and providing information is a relevant contribution from the IoT to relationship building and maintenance for firms. This allows these firms to provide better feedback to their customers. By sharing this data these firms gain access to information which they can leverage towards innovative new business models.

Furthermore, the IoT has a role of an innovation enabler due to the possibilities it creates (Miorandi, et al., 2012). One of these and perhaps one of the largest one is cloud computing. Cloud services allows the use of remote third-party software and hardware components, it enables businesses and individuals to use and maintain many resources remotely, reliably and at a low cost (Al-Fuqaha, et al., 2015). This is generally based on a cost-based model. This enables end-to-end services for businesses and users to access applications on demand from anywhere which is generally cheaper than creating your own system but is also highly scalable (Gubbi, et al., 2013). Moreover, the IoT generates big data which in turn requires complex computations to extract knowledge. Therefore, the storage and computing resources of the cloud present the best choice for the IoT to store and process big data (Al-Fuqaha, et al., 2015).

Innovation within the IoT comes from the combination of IT and physical components to create new products and enable new business models to be created. Furthermore, IoT can be used to make ordinary objects “smart”. For instance, an ordinary lightbulb can gain additional features with the use of sensors and can serve as a pseudo security system or simply being able to be controlled by phone (Wortmann & Flüchter, 2015). The internet and devices as we know it will come to an end. Devices will require less power and energy since everything will be processed through the cloud. The Internet infrastructure itself will become even more vital as it will serve as the backbone for information sharing and diffusion, connecting physical objects with communication capable devices across a wide range of services and technologies (Miorandi, et al., 2012). However, this makes it so that these services rely on the internet to operate.

2.2.The challenges of IoT

The IoT has a lot of challenges it must face for it to achieve the widespread adoption of IoT technologies and applications. The main challenges are related to security, privacy, and trust. There is a lack of common standards and architecture for IoT security which poses a serious threat. Since the IoT is composed of a heterogeneous network, networks which differ in specifications and functions as well as security, it is not easy to guarantee the security and privacy of users. Especially since the IoT is based on the exchange and communications between millions of devices (Al-Fuqaha, et al., 2015). Some of these issues could be solved by introducing standards and legislature which creates security and privacy demands firms must keep. However, the modular nature of IoT devices is one of its biggest draws due to its flexibility.

Without guarantees in terms of safety and privacy consumers and businesses are unlikely to adopt IoT on a large scale (Miorandi, et al., 2012). The use of automatically communicating devices in our everyday life presets a danger for safety and privacy. The smart objects of the IoT will be ever present even if you don’t want a part of it, these devices are unseen and will be embedded in personal devices, clothes, and even groceries can unknowingly be triggered to reply with their ID and other information. This has the potential to enable a third party to surveil an individual without their knowledge. These devices must be outfitted with strong security and privacy protocols for them to be accepted on a large scale.

The technology of IoT must include functions related to the management of the trust, privacy and security of all the exchanged data (Atzori, Lera & Morabito, 2010). People will resist the IoT if there is no public confidence that it will not cause serious threats to privacy. Atzori, Lera, and Morabito showcase the backlash of a case where a retailer planned to tag a complete line of clothes as the first sign of the potential mistrust towards the use and data collection collected by the IoT technologies. The increase in devices provides potentially malicious parties a greater attack service. There will be more exploitable weaknesses. Moreover, the smart objects will most likely be characterized by low capabilities, low power to keep energy use manageable which means these devices won’t have the necessary power for an appropriate authentication infrastructure (Atzori, Lera & Morabito, 2010).

2.2.1. Security

There are various vulnerabilities in the current IoT sphere, security will be a major concern wherever networks are deployed at this scale. First, the smart objects spend most of their time unattended since there is no need for human interference. This opens them up to a physical attack. Second, most of the communication will take place wirelessly, this makes spying on the communication simple (Atzori, Lera, and Morabito, 2010). Lastly, the low capabilities of the devices will make the implementation of a strong security system hard. There are many ways in which a system can be attacked, the network could be disabled, malicious or false data can be uploaded, personal information can be accessed, etc. The main way to defend standard networks is through cryptography (Gubbi, et al., 2013). However, cryptography has many drawbacks.

Throughout the literature a lot of solutions are proposed with the use of use of cryptographic methodologies. However, as mentioned before this type of security spends large amount of resources in terms of energy and power which at this point is not feasible, which is acknowledged by the researchers themselves as well (Atzori, Lera & Morabito, 2010; Gubbi, et al., 2013; Miorandi, et al., 2012). Even in the case when using encryption against outsider attacks to ensure data confidentiality and message authentication to ensure data integrity and authenticity. Encryption does not protect against malicious attacks which come from within (Gubbi, et al., 2013). Looking further, data confidentiality must be safeguarded and presents a fundamental issue. Especially within a business context, a firm can lose confidential or customer information which is highly sensitive (Miorandi, et al., 2012).

2.2.2. Privacy

Due to the nature of IoT, a lot of private information about an individual will be collected without them being aware of it. The current state of the IoT is not able to properly control all such information (Atzori, Lera & Morabito, 2010). For individual users it will become impossible to control the exposure of their data. The way information will be collected will be on a different scale than what is the case now. Thus, people's concerns for their privacy is justified and forms a significant barrier to the diffusion of the IoT (Atzori, Lera & Morabito, 2010). Furthermore, the identity management of the devices themselves is something which raises issues that needs to be carefully managed (Miorandi, et al., 2012).

The application of the IoT in the health-care sector represents the biggest risk. The lack of appropriate measures against malicious attacks and the safeguarding of personal and sensitive data will hamper the development of IoT and will stop government legislation in the allowance of the technology (Miorandi, et al., 2012; Catarinucci, et al., 2015). Furthermore, the decreasingly lower costs of data storage make the deletion of old information obsolete. Information will be retained indefinitely even though specific data won't have use anymore. This will derive an individual of their right to be digitally forgotten unless measures are taken against this (Atzori, Lera & Morabito, 2010; Igglezakis, & Politis, 2014). Especially in the context of national health care systems these issues represent a large risk factor for consumers and businesses alike.

Digital forgetting has been an issue that has gained traction only recently. Therefore, there is need for a solution that deletes information that has no further use for the purpose it was created. However, this is an issue that needs to be addressed on a legislative level to ensure cooperation. Steps are being made in the right direction with the introduction of the General Data Protection Regulation (GDPR) which a significant law introduced in the European Union. The GDPR further sets expectations and benchmarks for developing future privacy laws and regulations. Meanwhile, startups would do well by making this part of their policy (Atzori, Lera & Morabito, 2010; Igglezakis, & Politis, 2014).

2.2.3. Trust

Trust plays an important role in the diffusion and success of the IoT. Trust, however, is not a concept that has been researched extensively in the context of the IoT (Sicari, Rizzardi, Grieco, and Coen-Porisini, 2015; Yan, Zhang, and Vasilakos, 2014). Trust is a complex concept and there is no definite consensus in the scientific literature even though its importance is acknowledged, this makes it hard to use trust as an evaluation criterium (Sicari, et al., 2015; Miorandi, et al., 2012). Trust is a concept regarding the belief and expectation on the reliability, integrity, security, and other characters of a party (Yan, et al., 2014; Miorandi, et al., 2012). Trust management plays an important role in IoT for reliable data aggregation, user privacy and information security. It helps the end user feel secure and willing to use a service or product. If there is uncertainty and risk, user acceptance and use will be limited (Yan, et al., 2014; Sicari, et al., 2015).

Due to the communicative network of the IoT, a trustworthy system is not only dependent on one element in the value chain but on the reliable cooperation among the objects and software in the system (Yan, et al., 2014). This seems exceedingly hard to achieve since the cooperation of many players is necessary. As aforementioned, trust is not a principle that has been extensively researched within the IoT environment. Yan, et al., (2014) tried to summarize this principle into categories based on the works of Yan and Holtmanns (2008), and Yan and Prehofe, (2011). This divides the trust principle under 3 properties. Objective properties, subjective properties, and the context. Furthermore, the objective and subjective properties are approached from the side of the trustor and the trustee.

2.3.Business models

While business model research has been ongoing for fifty years, a common accepted definition and understanding is still missing (Zott, Amit & Massa, 2011; Wirtz, Pistoia, Ullrich & Göttel, 2016). Business model definition has evolved from the initial focus of, making money, to a more nuanced representation of value creation, value delivery, and value capture (Teece, 2010; Zott, et al., 2011). The value creation aspect of a business model refers to the products and services which they provide to the customer and create value for the firm. The value creation is the primary distinguishing factor between competitors (Schneider & Spieth, 2013; Osterwalder, 2004). The value capture is the monetization and revenue plan of the business model (Müller, et al., 2018). And finally, value delivery is everything necessary to ensure the products or services can be delivered to the customer (Teece, 2010).

Müller et al. (2018) distinguishes between three value capture components: customer groups, customer interaction, and payment methods. The customer interaction refers to the interaction between the firm and the customer. This can range from customer support to receiving feedback from the customers. Osterwalder & Pigneurs business model Canvas (2010) refers to this aspect of the business model as the customer relation building block and aims to describe how the firm reaches and interacts with its customers. Specifically, they have the task of maintaining the target customers while promoting the value proposition (Osterwalder, 2004). Within the research of Osterwalder, Pigneur, and Tucci (2005) they identify the nine most common business model aspects. Their research is based on information systems which fits the IoT. This conceptualization of the customer relationship aspect of business models will be used in this research.

The increase in technology leads to more and more options for firm-customer communication (Teece, 2010). However, the upper echelon in firms have the propensity to reduce the customer relationship process and problems as something that can be solved by using technology as opposed to seeing it as an assistance tool (Osterwalder, 2004). Especially with the emergence of the IoT, the communication model within firms becomes increasingly complex due to the ecosystem it creates comprising of several parties, which provide information to the IoT ecosystem (Kiel, 2017). This opportunity of sharing digital data leads to enhanced buyer-seller interactions and new business models based on this principle (Falkenreck & Wagner, 2017). This does mean that there is an increasing emphasis and dependence on partnerships which in turn can influence the customer.

2.4.Customer relations

The customer relations of a startup hold significant importance for its survival. Especially in fast paced innovative industries the input from and communication with customers can make a large difference. Customer relations are about the effective management of relationships between a firm and its customers, it involves finding, attracting, and retaining new customers, as well as nurturing and retaining customers the organization already has (Galbreath & Rogers, 1999). The creation of social media led to easier and quicker communication with firms. For instance, everyone can now send a tweet to a large corporation and expect a response since their interaction will now be displayed in public. Another example would be the inclusion of recommender systems in online marketplaces.

An online shop like Amazon can recommend products based on user reviews and amount of orders. This makes it easier for a customer to know what items are of high quality and thus leading to the customer returning. Furthermore, for a lot of retailers digitalized platforms of engagements have become integral to their offerings. Giving customers the ability to choose from and create customizable products, e.g. Nike's ID, giving them the ability to enhance the design (Avlonitis and Karayanni, 2000). Or offering free services which complement their product thus creating a stronger bond and brand value, e.g. Nike training club giving free workouts throughout cities for free (Ramaswamy & Ozcan, 2016). Thus, creating value through experiences and creating a stronger bond with their customers.

Firms strive to gain a competitive advantage through the relationships they have with their companies (Navimipour, 2015). Therefore, it's important to maintain and nurture these relations. The management of these relations are generally done through what is called, customer relationship management (CRM). CRM is a management philosophy for managing a firms' relations and interactions with customers and potential customers. It does this through data mining, data analysis, knowledge management, and etc. The overall goals of CRM are to create customer satisfaction, trust, loyalty, and retention (Siriprasoetsin, Tuamsuk, & Vongprasert, 2011). Basically, to optimize revenue and increase customer value and service quality through understanding and satisfying the individual customers' needs (Assimakopoulos et al., 2015). This is often done through CRM software with different aims such as, automation of processes, analytical systems, or operational systems (Soltani & Navimipour, 2016). The research of Gillies, Rigby, and Reichheld (2002) found that a small increase of 5% in customer retention boosted the lifetime customer profits by 50% on average. Especially for startups who aim to grow their business, this increase in profit can be very important.

Soltani & Navimpour (2016) conducted a literature review on CRM systems to determine the main advantages in the use of CRM technologies. They found that the quality of the customer information greatly impacts the customer relations performance. This in turn can lead to improve overall firm performance. The IoT will grant access to a large database of information, some of which will not be of the highest quality. It is paramount for startups to be selective in their use of data if they want to benefit from it. If they manage to do this successfully, they will benefit greatly. However, due to the small size of startups and their limited manpower this will be a hard thing to accomplish. Soltani & Navimpour (2016) further found that CRM based on data mining can grant great insights into customer's needs thus leasing to higher customer satisfaction and eventually enhance the firms' competitive advantage. This ties in with the previous point and the availability of data the IoT brings. The big data the IoT gives access to can play a large in decision making, business analytics, product development, and customer experience (Casado & Younas, 2014). By employing smart data mining systems, the strain on the startups could be alleviated. They further argue that trust is a dimension that plays an important role in the successful implementation of online systems which is in line with the theory discussed before.

However, the use of CRM is not a foolproof system as many firms still often fail to gain advantages which outweigh the costs. If a startup does not possess a strong customer strategy the implementation of CRM will not help. A firm needs to develop a customer strategy that separates the profitable clients with whom you want deeper relationships from the ones you should service at low cost (Gillies, et al., 2002). Loyal customers are more profitable over time. Furthermore, return customers refer others to your company. And they may also pay a premium to continue to do business due to the bond and commitment that has been created. Thus, it's important for startups to create these relationships so long-term profits can be maintained. However, due to the short existence of a startup they often don't have long-term relations since there has not been time to create these yet. It can be concluded that CRM is only recommendable when a customer strategy has been created (Soltani & Navimpour, 2016).

Lee, Moon, Kim, and Yi (2015) examined the effects of the usability of technology on user satisfaction, trust, and brand loyalty. They found that simplicity and interactivity increased the users experience and led to more user satisfaction, trust, and brand loyalty. This shows that by interacting with the customers and applying their feedback to create matching products a higher rate of customer retention can be achieved. They argue that by creating usability which is designed through the relations between the customer and the firm a stronger brand loyalty is established which further affects satisfaction and trust positively. In the current competitive market where many startups are trying to gain a competitive advantage it is important for them to distinguish themselves through their action and, through innovative products, low costs, and improved customer services. As discussed, customer relations management increases the productivity, customer satisfaction and leads to better performance (Soltani & Navimpour, 2016).

Nguyen, Newby, & Macaulay (2013) argue that customer relations make a positive contribution to the success of IT implementation. They find that customer relations have a crucial role within high-tech adoption environments in small businesses. These changes further show effect when looking at it from the firm-customer communication perspective as they argue that "small firms should take their customers into consideration when it comes to changes in IT communication in their daily business operation." (Nguyen, Newby, & Macaulay, 2013). This is in line with other research that agrees that collaboration with customers can lead to improvements to products and services (Levy, Loebbecke, and Powell, 2003)

In a digitalized world, through the IoT, co-creation will play a large role. Consumers will be part of the end product, e.g. voice recognition using the commands they receive to better their service thus ending up with a superior service, customers will want to use. Thus, engaging in activities that can potentially function as immaterial labor in the form of social relations, shared meanings or, commons (Ramaswamy & Ozcan, 2016). Value creation moves towards becoming a joint process that consists of co-creational experiences which has significant implications for the relation between customer and firm (Ramaswamy & Ozcan, 2016). This shows that a shift needs to take place where stakeholders get engaged personally and cooperating is valued. From this can be concluded that interaction between firm and costumer is an important social dimension, emphasizing the openness of the brand towards consumers as a central element.

2.5.The effect of the Internet of Things on business models, current research

As mentioned before the current academic literature is focused on industry 4.0, the Industrial Internet of Things. This research of mainly focused on manufacturing however, it can be argued that some of these results would be applicable to B2C startups as well. For instance, the IIoT creates value due to the possibility of individualized products and advanced mass customization it provides while showing positive results in terms of costs, reliability, time, and efficiency (Kalva, 2015, Petrick and Simpson, 2013). Regular IoT firms should be able to use the data they have at their disposal in a similar manner. Furthermore, the research of Kiel et al., (2017) shows that the use of the IIoT leads to the relationship with customers to undergo intensification and a stronger collaboration. They found that this leads customer relationships to become longer lasting as well.

To be able to create a successful business model, firms need to become a part of the ecosystem that emerges from IoT and find a way to integrate customers into the creation and general development of their products and services (Kiel, 2017; Kagermann, Helbig, Hellinger & Wahlster, 2013; Kans, and Ingwald, 2016). The ensuing data exchange of the ecosystem can enhance the customer relations if the firm creates and maintains their digital relationships with their customers (Falkenreck & Wagner, 2017). Higher information exchange and interaction between customer and firm leads to improved and longer-term customer relationships (Kagermann et al., 2013, Kans and Ingwald, 2016). Customers like to participate and interact with the products and services, they want to be more involved and as a consequence have an impact on the end product or service (Jara, Parra, and Skarmeta, 2012).

The created ecosystem creates a large userbase and with that a feedback loop. By including the customer and extracting information from those users the firm's products and services can be improved rapidly, which in turn would attract more customers. This information can further be used to create new businesses and business models (Osterwalder, 2004). The new IoT data for pattern analysis and anticipation of changes can be used in the commercial market as well as in the B2B market (Falkenreck & Wagner, 2017) as well as using it to create new communication channels, but also new relationship mechanisms, such as personalization and trust (Osterwalder, 2004). However, as discussed before, this can arise trust issues.

Falkenreck and Wagner (2017) argue that a shift in data handling and data ownership in general can cause serious concerns for the buyers, even in long-term relationships. This is exemplified by the increase of privacy concerns in recent years and the creation of privacy legislations. One of the causes of this disruption is due to disagreements between the vision of the IoT's advantages. This can cause issues with trust, commitment, and technology acceptance. Therefore, it is important to maintain high customer relationship quality so sustainable relationships are formed and value can be derived from these relationships. Jiang, Shiu, Henneberg & Naude (2016) find that the most frequent relationship quality dimensions are "commitment" and "trust". Thus, it is important to include these elements within the research.

Falkenreck and Wagner (2017) expanded upon Medlin's (2004) framework for social interaction by adding IoT specific integration. This paper is particularly useful for this study, their study is one of the few that looks at customer relationships from the IoT perspective. The framework they apply is relevant since the elements they use similarly apply to startups. Their research focuses on large manufacturing firms and the more specific Industrial Internet of Things (IIoT). The flexibility of startups gives them a higher degree of control on the way they respond to their customers actions and therefore might yield a different result. Falkenreck and Wagner (2017) argue that the bases of bonds are: commitment, trust, technology acceptance, intentions, openness to change, and reciprocity. These elements play a large role in the relationship between a firm and the customer and therefore, are important within the customer relationship aspect of a business model.

Due to the large information extraction in the IoT, there exists a fear of surveillance scenario's (Miorandi, et al., 2012; Atzori, et al., 2010). To counteract this fear, trust must be established as it is the basic requirement for relationships (Medlin, 2004). As aforementioned, it is important for customers to be included in the IoT ecosystem to create sustainable relationships. Therefore, the willingness of customers to join and cooperate in the ecosystem is vital for project success.

2.6.Theoretical framework

The key takeaways from the literature review guide this research. These are based on the most important consequences of the IoT which can influence customer relations. These elements will add a clear purpose to the study and introduces criteria with which the exploration can be measured and guided. Elements have been created based on Falkenreck and Wagner (2017), Medlin (2004), and Müller, et al., (2018) research and have been expanded upon by removing irrelevant aspects and including elements which have impact on the end user due to the shift to B2C. The elements with regards to customer-firm relationship are discussed and categorized.

In table 1 below, the frameworks used by Falkenreck and Wagner (2017) which is an extension of the works of Medlin (2004) is shown. This is a strong model containing relevant elements for the IoT market. These elements were created to analyze the customer relations of large manufacturing firms in the IIoT industry. The original framework has shown excellent results and will function as a strong foundation for this research. Not all elements of their framework have been deemed applicable to this study due to its different context. A few elements were removed, some adjusted, and a few added to their framework to create the elements on the right side of the table. The elements kept are trust, commitment, and technology acceptance.

Familiarity has not been included in the framework due to the nature of the technologies and startups. In this high-tech innovative environment, it is unlikely for customers to be familiar with the products/services since they will be more than likely new products/services and therefore being familiar with the technology is not likely.

The perceived usefulness relates to the usefulness of the technologies. The perceived usefulness is being used by Falkenreck and Wagner (2017) in combination with credibility as a subset of technology acceptance and is deemed redundant.

Openness to change is an element that has been included in security and privacy. The literature review showed that the customers openness to change is highly dependent on the security and privacy which is provided by the technology. This in combination with technology acceptance covers the elements set in the original framework.

The credibility elements in their original framework is related to a firms reputation. However, since the cases are startups this point is irrelevant since a reputation has yet to be established. The final omitted element is intentions which is the nature of the intended business relation. This element has been split into customer relationship innovation and interaction to gain a more nuanced view of the element.

Table 1 Relevant social interaction dimensions based on Falkenreck and Wagner (2017) and Medlin (2004)

Falkenreck and Wagner (2017) framework	Adjusted elements
Intentions	Customer relationship innovation
Credibility	Security
Trust	**Trust**
Commitment	**Commitment**
Technology acceptance	**Technology acceptance**
Openness to change	Interaction
Perceived usefulness	Privacy
Familiarity	

The first adjusted element is *Customer relationship innovation.* It is important to analyze the rate of customer relationship innovation and its overall effects on customer relationships in startups. However, since customer relationship innovation is not an objective metric, this will be measured by the firms perceived amount of effort of innovative activities towards customer relations. This is a relational dimension looking purely at the relationship between the firm and the customer. This is purely meant to determine if the firm is consciously trying to innovate their customer relationship activities and if the IoT influenced these.

The second adjusted element is *Security.* Security concerns are one of the IoT's biggest enemies. Security includes both authentication and data integrity concerns of IoT. If a startup is not doing enough to ensure data security, then customers might not be willing to use their products. This includes the increased partnership needs of the IoT. Since customers want end-to-end solutions strategic partnerships become increasingly important and thus a need for strong security within the whole value chain needs to be emphasized (Kiel, et al., 2017). This element goes together with the following one, privacy since both of these elements look at the technical side of the IoT.

The third adjusted element is *Privacy.* Privacy, including digital forgetting and data confidentiality will be another element. As discussed before the preservation of privacy holds significance for most people. Since the invasion of privacy can deter customers and has a large impact on the trust element this will be another element. This element has gained a lot of attention in recent years which shows the importance of this elements to consumers. The elements privacy and security belong to the technological side of elements which affect the customer relations in the IoT context and affect the technology acceptance which will be expanded further.

The fourth adjusted element is *Technology acceptance.* The fears which may arise with the increase of IoT devices might hamper technology acceptance and with that lead to negative results for startups (Miorandi, et al., 2012; Atzori, et al., 2010). The technology acceptance aspects will be analyzed to determine how the rate of technology acceptance will influence the customer-firm relationship. The technology acceptance further highlights the trust a customer has in a firm by virtue of accepting their technology since there are various security and privacy concerns. This element looks at the bond between technology and customer and not at the relational bond between the firm and customer.

The fifth adjusted element is *Trust.* The trustworthiness of the IoT technology and of a startup in the eyes of the general public is necessary to building trust and confidence in new IoT technologies instead of increasing fears of privacy (Falkenrick and Wagner, 2017). Furthermore, considering the findings of Jiang, Shiu, Henneberg & Naude (2016), the basic requirement for relationship commitment can be considered trust. This element can further be split in two, trust in the technology, and trust in the relationship between firm and customer. This means that trust is present in both the technological side of IoT as well as the relational side.

The sixth adjusted element is *Commitment.* Further Jiang, Shiu, Henneberg & Naude (2016) find that commitment is one of the frequent relationship quality dimensions found in literature. Falkenreck and Wagner (2017) expanded upon Medlin's (2004) research and find commitment and technology acceptance part of the concepts which lead to strong customer relationships. Due to the nature of startups however, commitment building will be the focal point as previously established commitment is non-existent and since the technology is new, the area of focus is the commitment to the firm as opposed to the commitment to the technology.

The seventh adjusted element is *Interaction.* Interaction between startup and costumer is an important relational social dimension, emphasizing the openness of the brand towards consumers as a central element (Ramaswamy & Ozcan, 2016). This further shows the extent of the customer relationship innovation and requires a business model tailored towards the viability of interaction between customer and firm. Once again, since this is a hard to quantify dimension, the perceived interaction level will be asked according to the perspective of the startups.

Selected theories related to this research were described in this chapter. By linking them, a theoretical framework (figure 1) is build. Here a physical representation of the theory is shown. The social interaction dimensions can be divided under technology and relational dimensions. Of the defined social interaction dimensions, trust is the only one that falls under both categories. It can refer to the trust of the customer in the technology and the trust in the relationship with the startup. Within the model the theorized links have been indicated by an arrow to show in which direction an elements effects another element. This is not the say that this only takes place in this direction but rather that this is the theorized, more prominent link in practice. Further, the general impact of the technology and relational categories on each will be explored for a broader view on these topics. The case study will try to research the links between each element.

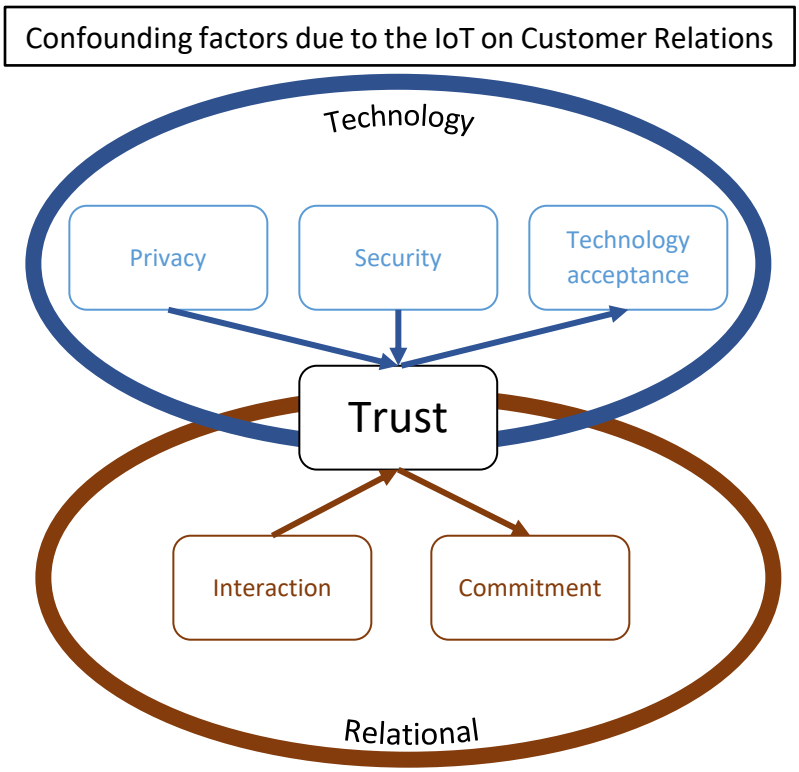

Figure 1 Relational and Technological impact on the customer relations due to the Internet of Things.

This model, however, does have its challenges. Due to the volatile and unpredictable nature of startups this framework might not be able to fully encompass all the nuances of real word interactions without becoming too convoluted. To keep the framework comprehensible, it has been kept as simple as possible. The initial findings and elements were discussed in chapter 2.6.

3. RESEARCH METHODOLOGY: MULTIPLE CASE-STUDY

This section presents the methodology incorporated throughout this study. Primarily, it sketches the research design as demonstrated in this study. Additionally, the sample selection and data collection are discussed. Consequently, the operationalization and data analysis are explained.

3.1. Research objective

The research design used within this chapter is formed around the main objective of this study, which is presented through the research question, as discussed in the introduction chapter. The leading research question is as follows:

"How does the Internet of Things affect the customer relations aspect of business model innovation within consumer centric startups?"

The research objective of this paper was to examine how the IoT affects customer relations and customer relationship innovation within startups. From existing literature on the IIoT we can derive that the IoT positively affects the customer relations due to the increase of information the technology provides. However, there are some downfalls with regards to trust and other relational and technological dimensions. It can be assumed that these dimensions will correspondingly affect common consumers as well. To increase the chance of exposure to innovative activities startups were chosen as the subject of the interviews since their innovative disposition might lead them to use the opportunities the IoT presents to innovate the customer relationship aspect of their business models with a higher rate.

Given that the research on the effects of the IoT on customer relations within the B2C context is still sparse, the objective of this study was to provide a more comprehensive understanding of the most prevalent impacting elements of the IoT on firms' customer relationships and use the existing literature on B2B firms to extrapolate potential effects on the B2C market. The literature review presented a clear overview of the underlying principles of customer relations. These identified customer relation variables can thus be operationalized so that they can be measured. Consequently, the initial literature review was used to create the interview questions. By employing the variables identified in the literature review as well employing these in the case study analysis, the research questions can be answered.

3.2. Research approach

This study will be using a qualitative research method due to the exploratory nature of it. Exploratory research is useful when there is a lack of prior information. It helps to develop concepts and operational definitions (Blumberg, Cooper, & Schindler, 2014). Furthermore, it allows interaction with the research subjects in their own language and allows for analysis based on primary and unstructured data (Labaree, 2017). Since the aim of this research was to gain insights into the area of IoT and business model innovation, a qualitative research design is the most appropriate. Since this research combines a theoretical framework and uses empirical cases, this study makes use of systematic combining.

Systematic combining is a process where theoretical framework and case analysis are conducted to match reality with theory (Dubois, and Gadde, 2002). This type of research is also called abductive research. What makes abductive research stand out from other type of research is that the literature review is a living document. As opposed to other types of research who first conduct the literature review and then their own empirical research. In the case of systematic combining the theoretical research is also conducted during the empirical research step so comparisons can be made (Dubois, and Gadde, 2002). This is especially beneficial in this case, since the existing literature on IoT is sparse but literature on customer relationships is expansive and can provide insights into the elements which are found.

To collect this initial academic literature information, a systematic literature review has been conducted. The method used for this systematic literature review is the snowball sampling technique. The snowball sampling technique starts with a couple main articles and builds a citation network by collecting articles that cite the main articles. In this case the papers, Kiel, et al. (2017), Falkenreck and Wagner (2017), and Medlin (2004). Articles that cite the main article are collected at the first level, then articles that cite the articles that cite the main article are collected at the second level, and so on. This method creates a network of relevant articles around the articles and enables insights into the context of the research instead of the more limited set of articles that are returned in regular keyword searches (Lecy & Beatty, 2012; Greenhalgh & Peacock, (2005).

3.3. Research strategy

A multiple case study approach will be employed so the topic can be explored and interpreted in its context and provide a more holistic view of the implications of the IoT. These cases are analyzed to determine specific and generic characteristics (Denzin & Lincoln, 1994). A case study is a descriptive method which allows a phenomenon to be explored and described from a variety of data sources and prevents a narrow view of the subject. This method relies on interviews to collect empirical data (Baxter & Jack, 2008; Denzin & Lincoln, 1994). According to Yin (2003) a case study should be applied when the study aims to answer “how” and “why” questions, the behavior of the of those involved cannot be manipulated, the contextual conditions need to be covered, and the boundaries between the phenomenon and context are not clear.

This research benefits greatly from the context of the situation and aims to answer a “how” question. A multiple case study is chosen so the differences between and within cases can be explored (Baxter & Jack, 2008). This will give insight into how the IoT affects different startups’ innovation activities. The chosen cases have therefore a common selection criterion but maintain differences so the research question can be explored within different contexts. Since the result of the case studies is dependent on various conditions, they can vary from case to case. Therefore, the individual case research findings may not provide a universal solution which is characteristic of an exploratory case study. The results will be used to extrapolate answers to the research questions. An attempt to generalize will be undertaken in the concluding chapter.

3.4. Selection of cases

Case-selection plays a pivotal role in any case study research to identify consistent patterns of behavior and to uncover relevant elements and how these influence each other. In total 13 cases were selected for this study. This study was carried out worldwide due to the exploratory nature of the study, through this, geographic differences were found as well, many of the cases are residing in Europe where the General Data Protection Regulation (GDPR) is in effect. Furthermore, the study focuses mainly on Europe and North America due to their similarities in culture. The main criteria for the cases are that the startups themselves and their use of the IoT must directly influence or interact with the end-user. This is to determine the effects of the IoT on the B2C market. Additionally, the study focuses on startups.

There is no universal definition of what a startup is in the academic literature. The closest definition that would fit the definition is the early-stage company definition defined by Ruhnka & Young in 1987. Which divides the early-stage company under 4 stages. For the purpose of this study the second and third stage will be considered, namely the "startup stage" and the "second round". The startup stage is categorized by Ruhnka & Young (1987) as a stage wherein the startup has created a business plan and may have some initial production or orders. They further argue that startup stage companies typically are not producing yet. Since modern definitions of startups tend to include working startups, the third stage will be included. The third stage companies have entered the market and the main differentiation between these is seems to be the initial market penetration has taken place and must now focus on growth and survival (Ruhnka & Young, 1987).

These stages align with Leach & Melicher's (2012) definition of the venture life cycle, more specifically the startup stage and the survival stage. As mentioned in the introduction we will be looking at startups as they are represented in the media and not the way the academic literature presents them in the fashion of an SME. In short, an emerging company with high growth potential. Generally based on a technological element which deviates from general line of the market. These companies aim to grow fast so they can employ their exit strategy which can range from selling to a bigger firm to going public. Traditionally, large companies are associated with established organizations and small with young. However, research show that this is not the case within the context of startups (Oukes, 2018). Since a distinction can't be made by size, the age of the startup will be used to determine the experience and the degree to which it is established.

Accordingly, the startups must (1) be less than 5 years old; (2) use IoT in their services/products (3) directly interact with consumers. Secondary sources are consulted to determine the viability of the firms. These sources consist mainly of the websites of the startups themselves. In total ten cases were interviewed. The cases that were interviewed were high-technology startups with a focus on IoT. The interviews lasted on average 30 to 45 minutes. A more thorough description of the cases is given below. Privacy of the respondents is kept by keeping the name of the startups and respondents anonymous. The respondents were qualified by their involvement in their firms' customer relation-based solutions. All respondents have either decision-making, influencing, or executional responsibilities for customer relation initiatives in their IoT based startups.

3.5. Cases

An overview of all the interviewed companies can be found in the table below. The interviewees and their corresponding companies have been kept anonymous and therefor won't be mentioned by name. The interviewees were highly positioned in the firm or had customer centric roles. The interviewed companies come from a wide spectrum of countries of the western world, namely, Germany, Spain, Poland, America, Canada, Scandinavia, Australia, The Netherlands, and Ireland. The majority of the interviewed companies are centered around smart home consumer home improvement products. These firms focus on the automation and general connectiveness of home products and technologies operating in different markets and nationalities. The smart home sector was the driving industry for this research with the remaining 4 cases acting as a generalization principle to see if these results were generalizable to other IoT using industries.

A total of 13 interviews were conducted with startups, of which 9 were with smart home focused IoT firms. 2 interviews were conducted with consultancies within the technology market. Finally, the 2 interviews were conducted with IoT firms that have auxiliary functionality in the form of smart mobility and healthcare. The second and eleventh interviews were with firms which focus their efforts on providing consumers access to the hardware needed for them to create or supplement their smart homes. Interviews three and six were with firms in the IoT home security sphere, providing home security solutions through IoT. The fourth interview was with a smart bin startup. Outside of the smart home startups that were interviewed there were startups like interview nine, a pill tracking product, and interview 13 a smart mobility startup, which deal with matters outside of consumers home improvements. Finally, interviews seven and ten were with consultancy firms which help startups in the development and growth of their IoT based firms.

Smart home
Interview 1 - Interview conducted with one of the cofounders of the startup - The firm is a startup in the home entertainment sphere - They recently became partners with one of the largest firms in this sphere
Interview 2 - Interview conducted with the founder of the firm - IoT hardware provider for supplementing and creating IoT networks within homes
Interview 3 - Interview conducted with the founder of the firm - A home security system based on IoT technology
Interview 4 - Interview conducted with the founder of the firm - One of the pioneers in the smart bin technology sector
Interview 5 - Interview conducted with one of the cofounders of the firm - Products and services in the smart home sector
Interview 6

- Interview conducted with the head of partnerships - Smart locks which can be opened through the use of your smartphone - They recently became partners with one of the largest firms in this sphere
Interview 8 - Interview conducted with the founder - Offers multiple tools for the monitoring of sports activities and health related problems or home automatization
Interview 11 - Interview conducted with the founder of the firm - IoT hardware provider for supplementing and creating IoT networks within homes - They also create custom boards and circuitry for developers' projects
Interview 12 - Interview conducted with one of the cofounders of the firm - Products and services in the smart home sector
Smart living
Interview 9 - Interview conducted with one of the cofounders of the firm - An IoT based medical device centered around medication - Starting to partner with large pharmaceutical firms
Interview 13 - Interview conducted with a customer relations manager - An urban mobility company working with public transport authorities and other mobility providers to create a platform - Recently partnered with two large industry leaders in the automotive sector
IoT Startup Consulting
Interview 7 - Interview conducted with the head of sales - A startup consultancy aiming to help young firms to grow - Located in Berlins largest IoT network hub
Interview 10 - Interview conducted with the founder of the firm - A consultancy firm focused on technology products like wearables - Their main focus is on the hardware and its facilitation

Table 2 Interview cases

3.6. Data collection

The data that will be used within this research will consist of primary and secondary sources. This consists mainly of theory collected from peer reviewed academic sources and empirical data gathered through semi-structured interviews. Furthermore, data collected from the websites of the firms will be used to make sure the cases fit the criteria. The semi-structured interviews will be used to evaluate the proposed framework. The goal is to identify how this might positively or negatively influence their customer relationship activities.

Initially literature research will be conducted to gain comprehensive knowledge on the underlying principles of the research. This will serve as the foundation for the following stages of the research and interviews. The knowledge gained through the literature review will be used to create the interview questions and guidelines.

The semi-structured interviews will be held with qualified participants who play a major role within an IoT firms' customer relation activities. Semi-structured interviews will be used to maintain flexibility within the interviews while maintaining structure (Lee, 1999).

Since the targets of the research are startups, high hierarchy positions are preferred for the interviews. The interviews will be following a standardized open-ended format. The interview locations will depend on the preferences of the interviewee. The interviews will be recorded and transcribed after the fact to ensure correct data accuracy.

3.7. Operationalization

The explanation of the variables as well as the operationalization of these variables can be found in the table below. By operationalizing the variables, they become measurable and subject to testing (Blumberg, Cooper, & Schindler, 2014). The interview questions are derived from the research Falkenreck and Wagner (2017), Medlin (2004), and Müller, et al., 2018 in combination with the new creation of questions where applicable.

Concept	Definition and operationalization
Customer relationship	*Customer relations aim to describe how the firm reaches its customers and how it interacts with them. Specifically, the relations have the task of maintaining the target customers while promoting the value proposition (Osterwalder, 2004).* - Did your firm try to approach customer relationships in a non-traditional way to account for the impact the IoT might have, if so, how?
Security	*Security in relation to IoT technology refers to the guarantee in terms of system-level confidentiality, authenticity, as well as the protection against malicious attacks (Miorandi, et al., 2012).* - How does the security, authentication and data integrity, of your IoT product/service affect the way your customers interact and perceive you (technology acceptance, trust, commitment, and interaction)? - How do your partners security affect these elements?
Privacy	*Privacy includes the concealment of personal information as well as the ability to control what happens with this information (Weber, 2010).* - How does your privacy policy, including digital forgetting and data confidentiality, affect the way your customers interact and perceive you (technology acceptance, trust, commitment, and interaction)?

Technology acceptance	*Technology acceptance refers to the customers willingness to come to accept and use a technology. (Legris, Ingham, & Collerette, 2003)* - How does the trust customers have in your firm and the general rate of the technologies acceptance affect each other? - How does this current level of acceptance influence your drive to innovative your customer relationship activities?
Trust	*Trust is characterized by a trustor (customer) who is willing to rely on the actions of the trustee (firm) and is willing to accept the vulnerabilities based on positive expectations. (Rousseau, et al., 1998). Trust is a concept with regard to the belief and expectation on the reliability, integrity, security, ability, and other characters of a party (Yan, et al., 2014; Miorandi, et al., 2012).* - Do you ever experience trust issues with regards to IoT and your customer relations? (Yes) in which way does this impact your firm? (No) why do you think this is? - How does trust in the customer-firm relationship influence trust in the manufacturer's credibility, so the trust in the technology itself, with regards to the IoT?
Commitment	*Commitment is defined as a customer's long-term ongoing attachment toward a relationship based on both an emotional bond to the relationship and on the conviction that remaining in the relationship will yield higher net benefits than terminating it. (Hennig-Thurau & Kee, 1997)* - How does the amount of trust the customers have in your firm or the technology and a customer's commitment to your firm affect each other? - How does your customers relationship commitment impact the willingness to cooperate with IoT projects?
Interaction	*Interaction between startup and customer denotes the communication and inclusion of the customer in decision making and design making processes and shows the extent to which the consumers are a central element (Ramaswamy & Ozcan, 2016).* - To what extent does your firm listen and respond to the needs of your customers and have you tailored your business model in a way to include them in your processes? - How has this affected the trust and commitment of your customers to your firm?
Customer relationship innovation	*The degree to which a firm innovates the way in which the customer and firm are connected, regard or behave towards each other.* - Is your firm undergoing innovative activities regarding customer relations and did the previously mentioned elements affect this if so, how?

Table 3 Operationalization concepts

3.8. Data analysis

The collected data has been analyzed. This is done by recording and transcribing the interviews. In this research the focal point is the cases' innovative activities towards customer relations brought forth by the IoT. The collected data has been linked to the sub questions as well. The conducted interviews are analysed to ascertain and interpret common patterns, themes, and identify the most common consequences the IoT has on customer relationships. As mentioned before, this research uses a method called systematic combining. Herein empirical research might result in the identification of related issues that haven't been explored yet. This can result in the amplification or alteration of the current theoretical framework to account for the inclusion of these related issues (Dubois, and Gadde, 2002).

The software ATLAS.ti 8 has been used to help analyze the data. ATLAS.ti 8 is a qualitative data analysis tool used for coding and analyzing interviews. It uses user generated codes to group the data and as such these have been created. The codes are derived from the existing literature and the conducted interviews; these can be found in the table below.

This research makes use of descriptive coding. Descriptive coding codes quotes which aim to summarize the primary topic of a passage (Seldaña, 2015). These codes are further divided under sub-codes so the quotes are coded as well as grouped under the right theme. This method makes it possible to organize and group similarly coded data in to categories (Seldaña, 2015). Since this research is based on abductive reasoning codes were defined before and during the data analysis. That is to say, the codes are derived from the academic theory and relevant research findings. The 13 interviews gave an extensive data set (49 pages), which were coded to generate 262 relevant quotes.

Codes	Sub-codes
Customer relationship innovation	Relationship innovation
Security	Production Partners Compliance
Privacy	Data Collection Compliance
Trust	Transparency Trustworthiness Startup vs established
Commitment	Attachment
Technology acceptance	Acceptance Demography
Interaction	Communication & support Co-operation

Table 4 Codes and their corresponding sub codes

4. RESULTS

The interview results will be discussed in this chapter. The most relevant quotes for each element have been selected and highlighted in this chapter. A comprehensive view of all the quotes and their corresponding code can be found in the attachments.

4.1.Technology Elements

The theoretical framework that was created using the existent literature will serve as a guideline to discuss the results. The technological elements will first be expanded upon. These consist of: Privacy, Security, and Technology Acceptance. As well as various sub elements.

4.1.1. Privacy and Security

The elements privacy and security have been combined in this chapter due to the interviewees often seeing these aspects as one element. This includes elements regarding data gathering as well as security of the IoT products. Compliance to legislation and standards appears to be a big element which became clear through the interviews and the security of the partners a lesser issue than initially expected.

4.1.1.1. Compliance

"There are also things like the new GDPR regulation in which you can ask as a consumer for the data a company has on you. This is something a few customers have asked about. And we have to send them the data, so to say. If we are doing that in a formal way and they are getting the data, they are happy, they are mostly happy and they trust us, and they trust us in that case." - Respondent 13

The compliance to legislation is a factor that was initially not considered within this research. However, interviewees showed that these regulations have a large role with putting their customers at ease. The presence of these regulations seems to mitigate a lot of worries the customers might have. When the interviewees were asked if the compliance to these regulations was enough for the consumers to be made comfortable with the technology their answer was often a resounding, yes. There are of course different regulations and legislation across different countries. Firms need to make sure they comply to these regulations especially if they are trading internationally. So, these regulations can be both a benefit as well as a risk for the startups. Since privacy and security are arguably the largest hurdle for IoT, the benefits outweigh the risks.

In the case of IoT a lot of technology related regulations apply. Especially the GDPR is a major one that has impact on firms in this technology sphere. The trust of consumers in the technology can be gained through well-structured policies (Bishop, 2019). However, the GDPR does have some limitations. Wachter (2018) argues that GDPR standards require further specifications that need implementation into the design and use of IoT technologies to minimize the privacy impact it might have. The GDPR makes firms accountable for their privacy and security principles. This accountability is a key to building the customers trust (Crabtree, et al., 2018). Additionally, transparency is a basic trust principle, the GDPR's technically enforced principles forces firms to become transparent and therefore lead to higher trust levels (Fischer-Hübner, 2016).

4.1.1.2. Data Collection

"But what is happening there is going to most likely have a destructive effect also on the privacy and how people are controlling their own data. So maybe that is the key take away. Getting you back on track with controlling your data. I think this is a massive promise. A lot of companies have tried to solve that already but no one has really been successful. Maybe in the future, whoever cracks that nut is going to be quite big." - Respondent 9

Data collection is an interesting element which looks mainly in how the data is collected by the IoT as well as managed by the firm. What is peculiar about this element is that the majority of the interviewed firms try to circumvent data issues by not having access to the data and leaving that to the consumers. By not managing the customers data they separate themselves from this responsibility. By changing who controls the data they push off this responsibility to the customer themselves. Giving control of the data back to the customers. Mittelstadt & Floridi (2016) look at the ethical considerations of mass data collection and conclude that ownership of data is one of the key areas of concern regarding the ethics of large-scale data collecting. This is a solution which initially did not come up in the literature review but is widely employed in practice.

"Having to provide privacy safeguards so that the consumer and the device and us can communicate properly is important" - Respondent 4

That is not to say that data collection from a production standpoint is not important. Authentication is one of the most important requirements in any IoT based device (Gope & Hwang, 2015). Bandyopadhyay & Sen (2011) further point out that privacy safeguards are one of the main challenges of IoT as well as transparency regarding the usage of the data and why it is being collected. This transparency leads to higher trust in the relationship as well. The satisfaction of security and privacy requirements plays an essential role here. These requirements encapsulate elements such as data confidentiality and authentication. As well as control over the technology through access control within the IoT network, and the enforcement of security and privacy policies in the creation and management of the tools (Sicari, et al., 2015).

"We are in this space where usually where a ton of data is collected. So, most of our customers already have Alexa and Google home at their homes and they are well aware that those things aren't only listening when you are talking to them or that they constantly collect stuff" - Respondent 1

A few interviewees see no real issues regarding data collection. They know that their primary customer segment is mainly comprised of early adopters who know what they are getting into. Data is being collected by some firms for analytical purposes but is anonymized. Many customers already use similar products which have these same issues. Like Amazon's Alexa which is mentioned in the quote above. These IoT products have existing well-known security concerns. It is possible to eavesdrop on private conversations unintentionally due to the imperfections that might exist. The potential for accidental recording means that users do not necessarily have complete control over what audio gets transmitted to the internet (Chung, Iorga, Voas, & Lee, 2017). The startups see the acceptance of these technologies as an acceptance of the potential flaws in their own products. The customers are already accepting IoT in their eyes.

4.1.1.3. Partners

"From a platform perspective we can really create value. From our partner as well in terms of the business products because all the products are running off the same platform, we have insight into everything." - Respondent 6

Big data and the ability it presents for data sharing, especially with business partners, opens opportunities for creating value. The firms gain access to a larger dataset through the data collected and shared by the IoT which in turn can be used for in depth analytics. These partnerships offer the opportunity for new business models (Hamel, 1991). On a relational level, partnerships have a big impact. Some of the interviewees were recently partnered with large firms. These large firms bring with them name recognition and a sense of trustworthiness. However, these large firms also bring with them expectations. Before, they were startups and consumers were more lenient with them. Now that they are partnered with large firms their customer support and products are being scrutinized to a higher degree. The partnerships bring with them possibilities and capabilities they did not have initially.

"Even if we claim that we deal with data as we should, we cannot claim that the smartphone on which [software] is installed deals with the data as it should. Because it's a general-purpose device and there are several different applications there, it's installed, it's android. It's operating system and we cannot even say that android doesn't even send location data every time. So, we take responsibility for our part but not for everything here." - Respondent 8

A few respondents raised the issue of testability. Since a large portion of the consumer base will more than likely not be technological experts, it is unlikely that they will be able to test the claims of the startups. Cloud computing technology, which is often IoT related, shares its resources among consumers and partners (Kaufman, 2009). This means that for this technology to properly work, each device in the value chain needs to be able to communicate with the each other. In the case of a breach all the parts of the value chain might be compromised. However, in terms of data and privacy the partners security does not have as large an impact as was initially expected. The firms see themselves as separate entities and have safeguards in place in case something was to happen. Even in the case of breaches the firms bolstered their security and moved on.

4.1.1.4. Production

"Because they love to see how their stuff is built. Because you all of that stuff normally comes from a factory. Like the smartphones, like all of the smartphones come from a factory in Taiwan or China, Vietnam and you don't really know what's behind it. So, what I do is jump on skype calls with customers and like really like walk through the warehouse like we did earlier and show them how our stuff is designed and built. And then they end up usually buying more, haha, I don't know how but this probably means that they like this approach a lot." - Respondent 1

The importance of transparency can be seen in this element as well. Showing the consumer that their information will be safe and active measures are being taken to ensure it will stay that way. By being transparent in the production and design of the IoT technology an increase of trust can be created (Zarei, Amanati, and Ghapanchi, 2018). Furthermore, traditional security

countermeasures cannot be directly applied to IoT technologies due to the different standards and communication stacks involved (Sicari, et al., 2015). Considering that this technology is generally placed in peoples homes the security and the transparency of these protocols is important to ensure consumer trust and the trustworthiness of the firm.

"It's always like a shift on allocation between security and how secure we need to be. Like, how does this affect the user experience." - Respondent 6

Another issue is the consideration between security and the usability of a device. The IoT devices security should not impede the usability of the product. Implementing an excessive amount of security protocols that impede the customers ability to use the technology will have negative effect which will decrease the value of the product. A successful design involves addressing the users' expectations and implementing authorization and security protocols based on these expectations as well as responding to threats accordingly (Yee, 2004).

4.1.2. Technology Acceptance

New technologies, especially, sensitive technologies such as IoT deal with technology acceptance issues. As such, technology acceptance is one of the inclusion criteria for this research. The interviews showed that this is one of the main inhibitors of diffusion. However, from the interviews can also be concluded that this is not necessarily an IoT based issue. The interviewees were asked their experiences facing resistance and how it related to trust. As well as the underlying issues that cause it. Several reasons were identified, these are discussed below.

4.1.2.1. Acceptance

"What I'm seeing from my customers is that on the beginning there was a lot of misunderstandings on what is IoT exactly and how this can be used. So, most of the projects 3 years ago let's say were just crazy ideas connecting things which had no reason to be connected for but having no real goal behind it." - Respondent 2

There are definitely trust issues within the market due to various reasons. The recentness of the IoT technology's appearance within consumer goods and the unclear definition of it within the consumer sphere has led to a lot of confusion and misunderstandings. This seems to have led the main consumer base to be early adopters. Open-minded people who are open for trying new things, early adopters who will lead hopefully to adoption by the majority, pave the way in a sense. According to the literature study of Vekatesh, Thong, and Xu (2016) performance expectancy, and effort expectancy are the major elements that lead to technology adoption. It stands to reason that the confusion caused by lack of familiarity with the technology is preventing the adoption of the technology since the customers expectancies and the reality have disparity.

"I am a strong believer that if a product is well designed and it has a purpose, it is considered for that purpose and you know it's not a gimmick. It has a genuine value then it is pretty easy to tell a story to a user. And if they can see benefits for themselves then they're reasonable cooperative in taking it on." - Respondent 10

The results show that a proper well-designed product is a clear antecedent for the adoption of a product. This is in line with the technology acceptance theory which argues that perceived value and perceived benefit are a clear signs of adoption intention even more so than perceived risk (Yang, Yu, Zo, Choi, 2016). Furthermore, they find that manufacturers should not only focus on well-differentiated value but also on brand name, the value of the brand will be explored later. The notion of creating a well-designed product and not paying much heed to the pit falls of IoT goes well with the strategy of one of the interviewees which did not explicitly tell their customers that their product used IoT. The IoT has garnered some negative stigma which could impact their products negatively. However, a well-designed proper technology product is just that.

"We bring something new to the market so there is always resistance but then again that depends on the type of client. Be it a millennial or someone that is middle aged, that makes a huge difference when it comes to adoption." - Respondent 12

Another major confounding factor which was found across most interviewees respondents was the effects of age and demography. It stands to reason that age, education, and culture play a major role in the acceptance of the IoT and technology overall. The following chapter will go deeper into this element to analyse how these elements effect the adoption of the technology.

4.1.2.2. Geography and Demographic

"The people that cannot really work with it. Is a small minority. I would say less than 5%. So, it doesn't really matter what age. We know millennials or the Y generation you don't have to explain anything. There is more resistance when you get to 40-50 that's more the resistance group because they rather stick to what they know. Our experience is that younger and older than that are more open" - Respondent 12

A host of technology acceptance issues seem to be able to be explained by demographic. This was not initially included within the framework; however, most interviewees mentioned these factors. There seems to be a divide in acceptance by younger and older consumers, with younger consumers being more open to the IoT technologies. The research of Bansal, Kockelman, and Sigh (2016) showed that the older population has a harder time accepting and trusting new technologies as well as a concern about having to learn to use these new technologies. The younger millennial generation seems to have less issues with these new technologies, most likely due to their exposure to these technologies while growing up.

"I think there is more technology adoption in the US, there is more willingness. Specially Germany or the DACH regions have been a little bit more hesitating. I'm a German I know what I'm talking about. So, the European market is a little bit more hesitating than the US market" - Respondent 6

In addition to demographic differences, geographic differences can be found. The main outlier seems to be Germany. Many interviewees which have business in Germany could attest that there seem to be issues accepting new technology there as opposed to other western countries which are more open to it. This is in line with the research of Smith, et al., (2013) which shows that the widely accepted Technology Acceptance Model does not apply to Germany. This disparity for the German market is most likely due to culture-bound differences.

4.2. Relational Elements

The relational elements are regarding the elements that impact the relationship between the customers and the startups. These elements are divided under Interaction and Commitment, as well as various sub elements.

4.2.1. Interaction

The questions related to interaction aim to answer how interacting and working with customers helps build trust and accept the IoT technology. It seeks to answer how and if doing projects with consumers is viable in consumer aimed products. In the theoretical framework it became clear that doing projects with customers has beneficial effects on trust and commitment. However, in a consumer setting this is not always a viable strategy. This chapter looks at this interaction through regular communication and support, as well as cooperation with the consumer.

4.2.1.1. Communication and Support

"As we are a small company, we have these growing problems. And obviously sometimes we cannot provide the best service we want to provide, immediately. Obviously, this can lead to some frustration. If there is a customer, even though it's not our product but it is part of how our product is being used and it makes it so things are not working, this can cause frustration." - Respondent 6

The importance of interaction with the customers and providing proper support towards them was mentioned by all interviewees. Improper or even slow support can lead to negative consequences in terms of trust. Especially in the IoT technology domain which is still not fully understood by the consumers as we have seen in the technology acceptance chapter. Doney & Cannon (1997) reinforce the importance of repeated interaction with the customers to build trust. This creates an important predicament for startups where they know the importance of communication and support but lack the manpower to carry it out. This further inhibits the startups ability to try new customer relations methods due to the restrictions they face.

"With crowdsourcing what usually happens is that it takes a long time before the product is ready to ship out and people get frustrated and there is a lot of people that are going to say that, hey I want a refund, because they didn't really understand what crowdfunding is initially about. Even when we have backers like that, we still find that people are quite engaged. Maybe this is some kind of area where people feel there is some kind of emotional bond or so with their own treatment and then whoever is then saying that we are taking care of it." – Respondent 9

Crowdsourcing is a great source for funding an IoT project and gauging the extend of the customer base. A few interviewees had or have used crowdsourcing platforms at some point in time. Outside of funding, crowdfunding backers are also important for the feedback and ideas they can provide (Stanko & Henard, 2016). Crowdfunding seems to build an environment which is very open in supporting the business and improving the product. However, as seen in the quote above, it is important to maintain the expectations of the backers to prevent unrest. Furthermore, for customers crowdfunding leads to feelings of connectedness to a community with similar interests and ideals thus creating a community (Gerber, Hui, & Kuo, 2012)

4.2.1.2. Cooperation

"Is it getting you the stuff you need? Is there any feature you would like us to incorporate? There are ways of doing that with the public, there's ways of doing that with the consumers. You can build a community and do it that way. But it's not as straightforward as B2B. I can't just call somebody on the phone. There is also the problem with the more technological you get, unfortunately the less you're concerned with the voice of the customer." - Respondent 4

The cooperation with customers within the consumer sphere is a different endeavour when compared to business to business industries. While the B2C market has a different approach to customer engagement as opposed to the B2B where a more direct approach is possible, there certainly are possibilities to engage the customer. Consumers engage in these relationships due to personal, social, and institutional influences (Sheth & Parvatlyar, 1995). The most desirable way is through the creation of small tight-knit communities. The engagement of customers has been made available through technological advances. However, is does not appear that the IoT has garnered new ways of innovating within this field.

"So, if we have something bigger on which we would like to get people's opinion on then we just send out an email that explained what we are asking and why and there is usually a link to a survey or something like that. For example, now we are working on a new product now, there would be a smart product coming for the device then we send out a survey to the backers and then we ask if you could take the survey and provide us with valuable feedback. So that is one way." - Respondent 9

The benefits of IoT include the vast amounts of usage information you can collect from the customer. However, this is something that not all companies want to take part in. It is a consideration between data privacy and analytics. Cooperation does take place through user interviews, surveys, focus groups, and the use of communities. These methods are employed in normal technology firms as well. Some firms that decide to collect the data were able to use their detailed analytics in conjunction with surveys to derive results which would be harder to achieve by regular technology firms. With the increasing acceptance and understanding of IoT, the ownership of data is becoming a polarizing issue for startups between data collection and trust.

"We always ask for feedback but we are not preparing our products for customers. We prepare our products from our own analysis from the market. We are not asking our customers what they would like to have we create the product and showing them the features and possibilities of the products, we tell them it's worth it to try. Then after they try and see it has potential. This is our own way." - Respondent 3

Some interviewees, however, don't consider working together with their customers. This is probably due to the perceived lack in technical knowledge in the IoT. Before, the lack of familiarity with the technology was discussed. This coupled with the difficulty of working directly with consumers in the B2C field has made some firms shy away from cooperating. However, Dellarocas (2003) argues that online feedback mechanisms are a viable mechanism for nurturing cooperation with the customers. The use of feedback mechanisms requires careful consideration on the part of the startups. However, the usefulness of these feedback mechanisms only shows when it is backed by a sufficient number of current customers and future prospects.

4.2.2. Commitment

The commitment aspect refers to consumers becoming repeat customers or even becoming part of the firm's community. Due to the young nature of startups this aspect seemed futile to include since; these firms do not necessarily have a history with their clients. However, some interesting findings were found. The subtheme within the commitment element is *Attachment*.

"You need to realize that usually it's a long-term commitment and you need to be aware those people to a certain degree bet their future on your product. Which puts a lot of pressure of course." - Respondent 6

The main contributing factors for the creation of commitment seems to be the nurturing of a relationship. The most beneficial relationship is a community which is closer and more invested in the firm and product and seems to be the ideal scenario for the interviewees. Furthermore, the firms' encouragement of customers to belong to a community and participate results in higher customer satisfaction (Royo-Vela & Casamassima, 2011). In day to day activities, having a proper support environment for customers is paramount, this leads to trust which in turn leads to stronger relationships and eventually to long term commitment and acceptance of the IoT.

"I think in terms of customer relations we want to create a small closed community that would allow us to engage. And get feedback more rapidly. Because we noticed that we have a few customers who are very much engaged....so just to get more, more of those kinds of people who make it their business to make us successful as well. To get those in the same community and engage them even more. Maybe building a community like that would be super. It's a sign that you done something right, a strong community." - Respondent 9

The creation of a community of loyal customers is the goal of many of the interviewed startups. Gerber, Hui, & Kuo (2012) found that peer companionship to be one of the major contributing factors towards community participation. The interviewees showed that customers in generally are very sympathetic towards startups, leading to a closer relationship with them. A large contributor to this and the creation of the communities as well is the use of the crowdfunding platforms. These platforms give the startups and customers a communication platform from the first stages of the product. Here tends to be a lot of direct communication between the consumers and the startup leading to long term commitment and community forming.

4.2.3. Trust

Trust is the most important element. All elements ultimately come back into trust, if a firm is trusted consumers are more willing to adopt the technology and the reverse is true as well. Trust can be split into two parameters. Trust in the relationship and trust in the technology. This chapter will investigate both.

4.2.3.1. Transparency

"That we build all our stuff here, we haven't outsourced any production. So, when customers are visiting us, they see how it's all happening here, we're really trying to provide this transparency to how our products are built. " - Respondent 1

Transparency in the security (production of the products) and privacy (data collection) are subjects that were discussed. By being transparent in these processes' customers are more prone to be trusting of the products and services a firm offers. Startups, in particular, are held to these standards since they are often viewed as closer to the customer. Especially, if they were funded by a crowdfunding platform. Moreover, for a consumer it can be very hard to test a firms' claims. Transparency was also acknowledged as an important element of privacy in the Mauritius Declaration on the IoT (Kohnstamm & Madhub, 2014) which sets out principles and recommendations designed to reduce the risks associated with the collection and use of data.

"I think relationship building is always important. But just being open and transparent with customers is helpful, they seem to appreciate that. That creates a long-term bond that lasts longer than just a regular sale. So that's one aspect of relationship building that's very important for us. " - Respondent 5

Transparency towards customers is highly valued by the interviewees and it is one of the key elements which leads to trust. Being transparent can ease some of the concerns the consumer might have. Being transparent shows your firm is honest and straightforward and this is reinforced by customers' support. This is partly since the rights of individuals could be violated who are often unaware of the potential privacy risk to which they are exposed due to their lack of technical acumen (Weber, 2015). There are regulatory changes being proposed to limit this exposure. However, the risks associated with a sensitive technology such as IoT is hard to completely safeguard. Transparency towards the customer removes some of these risks.

4.2.3.2. Trustworthiness

"We are now lucky that we have like these big industrial leaders which give us a lot of credibility in the market. Technology wise, yes, also this is going hand in hand. From the very beginning there are sceptics, is this technology working, people need to get used to it, how does it work. But if this happens then usually there is adoption. For young companies and startups actually usually this adoption happens, the question is how fast it happens. And if it's fast enough to survive. " - Respondent 6

Trust is arguably the most important element within a relationship and earning trust can be a long process. Within the IoT domain trust is very important because it can be a complicated topic. The different facets of trust can influence each other positively as well as negatively. The main take away here is that being true to your word is very valuable and can create a lot of trust. This trust in the firm might even persuade some sceptics of the tech. By partnering with a large established firm, the startup can gain a lot of credibility.

The startups that partnered with large established firms gained credibility. However, they lost many of the benefits a startup might have. Like the leniency startups might enjoy from their customers in the case of mistakes. Furthermore, the challenge of developing successful alliances is a great for small IoT technology firms partnering with their generally much larger customers due to the asymmetric characteristics between these. These differences represent significant communication challenges (Perez, Whitelock, & Florin, 2013). However, this does not take away from the potential benefits the alliance with a large firm might have. Such as, the increase in credibility as well as trust in the brand.

4.2.3.3. Startup vs. Established

"So also, people know that, because we write about all of this you know I think people know that we are still a relatively small startup here so and with some aspects I think they are more forgiving than others. " - Respondent 1

The interviews showed that trust is not necessarily only connected to the activities of a firm or the technology itself. Brand can be a huge factor in this equation. Being a startup gives more leniency towards a customer. The customers of a startup are generally early adopters. These customers know that a startup does generally not have the capabilities of a large firm and issues are bound to happen. As long as these issues get resolved there won't be problems. Furthermore, the established firm has the benefit of having an established reputation and existing customer base. This established brand grants them higher commitment from their customers which leads to their new IoT products being released with a lower threshold for acceptance.

"I think in terms of the platform and the tools used; we are not better. Mostly because of budget constraints and difficulties in integrations and all that. But then the level of personal service I think we can exceed theirs." - Respondent 9

Startups tend to have a closer relationship to their customers as well since there is more direct communication between them. However, being a startup means that the firm has little or no proven track record which makes it harder to trust them and their IoT technologies. Additionally, startups lack the company profile necessary for them to be easily trusted (Kim & Tadisina, 2005). So even if the startups provide the same, or even better, service they might not win over an established firm. Furthermore, the limited resources of the startup might constrain their efforts regarding new innovative processes or the development of the products and services. To overcome these hurdles efforts have to be made to create strong bonds with customers and alternative methods of funding can be explored such as crowdfunding.

4.2.4. Customer Relations

"Technology wise yes. It's non-traditional, because you have a different feedback loop and it changes and you can really proactively sell or upsell your solution or even ask for feedback and so on. But it's also the interaction is quite traditional to be honest. " - Respondent 6

Customer relations is the last element which will be analysed. While all these firms exist in a highly innovative field, there is very little innovation in terms of customer relations. This is not due to unwillingness but due to the fact they don't know how else to do it. Customer relations is an element of the business model, which is hard to innovate in, especially, in a B2C context. Some firms try to use the IoT's characteristics to their advantage by using the data collection to their advantage but in general terms there are very little innovations going on in customer relations. However, there is some evidence showing that there are possibilities of using smart technology to deepen customer relations within the B2B domain (Saarikko, Westergren, & Blomquist, 2016). Startups must take the initiative to bring these possibilities into the domain of B2C.

4.3. Overview Qualitative Research

An overview of the interview results can be found in the table below. In the appendix a full list of the results and their corresponding quotes can be found. The results show the most appropriate quote per element. There is some overlap in the quotes since some quotes fit into multiple codes. Many of these elements have confounding factors which tie them together.

The questions that were asked to the interviewees were within the context of the customer relationship and trust. The result of these interviews makes it clear that there a few factors which are very important. Overall there is an emphasis on good communication with their customers to create strong long-lasting relationships. These relationships get created through and are fostered by transparent firm communication in terms of security and privacy as well as supporting the customers with their issues. This transparency is important due to the customers unfamiliarity with the technology and lack of technical acumen. This unfamiliarity breeds doubt, especially in the older generations. By being transparent with their customers startups can mitigate a lot of doubts and lower the barrier for entry.

Most of the interviewees aim to create a close community since this brings many benefits such as a reliable source of feedback. However, this interaction is limited and often is one-sided since it is simply impossible for firms to work on projects with their customers. These relationships can also further help ease some of the trust issues potential customers might have. These technology acceptance issues stem from a lack of trust of the firm and product. Part of it is fuelled by lack of knowledge on the IoT and the accompanying privacy and security protocols. As for now, IoT startups are still mainly driven by early adopters with open minds until the products get absorbed by mainstream users. Before this is achievable however, changes and regulations with regard to the privacy and security of these devices will do a lot of good for the technology acceptance.

Privacy and security are the main inhibitors for the use of IoT. These elements are the main defining factor the IoT when compared to other technological innovations. Consumers are still afraid for their privacy and their data. Legislation and compliance are having a positive effect on these issues. Outside of this, a firm's transparency has positive effects as well. A firm's transparency regarding their data policies can lead to higher trust. Some firms try to accomplish this by giving away the control of the data to the consumers themselves. The partners of the startups however seem to have a smaller role than initially suspected. Even in the case of a breach they are a separate entity and thus do not necessarily affect the startups.

Surprisingly there is very little innovation in terms of customer relationship innovation. Out of the 13 interviewed firms only three (indicated with a green mark) indicated that the IoT led to customer relationship innovation. The other respondents simply indicated that they don't know how to innovate in this field. This is mostly likely since the IoT does not seem to be so different from regular technology acceptance cases. A main prohibitive factor for the use of IoT for analytical purposes are the privacy related issues. This creates a situation where the startups must choose between data gathering and customers privacy.

A total of 13 interviews were conducted with startups, of which 9 were with smart home focused IoT firms. 2 interviews were conducted with consultancies within the technology market. Finally, the 2 interviews were conducted with IoT firms that have auxiliary functionality in the form of smart mobility and healthcare. The four non smart home focused IoT firms were included to test the generatability of the results. From the results is becomes clear that the consultancy firms are the one that break the mold the most. Both respondents did not mention the codes partner security, transparency, or attachment. However, in general there were no significantly discernable differences between the responses from the various markets. This shows that the results of this study are mostly generalizable. However, more research needs to be done to fully determine this.

Variable	Code	1	2	3	4	5	6	7	8	9	10	11	12	13
Customer relationship innovation														
	Relationship innovation													
Security and Privacy														
	Production													
	Partners													
	Compliance													
	Data collection													
Trust														
	Transparency													
	Trustworthiness													
	Startup vs established													
Commitment														
	Attachment													
Technology acceptance														
	Acceptance													
	Demography													
Interaction														
	Communication & support													
	Co-operation													

Table 5 Overview of results per respondent

5. Conclusions and Discussion

5.1. Research Questions

The study was guided by the following main research question: *"How does the Internet of Things affect the customer relations aspect of business model innovation within consumer centric startups?".* In order to answer this research question an empirical study was conducted to (SQ1) find out which elements of customer relationships are impacted by the IoT, (SQ2) how these elements impact the customer relationship, and (SQ3) how these elements ultimately impact the innovative actions of firms within the context of customer relations.

The elements found in the existing IIoT literature within the B2B context as well as literature on customer relations were used to create a theoretical framework. This framework is used to explain how various elements in the literature interact and influence the customer relationship of firms within the IoT context. Following this the applicability of this framework has been tested through a multiple case study analysis on startups. Startups were chosen due to their innovative nature and their propensity to be closer to their customers than large firms (Trimi & Berbegal-Mirabent, 2012). By interviewing startups, a clearer result was expected. This analysis used the elements found in the literature as a baseline to create interview questions to find the applicable elements which affect the customer relationship of IoT firms in the B2C environment.

To discover these elements, a total of 13 interviews were conducted with startups, of which 9 were with smart home focused IoT firms. 2 interviews were conducted with consultancies within the technology market. Finally, the 2 interviews were conducted with IoT firms that have auxiliary functionality in the form of smart mobility and healthcare. The smart home sector was the driving industry for this research with the remaining 4 cases acting as a generalization principle to see if these results were generalizable to other IoT using industries. The 13 interviews gave an extensive data set (49 pages), which were coded to generate 262 relevant quotes using descriptive coding which aims to summarize the primary topic of the excerpt.

SQ1, "*Which elements of customer relationships are impacted by the IoT?",* is as discussed before, about which themes play a role in the interaction between the IoT and customer relations. Through this research it became clear that 6 themes played a role throughout these interviews to answer *SQ1*, namely: Customer relationship innovation, Security and Privacy, Trust, Commitment, Technology acceptance, and Interaction.

These themes as well as the relevant subthemes are discussed below through *SQ2, "How can these elements impact the customer relations of a firm?"*. The chapters 5.1.1 through 5.1.3 will be answering these questions individually on theme basis.

5.1.1. Technological Elements

The first recurring theme was **Security and Privacy**. This theme was initially 2 separate entities. However, the research showed a great deal of overlap, so they have been unified. This element has several subthemes, namely: Production, Partners, Compliance, Data collection.

One of the main applications of the IoT and how it is primarily used within the industry 4.0 is through the massive increase in information it generates. The IoT sensors offer real-time information availability enables pattern analysis, can be used for decision making, and general monitoring within the IIoT (Falkenreck & Wagner, 2017). However, this is not necessarily possible within the context of B2C due to scale and number of customers as well as constraints due to privacy and security legislature. B2B companies and B2C companies have different business models and for startups to properly exploit IoT it is essential for them to create new innovative business models (Schneider & Spieth, 2013). Due to the different nature of the relationship with a consumer, data gathering and analysis has more restraints as well as constraints due to available manpower and overall resources.

The respondents showed a propensity towards not or minimally collecting data as well as not being in possession of data. A few respondents were offering their data analysis services through the platforms and applications they provide. However, they still kept their distance to the data to limit their exposure to it. This is mainly accomplished by providing the customers the tools necessary to host the data. The strategy of the respondents seems to be split in two. 1, gather, anonymize the data, and use this information for decision making purposes, or 2, abstain from using or having access to their customers IoT data to provide a sense of security. Both strategies surrounding customer data seem to yield positive results long as the firms are transparent about their use of the data and they anonymize the data so provide their customers a sense of safety.

The first strategy is in line with the academic literatures approach to the increase of information available due to the IoT. The literature argues that data has become vital and a decisive factor in the profitability and success of nearly every organization and plays a major role in decision making (Sidorova & Torres, 2015). However, this increase in data has risks. This increase in risk is the driving motivation for the firms that do not want access to their customers data (Jing, et al., 2014). The latter strategy omits the use of their customers data I hope to increase their trustworthiness in the eyes of their customers. This strategy aims to increase trust, privacy, and security which is deemed vital by Sicari, et al. (2015). The second strategy however is not mentioned within the literature; however, the responses show that it is employed widely. With seemingly good results. Customers of the firms that employ this strategy enjoy their privacy.

Currently, there is a lack of common standards and architecture for IoT security which poses a serious threat. Without guarantees in terms of safety and privacy consumers and businesses are unlikely to adopt IoT on a large scale (Miorandi, et al., 2012). Recent employments of legislature like the GDPR seem to have curbed this issue according to the respondents. Being able to show their customers they are compliant is a major boost in trustworthiness. These elements seem to be of higher importance in the B2B environment. Especially since a firm can lose confidential or customer information (Miorandi, et al., 2012). However, this does not mean that people's concerns for their privacy is not justified, this still forms a significant barrier to the diffusion of the IoT (Atzori, Lera & Morabito, 2010) even if the recent legislature did provide some reprieve.

The factor which seems to differ most from the literature is the importance of partners security in the trustworthiness of a firm. Within the B2B context partnerships provide opportunities for sharing digital data and lead to enhanced buyer-seller interactions (Falkenreck & Wagner, 2017). Consequently, this data sharing leads to increased risks of data leaks and loss of customers confidential data. However, this does not seem to apply to B2C firms. There is less data exchange between partners, the firms see themselves as separate entities. The customers of the firm seem to understand that the security of the firms are separate and often don't even realize that these firms are affiliated. This indifference from the customers changes the dynamic of this factor.

The second recurring theme was **Technology acceptance**. Technology acceptance refers to the customers willingness to come to accept and use a technology. This element is represented by the factors Acceptance and Demography. The factor Demography was added after the interviews were conducted and the presence of the factor was seen present in many responses.

The interviews showed that the main customer base of these new innovative products are mainly early adopters. This is not surprising since all new technologies and products have to go through this phase. What is interesting however, is that the firms seem to take this into account and act accordingly. The knowledge that their customer are early adopters mean that these startups know that mistakes are not as grave and their customers are more forgiving. These early adopters, which are generally more tech-savvy than the run of the mill customer, are more open to these new technologies and often can provide valuable feedback to the customers. Most of the interviewed firms see this as natural progression. After the early adopters use their technology, diffusion will slowly happen until the general populace will follow.

The main issue holding back the adoption of the IoT is likely due to a lack of familiarity with the technology. IoT is a technology that is gaining more traction but despite this, the interviewees found that there is a lack of familiarity. This coupled with an unclear definition of the IoT for consumers has led to confusion and misunderstandings. The privacy scare of the recent times plays a role here as well (Miorandi, et al., 2012; Atzori, et al., 2010). If the consumers are afraid of IoT, they will not be likely to adopt it, especially since many IoT products are placed in homes. The transparency that was mentioned before could mitigate some of this misinformation and ease the consumers into the technology and eventual adoption by educating them on the technology and its benefits as well as its risks and how the companies secure their assets.

A factor that was originally not considered was the factor demography. Geography also plays a part but these two elements have been combined. From the interviewees became clear that some countries are more resistant to change. Namely, Germany. However, the sample size is too small to make any real conclusions and would need further investigation. Demography and particularly age played a major role. Young people are more willing to adopt the new technologies. This is most likely due to their familiarity with new technologies. Older groups had more trouble with is, most likely due to an effect similar to structural inertia. What is interesting however is that the group older than 50 had less problems adopting the new technologies. None of the firms however treated their customers different safe for providing them more support.

5.1.2. Relational Elements

The third recurring theme was **Interaction**. The factor Interaction shows the extent to which the customers are a central element to the firm and its processes. As well as the scope of communication and inclusion of the customer in decision and design making processes. This element is represented by the factors Communication & support and Co-operation.

Interaction has been shown as an important relational social dimension within academic literature, emphasizing the openness of the brand towards consumers as a central element (Ramaswamy & Ozcan, 2016). This reinforces the choice and the focus of this study on customer relationship innovation. As mentioned before, the inclusion of new innovative technologies would require customer relationship innovation and require a business model tailored towards the viability of interaction between customer and firm to truly make use of these new technologies. However, since this is a hard to quantify dimension, especially through case studies, the perceived interaction level was investigated. By looking at the communication and support dimension as well as the level of co-operation the firms have with their customers.

This research shows that by interacting with the customers as well as applying feedback; a higher rate of customer retention and trust can be achieved. Which is in line with the research of Lee, Moon, Kim, and Yi (2015), Nguyen, Newby, and Macaulay (2013), and Levy, Loebbecke, and Powell (2003) which show that interactivity increased the user experience and led to more user satisfaction, trust, and brand loyalty. It shows that collaboration with customers can lead to improvements to products and services. It can be concluded that interaction between firm and costumer is an important social dimension, emphasizing the openness of the brand towards consumers as a central element. Ideally, interacting with customers through small communities.

Firms want to create communities and find ways to integrate customers into the creation and general development of their products and services. This shows that these firms are following the recommendations that the academic studies outline. However, the IoT does not seem to play a particular role in this situation. While the startups try to incorporate their customers and create feedback loops, very little respondents used the IoT to achieve this. They mostly employed regular ways of customer relational interaction. The communication and support the startups offered did have a higher emphasis on explaining the technology as well as walking through the design and production steps to increase transparency and foster familiarity with the technology.

This further seems to enforce the commitment towards the firms by the customers. If the firm creates and maintains their digital relationships with their customers it enhances the customer relations (Falkenreck & Wagner, 2017). Higher information exchange and interaction between customer and firm leads to improved and longer-term customer relationships as well (Kagermann et al., 2013, Kans and Ingwald, 2016). Which has been demonstrated by the respondents. For some startups a large portion of this communication also seemed to have taken place on crowdfunding platforms. Where a lot of feedback was received before the products even entered the production phase. Creating a small community before the product was even launched.

The fourth recurring theme was **Commitment**. Due to the nature of startups and the technology, commitment building is the focal point as previously established commitment is mostly non-existent and is a goal for many startups. This element is represented by the factor Attachment.

There are some elements which do not change when comparing B2B and B2C environments. Loyal customers are more profitable over time and return customers often refer others to your company. Within the B2B context they may also pay a premium to continue to do business due to the bond and commitment that has been created (Gillies, et al., 2002). While this might not be the case within B2C relationships, a bond and commitment are being created. The respondents showed as well that it's important for startups to create these relationships so long-term profits can be maintained. However, due to the short existence of a startup they often don't have long-term relations since there has not been time to create these yet (Soltani & Navimpour, 2016).

5.1.3. Trust

The fifth recurring theme was **Trust**. This element is arguably the most important element and is the element which ties the other elements together. The various other elements positive or negative elements all end up influencing the trust the customers have in the firm. This element has several subthemes, namely: Transparency, Trustworthiness, Startup vs established.

Trust is a concept with regard to the belief and expectation on the reliability, integrity, security, and other characters of a party (Yan, et al., 2014; Miorandi, et al., 2012). This element is intertwined throughout all the other elements. At the end it all ends up in the realm of trust. All the different facets of the other elements can influence trust, either positively or negatively. Especially within the realm of security and privacy which are elements the IoT has brought up are linked to the other elements. When a firm is honest and transparent consumers seem to respond to this positively. This is clearly exemplified in the responses. Customers seem to put an emphasis on honesty and integrity in firms. This is seen through all the different elements. The way some elements are handled might be a hurdle for some customer but if a firm is transparent these issues are reduced. This shows that the elements are intertwined and affect each other.

Since this study has chosen startups as its research subject it becomes possible to compare their perceived differences between the startups and larger established firms. While the theory argues that startups compared to an already existing and operating SME undergo risks which force it to be highly innovative (Trimi & Berbegal-Mirabent, 2012), startups operating in high tech environments face constraints such as the need for large investments, lack of time and manpower. This was highlighted by some respondents as well. There are efforts made by some of the startups in order to try new possibilities in regards to customer relationship innovation. However, the prohibitive cost of failure made this difficult to justify. Kiel (2017) showed the importance of business model innovation and the role of customer relation within it. However, the results showed that startups often lack the tools the industry has in terms of capital and manpower.

This is further made clear by the firms that recently partnered with large established firms. While the factor Partnership was originally looked at within the Security and Privacy element it seems that on a relational level, partnerships have a bigger impact. These partnerships in a way symbolize the difference between a large firm and a startup. The respondents show signs of higher trustworthiness due to the backing of a large firm. These partnerships show a certain level of quality and credibility, which a normal startup usually lacks, by attaching the brand of someone trusted. However, these partnerships put higher expectations on the startups. The partnerships bring with them possibilities and capabilities they did not have initially by offering the resources of the large partner. The startups did mention the loss of closeness they used to have with their customers. This is a consideration a startup must make before partnering with a large firm.

The sixth and final recurring theme was **Customer relationship innovation**. Since this is not an objective metric, it was measured by the firms perceived extent of innovative activities. This determines if the firm is consciously trying to innovate their customer relationship activities and if the IoT influenced these. This element is represented by the factor Relationship innovation.

Surprisingly there is very little innovation in terms of customer relationship innovation. Out of the 13 interviewed firms only three indicated that the IoT led to customer relationship innovation. The other respondents simply indicated that they don't know how to innovate in this field. However, this amount of innovation is not negligible since there are high risks and high costs associated with it. The firms that felt that they were not able to innovate in this field were mostly held back due to the fact that they did not see the IoT differently from regular technology acceptance cases. The issues the startups faced are in their eyes part of any other technology acceptance and relational product innovations situations. IoT does bring a higher emphasis on security and privacy. This is mainly handled by being clear in the technologies goals as well as showing transparency regarding security protocols and privacy security.

In the greater context of things, these results are not that surprising. While the academic literature calls for highly innovative business models this is simply not very feasible in practice. The IoT brings with it many possibilities through the high amounts of data it aggregates. However, unlike B2B businesses where the firms and their customers can come to agreements as well as developing business models wherein they work closely with their customers, this is not possible in a B2C relationship. A B2C relationship and the accompanying product or service cannot be as personalized and modular as within a B2B relationship. This is a barrier that needs to be surpassed to create truly innovative business models within the B2C context. A quote from one of the respondents sums this up quite well:

"The only thing I would say in relations to IoT is that apart from the technology issues, designing and developing them is like designing and developing any other product in a lot of ways. It's all about the use and user experience. If you do it well and it has a purpose and it is considered. You get around any stigma or negativity that is associated with it and so I am a big believer, with all products, that if they have a purpose then they are worthwhile. If they are just gimmicky or they are not well delivered or considered, then there is not much purpose to them." – Respondent 10

The original **Theoretical Framework** has been adjusted according to the findings of the study. The framework was originally created using academic literature on relational elements as well as the IoT and IIoT. This model can be found below.

SQ3, "How do these elements impact the innovative actions of a firm with regards to their customer relations?" will be answered using the revised model below.

The elements familiarity and credibility from the framework created by Falkenreck and Wagner (2017) were originally omitted since startups are so young there often is no familiarity or credibility involved. However, the research showed it was applicable within the startup context as well. The familiarity element alludes to the technology aspects while the credibility element is related to a firms' reputation. The interviews showed that trust is not necessarily only connected to the activities of a firm or the technology itself. Brand can be a huge factor in this equation. Furthermore, being a startup gives more leniency towards a firm. The customers of a startup are generally early adopters. These customers know that a startup does not have the capabilities of a large firm and issues are bound to happen. However, being a startup means that the firm has little or no proven track record which makes it harder to trust them.

This study showed that the elements that can impact a firms' customer relationship and therefore the innovative abilities related to it can be separated in two categories, technological and relational. All these elements must be considered in order to conduct proper customer relationship activities. Since these elements are needed to conduct proper customer relations, they must be considered while creating innovative ways to conduct customer relations. From this analysis became clear that a variety of confounding factors that play a role in the IIoT literature impact the B2C IoT sphere to varying degrees. As a result, the interviewees conducted their businesses in surprising ways deviating from the literature. The found confounding factors all influence customer relationship innovation as well as each other. This makes it imperative to consider all confounding factors during the creation of sustainable long-lasting innovation.

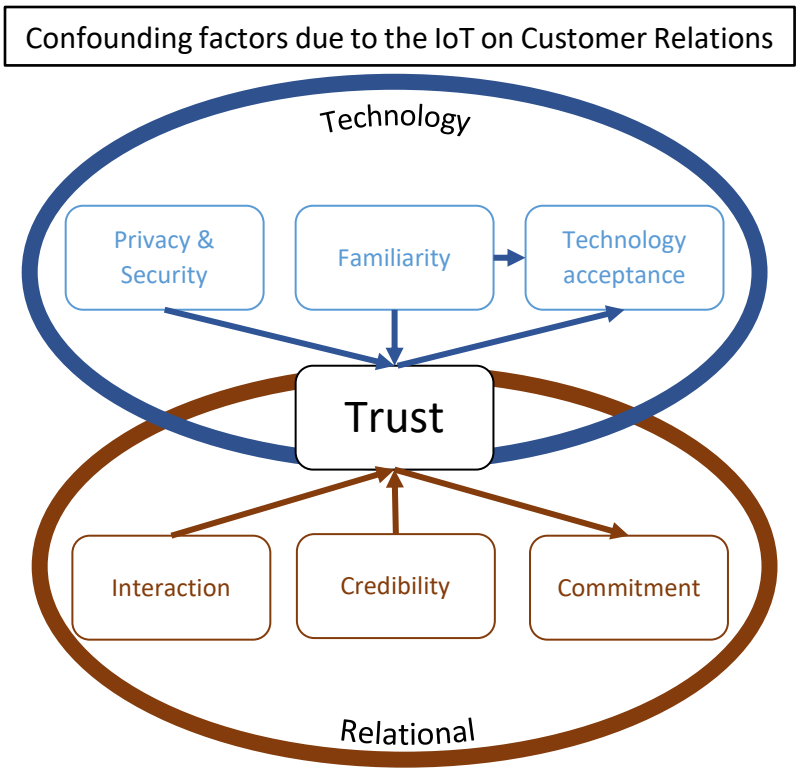

Figure 2 Revised Relational and Technological impact on the customer relations due to the Internet of Things.

5.2. Relevance

In the discussion the practical and theoretical relevance of this study will be discussed. As well as the limitations of this study and future recommendations.

5.2.1. Practical Relevance

This study can be used as an informational guide for entrepreneurs that are thinking of getting into this field. While customer relationship management might be beneficial it is not a prerequisite to get into the field. However, it is important to keep some factors in mind while creating and conducting their customer relationship processes. The study contains many examples into how these different factors affect these startups experience these elements in their day to day activities. Furthermore, the mistakes the interviewees have made in their activities can be used as a guiding principle to prevent these errors in startups future endeavours.

Moreover, the elements and their corresponding factors that have been found in this study can be used as a guideline for customer relationship strategy creation to make sure the most important elements have been taking into account. In a similar vein, this conceptual model could also be used by investors as a way to evaluate a firms' customer relationship strategy. The responses from the interviewees clearly showed that innovation within this field is a hard to accomplish task. Hopefully, the result of this study will shed some light on the various elements which are deemed important and will lead to new results.

5.2.2. Theoretical implications and Limitations

5.2.2.1. Theoretical implication

As mentioned before, the current academic literature is mainly focused on IIoT and the B2B relationship. The B2C IoT literature is almost non-existent, especially, literature on customer relations. Furthermore, the small amount of literature in this field is aimed towards production and large firms. There are few studies which have startups as the vocal point. There is a wide range of academic papers which look at IoT in a general sense. They describe the technology, its applications, its potential in the future, and which elements could be important. These studies are generally very technical and focus primarily on the technical aspects of the technology. Luckily, a large amount of literature focuses on customer relationships, technology acceptance, and business model innovation. Nevertheless, the startup has not been researched within this context. The startup is gaining increasing amount of attention as an innovative entity. Larger firms are innovating less and are instead opting for the acquisition of these innovate startups.

Eventually 6 elements have been identified with 13 accompanying sub themes that could possibly affect the customer relationship and its innovation. The conceptual framework is an attempt at developing an applicable model and to give better insight in this important element of a business model. Finally, there are also several contributions to the existing literature. In particular the contradiction to the literature that emphasises the importance of preparing the customer for the technology, in particular the security and privacy aspects. The results of this study show otherwise, namely that although these elements are important, the main users of these new technologies are early adopters and are probably already aware of the risks. However, this difference is most likely due to the discrepancy between industry. A B2B firm will have stricter guidelines as opposed to the B2C market where the customers are more adventurous. Many startups depend on these early adopters to familiarize the general populace and lead to diffusion.

5.2.2.2. Limitations and recommendations

This study tried to give more insight into the effects of the IoT on customer relations within a B2C context. Since the literature on this topic is limited, an exploratory multiple case study was conducted with the existing B2B literature as a leading example. Since many quotes were applicable over a wide range of themes and elements concessions had to be made and quotes had to be attributed to accordingly. Therefore, the transcripts were read several times to make sure the quotes reflected the right elements and the correct codes were created.

Moreover, this study had startups as its vocal subject due to their potentially innovative nature. However, this research showed that these startups were constrained by many boundaries. Large firms are less flexible than startups due to their rigid character and therefore, were initially not chosen. For future research it would be interesting to focus on these larger firms with established branding and how they would handle innovative these new technologies in the same context. Accordingly, the firms that just partnered with large firms showed that there are certain benefits to this as well as the limitations they bring with them.

Looking further, this study interviewed startups from across the western world. This had the benefit of being able to ascertain cross country elements and differences between countries. Especially in an increasingly digitalized and homogenous environment this has benefits. However, the results did show certain major differences between some countries. Limiting the scope of a study to reflect certain countries or regions might unveil some interesting insights into cultural differences in terms of technology acceptance as well as security and privacy awareness. Specifically, the increased global outcry for digital privacy legislation might play a big role in this.

Additionally, this study looked from a perspective of the startup. The customer side was of these relationships was not researched. By looking at the customers perspective on these issues some interesting information might become apparent. By combining the two perspective new insights could be gleaned and lead to innovation within this field. Furthermore, a quantitative study could confirm the results of these studies to increase the reliability of these results.

Overall, this study used respondents from a wide variety of markets. Many of them could be placed in the same sector however, their appliances provided different services. The different effect within different industries could be researched by focusing on these industries. So did the healthcare interviewee provide this research with interesting findings that the other respondents had no relation with. Especially, the healthcare sector is an interesting research area due to the higher privacy risks these products might pose.

Overall, the IoT is an interesting field of study. It is a technology that is increasingly rising in usage and will undoubtedly bring with it various innovations. Further research could lead to new insights and opportunities that are not identified in this study. As this technology is still new in the B2C market, further adoption and familiarity within the consumer base will bring with it new research topics to extend this study. Since this study is mainly based on qualitative findings, further quantitative research is needed in order to quantify the impact of IoT.

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APPENDIX

Quotations

Quotation Content	**Codes**	Respondent
people were like, I don't need your products, I can do all that with my phone	Acceptance	1
We are dealing a lot with early adopters, right, and influencers kind of. And they are a bit different i would say then, like people that would, i don't know go to media markt and buy a product and like expect it to like work immediately on the first try.	Acceptance	1
I've read somewhere that in general in iot products there is a return rate of 15-20% return rate. Just very roughly. And most of that is because people don't understand it. But that doesn't mean that people are stupid or something, it just means that the product isn't designed very well. So of course we are also to some extent struggling with that you know getting an outside perspective on it. Like designing stuff for the like worst case.	Acceptance	1
I would say that the internet of things has taken quite a lot of years for people to come into the mind of people, lots of people were trying to understand what internet of things was about, how the internet of things can help them.	Acceptance	2
What i'm seeing from my customers is that on the beginning there was a lot of misunderstandings on what is IoT exactly and how this can be used. So most of the projects 3 years ago let's say were just crazy ideas connecting things which had no reason to be connected for but having no real goal behind it.	Acceptance	2
They have an actual goal in mind, with connected devices or a smart home system or something like this. That's why they do it, to connect the devices. I see this as a symptom that the market is reaching a maturity that's showing that the market is steadily growing in the coming years	Acceptance	2
It depends. It's about the people. The open minded people, like with all kinds of technology, innovation, and all kinds of stuff, if you have open minded people they are always	Acceptance	3

willing to try new things. They always want to check if something new is fitting into their plans, into their work or i don't know project or their lives. But if some people are close minded it's much more difficult with them to show them, explain to them. This becomes much harder. This is the hardest part about our sales project. But like with most companies in this field and in the IoT sector, we deal mostly with customers that are open minded.		
Yeah for use, we ran into a number of problems. I'll put it to you like this, everybody has trash cans right. So, whatever building you're in right now probably has 250 trash cans at least i would say. Then there's a percentage of a market, most of the market i would say, that is not ready for an innovation like ours. So we're only looking for like a small percent of an innovative market so from there there's a big percentage that doesn't even recycle. They have like 0 sustainability plans and just don't care for it.	Acceptance	4
So we're really looking for that tip of the curve. That 2% that is innovative. Once we can demonstrate it there then i think that the rest of the market will follow. I have this theory with the challenges that the world is facing that the millennial generation is trying to save the world in any way they can. And it would be well to take advantage of that.	Acceptance	4
I think we're in a very favourable market right now in terms of customers willing to experiment and try new products that might have a lasting change. Typically our customers are very excited to start work with new products to enhance their lives because it's all new and exciting for them. We're in a nice place with IoT as well. Since hardware costs are going down significantly you can start gathering data sets which are very unique, that have never been able to be gathered before. With very disposable sensors and whatnot. Easy infrastructure to set up. So i think we are in a favourable market regarding customers willingness to adopt new technologies.	Acceptance	5
We had customer before we even started the business. I think that's a crucial part in validating a business's long term success. It's making sure that you're doing the proper	Acceptance	5

research and finding customers before you even start. I think that's the one most critical part of starting a new business idea. Doing proper research and making sure there is a proper market for it before you even begin.		
yes of course. Especially in our industry, it's a very traditional industry. Acceptance is sometimes not given. But also that changed a lot. We also have a lot questions for example like what happens if my phone is off or they usually ask, yeah it's nice to use my mobile phone but can i also use traditional RFID cards, and we always provide this backup. You can not force your users to use their mobile phones. The most important thing is actually that you keep those hurdles as low as possible. So from our perspective meaning that you don't have to download an app I can just send you a pass by sms for example or you can still use your RFID card if you want to.	Acceptance	6
innovation is always leads to longer and more sales cycles definitely because you are doing a lot of education from the very beginning. A lot of knowledge transfer needs to happen. Before you actually can focus on a real project. This is something which definitely got better over the last years. Like 2 years ago everyone was asking what is IoT and know everyone has an idea. And also technology wise people get more confident and more used to the technology like cloud or analytics or whatever. You always have this shift between innovation and traditional businesses.	Acceptance	6
There are definitely some concerns as I see it. There is definitely resistance in terms of cloud for example, sharing the data. But also a lot of our customers aren't all completely open yet	Acceptance	7
for the more open ones you don't need to overcome the bigger obstacles	Acceptance	7
Finally it's about adding value yea. If you can bring big added value that a customer don't want to miss, they of course have to rethink their approach.	Acceptance	7
I think the willingness to talk about it is at least there. It helps to break the ice. You don't need, at least with our	Acceptance	7

existing customers you do not need to break the ice. At least the first layer is already broken.		
when it comes to data security and so on, in german we don't always run into open arms. But of course it helps. But it is not an easy game afterwards.	Acceptance	7
Basically I am the one that don't wish to accept some kind of let's say internet of things. Working or how some big companies deal with that because our aim is that who collects data owns the data. So that is the reason that i do not prefer different types of variables which have their own application send their data to the cloud and the developer can connect to the cloud and collect that data.	Acceptance	8
you asked if we have received any pushback. Then this is usually one of the key that comes up. For example in startup competitions and also other kinds of initial meetings with for example pharmaceutical companies because it is sensitive data and many people are worried about that. But in our case it's we do not know your name and even if it would be possible to identify you with a very rare disease and you would put the name of your disease in your application we still do not know who you would be because we do not know who has that rare disease.	Acceptance	9
I would say not actually. But most of the time when we have been dealing with wearables they have been either used for gathering sporting data, so athletic sort of data. Or medical data, so collecting vital information from a patient in relation to a medical concern. Or for things like entertainment, so we've been working on a wearable for a theme park and it's part of the entertainment experience for the guests in the theme park. And in all of those cases there is virtually no, well we have seen very little resistance to the users engaging with the product.	Acceptance	10
I am a strong believer that if a product is well designed and it has a purpose, it is considered for that purpose and you know it's not a gimmick. It has a genuine value then it is pretty easy to tell a story to an user. And if they can see	Acceptance	10

benefits for themselves then they're reasonable cooperative in taking it on.		
no, no issues. People have accepted the technology. People are accepting, and have accepted it and are using and working with it.	Acceptance	11
they do ask about the security aspect about their idea and how they can make it more secure and what is happening in the industry or what is happening in the marketplace.	Acceptance	11
We bring something new to the market so there is always resistance but then again that depends on the type of client. Be it a millenial or someone that is middle aged, that makes a huge difference when it comes to adoption.	Acceptance	12
What I have understood is that it's more about the adoption of technology in general. It's true that you have your early adopters and you grow from there if you do well until a point where you hit a point of critical mass from there it will get to the point of the s curve. The market is huge, a lot of technology is available and you don't need everyone to use it.	Acceptance	12
kind of. If you are a customer or a user who will use our app you will have to be open to download it of course. In that case most of the customers are open to use our technology. But you are right, we also have older customers who are asking more often why we need this and that data from you. How do i get my invoice and so on. I think the older people are asking more often questions regarding the younger people.	Acceptance	13
I mean we already did a kickstarter one and a half years ago that was about a speech enabled furniture. So we we had like a thousand people pledging for it. It is basically a light. And um we had a microphone array inside, so it was Alexa enabled. But we kind of, we cancelled the product to make it short. Because it was not really something, looking back on it you know it didn't really follow our mission i would say. And the acceptance of this, having a piece of furniture that you can talk to wasn't really there. I am pretty sure that this	Acceptance Communication & Support	1

affected our customer relationship in some way, but in a very good way. Because we in the end chose to abandon it.		
the acceptance of this, having a piece of furniture that you can talk to wasn't really there. I am pretty sure that this affected our customer relationship in some way, but in a very good way. Because we in the end chose to abandon it. And you can kind of read through the comments, you can find out a bit more, if people had concern. Yea this is really cool because everything is super transparent (kickstarter and it's comment section). " you guys made a difficult choice and are resolving it with great respect". " We can only imagine how this step must have been for you, we really appreciate the transparency and honesty" .	Acceptance Transparancy	1
Yes of course, because i can claim anything. I can claim there is no back door in our software but i can not prove it.	Acceptance Trustworthiness	8
when you for example go to amazon or so, and especially in germany, i don't know how high the return rates are but if feels like 50% of the people like zalando, they just buy a lot of stuff and they have a look at it in their homes and if they don't like it they just return it like it's nothing. And that is something that is very german i think. We don't get so many returns in the states for example where we have our core market.	Attachment	1
we would invite individual people here, like from our beta testing group for example. We have a really big community of people who use our products, who like our products.	Attachment	1
So we got the trust now to get that project to get that customer, now we have to keep that trust and the way to keeping it is being in touch. That's probably a big difference. The customers that work with the startups, the small companies, they accept it because they know the contract is more intimate. If you just sell a product and disappear you will have problems with trust and if problems arise you won't be there to solve it and gain a reputation which will lead to issues. But once they know you are there and there	Attachment	2

is an issue you are hands on and solve it. You are in touch with them. They feel very very grateful. Shit always happens, especially with new technology. There will always be problems with the integration of such of a new technology. And what they are expecting is that when these problems arise you will help them. Not that there won't be problems. So the customers expect that things won't be super smooth but they do expect you to be there to help.		
yes that's a big investment for them. You can see it as a long lasting process, because it can be very specific to the customers need. They know they have to invest some time and money. To integrate that technology in their house. Because they want to use this technology for a long time. At least overcome the investment that they make.	Attachment	2
In the sense that they are not happy with our technology and the way we work they can always just swtich to another provider using the same standards and the same technology that we have. Or using things similar to us. But once we are demonstrating that our technology works and that we are helping them even support after the integration, giving them a good product. Being on their, just leads to a good relationship and a bond between that can last longer.	Attachment	2
after support for instance when they have problems or something. This process might take a long time but when they start using your products and they get more invested it leads to more profits in the future.	Attachment	3
When the customer is already using your product then they are more likely to keep doing stuff with you. This helps build this trust and opens more options down the line for further cooperation	Attachment	3
We certainly hope that the trust we create with the products we already have on the market will lead to them buying new products when they come out. We know that there is a main market and that basically the technology does what we say it does so we will come back to it.	Attachment	4

So that comes into customer success and making sure that you're keeping customers engaged. So one thing that we do is we do constant reporting of our analytics to our customer, like once a week. And that allows them to see into their habits, and to see our value, how we improved their lives and how they use our platform in general.	Attachment	5
If it takes a little bit more time to get to that point that's fine, it's to build that relationship that will lead to long term profits. For instance if they are already using our product and we would be coming out with a new product or service they would be more likely to use it since the relationship is already there. You have already proven yourself a little bit.	Attachment	5
First step is access and identity management and then we take it further. This is usually how you get a lot of trust. Once you build this relationship it is really long lasting.	Attachment	6
You need to realize that usually it's a long term commitment and you need to be aware those people to a certain degree bet their future on your product. Which puts a lot of pressure of course.	Attachment	6
there is definitely a link there, they would be more willing to use our other stuff,	Attachment	8
if a customer returns then you have done something right. We are seeing that for example in the crowdsourcing community if we send something out to them and then ask for feedback or other stuff like that there is usually a pretty good response rate.	Attachment	9
I think in terms of customer relations we want to create a small closed community that would allow us to engage. And get feedback more rapidly. Because we noticed that we have a few customers who are very much engaged. One lady for example she sent, she was an application developer and when she first got her hands on the app, i think she sent us 3 or 4 emails about possible improvements. She had really gone through everything and she had even recorded video of what in her opinion is wrong in the application so that was really valuable, so just to get more, more of those kinds of people who make it their business to make us successful	Attachment	9

as well. To get those in the same community and engage them even more. Maybe building a community like that would be super. It's a sign that you done something right, a strong community.		
if you are trusting our company this probably means you are interacting more often with us. So i were a customer i would talk to them in many cases and i didn't understand anything i would talk to them but on the other side if i am trusting in a company i wouldn't talk to them or rather i wouldn't even download their app. I think the interaction is more often if you build up the trust with your customer	Attachment	13
If they are using our service and they are happy with it and they haven't faced any issues they are more committed to use more of our apps and more of our services. This is also something which indicated a more interactive way. So if you are happy using our services you might more often talk or write us that it was a good service or if you want to thank us. This is something i would go for. If you are using our app you are more committed to our support or our support process.	Attachment	13
If you are happy using our services you are definitely more open to try our new services, so try our new apps. So of course this is something which is going in the other direction as well. So if you faced some issues or had a lot of things go wrong when use one of our services you might not wish to use our app again. Because you remember, shit i had difficulties using their services so i'll try another service. So this is going in 2 directions	Attachment	13
Of course it doesn't always happen like this, and we don't have time to do it for everyone but we always try to give them support. So they can have regular contact with our support team if they have questions to solve their issues. Our customers really seem to like that and it builds a relationship.	Attachment Communication & Support	2

we started writing a lot about it. We have, I don't know, a lot of Medium posts, if you go to the website for example. You can you have the journal and here you can read through all of the stories that we're writing. We're writing a lot. About that minimalist approach towards technology for example " can you love technology" for example. Like you can spend a couple of days just reading through all that stuff. And we take this very seriously, not just describing how our products are build, like kind of the steps that we took but, ah yea this is for example one of the things i worked on at the university making three modeling more accessible you know. So you kind of have like physical representations you know, of stuff and ehh. Just like you know having this like really natural interaction, you can read about the whole story. But then also read other things about uhm how we manufacture locally, we write about the future of human computer interaction. And like all of that stuff is really helping us to explain where we come from and why we do this basically. And a lot of people when they buy our products or when they meet us. They also refer back to these articles. The people are really reading all this stuff these articles you know. I think it's interesting and really cool to see.	Communication & Support	1
So of course we are also to some extent struggling with that you know getting an outside perspective on it. Like designing stuff for the like worst case. I think you can only do learn it over time. But currently the people that are using us are amazing. We get so much good feedback. We got into the sonos store recently, and they i think have one of the highest barrier for their accessories, so it seems to work	Communication & Support	1
we'll try to prepare ourselves as much as possible. I mean if you go to our app. If you go into our help section, we really try you know to like really consider the smallest aspects and make it really intuitive for people to unboard the products and also so they can use it.	Communication & Support	1
they take customer service really really fucking seriously. Like you can not compare that to like german standards because they are super fucked up. Like you would call a company and they wouldn't answer the phone and two days	Communication & Support	1

later send you an email but ohh the person is on holiday you know, he cannot answer your question so it drags out for like two weeks or so. Like we cannot afford that, that's just super bad. Whoever is like calling me here, you i'm like resolving the issues, giving them the best advice. Like which products to buy from us, how to set them up, ideally from skype, that's also something that we do a lot.		
As i said like one and a half weeks ago we did our, no actually like way before that we, did tons of customer interviews, we do tons of user interviews. Um so, as you can see for example, like we would invite individual people here, like from our beta testing group for example. We have a really big community of people who use our products, who like our products. But also just use sonos or philip hue so don't really know about us yet. So we do all of these user tests and try to get the best input from them. And what i really like in the beginning is to work with focus groups for example. Like especially if you want people to really discuss the products and kind of iterate together on idea. So we're doing like 20 people a day, it's like 4 focus group with 5 people each for like one, one and a half hours. And next step for this product would then be individual interviews again. And then of course we're also going to do kickstarter around this and as you've seen earlier, you're really exposed. You get tons of different comments and the people really help to shape you, um the people help you to shape the product with what they really like or really want. So in every step we include these people.	Communication & Support	1
So usually what we would have is customers who would approach us. Because what we have done is position our company as a reference with the new things will. Just doing conferences. Being in the most of these iot exhibitions and events it's happening well. In these events is where we take most of our leads. And then we can contact them. Build that relationship in a more traditional manner.	Communication & Support	2
But with our customer we try to stay in touch with them with online and offline methods. Like social media, publishing things on our twitter account, things like that. And going to things like conferences what i mentioned	Communication & Support	2

before. But we try to keep on things, to see how they are doing, if their products are working fine, to just check in. regularly to just stay in touch.		
The technology is not easy, and while our customers are more tech savvy they still appreciate the help.	Communication & Support	2
The best option for us is to meet people on fair trades and conferences, stuff like this. Over there we can meet a lot of people that are more open and more interested to new technologies. Over there we are starting the relationship and the we try to build it from there.	Communication & Support	3
What we do is, we have made our own idea, and this idea can be build and can grow obviously, but it's not like we are doing special projects for the customers. It's a bit different. We are trying to fit into the market. Or what we're actually doing is showing the new way, of how the market can be used. What we do is provide these products which are different from how they are done traditionally. It's a process, and it takes time to convince people and after they want to cooperate.	Communication & Support	3
And getting onto a clients connectivity was a question we saw a lot. But other then practical questions about implementation, i don't know if there would be a different strategy other then targeting the right people and not target the wrong.	Communication & Support	4
This is well documented in innovation literature right. Especially when you are rolling out a new product as a new startup it's good to have very close contact with your early adopters and get immediate feedback so they know you care and you're not just making a quick dollar. So it's good business practice to keep a good pulse and people appreciate that. They think you're very responsive and that's always a good thing and they are good references going forward.	Communication & Support	4
especially with tech it is important to get feedback often. It's not easy to scale something you have not fully tested. It's also not smart, you would never do that. But you want make sure you're building the right thing, for the right	Communication & Support	4

person, at the right time. The only way to do that is by asking people for feedback. We reiterated quite a bit, we worked very closely with early adopters too, to make sure that our features and the way we're building makes sense for them.		
There is obviously a learning curve and you have to make sure that the customer is gaining a value that they expect out of the platform. So that comes into customer success	Communication & Support	5
How does it change actually, in terms of user interactions. You always get really direct feedback. And because we know how a system is used. We can also like our sales are different. So upselling a solution is definitely a lot different from before IoT.	Communication & Support	6
As we are a small company we have these growing problems. And obviously sometimes we can not provide the best service we want to provide, immediately. Obviously this can lead to some frustration. If there is a customers, even though it's not our product but it is part of how our product is being used and it makes it so things are not working, this can cause frustration.	Communication & Support	6
We always can get a feedback loop. What we have with customers is usually like minimum every three months. Where we have a sync or update meeting where we ask how things are going and what we can improve so we get this feedback loop. So when we update our systems or our applications we always ask for feedback.	Communication & Support	6
The more we interact with them the better the trust and commitment becomes.	Communication & Support	7
sometimes we, get some technical support tickets and we reply to that ticket and we establish some kind of relationship with them. But there are all over the world.	Communication & Support	8
how we do this is, first to never mention iot. It's a solution for someone who probably has a problem which involves sensors, nfc, actuators or something and we can prepare that solution much much faster with our tool.	Communication & Support	8

just good customer service, so that we answer as soon as possible and we provide personal support. And then thinking of the customer first. Thinking things from a customer first perspective, making also the application as reliable as possible and trying to get it, to a point it doesn't have gimmicks.	Communication & Support	9
I would say yes because if no one knows about us then it would be difficult to create any kind of a brand. So just being out there and trying to communicate a message as consistently as possible is a step towards that direction. And with crowdsourcing we were targeting that mostly for women who were using birth control pills and then we wanted to be.	Communication & Support	9
with crowdsourcing what usually happens is that it takes a long time before the product is ready to ship out and people get frustrated and there is a lot of people that are going to say that, hey i want a refund, because they didn't really understand what crowdfunding is initially about. Even when we have backers like that we still find that people are quite engaged. Maybe this is some kind of area where people feel there is some kind of emotional bond or so with their own treatment and then whoever is then saying that we are taking care of it.	Communication & Support	9
The inbound feedback from either happy or unhappy customers, we have a pretty standard ticketing system where the feedback comes into and we then respond to those, that's all documented then.	Communication & Support	9
so it's also about professionalism, about how you handle feedback. I'm obviously one of the cofounders so i take things quite personally so when someone says that something is wrong they received the wrong color device or something like that then i usually make it my business then to make them happy. It's great to get the kind of feedback where they say, your customer service is awesome. Of course in some cases we do not exceed expectations, even though we should always try to do that but in some cases it is rather difficult. But that is life.	Communication & Support	9

software we roll out, a beta product that a 100.000 people might be using or even just thousands. It might be ten people that have access to a particular product at a beta level to review. So they really can't influence others too much i think. It's great for us because we get genuinely good feedback a lot of the times.	Communication & Support	10
I hope it convinces them that the product is good. But there is such a small segment of potentially the whole market that it probably doesn't influence the general population. But individually when we're working with focus groups and we're developing a product that is interesting to them and they have been involved in the development process I think they naturally gravitate towards it and start to trust it. Because they know that people are generally working hard to get it right.	Communication & Support	10
does participating in awards and conferences and thinks like this help people to trust you more? S: I think it helps get our name out. It gives some recognition to our name. And who we are. Yes it does, it gets us more referrals. But it's not an IoT issue. It's a general i am dealing with your stuff.	Communication & Support	11
I think every technology company has to take into account what the feedback is of their customers. So yes this definitely reflects what we do. If we learn from our customers that they don't like a specific rollout or specific technology that we use then we use to adapt the situation until they do like it.	Communication & Support	12
It's all about having a good relationship, having a beneficial relationship, win-win for both of the parties in there. It doesn't make sense if nobody is using it, it doesn't make sense if nobody likes it. All these things are important to build up trust and build a good relationship. It is quite simple and straight	Communication & Support	12
Sometimes you have to answer more questions and sometimes there is no need to answer all the questions. Because like i said It depends on the customer we are facing. If you are downloading our app, or if you downloaded our	Communication & Support	13

app you're like step further because you want to use our app and therefor you need to use our technology		
Sometimes we are getting enquiries where customers are asking for explanations for invoices or another thing. When you are doing that, we try to do it like the best.	Communication & Support	13
we try to solve every enquiry gently and with the highest priority in order to make our customers happy. That's basically the thing, we are trying to build up the best customer support. For that it is very important to answer every enquiry with the highest priority and answer not only the question they are asking but also look a little bit forward, what could be the next question of the customer, and that is something many customers are telling us in the next mail, like a thank you mail. We are getting a lot of thank you mails, that they thank us in a way we helped them a lot, that we answered every question. And this is something we want to improve and that is also something with which we can build up the trust with our customers more.	Communication & Support	13
it's really important for us to grow in order to make our customers happy because our customers are the ones that are using our apps the most. So no employee of us is using our apps so much more than our best customers we would ever have. And this is something that is really important for us. So what we are also very thankful to our customers contact us not only if they are facing difficulties but also when they have implementation wishes or feedback which we might improve on.	Communication & Support	13
Some customers, ok, to be honest, some customer will tell you, you need to work on this part you will have to do this a little bit different, we had some issues with this or that. But it's not they will tell us, they didn't say to us, your work is completely awful we don't want to cooperate with you anymore. It's like with every work, you always want to get better and better, so you're always asking for the feedback and with this feedback you will change a little bit you will do this a little bit differently because every customer is different. You have incorporate the feedback they give you and try to do better next time.	Communication & Support relationship inovation Transparancy	3

so this is something really important because we have many [partner] employees so our customer communication is not that direct. Like compared to another startup I would say. We are reaching our customers through the email way, because that's what the [partner] customers are expecting as well. Because sometimes in the direct or social media channels we are dootsen? Employees and some of our [partner] customers answered already that they didn't want to dootzed. But that is something we have to take care of because we have a lot of [partner] employees. That's why we might not act like a startup, like another startup i would say.	Communication & Support Startup vs large	13
if you're trying to start a relationship with their customer you need to meet them. And it depends on what you sell. We're talking about IoT stuff that works through security cameras and light systems. So our customers aren't the most normal persons or sometimes governments as well.	Communication & Support Trustworthiness	3
And of course everything has to be compliant	Compliancy	1
A lot of IoT equipment collects a lot of data or can send data or it can collect the data, it depends on the sensor which is on the end of the network but the european commission have special regulation about data, about data collection, about data process, what you will do with data and so on, like rodow for example. And this information and law regulations give specific policies which can be used or which things need to be hidden or prohibited.	Compliancy	3
We just make sure we provide them with a secure protocol	Compliancy	3
It's compliant with GDPR Before there was a gdpr.	Compliancy	4
We use a bunch of partners for the connections and the technology. So they offer a certain level of security, of course it's the same stuff everyone else uses. But it's all following the standards across all the devices. Our house servers are managed by amazon, they offer tls encryption. We have different levels of encryption on each part of the technology chain so even if one were to fail the other links would keep it secure.	Compliancy	5

This also changed a lot. I think within the last 18 months, I think the whole topic about cloud based systems or where the data is held. So these sceptics or fear of data fraud has decreased a lot. In general of course we are GDPR conform of course. We have all of our services hosted in europe or even germany and the us. Depending on where the service is needed. We are completely conform. And we need to provide this information and people do ask for it.	Compliancy	6
You need to fulfill a lot of compliance, that's really important. You really need to fulfill these requirements, that's really important and you really need to listen to that because otherwise this could be a complete showstopper. So we do a lot of certifications and so on that we actually provide to our customers so they are more or less confident that we meet those security standards.	Compliancy	6
they can download it on the google play store for instance so they know it at the very least meets the demand of google	Compliancy	8
most of the cases there it's not much of a problem either because they still need to comply to the existing regulations.	Compliancy	8
the approach needs to be a bit different. Definitely also because we are working in the medical field because we are a medical device, legal manufacturer. We also need to be mindful about these things and do everything by the book.	Compliancy	9
I would say that one reason also is that we do not need to absolutely know your id. We do not stand to gain anything from it. It actually makes things more complex. There is a lot of stuff to take into account. With gdpr for example. In case you're gathering sensitive data. So the benefit vs effort is not there.	Compliancy	9
rolling out projects globally can be made more difficult by local standards and accreditation requirements, certification requirements, depending on the product. So that needs to be taken into account. You might be rolling out a medical product in Australia and it needs certain certifications here and they need different ones in Europe and different ones in America and potentially different ones	Compliancy	10

in Asia, Japan for example. So you have to assess that as a risk.		
not really, because everything is from the bottom up GDPR compliant.	Compliancy	12
like I said we're GDPR compliant to the highest standards. So the company has a good reputation	Compliancy	12
there are also things like the new GDPR regulation in which you can ask as a consumer for the data a company has on you. This is something a few customers have asked about. And we have to send them the data, so to say. If we are doing that in a formal way and they are getting the data, they are happy, they are mostly happy and they trust us, and they trust us in that case.	Compliancy	13
Do you think you complying with these regulations is enough for your customers? MK: yes, i think so. Because it is written all the bookings and all information we have of the customer in the gdpr data export so for some customers this is a very big customer. They are happy to see what we are saving but also sometimes wondering why we are saving so much things of them. And then we have to explain this to them. But often we can answer all their questions.	Compliancy	13
i think so far we've only had one case where a customer wanted to have all his data deleted.	Compliancy Data Collection Transparancy	1
we've been very very public before because we did three crowdfunding campaigns in total	Co-operation	1
I think you can only do learn it over time. But currently the people that are using us are amazing. We get so much good feedback	Co-operation	1
I mean we already did a kickstarter one and a half years ago that was about a speech enabled furniture. So we we had like a thousand people pledging for it.	Co-operation	1

As i said like one and a half weeks ago we did our, no actually like way before that we, did tons of customer interviews, we do tons of user interviews. Um so, as you can see for example, like we would invite individual people here, like from our beta testing group for example. We have a really big community of people who use our products, who like our products. But also just use sonos or philip hue so don't really know about us yet. So we do all of these user tests and try to get the best input from them. And what i really like in the beginning is to work with focus groups for example. Like especially if you want people to really discuss the products and kind of iterate together on idea. So we're doing like 20 people a day, it's like 4 focus group with 5 people each for like one, one and a half hours. And next step for this product would then be individual interviews again. And then of course we're also going to do kickstarter around this and as you've seen earlier, you're really exposed. You get tons of different comments and the people really help to shape you, um the people help you to shape the product with what they really like or really want. So in every step we include these people.	Co-operation	1
At the same time we have developers mostly so not consumers but developers. That use our technologies to go deep on the internet of things technology and create a prototype and ideas with our technology. Not creating final products but probably just doing research for their own products.	Co-operation	2
we don't actually call them projects because it's not something we do together. But what we do is we do kind of consultancy where we try to help them with their projects and implementing our technology	Co-operation	2
We always ask for feedback but we are not preparing our products for customers. We prepare our products from our own analysis from the market. We are not asking our customers what they would like to have we create the product and showing them the features and possibilities of the products, we tell them it's worth is to try and then after they try and see it has potential. This is our own way.	Co-operation	3

that's something we want to do but we haven't done yet. We've looked at a few opportunities to do that but. For example we had one client that wanted a composting unit. We were building to build a composting unit for them but they decided that they would rather buy one of our current versions without having to finance the development of a new technology. It's something we're open to do but we haven't done it yet.	Co-operation	4
especially with tech it is important to get feedback often. It's not easy to scale something you have not fully tested. It's also not smart, you would never do that. But you want make sure you're building the right thing, for the right person, at the right time. The only way to do that is by asking people for feedback. We reiterated quite a bit, we worked very closely with early adopters too, to make sure that our features and the way we're building makes sense for them.	Co-operation	4
is it getting you the stuff you need? Is there any feature you would like us to incorporate. There's ways of doing that with the public, there's ways of doing that with the consumers. You can build a community and do it that way. But it's not as straightforward. I can't just call somebody on the phone. There is also the problem with the more technological you get, unfortunately the less you're concerned with the voice of the customer.	Co-operation	4
You can crowdsource it but it's also like, you run into the same issues or a different set of issues. It's either you make a hit on the crowdsourcing platform and you have to like commit resources to tooling up to that kind of production set up.	Co-operation	4
I think general i think it's important to make sure customer interest is there before going deep into product development. That's one of the key factors of managing a product that we learned along the way. Just make sure you get a lot of customer feedback before you go into expensive sprints and whatnot.	Co-operation	5
Some try to be more involved in our business so we try to get this little community going.	Co-operation	5

Just make sure you get a lot of customer feedback before you go into expensive sprints and whatnot.	Co-operation	5
Knowing how our system is being used and the feedback, this always feeds into new product innovation, new product development, it's a really important piece, also feedback from the market is really important. And you also compare it, because you know how the product is being used and you get feedback from different channels you can also validate the quality of the feedback.	Co-operation	6
We always can get a feedback loop. What we have with customers is usually like minimum every three months. Where we have a sync or update meeting where we ask how things are going and what we can improve so we get this feedback loop. So when we update our systems or our applications we always ask for feedback. Then there is some kind of support or service level agreement, if something is not working or something needs to be changed we try to get in touch. The good thing is actually that the feedback to a product over IoT is more direct.	Co-operation	6
of course it's about building trust and showing the added value and trying to sell the added value. So often we also work with ideation workshops, design thinking workshops	Co-operation	7
Yes, mostly during some kind of european funded projects. Like horizon 2020 or ambient assisted living foreign projects or open source or that kind of stuff. Even there we have let's say 2 different roles. Or we are an application developer using IoTtool as a tool to prepare fast solution or a fast prototype or something like that. Or we are a subcontractor so there are other developers or other system integrators and they use our solution so we are unknown in those projects.	Co-operation	8
one thing that came to my mind also was that how do we create trustworthiness or how do we create that air of reliability is also quite participating in public discussion about how medication works and the importance of medication adherence. So pitching in with stuff that doesn't provide us with revenue or sales or stuff like that. That is	Co-operation	9

also important so that we are also contributing to the greater good. Reducing healthcare costs.		
so if we have something bigger on which we would like to get people's opinion on then we just send out an email that explained what we are asking and why and there is usually a link to a survey or something like that. For example now we are working on a new product now, there would be a smart product coming for the device then we send out a survey to the backers and then we ask if you could take the survey and provide us with valuable feedback. So that is one way but then.	Co-operation	9
in the development of the product. We're doing user research. We're understanding what the users issues are in relation to the product space we are working in. We designed and developed a wearable thermometer for small babies and we so we did a whole research with parents about what their issues were when their children were sick. Where did they have problems, what was annoying to them. If they wanted to use a thermometer, how would they use it. What could be beneficials, would they be willing to use a wearable thermometer with their child and if they did what were their concerns. So as part of that early ideation process we are trying to address all those issues. And develop a product that would be appealing to them. And then, when the product becomes real and starts to form into a prototype level we then take it back to the users and clients and get them to evaluate it as it is being developed and potentially tweak it. By the time it gets to market. Hopefully we have understood most of the issues and addressed them	Co-operation	10
absolutely it creates more trust and commitment. In general when we do that it's a small segment of customers, it's not all customers so there is definitely some positive influence on those people but it's probably more of a one way communication in a lot of ways so the benefit to us is greater than the benefit to them in the development stage	Co-operation	10

New projects is a little bit too big i would say. But in general for us it's very important to know what our customer is saying. So not matter what it is, a bug, a wish, implementation, etc. it is very important for us because we are internally communicating this and try to look at this wish or this bug. And then we will see if will be implementing it or fixing this bug.	Co-operation	13
we are in this space where usually where a ton of data is collected. So most of our customers already have alexa and google home at their homes and they are well aware that those things aren't only listening when you are talking to them or that they constantly collect stuff	Data Collection	1
our approach to this is that we, of course we don't collect any data behind it. We have, you can not tell who is operating our products for example. These are very dumb iot projects, you could say, in a wayy but a very good way. For example for sonos you always need to sign up, we make that optional	Data Collection	1
Well what we have to own is that in our technology, we introduce the tools that our customers may need to create their own connected product. Because we do hardware, we are providing hardware to our customers that want to create iot products. We are actually not managing sensitive data from them, they are managing the own data.	Data Collection	2
Yes it's exactly the same. We have less impact on this however since we do not manage our customers data. Which makes having IoT products a lot easier.	Data Collection	2
My business doesn't collect data. It collects the signals but the data is not collected by my business. For example when we are recording videos on cameras, we are not the owner of the cameras, we are not the owner of the videos. We are just a producer of the device. The owner of the infrastructure is the owner of the video and of the record from the video, the data from the video. All data of what we can collect. So this is not an issue for us. We put the ownership of all the data and recordings in their own hands.	Data Collection	3

As I mentioned before, we are not the owner of the data. So, our customers are the data owners. This clears us from all liability in terms of privacy regulations.	Data Collection	3
Apart from the obvious privacy issues right, the data is naturally anonymized. We're not capturing user information	Data Collection	4
Having to provide privacy safeguards so that the consumer and the device and us can communicate properly is important	Data Collection	4
yes. Our system, all our readers. The access points or modules. Work offline, so you don't have any risk there for data fraud or something. Everything is happening over the cloud to their mobile. Encrypted.	Data Collection	6
of course the question is then all about who owns the data.	Data Collection	7
fitbit or that kind of stuff. Because users never know what is going on with their data. So our tool collects data to the smartphone and the user has 100% access to that data and they can do whatever they choose to do. On the other side they can connect to our [application] cloud but even their we don't have access to the data, mostly. Mostly because for, if we need to make some service or something we need to have some access. But we can not access that data at all.	Data Collection	8
our data is anonymous so we don't actually gather information. We do gather information but we do not gather your id, your profile. So we do ask in the application if you want to give your date of birth and location and gender. But this is mostly so we can provide a segmented data back in the application so you can compare your performance against your peers. But we do not ask for name of there is no user account or anything of that sort.	Data Collection	9
Today many people are really worried about sharing their data, and at least they want to know why. That's definitely something that we have received feedback on that some people are ok with sharing for example date of birth and gender and where they live but they just need to	Data Collection	9

understand why that data is gathered. So if you just ask for then they will say, nah i couldn't be bothered.		
well right now our application is not having too much information on why we are asking that optional, gender, date of birth, location. So what we are doing is actually adding more information about why it would make sense to provide that information so that you can compare your own medication events with your peers so women for example could see from the application how well they have been staying on track compared to women of similar age.	Data Collection	9
That's going to make it so that there is a lot more data about patients and especially when medication is also becoming connected, then there is going to be even more data. And that data is unprecedented and the amount of it is going to be staggering. How do we solve then the problem of privacy with those amounts of data. Because the benefit of gathering that data is going to be in combining it with all of your other daily lifestyle habits or your vital signs. But it's really fragmented everywhere, so the really interesting thing is that at the moment there is a lot of different data from your different walks of life but then nobody has the means to make sense out of it. That's like the iot promise is that you can create a digital copy of yourself. But nobody has that answer.	Data Collection	9
But what is happening there is going to most likely have a destructive effect also on the privacy and how people are controlling their own data. So maybe that is the key take away. Getting you back on track with controlling your data. I think this is a massive promise. A lot of companies have tried to solve that already but no one has really been successful. Maybe in the future, whoever cracks that nut is going to be quite big	Data Collection	9
In terms of the data that is collected by these devices. We are rarely involved in the management of that data. We don't do electronics and software.	Data Collection	10

This stuff is reasonably well secured and often the level of data is such that it is appropriate for the product used. You know in an entertainment scenario the data might be minor while as in a medical product maybe the data has higher requirements so the security levels are higher in terms of the storage and management of that data.	Data Collection	10
in the IoT world where all that information is going into the cloud somewhere, and how is that information being dealt with, how easy is that information accessible. That's the problems our customers have after they're done with us.	Data Collection	11
i talked about data export because of the GDPR. so this is something which affects us. Because now as a customer you can ask us to send them all their saved data. So we had to implement a process, and implement some features and services in order to send them this data export. And this is something we are affected by because if you want to see your data you have to ask us to send the data export.	Data Collection	13
it's a pure software thing. It means you can hack it, so. I mean look you know we all of us are taking that very seriously and we have a lot of open discussion within the team around what we want iot to be and that way we kind of make sure that everybody is aligned. We share, in the team, a lot of stories around i don't know what's in here at the moment. But you know we share all of these stories around how google was recently fined. This one is really cool, do you know that, this alexa and google home hack. Where you can where you can control them in a much more convenient way because you add this little device on top and it would now recognize the individual wakeword and like none of the alexa or google home so you kind of put this barrier in front of it. So all of that is openly discussed here. People go to great lengths to protect themselves.	Data Collection Production	1
The privacy policy, of course all the data is logged and audited. Everything that goes through our application is audited in terms of all activity and sensory input. So there is a full log of data available on the platform in case there is an opportunity for data analysis or something like that. We're	Data Collection Transparancy	5

doing everything we can to try to make sure everything is transparent and available to the customer.		
well we're very pragmatic. We are saying look, deploy our solution in your cloud and test it out, let's use wireshark or whatever they wish to call home and that's it. Close all ports you wish to close in your firewall. That's it.	Data Collection Transparancy	8
So we are like 20 people from 12 different nations and they take customer service really really fucking seriously. Like you can not compare that to like german standards because they are super fucked up.	Geography	1
I think there is more technology adoption in the US, there is more willingness. Specially germany or the DACH regions have been a little bit more hesitating. I'm a german I know what I'm talking about. So the european market is a little bit more hesitating than the US market	Geography	6
If you're talking about where the product is sold, ehm I think potentially. Australia is traditionally a market that takes up technology pretty quickly and so we've got clients that roll projects out real easily into the local market. I think some of the markets are more difficult to do that with and you know rolling out projects globally can be made more difficult by local standards and accreditation requirements, certification requirements, depending on the product. So that needs to be taken into account.	Geography	10
Be it a millenial or someone that is middle aged, that makes a huge difference when it comes to adoption.	Geography	12
We get a lot of questions, and one of the questions that very much comes back is until which age can people adopt a technology like yours. Our general experience is that up to about 75-80 years is that people are well able to adopt it. Older people are very much tech savvy or are becoming more and more tech savvy they are used to it.	Geography	12
the people that can not really work with it. Is a small minority. I would say less than 5%. So it doesn't really matter what age. We know millennials or the Y generation you don't have to explain anything. There is more resistance	Geography	12

when you get to 40-50 that's more the resistance group because they rather stick to what they know. But our typical experience is that younger and older than that are more open.		
What we do notice is that the German people are less open to adopt new technologies like ours. So you could say more or less it's a cultural thing, there's a cultural difference in there. Overall they'd rather stick to the situation as is. The people are very often resistance to change. I think that's the case. It's not so much about adopting new technology but about, something has to change and i don't want it to change.	Geography	12
we also have older customers who are asking more often why we need this and that data from you. How do i get my invoice and so on. I think the older people are asking more often questions regarding the younger people	Geography	13
It's definitely a customized approach with every customer group. Obviously it comes into play with the age of the customer and their ability to work with the technology. But that's just kind of sales in general i think. You have to understand who you're talking to and make sure that your pitches tailor to them because it's going to be different for everybody so there is a lot of customization.	Geography relationship inovation	5
We have a lot of supply partners in Asia, and many customers specifically request that we don't work or share with our partners in Asia they would prefer we would work with our partners in Europe. We have supply partners all over the world and we have customers who prefer that we deal only with the partners in european supply partners.	Geography Transparancy	11
We've seen that with a lot of IoT products that the interaction is very broken.	Human-Technology interaction	1
connected music and connected lights, you usually have to interact with them via smartphone right. And that is definitely not human centered, there are a couple of problems that come with it. So first of all you need to have your phone with you pretty much all the time, which is not	Human-Technology interaction	1

very good for your mental and physical health. Then it's not a shared experience. Like who ever else is in your home, whether it is your family or your friends they cannot necessarily interact with these products. They have to grab your phone. And then third thing is, the time to action, like the phone is such, like you know a swiss army knife, that you, you know, would take with you to the jungle when you don't know what you're going to experience. So this can do pretty much everything. So when i use it as a remote control for a hue for example I get tons of notifications at the same time, I don't really know what to focus on. And that is the reason for example why instagram facebook, they are pretty much aware of that problem. They have these small timers, right, that would remind you to constantly be aware of how much time you spend online. How much time you spent looking at that device. So what we do is, we make the interactions with these products really. Intuitive and natural.		
I mean not everyone is aware of that problem, right. But uhm, like, people you know like, when they buy the products, they won't necessarily immediately recognize that there is something wrong. With like interacting with them over your phone it comes over time.	Human-Technology interaction	1
I mean like so one of the things that is kind of disturbing for people is that we don't really have a screen on our products so they are kind of limiting people so about minimalism and technology, people are used to have graphical interfaces pretty much everywhere so that's to some people that can seem like a step back maybe. But most of the people that use us and love us are well aware that we need these interfaces to keep our sanity, you know.	Human-Technology interaction	1
You have everything regarding your home or your workplace in the palm of your hand, in your mobile. It's easier for them to use their mobile which they're using anyway. It's just new to them.	Human-Technology interaction	12
We have a smart system that replaces waste bins. So from the outset the relationship is non traditional right. Trash cans haven't really changed pretty much ever. With maybe	Human-Technology interaction	4

a handful of changes. Our price model is very different, the capabilities that our technology enables is very different so everything about what we're doing really changes the customer relationship.	relationship inovation	
The only thing I would say in relations to IoT is that apart from the technology issues, designing and developing them is like designing and developing any other product in a lot of ways. It's all about the use and user experience. If you do it well and it has a purpose and it is considered. You get around any stigma or negativity that is associated with it and so I am a big believer, with all products, that if they have a purpose then they are worthwhile. If they are just gimmicky or they are not well delivered or considered then there is not much purpose to them. So we always try to do that. I think the other thing that is worth highlighting with IoT is that the landscape changes so quickly. So what was cutting edge 12-18 months ago is now mainstream and the next level is coming through. So you've continuously got to try to educate yourself on what people are doing out there and trying to assess what's at the bleeding edge of what's possible commercially and what's research, blue sky stuff that you can't utilize in a project at this point.	iot is not special	10
Yes we're very much a startup and we have a number of options. The thing is that for us it doesn't make sense to commit to a partnership with a telecom. Because to be frank and candid, partnerships with telecoms don't mean much for a startup. They make a lot of noise how they partner with startups and how they enable the cutting edge of of technology. In reality what it is, it's a client relationship. You'd pay for a certain amount of units or a certain amount of data you will be receiving and transmitting every month or every year and that's, that's the end of the relationship. I don't see it as much of a partnership.	Partners	4
To actually enter the building, but from a platform perspective we can really create value. From our partner as well in terms of the business products because all the products are running off the same platform we have insight into everything.	Partners	6

even if we claim that we deal with data as we should, we can not claim that the smartphone on which [tool] is installed deals with the data as it should. Because it's a general purpose device and there are several different application there, it's installed, it's android. It's operating system and we can not even say that android doesn't even send location data every time. So we take responsibility for our part but not for everything here.	Partners	8
in case a pharmaceutical company would like to identify a person from our data they can do that but they but then they need to map the unique identifier that we provide with the patient's actual identity	Partners	9
before you mentioned that you don't know who has which pills, but if you start working with these pharmaceutical companies won't this have to change? T: yes and in those cases the distribution will happen through that client. Which would be a pharmacy chain or a pharmaceutical company. when they distribute the device or the solution they are going to be requesting consent at the same time.	Partners	9
there were some issues, also with our sister companies. In which customer data got public. After such issues we try to improve our processes and improve our security. So there were several issues in the last few years which drove us to improve our services and our security.	Partners	13
yes sure we have partners. They are affecting us not as much as you would guess. Because we have our own data base, we have our own security processes. So when one of our partners is facing an issue we are not affected directly. We are really independant.	Partners	13
the interesting part of this is that making the medication connected is something that offers new kind of business opportunities. For example if you think about something as simple as refill from the pharmacy. So if the application knows that what is your status right now with your medication. You're able to automatize the refill.	Partners relationship inovation	9

i think, so in general a good iot product is very very hard to build. And therefor, i understand people that are suspicious when there is something new coming out.	Production	1
We included a little slider switch that would disconnect the microphones from the electricity. So it would like shit down the microphones entirely. That was a step that we did because a couple of people, including myself, had really really uncanny experiences with alexa.	Production	1
What we have made on our side is quite a tool that can be secure. It has authentication systems, it has encryptions. It has all different types of securities and mechanisms. To allow them to create secure IoT devices. We made that together with some research entities and universities. We developed the security of our product within an european project. And now we, this project, so this projects, so the outcomes of the projects are open and enabled for any customers to use.	Production	2
the security of the products was actually something that in the beginning our customers were not so worried about. I would say that we are still now at a moment where people i mean our customers want our IoT products to work and to understand how they can add value to their products.	Production	2
Like they want to something, they want to use something in their homes that's secure by design.	Production	2
well something that we do is to try to be. To always use always open source technology open source code to make them feel comfortable with working for us.	Production	2
We just make sure we provide them with a secure protocol. For example, I'm not producing the camera's so the video is secured by the protocol of the global products which are producing video cameras. If I am buying the cameras which I am using in the system, the cameras have already implemented a protocol which is controlling the video streaming which is secured by this protocol which is allowed by the laws to be in the official sales cycle.	Production	3

You're doing research on a lot of different IoT companies you're probably coming up where they face a challenge whether they figure out their own way to connect their devices to the cloud or they're trying to use their clients wifi our connectivity, you're trying to use clients its a problem, if you're trying to use your own it's a problem for different reasons.	Production	4
We have the benefit of going to accelerators and since we're hardware they really emphasise user experimentation. Before making anything, before making too many of any one thing and really driving up your costs. The problem with hardware is that once you sink cost into a part, into a material, you can't get it back. It's not easy to iterate. It's not easy to change things. If we were a software company and we wanted to change something it would be easy. Somebody can just go and change the code, it's easy. But with hardware it's a commitment. So you want to make sure you're making the right thing. Or at least better than the last version before you do anything. I found with hardware founder that if they're smart and careful they are very careful.	Production	4
security is a big concern. These are people's homes so of course security is a major major concern for them. But what we do for that is, we use secure, encrypted, independent, cellular networks specifically a lot of the times there are IoT networks. I know one in Europe there is a lot of IoT specific IoT networks.	Production	5
in term of security. So we are crypto encrypted in our systems. So that is why are really secure actually. That is why we are way more secure than traditional access systems, because we don't, uhm. The most unsecure thing is your mobile device.	Production	6
It is always like a shift on allocation between security and how secure we need to be. And like how does this affect the user experience. So, the consumer product we showed you for example also have the possibility, to have something which is called touch to open. So you don't have to pull out	Production	6

your mobile. The device just recognizes that you have access because you have a bluetooth connection.		
First of all if customers come to us with these concerns you have to take them seriously. You can not act like bulldozer.	Production	7
look usually the security of an IoT device is more based if you have different types of devices connected to gateways and the cloud using camqtt or whatsoever, our usecase is slightly different, it's more specific because we're using some kind of personal device, which is a multipurpose device.	Production	8
We take very serious measures to keep our work confidential. It's stored securely, it's communicated only amongst the team and those that have approval to have access. So it's all quite tight	Production	10
We have a lot of security protocols in place with how we deal with their data. How we get rid of their data when we're done with it. Or how we dispose of their data. We also use stuff like encrypted messaging for sending files of data.	Production	11
it is very important to handle the customers data very secretly and trustly and if there are no issues in which some third parties got customer data of us then the customers are happy with us.	Production	13
so if you are a customer and you want to buy a public transit ticket or you want to use car2go then you need to type in a pin, and the pin is something like a last request to be safe that it is you who wants to book the car2go. So there is also a pin reset option possibility, and this possibility in order to reset your pin our customer has to ask us to reset the pin for them. This is something the customers i think they might like this because it is something that represent our security processes. During the reset process we are also asking for their paypal address or for some more information of the payment method of them. If we request these numbers or the information of the payment methods, the customers feel more secure. So they have more trust in us and also they feel more secure with us.	Production	13

And another thing that is good to mention that, as you've seen earlier, is that we build all our stuff here, we haven't outsourced any production. So when customers are visiting us they see how it's all happening here, we're really trying to provide this transparency to how our products are build.	Production Transparancy	1
Because love to see how their stuff is build. Because you all of that stuff normally comes from a factory. Like the smartphones, like all of the smartphones come from a factory in taiwan or china, vietnam and you don't really know what's behind it. So what i do is jump on skype calls with customers and like really like walk through the warehouse like we did earlier and show them how our stuff is designed and built. And then they end up usually buying more, haha, i don't know how but this probably means that they like this approach a lot.	Production Transparancy	1
the market is also showing some symptoms of maturity and the last years we detected some customers that are starting to ask for, to understand the security of the system.	Production Trustworthiness	2
I have no idea how to do it in another way	relationship inovation	2
So we have to approach the sales cycle and the success cycle very differently than a traditional commodity organization. We're approaching it with partnerships that allow us to get the inside scoop and really understand our clients needs before we even speak with them. So it begins when we engage with them and are speaking their language. We know what their issues are. We can really customize every transaction from their point of view.	relationship inovation	4
There is not much that is going in terms of new things regarding customer relations in IoT. But a lot of people are interested in starting new initiatives for IoT. The main way of getting to customers and the way we have been doing this is, really indicate how our business can help and change their lives. Another way of doing it is really showing what we do and can bring to a home. Be that our sensors or controls through their smartphone. But the thing about IoT and in smart homes in general is that every home is different and everyone will want something else. So a	relationship inovation	5

modular approach to suit the customers needs is always helpful.		
One example is if we charge one euro per user per month for getting access to a building 24/7 or whatever and when then we do have a new software tool or a new module like meeting room booking we can just enable this module for a customer and they can use it for free for one month and they can really start trying it without any hurdles and after we can even provide our customers proactively the information to show usage data and the like and ask if they want to proceed or not for whatever price per month. So that's like the interaction and the proactivity of the setting is definitely different.	relationship inovation	6
technology wise yes. It's non traditional, because you have a different feedback loop and it changes and you can really proactively sell or upsell your solution or even ask for feedback and so on. But it's also the interaction is quite traditional to be honest.	relationship inovation	6
I think the biggest change is this proactivity you can bring. What does your customer need and how to solve it. Also to give him insights in his usage, this has also completely changed because of the IoT. It's more, every customer is more like a partner I guess. Because you have more in depth data and knowledge on them. You know how they use it, you get better feedback, all together this makes it more valuable.	relationship inovation	6
I can't really say. We try to be unique with our products and of course our customer relationships. However I think it's hard to innovate in this field since there is not much else you can really do differently.	relationship inovation	7
awards mean nothing and there are thousands of different iot platforms around. And it's very hard to distinguish between them. Its very hard to find out which is good and which is not. What every platform supports. So we are trying to move out of that part of solutions just because for	relationship inovation	8

a customer it's hard to distinguish between us and someone else.		
you define what is non traditional way. Because we are a small business we don't have a huge marketing department. So we can expose ourselves through some awards through some kind of horizon 2020 projects and that type of stuff. If this is a non-traditional way then yes.	relationship inovation	8
i think that's quite traditional especially in this field, so if you think about the more traditional medical device manufacturers like xxx or whatever, all of them are quite conservative. We don't want to be conservative we want to be reliable and approachable.	relationship inovation	9
consumers nowadays are very accustomed to paying for access. If you think about paying for spotify or netflix, people pay a monthly subscription fee for access to the content. This is probably where the expectation is also going for the younger generations that they are expecting the pharmaceutical companies to also be, well they are not going to give drugs as a service, but probably some sort of a level of access to either the information regarding the pharmaceuticals or really making it simple to get access to your treatment. I guess that's where it is going to.	relationship inovation	9
In a way all this privacy constraints and then the problems are also slowing down that innovation, they are of course very important. But I think the consumers do not actually have too much possibility to provide their data for that kind of research if they would so choose. On the other side we have this massive amount of data from different areas but on the other side there is a constraint to put it all together. I guess that's what i'm drawing too. And the newer generations are really accustomed to combining that data so their needs are predicted. That's probably something that we will be seeing in the following 10 years because this industry moves quite slowly	relationship inovation	9

even back in 2008 even 2009 there was a lot of discussion about privacy and data and then it was seen as a trend that people would be growing more interested in what happens with their data and many people said it would happen rapidly, but it really hasn't. You're still leaking data, you're sharing it. You don't really care because you get access to spotify and netflix so they can predict your needs. So i wonder how long is it going to take before people want that control of their data, will they ever want to get that control. Is that something that they are willing to give up for the convenience.	relationship inovation	9
I don't know what is the traditional way. Our customer relationships are very. I actually don't know what a non-traditional customer relationship would be.	relationship inovation	11
so customers relationships are working through phone, email, social media, internet communication. So basically these are the standard ones. So i wouldn't say we approach it from a non traditional way.	relationship inovation	13
Always, when you will get a bright idea you will find out you are not the first one. We tried this, we tried with several different let's say underground marketing stuff. But usually it helps if you're present on different markets if you have your website as it should be and that kind of stuff. That's the maximum you can do as a small company.	relationship inovation Startup vs large	8
You mentioned before that because you had to act differently because of the [partner] support. Does this kind of limit you in how you approach your customers? MK: yes I would say so. Because behind us are now two big companies are standing. This is why we are seen in different eyes. For example startups which would not have this backing, they could interact more freely on the market. But there is nothing that comes to my mind with which we are hurdled. We had our communications like we wanted to do it. So there were no regulations of [partner]. But of course you have to be careful when you talk or offer customer support to [partner] employees, this is completely different. So in direct marketing ways or commercial ways we didn't	relationship inovation Startup vs large	13

face any issues because we have these companies in the back.		
So also people know that, because we write about all of this you know i think people know that we are still a relatively small startup here so and with some aspects i think they are more forgiving than others.	Startup vs large	1
This is very different when you're a startup. Where the trust on the founder and the leaders of the startups is very important. Then when you are corporate. When you buy from corporate you just trust in the name and you don't care about the people. In a startup people are more important.	Startup vs large	2
That's probably a big difference. The customers that work with the startups, the small companies, they accept it because they know the contact is more intimate.	Startup vs large	2
So we always get asked, what happens to you as a young company, if you don't exist, what about your technology, would it still be running.	Startup vs large	6
our partners are very well known, they have high quality, they have high brand awareness, sustainable. There usually is trust before they even use our technology	Startup vs large	6
if you compare it with smaller startups, yes. Nevertheless, there are still a lot of big hurdles we need to pass even though we are backed by a big and trusted german company with affiliates all over the world. But still there is some fear.	Startup vs large	7
I think in terms of the platform and the tools used, we are not better. Mostly because of budget constraints and difficulties in integrations and all that. But then the level of personal service i think we can exceed theirs.	Startup vs large	9
being a startup nowadays is not a bad thing.	Startup vs large	12

So we are facing different points. So somebody is downloading the app and you are reading that it is a subsidiary of [partner] you might be more trustworthy but on the other side you are seen differently in a the way you are interacting with your customers. Because they are expecting the best service. But that is not nothing of course. So this something we are facing. So there are 2 sides. When people are dealing with startups they know it's still a young firm and that mistakes are being made. We don't have that advantage.	Startup vs large	13
yes definitely. Because we are a startup, a small company. We have nice technology, proven technology because we have some customers already because there are some customers using our technology already. But it's easier for people to buy ready made products or go with larger firms because they just have this name recognition.	Startup vs large Trustworthiness	2
it's a tough market. It's something that you have to fight for. To reach some customers, that give you this reputation. That give you this trust. And you can demonstrate that you have something that really works. Some customers are the best representation that we are doing trustable things or that we can be trusted. But you know it's always, the risk is always there. So how the customers will manage that risk can mean that they can choose for larger more established firms instead of using the technology of a startup or a very well known company even though that technology is older and less customized or more expensive. It's complicated. But it's something that we have to make slowly and steadily and it will take some time but at some moment all that trust building will pay off. Starting as a startup and becoming trusted is hard.	Startup vs large Trustworthiness	2
When you're starting your business, when you're a startup it's much more difficult to convince people. When you are trying to convince them they are not trusting you because you are new. But after a while, like we are on the market for some time, around 3 years, it's already, we are well known here.	Startup vs large Trustworthiness	3

we've been very very public before because we did three crowdfunding campaigns in total so you're super exposed. So no not that I know of.	Transparancy	1
We have also a lot of people visiting us, because we're pretty much in the center of everything and i think we currently get on average between 20 and 40 emails a day	Transparancy	1
We always ask for feedback but we are not preparing our products for customers. We prepare our products from our own analysis from the market. We are not asking our customers what they would like to have we create the product and showing them the features and possibilities of the products, we tell them it's worth is to try and then after they try and see it has potential. This is our own way.	Transparancy	3
They tried to crowdsource, but i think it's. You can crowdsource it but it's also like, you run into the same issues or a different set of issues. It's either you make a hit on the crowdsourcing platform and you have to like commit resources to tooling up to that kind of production set up. Or maybe you first do a commercial run of something without getting feedback first. Unless you've been very deliberate about that. Or it flops and then you're going back to the drawing board on strategy. It's hard to do. For something like this, that's really intense on the technology. You need really top notch developers. Getting it wrong the first time is expensive, it hurts. And if you're going direct to consumer, then it hurts even more, it might sink you, put you out of business.	Transparancy	4
I think relationship building is always important. But just being open and transparent with customers is helpful, they seem to appreciate that. That creates a long term bond that lasts longer than just a regular sale. So that's one aspect of relationship building that's very important for us.	Transparancy	5
we also want to go on new markets where our company is not in yet. You have to be honest and do not oversell.	Transparancy	7
when you're talking about just people. They cannot test our claims. For normal users, they can download it on the google play store for instance so they know it at the very	Transparancy	8

least meets the demand of google. They can also download the app without the ability for a cloud collection if they want so everything stays on your smartphone and you can export it. So we have a lot of, let's say users who use this for different purposes. But as i said it's hard for them to test our claim.		
The people that use it directly are mostly technical nerds. Because they wish to test some sensor or they wish to make their own application and [application] is a good let's say reference point. So they are aware of privacy and security issues if there are any.	Transparancy	8
For us for example, the company brand needs to be one that is trustworthy so we can not just go out and say something silly or we can not say anything that is not true in that sense that it would say that.	Transparancy	9
I think you have to be very clear about it as well. Communicating about what you're trying to do. And you have to earn trust. I mean reputations come very slow and are lost very fast. So you have to be on top of it all the time. But it hasn't been an issue so far. I mean anything can happen but there's been no breach or anything.	Transparancy	12
many of our customers are asking us why they have to do this. Why we want to look at their drivers license. Those are some things we are facing, including producing our technology, but we try to help them and try to answer all their questions.	Transparancy	13
You have to explain to some users what we are doing and how this process looks like and why we want this data from them.	Transparancy	13
I would say that, if we don't have that trust. We would not sell right now. So the customers now are looking to trust firms. If they don't trust what you are doing, they will just not buy your products.	Trustworthiness	2

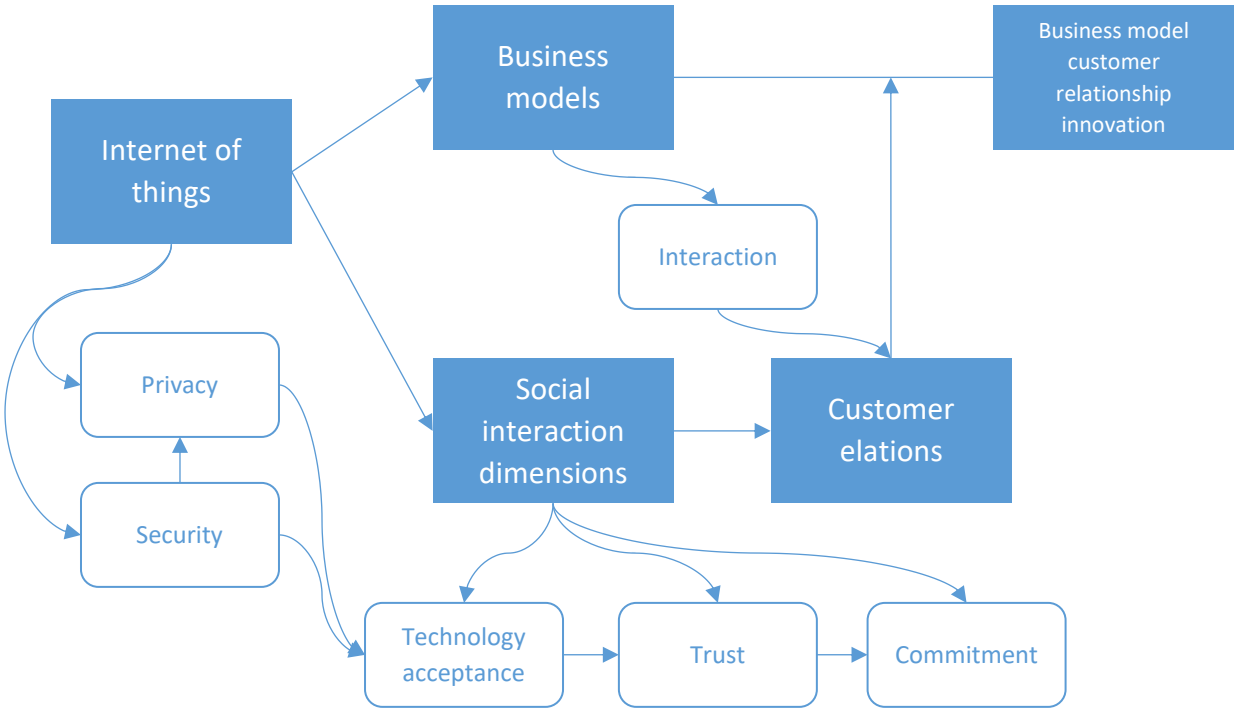
When you work in a startup and you're making something new, i think that the trust in the people is probably the most important. So ones you have a persons trust, you are doing things that work, since these traditional way of approaching the market which is very personal still, they are talking to you, well i mean when they are talking to me. And they know the things that i have made. This leads to more trust on the company and the technology. Especially because sometimes when you are doing these iot stuff it's quite complicated to explain and even more to understand for someone that has not a technology background.	Trustworthiness	2
They trust in you, they will say, ok, this guy know what he is talking about, he has made before trusted projects, he has the trust of the customers, so i will trust this guy i will trust his company and his technology which is behind it.	Trustworthiness	2
Case studies are really good because you can show them why your product is good, it builds more trust. After the normal sales it's just like other companies.	Trustworthiness	3
It takes time, obviously of course you have to develop everything what you promise that you will do. Your services and products have to work. Even if something will be not working, for example we have made an installation 3 years ago and after two years some part might be damaged. The quick reaction for the service is always building good trust for the customer so you have to fix the issues your customer has. So the trust your customers have in you make other customers trust you more. It's all about reputation. It's like buzz marketing.	Trustworthiness	3
Yes it's important. Lots of people saying something about the reputation is a very important thing. If you are already on the market and you have done a few things and those things are on a good way to build, to create new possibilities and everyone is happy. Then after they want to tell to their friends and family that they might have someone that might solve their problem	Trustworthiness	3
In this business it's a lot about relationships with customers.	Trustworthiness	3

Yes i think that's a reasonable point so. In general we don't have a difficult time establishing trust from a relationship point of view. For a mission driven organization that has a lot of currency. But if there is a question it tends to be on the technology side.	Trustworthiness	4
yes of course. I think it's like always, not even in business or anything else. Where if you don't deliver on your promises then there's a lot of trust lost. Especially in the relationship with the technology. Of course they influence each other but depending on the customer the one type of trust might not affect the other. If the technology just doesn't work properly then it doesn't matter how well your personal relationship is. You have to make sure that your product is fool proof or when it does fail you are able to resolve issues quickly. The way to maintain and build up trust in a relationship is by setting up expectation and making sure that you're keeping them. Don't over promise and make sure that they understand that things can go wrong, it's a startup but also making sure that they know that if something goes wrong we can fix it. If it takes a little bit more time to get to that point that's fine, it's to build that relationship that will lead to long term profits.	Trustworthiness	5
Concerns also sometimes yes. But as soon as they really understand. Our system works even if we don't know who it is. We just need to know if it's someone. We just need your name or something. We even don't necessarily track those information. It's just someone entered the building and he had access to this room or that door. Sometimes people want to know who is where and when. But in general all this functionality can work regardless.	Trustworthiness	6
sometimes we have very traditional customers who really don't doubt the technology because they already looked into the market and they know what is going on. They sometimes don't have any trust issues. On the other hand you can have a quite sophisticated customer which then really wants to dig deep into the technology. At the end I think we can win their trust.	Trustworthiness	6

So we always get asked, what happens to you as a young company, if you don't exist, what about your technology, would it still be running. This is like a challenge that all companies have, especially in technologies. We are now lucky that we have like these big industrial leaders which give us a lot of credibility in the market. Technology wise, yes, also this is going hand in hand. From the very beginning there are sceptics is this technology working, people need to get used to it, how does it work. But if this happens then usually there is adoption. For young companies and startups actually usually this adoption happens, the question is how fast it happens. And if it's fast enough to survive.	Trustworthiness	6
you need to proof, also with success cases and success stories. That the things you are promoting are true.	Trustworthiness	7
It's also about the trust and relationship between people. We try to build this by acting as a trustful company. Of course with success stories.	Trustworthiness	7
it was very hard to create trust with our customers. Everything is about trust. It doesn't matter how good we are. It matters only if they trust us or not. I learned that lesson the hard way, several times.	Trustworthiness	8
no, because awards doesn't mean business. We got that award we are claiming that usually we can get any award we wish if it's in the iot domain. But this doesn't have any effect on business	Trustworthiness	8
If someone else did due diligence instead of you as a customer probably the product is not very bad. So if we got horizon 2020 project as a partner. Probably someone tested that product and got some information about that product before. So let's trust that product. That's how people work, do my work instead of me.	Trustworthiness	8
We want to become a trustworthy brand that is primarily out there to make your treatment more effective so you either get better quicker or you stay on track with your treatment so it has a maximum impact.	Trustworthiness	9

It's about building a reliable brand. That's a really lengthy process and that is something where we can't really take shortcuts.	Trustworthiness	9
We do now want to be like (big firm) or a company like that but we want to be a consumer brand that has the trustworthiness of a medical device manufacturer.	Trustworthiness	9
i feel that in reality a lot of the users that are using the products don't know our firm. We're walking behind the scenes working for a client in most cases. So all they know is the product. So the product needs to stand alone. The confidence thing comes in the relationship between us and our clients I would say. So our clients would have to have confidence in us to deliver a good solution, an appropriate solution. But the actual users really look at the product on it's own. The product has to be the thing that stands and delivers.	Trustworthiness	10
I would definitely say technology is relevant but i would also say rather than firm it might be brand. So you know a customer has to believe in a particular brand. And if we were designing a product for nike the customer believes in nike.	Trustworthiness	10
Trust is a big thing that's very important, obviously. We're dealing with people and we're dealing with their privacy and their IP. so they need to trust us before they're going to give us any details of their design	Trustworthiness	11
I suppose nowadays the world has become so open that trust is more hard to get. From a personally perspective I'm glad they are starting to put more emphasis on regulations. And from a company perspective it is all very important. People are getting rich of our data and then not telling us.	Trustworthiness	11
you have to underpromise and overdeliver, that's in general what we try to do.	Trustworthiness	12
the company has a good reputation, and I think the technology has a good reputation as well but it's new. But i don't know how that would influence each other. I tink, for example when something goes wrong, it has effect. That affects the reputation. If you get in a situation where the	Trustworthiness	13

company is losing trust, that would affect the technology and the other way around. We haven't experienced that as far as I know.		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