LUND UNIVERSITY
School of Economics and Management

To Chip or Not to Chip?

Determinants of Human RFID Implant Adoption by Potential Consumers in Sweden & the Influence of the Widespread Adoption of RFID Implants on the Marketing Mix

by

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May, 2019

Master's Programme in International Marketing and Brand Management

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Abstract

Title:	To Chip or Not to Chip? Determinants of Human RFID Implant Adoption by Potential Consumers in Sweden & the Influence of the Widespread Adoption of RFID Implants on the Marketing Mix
Date of Seminar:	5th June 2019
Course:	BUS N39. Degree Project in Global Marketing
Authors:	Natasha Boella, Daria Gîrju & Ieva Gurviciute
Supervisor:	Burak Tunca
Keywords:	Human RFID Implants, Microchip Implants, Marketing Mix, Technology Adoption, UTAUT 2
Thesis Purpose:	The aim of this study is twofold. Firstly, we explore the perceptions of young people in Sweden towards the adoption of human RFID implants. Secondly, the paper aims to understand how companies' marketing activities would be influenced by the widespread adoption of this technology.
Methodology:	This paper has taken a qualitative approach to research, specifically employing focus groups and interviews to gauge the opinions of potential customers and experts, respectively.
Theoretical Perspective:	The study is based on three literature streams: human RFID implants research, the UTAUT 2 model and the marketing mix model. The UTAUT 2 model aided in answering the first research question, while the marketing mix represented the basis for the second question.
Empirical Data:	The empirical data was collected through five focus group sessions with young people in Sweden and four interviews with experts from various fields.
Conclusion:	The study offers two conclusions relating to each research question. Firstly, the determinants exemplified in the UTAUT 2 model, specifically, Performance Expectancy, Effort Expectancy, Facilitating Conditions, Social Influence, Price and Habit played an important role in determining the adoption of RFID implants by potential consumers. Additional determinants, namely

functionality, health, invasiveness, privacy and safety were also added to the model to better answer the research question. The second conclusion is that the proposed extended marketing mix model was relevant in identifying how RFID implants will affect marketing activities if the technology is widely adopted. The elements of People and Personalization were noted to experience the greatest changes if the technology is adopted.

Acknowledgements

Firstly, we would like to thank our supervisor, Burak Tunca, for his honest feedback, sound guidance and continuous support which helped us throughout the thesis writing process. It was a pleasure to work with you.

Secondly, we would like to express our gratitude to the participants of our research, who dedicated their time to express their opinions in our focus groups. Also, we would like to thank the experts who shared their valuable experience and opinions with us in the interviews.

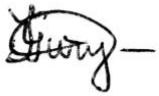
Finally, we would like to thank our families and friends:

"I would like to thank my parents, Zahra and Michael, for their unwavering support throughout this process. To my siblings, Faiz and Zak, thank you for always encouraging me and lifting my spirits. To my family and friends, you have been in my corner and I cannot thank you enough for that. To my thesis partners, thank you for being amazing research partners and writing this thesis with me." - Natasha Boella

"I am extremely grateful to my family, who have done all that was possible so that I can achieve my dreams and enjoy the best education available. Cosmin, Alexandra and Amelia, thank you for being my support and unlimited source of love and laughter through the hard times, even from 2100 km away! Natasha and Ieva, I couldn't have found any cooler and funnier research partners than you. Thanks for all the laughs and hard work!" - Daria Gîrju

"I am very grateful to my parents, Irena and Jonas, and amazing friends that gave me all the support and inspired me along the way. I really appreciate the long talks and encouragement, you are always there when I need it. Holly, your support was special and here is your special moment. Last but not least, I would like to thank my awesome thesis partners that I had lots of fun working with." - Ieva Gurviciute

Lund, 29th May, 2019



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1 Introduction

1.1 Background

"I bring you the Superman! Mankind is something to be surpassed. What have you done to surpass mankind?" (Nietzsche, 1885, p. 12)

More than 100 years have passed since Friedrich Nietzsche first wrote about the notion of *Übermensch* or *Superman* in his book, Thus Spoke Zarathustra. In Aydin's (2017) interpretation of Nietzsche's work, the overman is a representation of a being who transcends the boundaries of the human state, thus giving meaning to life. The author further proposes that the transhumanist ideology shares Nietzsche's view, as its supporters seek to enhance themselves and humanity by overcoming the physical and mental limitations of the human body.

With the advent of human enhancement technologies, the transhumanists' vision of the ideal human being is becoming more and more of a possibility and less of a science-fiction fantasy. They see opportunities to extend the human body with the help of newer sciences such as genetic engineering, prosthetics, neuroscience and neuropharmacology (Aydin, 2017). According to Saritas (2019), the three main areas of enhancement which the supporters of transhumanism are targeting with the aid of technological advancements are: (1) medicine, drugs and diet; (2) external or wearable technologies and (3) internal or implanted technologies. The latter category is of distinct importance, as a report shows that 8 out of 10 smartphone owners would be interested in augmenting their sensory perceptions and cognitive capabilities with the help of internal sensors called *internables* (Ericsson.com, 2016).

Sprouting from the transhumanist ideology and strongly associated with the body modification movement, the biohacking phenomenon is a citizen-driven science which focuses on changing or improving human bodies' functionality through biochemicals or do-it-yourself cybernetic devices (Yetisen, 2018). Most notably, biohackers insert commercial or homemade implants under their skin, examples of which include neodymium magnets, light sources, sensors or microchips (Yetisen, 2018). Bradley-Munn, Michael and Michael (2016) suggest that microchip implants could now play a critical role in redefining one's identity and refer to this movement as *chipification.*

To date, the most common type of chip that is implanted in humans, either in the forearm or the hand using a hypodermic syringe or an incision in the skin, is the RFID chip (Ip, Michael & Michael, 2008a). RFID stands for Radio Frequency Identification and involves the use of wireless technology communication between an encoded RFID chip and an RFID chip reader (Techopedia.com, n.d.). RFID systems consist of three components, namely, an RFID tag, an RFID reader and an antenna (AB&R, n.d.). The RFID tag and antenna transmit radio waves to the RFID reader which then converts the waves into usable data to transmit through a communications interface to a host computer system (AB&R, n.d.).

The implantable RFID device contains a microchip and an antenna coil, its size being commonly associated with that of a rice grain (11mm long, 1mm diameter) (Ip, Michael & Michael, 2008a). Furthermore, it does not require an internal power source as the chip is activated only once the built-in antenna interacts with the magnetic field of the RFID chip reader, allowing the exchange of information (Ip, Michael & Michael, 2008a). An image of an RFID microchip can be found in Appendix A.

Alternatively, RFID implants are described as omnipresent electronic surveillance devices, which, once introduced in the human body, have the capacity to track "the who, what, where, when, and how of human life" (Perakslis & Michael, 2012, p. 2). RFID implants have also been associated in extant literature with the emergent concept of *uberveillance*, which is defined as the "act of embedding devices into human beings for surveillance purposes" (Perakslis, Michael, Michael & Gable, 2014, p. 1).

Despite its perceived novelty and science-fiction appearance, the concept of implanting microchips in the human body is, in reality, not new. Heart pacemakers are a type of microchip implant that helps medics monitor irregular heartbeats in patients, while brain pacemakers are installed in order to treat illnesses such as epilepsy, Parkinson's and severe depression (Michael & Michael, 2013). Nowadays, implantable RFID chips can be used for non-medical purposes as well, such as for convenience, control or care applications (Michael & Michael, 2013). Examples of such non-medical purposes include storing medical journals and personal identification documents such as passports or ID cards, locking and unlocking doors and making authorized payments, thus eliminating the need for plastic cards and keys (Patel, 2018).

Although RFID implants have wide scale applications in the medical field, commercial uses are only now being realized. This brings into question how the technology would affect both companies and consumers in the future and whether consumers would even be open to adopting it in the first place. The possible adoption of RFID implants for commercial use will be therefore be the focus of this paper.

To date, there are around 10,000 people with RFID chip implants worldwide and Sweden has the largest share (The Economist, 2018), as up to 4000 Swedes have voluntarily opted to get microchip implants (Mail Online, 2018). In Sweden, the microchipping phenomenon was started by BioNyfiken, the Swedish Biohacker Association who has hosted several implant parties across the country (SSCI, 2015). At the same time, Sweden's relationship with the microchip implant phenomenon is strengthened by the fact that the country is home to the several microchip companies, such as market leader BioHax International led by Jowan Österlund (Mail Online, 2018). Thus, Sweden's interesting connection to the emerging phenomenon of RFID adoption and the biohacking phenomenon represents the motivation as to why this particular country has been chosen as the focus of this paper.

1.2 Problematization

According to Ericsson's 2019 consumer trends, technology is at the center of many upcoming trends (Ericsson.com, 2019). With the growing popularity of biohacking and microchipping, RFID implant technology could soon become a reality for many. The emerging trend of RFID implants could shift the way we interact with products, inevitably changing how companies

will market these products and to who. RFID implants are part of the biohacking phenomenon which is driven not by companies, but by citizens who are passionate about altering their bodies in ways which would expand the limits of the human condition (Yetisen, 2018). It is however important to point out that although this movement has been propelled by citizens, some companies have started requesting their employees to get implants in order to access the office building, purchase food and drinks at the cafeteria or log on the work computers (Metz, 2018). Furthermore, other companies have already made their services compatible with the technology, such as SJ in Sweden who have begun accepting the RFID implants it as a ticket form on their trains (SJ, 2017).

Even though both consumers and companies seem eager to adopt this technology, limited studies have focused on this area. The only similar study available has looked at Indian millennials and their perception of how secure RFID implants are (Perakslis & Michael, 2012). Furthermore, other studies have explored perceived barriers for implanting human microchips (Perakslis et al. 2014) or the perceived risks of human RFID implants (Michael & Michael, 2013). Additionally, there are no previous studies, to the extent of our knowledge, assessing how the widespread adoption of human RFID implants would change the way marketing related activities are conducted by businesses.

Despite the fact that Sweden is pioneering the emerging trend of RFID implants, to the best of our knowledge, there has been no study which attempts to assess and understand the attitudes of people in Sweden towards RFID chip implants. Understanding the perceptions that potential users have towards the technology can provide useful insights into its implications for marketing related activities in the future. A lack of adequate research in this area, especially in a country where the technology is being rapidly adopted, could lead to the creation of knowledge gaps between customers and companies. This in turn could result in one party taking advantage of the other. Consequently, it is essential to understand the full extent of this technology's implications from both perspectives in order for both customers and companies to reap the benefits of human RFID implants. Thus, the emerging potential of RFID implants coupled with the lack of present research on their adoption in Sweden and limited research on the effects on marketing activities makes the present study increasingly relevant and worthy of investigation.

1.3 Research Purpose and Aims

The overall purpose of this study is to explore potential consumers perceptions in Sweden on RFID implants and to gain understanding how its widespread adoption would influence marketing activities. In order to serve this research purpose, two research questions were formulated:

> RQ1: What determines human RFID implant adoption by potential consumers in Sweden?
>
> RQ2: According to experts, how would the widespread adoption of human RFID implants influence marketing activities?

To answer the first research question, the perceptions of young consumers will be explored using qualitative methods, namely focus groups. The choice of young consumers as an age group is further elaborated on in Chapter 3. Additionally, to gain an understanding of these perceptions, the UTAUT 2 (Unified Theory of Acceptance and Use of Technology) model developed by Venkatesh, Thong and Xu (2012) will be adopted. We will provide additional details as to why this particular model was chosen in the following chapter, under sub-section 2.2.

The second research question will be addressed using qualitative data gathered from interviews with a diverse group of experts working in both academic and commercial fields. For this purpose, an extended marketing mix model will be derived from extant literature and used as a foundation to understand how marketing activities could be influenced by the widespread adoption of human RFID implants. The model's development is further addressed in Chapter 2.4 Analytical Frameworks.

1.3.1 Theoretical Contributions

The present study aims to contribute to theory in several respects. Firstly, this research will apply the UTAUT 2 model to understand potential consumer perceptions regarding the adoption of human RFID implants in the context of Sweden. The study aims to utilize the factors outlined in the model and further explore whether all its determinants are relevant or whether there is a need to include additional intervening factors which improve the understanding of these perceptions. This in turn will contribute to the existing literature streams on both RFID implants and the applicability of the UTAUT 2 model to emerging technologies. Secondly, as most previous studies applying the UTAUT 2 model have been quantitative in nature, the present study aims to provide a qualitative perspective. This would therefore provide a deeper understanding of the perceptions of potential consumers towards human RFID implant adoption.

Furthermore, we intend to draw a connection between RFID human implant adoption and marketing activities. In order to do so, we will develop an extended marketing mix framework by reviewing extant literature on various marketing mix models. In addition, the developed framework will be applied in understanding the potential implications of human RFID implants on marketing activities. This framework could be further used to shed light on how other technologies influence marketing activities.

1.3.2 Practical Contributions

The present study also aims to contribute practical insights for both managers and policy makers through providing an understanding of RFID implants from potential consumers and experts. From a managerial point of view, this study intends to provide an understanding on the implications of adopting this technology specifically within marketing related activities such as distribution, price, promotional activities and even the product itself. A consumers' point of view is also relevant as it allows managers to gauge the potential of this technology being used in the future and what consumers find important to integrate in the implants.

1.4 Outline of Thesis

The present study is structured into five chapters. The first chapter aimed at providing background on the topic of human RFID implants, revealing the importance of the study through problematization and introducing the study's aims and purpose. In the second chapter, three literature streams will be reviewed which are essential to answering the two research questions, namely previous studies on human RFID implants, the UTAUT 2 model and the marketing mix model. Then, the third chapter describes the research design and methodology used in the thesis and it is followed by the fourth chapter where the findings are explored and discussed. The final chapter sums up the study, outlines theoretical and practical contributions, explains the limitations of the study and finally provides suggestions for future research.

2 Literature Review

This literature review consists of three streams. Firstly, previous studies done on human RFID implants will be considered in order to understand how the topic has been approached by academic research in the past. Secondly, the UTAUT 2 model, its determinants and studies which utilized the model will be reviewed. This understanding will pave the way for Chapter 4 as the determinants in the model will used to understand the adoption of human RFID implants by youth. After which, an extended marketing mix will be formulated through reviewing previous literature on the marketing mix and combining elements which are suitable for the study. The model will aid in answering how the widespread adoption of human RFID implants will affect marketing activities according to experts. Finally, the analytical framework used in this study will be presented in the last subchapter.

2.1 Previous Studies on Human RFID Implants

Previous studies on this topic can be divided into four themes: assessing perceptions towards human RFID implants (Perakslis & Michael, 2012), identifying barriers to RFID implant adoption (Perakslis et al. 2014), conceptualizing implications and motivations of RFID adoptions (Michael & Michael, 2013; Foster & Jaeger, 2008; Patel, 2018; Clarke, 2010) and determining the benefits of human microchip implants (Smith, 2007; Ip, Michael & Michael, 2008a; Michael & Michael, 2013). This paper falls into the first category, as it attempts to understand the attitudes of Swedish citizens towards RFID human microchipping.

Regarding research conducted within the first category of this topic, according to a study conducted by Perakslis and Michael (2012), Indian millennials and baby boomers perceived RFID implants to be a secure technology which could be used for identification and access. This initial study was conducted using quantitative methods, however the study delved further into the attitudes particularly exhibited by Indian millennials using qualitative interviews. We noted that three factors affected Indian millennials perceptions towards RFID implants as a secure form of technology. These factors were country of residence, generational factors as millennials were more open towards the technology than baby boomers, and lastly, participants who resided in India and were categorized as millennials exhibited more positive or neutral feelings towards RFID implants (Perakslis & Michael, 2012). The security benefits of an RFID implant are also highlighted by Smith (2007).

Studies have also looked at barriers to RFID implant adoption. Perakslis et al. (2014), note that security issues, privacy and social influence are the main barriers in the adoption of RFID implants. Other barriers are seen to be a lack of control within the market for RFID chips as there are limited quality control standards and low knowledge on the subject, even from experts (Perakslis et al. 2014). The researchers do however state that the political climate in many

nations, natural disasters and issues such as border control in the Eurozone could see RFID implants being adopted sooner (Perakslis et al. 2014).

Another study by Patel (2018) looks at the implications, specifically, ethical issues which arise from RFID implants, and states that consumers worry about safety of the technology, medical privacy, secure payment processes, the possibility of being tracked and current laws on the use of RFID microchips. These are also stated as dangers of using RFID implants (Clarke, 2010). According to a study by Foster and Jaeger (2008) there have been several activists stating that RFID implant dangers range from tracking to mind control to the disclosure of risks and deceptive advertising. Two of these risks are seen by the authors as present ethical concerns, that is, disclosure of risks and deceptive advertising used by RFID implant companies.

In terms of disclosure of risks, the authors further note that individuals should be informed of the possible adverse effects of using RFID implants. VeriChip, an RFID production company received criticism and a drop in stock price due to the fact that they did not disclose the results of the carcinogenic effects that the chips had on laboratory rats (Foster & Jaeger, 2008). Ip, Michael and Michael (2008b), also conducted a case study on VeriChip, and found that testing of the chips in animals had caused the formation of malignant tumours to which the CEO of VeriChip denied the possibility of this occurring in human beings. This thus brings into question the ethics of VeriChip in promoting the use of these implants. Additionally, in terms of advertising, Foster and Jaeger (2008) state that VeriChip advertises their VeriMed system based on the idea that if one is brought into the emergency room and is unable to communicate, they can be identified through their chip implant. The authors further note that there is limited research into the validity of this premise with only preliminary studies available on the benefits of having an implant for this specific reason.

Michael and Michael (2013) concur with these studies, stating that another problem which may arise is the loss of services if RFID chips are used as a form of identification and there is no alternative for those who would opt out. A similar study offered by Ip, Michael and Michael (2008a) provides similar results with social division being seen as one the products of RFID implants becoming a mass product. Additional risks include human rights concerns as activists question placing RFID chips in human beings for commercial applications (Michael & Michael, 2013).

Benefits of using RFID implants have also been studied, with some studies concluding that RFID chips could have benefits within the healthcare sector as discussed in Chapter 1 Introduction (Michael & Michael, 2013; Smith, 2007). However, Michael and Michael (2013) also point out that all benefits rest on the idea that RFID chipping will be a voluntary activity. Ip, Michael and Michael (2008a), state in their study that attitudes towards RFID chipping are in fact changing, with more people being open to the idea. The authors categorized the results of their study into three views on RFID chips based on the source, specifically, researchers, hobbyists and corporations, and customers. Researchers focused more on the technological aspect of the chips, whereas hobbyists were more interested in security aspects of RFID implants and lastly, corporations and customers were interested in privacy aspects of the chip (Ip, Michael & Michael, 2008a). Interestingly, those who were interested in getting RFID chips or those who were already chipped did not connect RFID implants to government systems which would use the technology for identification purposes (Ip, Michael & Michael, 2008a). A summary of the previous studies outlined in this sub-chapter is provided below:

Table 2.1 Summary of previous studies on human RFID implants

Category	Title of study	Findings	Author	Year	Country	Method
Assessing perceptions towards RFID implants	Indian Millennials: Are microchip implants a more secure technology for identification and access control?	Participants perceived RFID implant technology as secure for identification and access control.	Perakslis and Michael	2012	India	Quantitative and qualitative surveys with small business owners and graduate students
Identifying barriers towards RFID implant adoption	Perceived Barriers for Implanting Microchips in Humans: A transnational study	Several barriers were noted including social implications, privacy, security issues. Country specific factors such as technological infrastructure improvement in India were however seen as possible avenues for RFID implant adoption and use.	Perakslis, Michael, Michael and Gable	2014	Australia India, UK and USA	Surveys with a wide variety of age groups (18-71 years old)
Implications	Science Fiction Twenty Years Ago, a Nanotechnology Reality Today: Human Microchip Implants	Usage of RFID microchips noted to grow with new uses such as secure payment methods and medical use. Study outlines issues to take into consideration such as safety concerns, laws	Patel	2018	USA	Document Analysis

		on RFID microchips and tracking possibilities.				
Implications	What is Überveillance? (And What Should Be Done About It?)	Author focuses on tracking possibilities and surveillance from using RFID chip implants.	Clarke	2010	USA	Document Analysis
Implications	Ethical Implications of Implantable Radiofrequency Identification (RFID) Tags in Humans	The authors focus on ethical issues such as RFID sellers not disclosing risks and deceptive advertising.	Foster and Jaeger	2008	USA	Case Study
Implications and Motivations	The Future Prospects of Embedded Microchips in Humans As Unique Identifiers: The risks versus the rewards	The authors talk about both the benefits and disadvantages of using RFID implants. The benefits include healthcare system improvements. Risks include possible social exclusion, inability to use services and human rights issues.	Michael and Michael	2013	Australia	Case studies and interview with manager
Benefits of using RFID implants	The Social Implications of Humancentric Chip Implants: A scenario - `thy chipdom come, thy will be done'	The authors categorized three different groups of people and their attitudes towards RFID implants. The	Ip, Michael and Michael	2008a	Australia	Case Studies

		authors also note an increase in positive attitudes towards RFID implants overtime.				
Benefits of using RFID implants	Evolution and Acceptability of Medical Applications of RFID Implants Among Early Users of Technology	Secure identification of individuals and healthcare applications are seen as the main benefits derived from RFID implant technology	Smith	2007	USA	Case Study
Benefits of using RFID implants	The Future Prospects of Embedded Microchips in Humans As Unique Identifiers: The risks versus the rewards	Benefits include healthcare system improvements. The authors also note an increase in positive attitudes towards RFID implants overtime.	Michael and Michael	2013	Australia	Case studies and interview with manager

2.2 UTAUT 2 Model

Although the UTAUT 2 model has been chosen as the analytical framework for the first research question, it is important to point out that technology adoption by consumers, employees and organizations has been studied extensively by several scholars. Some of the models and theories put forward include the technology acceptance model (Davis, 1985), the theory of planned behaviour (Ajzen, 1991), the UTAUT (Unified Theory of Acceptance and Use of Technology) model (Venkatesh, Morris, Davis & Davis, 2003) and the chosen UTAUT 2 model (Venkatesh, Thong & Xu, 2012).

The initial UTAUT model created by Venkatesh, Morris, Davis and Davis (2003) took into account four factors, namely, Performance Expectancy, Effort Expectancy, Facilitating Conditions and Social Influence which was applicable in organizational contexts. Later, the

model was altered by Venkatesh, Thong and Xu (2012) into the UTAUT 2 model which incorporates three additional factors that is, Price Value, Experience and Habit and Hedonic Motivation so as to be applicable in consumer settings as well. The UTAUT 2 model was viewed as the most suitable to our study for two reasons. Firstly, the model integrates various models and constructs in order to generate a holistic view of technology acceptance and use. Secondly, the altered UTAUT 2 model is often used to understand technology acceptance from a consumers' perspective which is in line with our intentions in research question 1. An illustration of this model is provided in Figure 2.1.

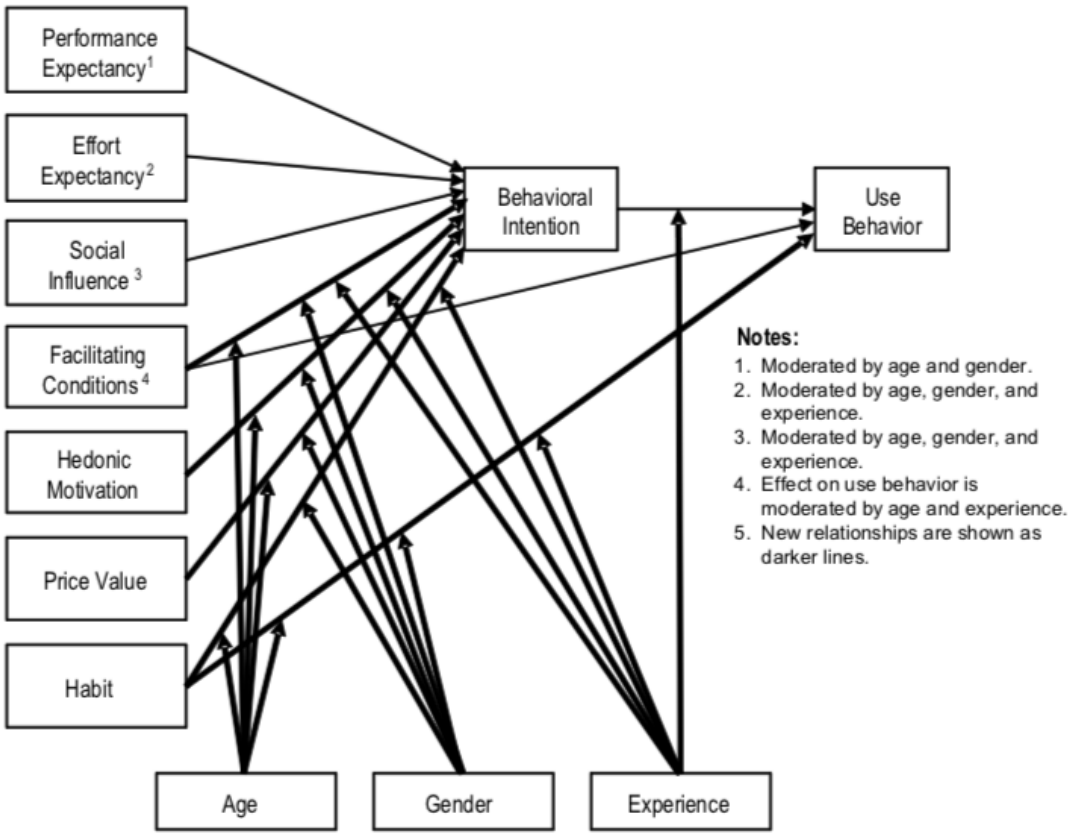


Figure 2.1 UTAUT 2 research model (Venkatesh, Thong & Xu, 2012, p. 160)

The applicability of the UTAUT 2 model in customer settings can be seen studies such as one done by Tarhini, El-Masri, Ali and Serrano (2016), which used the model to understand customers' acceptance and use of internet banking in Lebanon. Other customer related studies which have used this model include a study by Marchewka and Kostiwa (2007) which looked at students perceptions using course management software and a study by Yu (2012) which looked at the factors which affect people's adoption of mobile banking. The UTAUT 2 model has also been applied in understanding technology acceptance across industries such as education (Raman & Don, 2013), banking (Alalwan, Dwivedi & Rana, 2017), health (Yuan, Ma, Kanthawala & Peng, 2015) and social networking (Herrero, San Martín & Garcia-De los Salmones, 2017). The findings of these studies will be elaborated on in section 2.2.1, that is, Determinants.

2.2.1 UTAUT 2 Model Determinants

Performance Expectancy
This refers to the degree to which an individual believes that using a system will help him or her to attain gains in a job (Venkatesh et al. 2003). According to Venkatesh et al. (2003), there are five constructs within Performance Expectancy, namely, perceived usefulness, extrinsic motivation, job-fit, relative advantage and outcome expectations.

Venkatesh et al. (2003) describe perceived usefulness as the degree to which a person believes that using a particular system would enhance their job performance. The authors further define extrinsic motivation relates to the perception that users will want to perform an activity if it is perceived as instrumental in them achieving valued activities distinct from the activity itself. Job-fit is defined as the way that capabilities in a system would enhance an individual's job performance and relative advantage is defined as the degree to which using an innovation is perceived as being better than using its precursor. Lastly, the authors state that outcome expectations are related to the consequences of the behaviour which are further divided into job related and individual goals. In a consumer setting, Slade, Williams and Dwivedi (2013) identify the relevance of these subcategories as their study revealed that participants saw convenience, time and outcome expectancy, as considerations in their potential use of technology. This study will utilize convenience, outcome expectancy and individual goals to understand and apply this determinant. This will be divided in terms of task ease, motivation to carry out tasks, quality of tasks using the implant and the individual goals which could be achieved using the technology.

Performance Expectancy is seen as a strong predictor for intention at all points of measurement within both voluntary and mandatory situations (Venkatesh et al. 2003). These findings have been confirmed by other studies which have looked at the adoption of technologies such as learning management software (Raman & Don, 2013), mobile internet (Venkatesh, Thong & Xu, 2012), and mobile banking systems (Alalwan, Dwivedi & Rana, 2017). A study by Morosan and DeFranco (2016) however found that Performance Expectancy was not the most important indicator of technology acceptance for consumers when assessing their intentions to use mobile applications in hotels. The authors further found that Hedonic Motivation, the level of involvement, privacy concerns and how personalized they perceived the application to be, played more significant roles in determining consumers acceptance of technology. Given these findings, we will analyse the role of performance expectancy in determining RFID implant adoption.

Effort Expectancy
Effort Expectancy refers to the degree of ease which is associated with the use of a system (Chang, 2012). Effort Expectancy can be further broken down into three constructs, that is perceived ease of use, complexity and ease of use (Venkatesh et al. 2003). Perceived ease of use is defined as the degree to which a person believes that using a system would not require effort, whereas ease of use is the degree to which using an innovation is perceived as being difficult to use (Venkatesh et al. 2003). Complexity is closely related to the other two constructs as it is related to the degree to which a system is perceived as relatively difficult not only to use but also to understand (Venkatesh et al. 2003). Effort Expectancy in this study will be relayed as how easy RFID implants are to use and understand to potential consumers.

Studies by Herrero, San Martín, and Garcia-De los Salmones (2017) and Alalwan, Dwivedi and Rana (2017) highlight that Effort Expectancy impacts both a consumer's intention to use and

Performance Expectancy. The studies further found that consumers associate the ease of use of a technology with being more beneficial and useful in their lives (Herrero, San Martin & Garcia-De los Salmones, 2017; Alalwan, Dwivedi & Rana, 2017). Morosan and DeFranco (2016), in contrast to other studies found that Effort expectancy was not a critical predictor of consumers' intention to use technology. This was however attributed to the nature of the industry (hotel setting), in which the model was applied. We therefore aim to understand if Effort Expectancy will play a role in determining the adoption of RFID implants according to potential consumers in Sweden.

Facilitating Conditions

This is related to the degree to which an individual believes that organizational and technical infrastructure exist to use a system (Chang, 2012). Facilitating Conditions can be divided into three sub-sections, that is, perceived behavioral control, facilitating conditions and compatibility (Venkatesh et al. 2003). Perceived behavioral control looks at the perceptions of internal and external constraints on behavior in terms of self-efficacy, resource facilitating conditions and technology facilitating conditions (Venkatesh et al. 2003). In their study, Venkatesh, Thong and Xu (2012) found that within the consumer context, facilitating conditions play an important role in influencing technology use. This study will relay Facilitating Conditions in terms of knowledge and resources, accessibility and care and how compatible potential consumers find the technology to be with their daily lives.

Alalwan, Dwivedi and Rana (2017) offer similar findings as consumers within the study were particularly interested in the availability of the skills and resources they would require to use a technology. Morosan and DeFranco (2016) however found that Facilitating Conditions played a more limited role in predicting technology acceptance in comparison to determinants such as Habit and Hedonic Motivation. This study attempts to understand the role of facilitating conditions in the adoption of RFID implants.

Social Influence

Social Influence looks at the degree to which an individual feels that other people's belief that he or she should use a system, is important (Chang, 2012). Under Social Influence there are three constructs outlined by Venkatesh et al. (2003), these are subjective norm, social factors and image. Subjective norm is defined as a person's perception that most people who are important to him or her think that he or she should or should not engage in certain behaviour or perform certain tasks (Venkatesh et al. 2003).

Social factors relate to an individual's internalization of a reference group's subjective culture and the interpersonal agreements that the individual made with others in social situations (Venkatesh et al. 2003). Lastly, image relates to the degree to which the use of an innovation is perceived to enhance one's image or status in a social system (Venkatesh et al. 2003). Venkatesh et al. (2003), state that Social Influence has an impact on individual through three mechanisms, that is, compliance, internalization and identification.

Venkatesh, Thong and Xu (2012) found Social Influence to be an important consideration for consumers when deciding on whether or not to adopt or use a technology. These findings differ with that of Alalwan, Dwivedi and Rana, (2017) who found that social reference groups had little impact on consumer intentions to use technology. This is supported by findings by Herrero, San Martín, and Garcia-De los Salmones (2017) which revealed that Social Influence had no direct impact on intention to use technology. The present study therefore aims to understand if Social Influence plays a role in the adoption of RFID implants.

Hedonic Motivation

Venkatesh, Thong and Xu (2012) defined Hedonic Motivation as the fun or pleasure that is derived from using a particular technology. Further, the authors note that Hedonic Motivation has been found to strongly directly influence technology acceptance and use, especially in a consumer context. Within the authors study, Hedonic Motivation was studied alongside intervening variables such as age, gender and experience. This was due to the fact that consumers were different in their innovativeness, novelty seeking and how they perceived the novelty of the chosen technology (Venkatesh, Thong & Xu, 2012).

Venkatesh, Thong and Xu (2012) found that Hedonic Motivation can often be seen by consumers as more important that Performance Expectancy in predicting technology acceptance. The authors go on to state that the more a consumer associates a technology with more utilitarian purposes, the smaller the role Hedonic Motivation has in influencing technology adoption. Huang and Kao (2015) offer similar findings as Hedonic Motivation was viewed as the strongest indicator of a consumers' intention to use technology.

According to Raman and Don (2013), Hedonic Motivation has a positive influence on intention and use of technology. Other scholars have concurred with this study stating that consumers association of technology with future joy and entertainment, plays a significant role in determining intention to use a technology (Alalwan, Dwivedi & Rana, 2017). Furthermore, Hedonic Motivation is seen as an important consideration for consumers irrespective of what the original purpose of the technology is as noted in a study by Yuan, Ma, Kanthawala and Peng (2015), on the adoption of health and fitness applications. In light of these studies, the present study aims to understand if and how Hedonic Motivation plays a role in RFID implant adoption.

Price Value

This factor looks at how cost and pricing structure has an impact on a consumer or customers use of technology (Venkatesh, Thong & Xu, 2012). Venkatesh, Thong and Xu (2012) point out a distinction between organizational and consumer settings, noting that consumers bear the cost of use of technology whereas organizations do not. Additionally, the authors, in their study on mobile internet technology acceptance found that consumers saw price as important in the decision making process.

Venkatesh, Thong and Xu (2012) theorize price in terms of the value received for the amount paid. In this way, the authors view price as a tradeoff between cost and benefit obtained. This is confirmed in other studies across industries such as mobile banking (Alalwan, Dwivedi & Rana, 2017) and health and fitness (Yuan et al. 2015). Huang and Kao (2015) identified Price Value as one of the most important elements in predicting technology acceptance in consumers. This being said, this study will attempt to understand the role of price in the adoption of RFID implants.

Experience and Habit

Experience although seen as a mediating variable, is considered in this study as influencing to Habit and therefore categorized together. Habit is organized into two categories, namely, prior behaviour and the extent to which an individual believes that a behaviour is automatic (Venkatesh et al. 2003). According to Venkatesh, Thong and Xu (2012), experience although necessary to form a habit, does not guarantee its formation. Instead, the authors state that habit

is a construct that results from previous experiences and these experiences can lead to different levels of habit depending on individual's use of technology.

In their study on mobile internet technology, Venkatesh, Thong and Xu (2012) found that Habit had a direct effect on use of the technology and an indirect effect on behavioural intention to use. This is supported by Morosan and DeFranco (2016) in their study on NFC mobile payments in hotels. In contrast, a study by Raman and Don (2013) found that Habit did not have an impact on technology acceptance. This was reasoned as being due to the model being applied to the education industry where the technology was used only academically. Taking into account past studies, this study will look at how experience and habit could influence the adoption of RFID implants.

2.3 Marketing Mix Model

In order to understand the implications RFID implants would have on various marketing activities and processes, the marketing mix concept will be analysed. The marketing mix refers to "the set of tactical marketing tools that the firm blends to produce the response it wants in the target market" (Kotler, Armstrong, Harris & Piercy, 2013, p. 53). As the marketing mix encompasses various marketing activities and processes, the concept is ideal in addressing the second research question of this study. The foundation model of the marketing mix concept is the 4Ps model devised by McCarthy (1964) which includes Product, Price, Place and Promotion as its elements.

This chapter will first explore the 4Ps model (McCarthy, 1964), followed by a review of the extant literature on various marketing mix models in order to take into account all of the model's variations. This review will aid in the creation of a comprehensive analytical framework, further presented in Chapter 2.4, which will be utilised in answering research question 2.

2.3.1 McCarthy's 4Ps Model

The foundation model of the marketing mix is the 4Ps framework, created by McCarthy (1964) and consisting of the following elements: Product, Place, Promotion and Price. The model's diagram shows how the 4Ps are interrelated with the letter C in the center which symbolizes the customers (Figure 2.2). Despite the customers being the focal point of the diagram, they are not part of this marketing mix model (McCarthy, 1964).

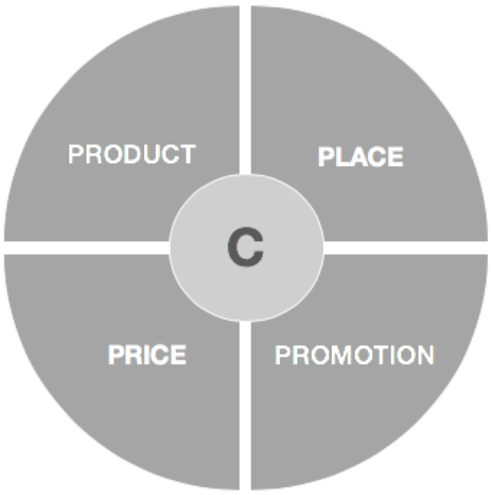


Figure 2.2 The 4Ps model based on McCarthy (1964)

Product
The first P in the model refers to the "Product" dimension and symbolizes the combination of goods and services that the company offers to the target market (Kotler et al. 2013). This aspect can comprise of elements such as the quality and size of the product, attributes pertaining to packaging, characteristics of the product's brand, as well as the kind and quality of the service (McCarthy, 1964). In summary, the Product aspect is concerned with "developing the right "product" for the target market" (McCarthy, 1964, p. 39).

Place
The Place segment relates to the distribution channels of the product or service and can include means such as wholesaling and retailing, types of transportation used, ways of storing the product and the locations from which the customer can interact with the company and purchase the product (Kotler et al. 2013). In short, all the problems and parties involved in "getting the right product to the right market" will be considered under Place (McCarthy, 1964, p. 39).

Promotion
The third P deals with all the activities pertaining to communicating the advantages of the product and convincing the customers to purchase it (Kotler et al. 2013). Such communication methods include sales promotion, advertising, publicity, public relations and personal selling (McCarthy, 1964). Thus, the Promotion area is concerned with "communicating to the target market about the right product" (McCarthy, 1964, p. 39).

Price
The decisions related to factory price, wholesaler price, retailer price, markups, discounts and terms of sale fall under this final element which represents the amount of money customers charged for goods and services (Kotler & Armstrong, 2006). In establishing the price, one must take into consideration the level of competition in the target market as well as existing regulations, in order to make the marketing mix as attractive as possible (McCarthy, 1964). Therefore, the Price dimension focuses on "determining the "right" price to move the right product to the right place with the right promotion for the target market" (McCarthy, 1964, p. 40).

2.3.2 The Evolution of the Marketing Mix Framework

7Ps - Booms & Bitner (1982)
Since its inception in the 1960s, McCarthy's 4Ps model has seen many reiterations and additions. Concerned about the 4Ps model's applicability to service marketing, Booms and Bitner (1982) expanded it to include three more Ps thus, adapting the framework for companies that provide services instead of products. The three new dimensions - *Physical Evidence*, *Participants* and *Process of Service Assembly* - focus on the environment where the service is provided, the people participating in it (e.g. employees and customers) and the flow of activities and procedures involved in delivering the service, respectively (Booms & Bitner, 1982).

6Ps - Kotler (1986)
Furthermore, in order to help companies gain access to new markets Kotler (1986) adapted the 4Ps model by adding two new dimensions to the original four, namely *Power* and *Public Relations*. The first new element is concerned with winning the support of government officials and legislators, enabling the company to access and operate in a new market (Kotler, 1986). The latter dimension refers to cultivating the public's opinion regarding the business' operations in the new market, helping it enter and become accepted by the local community more easily (Kotler, 1986). Therefore, this particular alteration of the 4Ps model focuses solely on the circumstance of gaining access to a new market.

4Cs - Lauterborn (1990)
One criticism of 4Ps model is that it only provides the view of the seller, leaving out the buyer's perspective (Kotler et al. 2013). As a result, a different framework has been developed which focuses on the customer's side, namely Lauterborn's 4Cs: *Customer wants and needs*; *Cost to satisfy the want or need*; *Convenience to buy* and *Communication* (Lauterborn, 1990). The first C replaces Product and posits that businesses should strive to sell only what customers want to buy specifically (Lauterborn, 1990). The *Cost to satisfy the want or need* stands in the place of Price and suggests that companies should take into account not only the financial cost of the product they are selling, but also other costs such as the time required to drive to the store (Lauterborn, 1990). Replacing Place, the concept of *Convenience to buy* refers to the fact that, thanks to technological advancements, customers no longer need to go to a physical store in order to shop. As a result, the business needs to be aware how and where its customers shop, and to be present in those particular channels (Lauterborn, 1990). Finally, *Communication* stands in place of Promotion, the difference between the two being that Communication implies a cooperative effort between the business and the customers, creating a dialogue (Lauterborn, 1990).

15Ps - Baumgartner (1991)
Another rendition of the 4Ps model is Baumgartner's 15Ps (1991). The author adapted the framework for non-marketing professionals by adding eleven more dimensions to the original four: *Probe* (external and internal environment research), *Partition* (customer segmentation stage), *Prioritize* (choosing the best opportunity), *Position* (product positioning stage), *Positive implementation* (seeking success stories from similar products or services), *People* (ensuring that the staff knows the product), *Politics* (assessing the capacity to influence distributors), *Public relations* (assessing the capacity to influence customers), *Profit*, *Plan* (designing a written structure to follow) and *Performance* (evaluating results and making adjustments) (Baumgartner, 1991). The purpose of the new model was to aid generalist professionals understand the different facets of strategic marketing and to ensure no step of the marketing process is overlooked (Baumgartner, 1991).

5Ps + 1S - Vignali & Davies (1994)
Named *the MIXMAP model*, Vignali and Davies (1994) provided an extended version of the marketing mix by adding *People* and *Service* to the existing four elements. The People dimension refers to the customers and their different characteristics such as age or social status, while the Service element includes attributes of the service provided, like warranty or insurance (Vignali & Davies, 1994). The authors also provided a guide on how to combine marketing mix elements and their corresponding variables into matrices with the purpose of providing a tactical and strategic view of the company's marketing activities (Vignali & Davies, 1994).

8Ps - Goldsmith (1999)
Based on Booms and Bitner's 7Ps of service marketing (1982), Goldsmith (1999) proposes the 8Ps model. In addition to McCarthy's original four elements, the author includes *Personnel* (employee-related characteristics); *Physical Assets* (attributes of the store experience); Procedures (the flow of marketing activities) and more notably, *Personalisation* (the degree of the product or service's customization to each individual client) (Goldsmith, 1999). According to Goldsmith (1999), the *Personalisation* aspect affects all the other marketing mix elements and thus should be regarded as a key success element in the company's marketing strategy.

7Ps - Tracy (2004)
Another contribution to McCarthy's model was brought by Tracy (2004) in the form of the *Seven P Formula*, which includes three new elements in the mix: *People* (employee-related decisions), *Packaging* (visual aspects of the product, stores and of the company as a whole) and *Positioning* (what and how customers think and talk about the company and its products). Tracy (2004) posits that, by continuously revisiting the 7Ps, companies succeed in adapting their business activities to the current marketplace and achieve better results.

4As - Sheth & Sisodia (2012)
On the other hand, Sheth and Sisodia (2012) diverged from the 4Ps by providing a marketing mix framework consisting of 4As: *Acceptability*, *Accessibility*, *Awareness* and *Affordability*. Firstly, Acceptability corresponds to the Product element and postulates that companies should meet and exceed product expectations of target customers (Sheth & Sisodia, 2012). Further, Accessibility can be matched with Place and it means the ease with which customers are able to purchase the products in terms of availability (enough quantity) and convenience (Sheth & Sisodia, 2012). Awareness replaces Promotion and measures how knowledgeable the customers are when it comes to the product and brand's existence (Sheth & Sisodia, 2012). The last element is reminiscent of the Price dimension and refers to the economical and psychological ability of target customers to pay the product's price (Sheth & Sisodia, 2012). While Sheth and Sisodia's 4As (2012) can be correlated with the original 4Ps, this particular version of the framework contributes to the marketing mix literature by putting an emphasis on the customer's perspective.

4Ps of Modern Marketing Management - Kotler & Keller (2012)
According to Kotler and Keller (2012), McCarthy's 4Ps are not sufficient to deal with the breadth and complexity of the current marketing landscape. As a result, the authors designed an updated version of the 4Ps framework which better matches the reality of modern marketing management, specifically, *People*, *Processes*, *Programs* and *Performance* (Kotler & Keller, 2012). The first dimension is connected to the company's employees and how the success of marketing operations is dependent on them (Kotler & Keller, 2012). At the same time, it emphasizes the need to view customers as humans and not just as consumers. The Processes

element stresses the importance of structuring all marketing-related activities and decisions in order to ensure the maximization of a company's marketing endeavors (Kotler & Keller, 2012). Programs is related to the customer-oriented efforts a business makes, encompassing the original 4Ps as well as other marketing activities that might not fit in the traditional view of the field (Kotler & Keller, 2012). Finally, the Performance element is concerned with capturing both the financial and non-financial results of the business' marketing activities (Kotler & Keller, 2012).

1964	1982	1986	1990	1991	1994	1999	2004	2012	
McCarthy's 4Ps	**Booms & Bitner's 7Ps**	**Kotler's 6Ps**	**Lauterborn's 4Cs**	**Baumgartner's 15Ps**	**Vignali & Davies' MIXMAP (5P + 1S)**	**Goldsmith's 8Ps**	**Tracy's 7Ps**	**Sheth & Sisodia's 4As**	**4Ps of Modern Marketing Management by Kotler & Keller**
Product	Product	Product	Customer wants & needs	Product	Product	Product	Product	Acceptability	Programs
Place	Place	Place	Convenience to buy	Place	Place	Place	Place	Availability	Processes
Promotion	Promotion	Promotion	Communication	Promotion	Promotion	Promotion	Promotion	Awareness	People
Price	Price	Price	Cost to satisfy want or need	Price	Price	Price	Price	Affordability	Performance
	Physical Evidence	Power		Politics	People	Personnel	People		
	Participants	Public Relations		Public Relations	Service	Physical Assets	Packaging		
	Process Assembly			Probe		Procedures	Positioning		
				Partition		Personalisation			
				Prioritize					
				Position					
				Positive implementation					
				Profit					
				Plan					
				Performance					

Figure 2.3 Evolution of the Marketing Mix Frameworks

The Relevance of the 4Ps Model in the Digital Age

In summary, the concept of the 4Ps has witnessed a series of revisions and additions since its conception, as highlighted in Figure 2.3. Despite the fact that many scholars attempted to adapt the framework to the current reality of marketing practices, most have maintained McCarthy's original four elements in their versions of the marketing mix (Booms & Bitner, 1982; Kotler, 1986; Baumgartner, 1991; Vignali & Davies, 1994; Goldsmith, 1999; Tracy, 2004) or have encompassed them in one of their new elements (Kotler & Keller, 2012). On the other hand, there are some scholars who have diverged from the original model by shifting the focus of the framework from the company to the consumer's perspective (Lauterborn, 1990; Sheth & Sisodia, 2012). However, as mentioned in the previous paragraphs, each element of the 4Cs (Lauterborn, 1990) and 4As (Sheth & Sisodia, 2012) models can be traced back to one of McCarthy's original four dimensions, which proves the timelessness of the original 4Ps.

Therefore, despite the fact that more than half a decade has passed since the birth of the 4Ps model, the search for a new marketing mix paradigm suitable for the online environment is still ongoing. It is apparent that the basic formulation of the 4Ps model is still valid today and can be adapted to match modern marketing processes by expanding the framework with additional dimensions. Consequently, it is relevant that the present study uses an extended form of the 4Ps model in order to assess which areas of the marketing mix could suffer changes should human

RFID implants become a common occurrence in the future. This extended model will be argued for and illustrated in the next section.

2.4 Analytical Framework

The analytical framework for the study is two-fold. The first framework (Figure 2.4) is applicable for consumers and is used to answer the first research question which centres around their perceptions towards RFID implant adoption. The framework is adapted from the UTAUT 2 model developed by Venkatesh, Thong and Xu (2012). The second framework (Figure 2.5) is applicable to the second research question which addresses the possible implications that RFID implant adoption would have on marketing activities. This is illustrated through the gathering of insights from experts on the effects that the uptake of the implants would have on the marketing mix. Figure 2.4 is illustrated below:

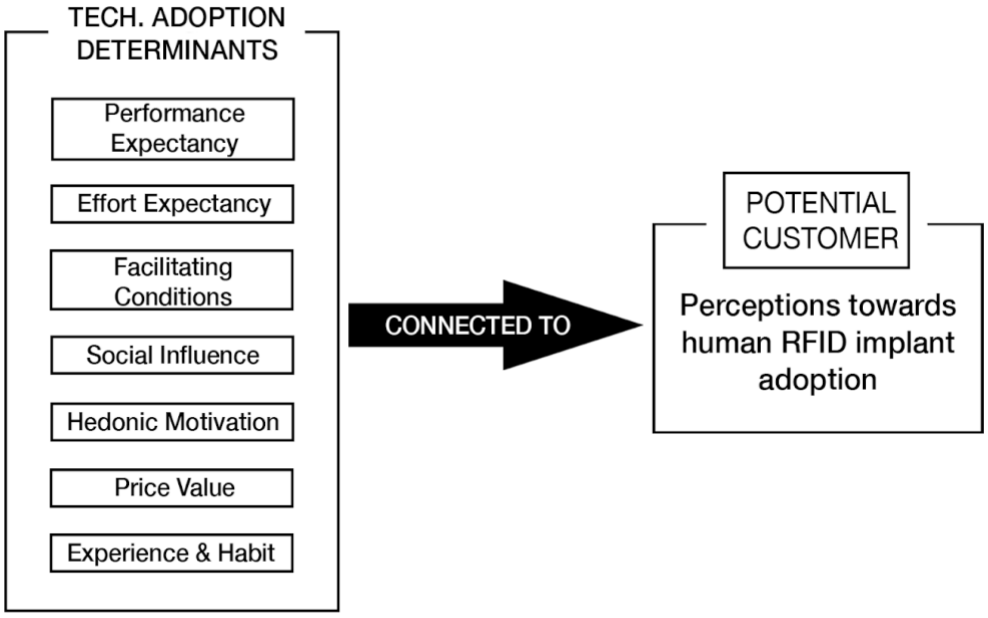


Figure 2.4 Analytical framework utilised in examining potential consumer opinions (Adapted from Venkatesh, Thong and Xu, 2012)

Experts - Extended Marketing Mix Framework

In order to record the experts' opinion on how human RFID implants would impact the way companies deal with various marketing activities, the present study uses an extended marketing mix framework as a basis for research. The elements of the framework were selected after reviewing the literature on the marketing mix topic, as presented in the previous subchapter. The first four elements are McCarthy's 4Ps and follow the same definitions provided by the author of the model (McCarthy, 1964). Six more dimensions have been added to the basic formulation of the marketing mix framework in order to provide a more comprehensive view

of the marketing mix when studying the research question. The resulting extended marketing mix framework is illustrated in Figure 2.5 below:

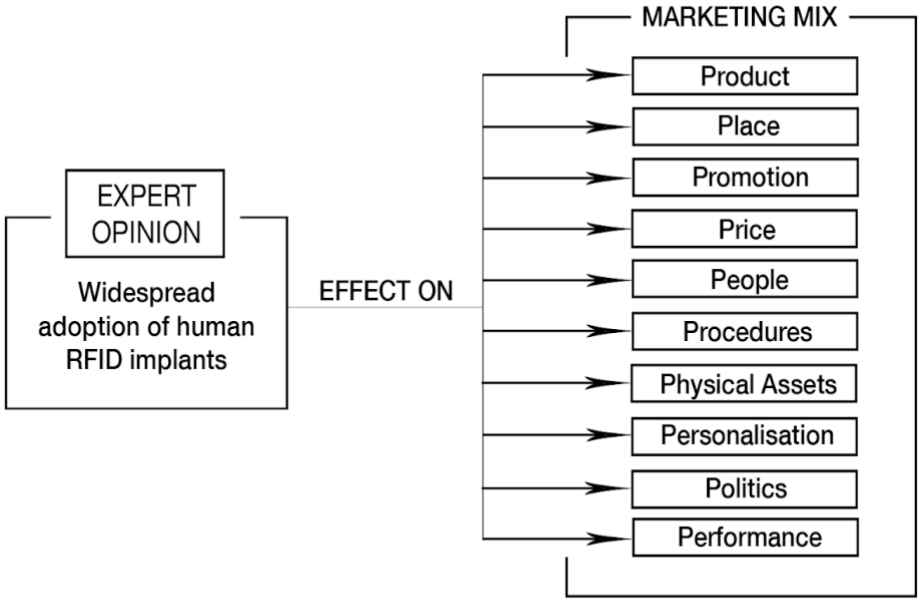


Figure 2.5 Analytical framework utilised in examining expert opinions

Product

Technology can play an important role improving various aspects of a product or service. According to a study conducted by O'Connor, Yu and Lee (2016) within the pharmaceutical manufacturing industry, emerging technology could be used to improve quality consistency, reduce product failures and result in fewer processing interruptions. The authors further found that these improvements would only occur if the technology used was novel and unique in nature. Additionally, the study outlines overall improvements in product safety when using such emerging technologies.

In their research on smart and connected products, Porter and Heppelmann (2015) state that these types of products will force companies to reconsider their current strategies and product design. The authors see smart, connected technologies changing how companies interact with customers. This, the authors suggest, will be in terms of interactions being more open-ended and continuous in nature and relationships with customers being more optimized. In this way, the authors state that the focus of companies will change from selling to maximizing the value a customer receives from a product over a period of time. The product, through customer analytics, will therefore be used by firms to understand customers needs.

In terms of service, Porter and Heppelmann (2015) state that smart, connected products will be able to deliver service via connectivity or digitally, as companies will be able to access an equal amount information from customers in both on and off site scenarios. The authors propose that this will significantly improve customer satisfaction. Additionally, the authors identify

preventative service as a possibility with such technology. This would allow companies to predict customer problems and possibly even remotely alter products or services accordingly (Porter & Heppelmann, 2015). The present study will attempt to understand whether RFID implant technology could also impact product and service design and in what ways.

Place

According to previous studies, technologies can also change the way products and services are distributed and channels through which goods are acquired (McCarthy, 1964; Kotler et al. 2013). For instance, a study by Álvarez López et al. (2018) has indicated that RFID technology systems can reshape distribution of drugs and other items in the medical field. The authors further suggested that mobile applications should be established to compliment RFID technology. This would ensure potential users have accessibility to real-time information of RFID items (Álvarez López et al. 2018). Joseph and Stone (2003) adds that platforms that use technology should be designed in a user-friendly way. Furthermore, Sun (2012) highlights the importance of RFID technology in supply chain as their study discovered that RFID can replace old barcodes and allows real time tracking of objects and visibility of goods.

Promotion

In terms of promotional activities, current technologies have revolutionized the way companies reach their target audiences. This is illustrated by the growth of direct marketing activities through mobile digital technologies (Mort & Drennan, 2002). Scholars have argued that future technologies will have an even greater effect on promotion activities such as advertising. Specifically, Kumar and Gupta (2016) find that digital technology could be used in a process of 'mass customization', where communication with customers is more personalized and targeted. The authors see data driving this personalization process and resulting in a more profitable endeavour for companies. In turn, they add that this would increase customer engagement with companies.

Examples of such technologies include artificial intelligence, which could be a powerful tool in achieving personalization as found by Sterne (2017). In respect to advertising, the author concurs with Kumar and Gupta (2017), as he goes on to state that the machine learning ability of the technology could be used to create more data driven, targeted and personalized advertising. The present study therefore aims to understand whether RFID implants could also be seen as means to achieve personalization and improve customer engagement.

Price

As explained in Chapter 2.3.1, the Price element refers to the amount of money charged for goods and services (Kotler & Armstrong, 2006). In recent years, studies have focused on how technology could be used to alter pricing strategies. An illustration of this is seen in a study by Grewal, Ailawadi, Gauri, Hall, Kopalle and Robertson (2011) who note that emerging technologies such as SAP and Oracle can be used in the retail sector. Specifically, the authors found that such softwares can be used to analyse purchase patterns and determine pricing in particular markets. In terms of RFID implants, there is little research available on how they could affect prices of other goods. The present study therefore aims to shed light on this.

People

This element is a combination of concepts from the reviewed literature: Participants (Booms & Bitner, 1982), People (Vignali & Davies, 1991; Tracy, 2004; Kotler & Keller, 2012) and Personnel (Goldsmith, 1999). It refers to the ways employees influence the customer's perception and intentions to purchase, for example: employees' uniform, employee-customer

interactions, personnel's knowledge of the product or service and employee training and rewards. A previous study highlights that in a retail setting, new technologies such as interactive informative kiosks, self-checkout desks and self-checkout smartphone apps have a beneficial effect on the employee-customer relationship (Pantano & Migliarese, 2014). In particular, the study shows buyers felt more autonomous and satisfied with the provided service thanks to these innovations (Pantano & Migliarese, 2014). As a result, it is interesting to understand if and how such a complex innovation like the RFID implant would affect this relationship, which is why the People dimension has been included in the framework.

Procedures

In the context of this study's analytical framework, this element is defined as the structured flow of marketing activities and processes through which the service or product is delivered to the customer. The concepts of Process of Service Assembly (Booms & Bitner, 1982), Procedures (Goldsmith, 1999) and Processes (Kotler & Keller, 2012) lie at the foundation of this element. Research shows that innovations based on the RFID technology such as smart mirrors, smart fitting rooms and smart shopping carts can enhance the customer's purchasing experience by providing a more convenient and faster checkout process (Novotny, David & Csafor, 2015). Additionally, such innovations can also increase product safety and lead to fewer counterfeit items thanks to enhanced product tracking (Novotny, David & Csafor, 2015). Consequently, the Procedures element is included in this extended framework in order to assess how human RFID implants would impact not only the customer's purchasing process, but also other activities that are part of the marketing flow.

Physical Assets

Physical Assets relates to the environment in which the service or the product is provided and in which the customer interacts with the business' employees. It includes tangible and intangible characteristics of the environment that facilitate or improve the performance of the service or product delivery, such as store equipment, decor, music and scent. Booms & Bitner's Physical Evidence (1982) and Goldsmith's Physical Assets (1999) are the origin of this dimension. Recent research highlights that the current trend in retailing is heading towards innovative solutions based on technology which have an effect on the spatial setting of the store (Sorace, Pantano, Priporas & Iazzolino, 2015). This technology can impact the way products are displayed in-store or the system through which customers pay (Sorace et al. 2015). For example, increased usage of credit or debit cards and mobile payments has led to the elimination of the cash register in many Swedish establishments (Fourtané, 2019). In a similar manner, the widespread existence of human RFID implants might also impact the way shops are designed, therefore the Physical Assets is included as a component of this study's framework.

Personalisation

This element's definition is in accordance with Goldsmith (1999), referring to the degree that a service or product can be customized to each individual buyer. This dimension is also concerned with which aspects of the service or product can be personalized (Goldsmith, 1999). Studies show that IT has enabled companies to provide only products that are customised to their client's needs, but also individualised services for each customer (Bharadwaj, Bharadwaj & Konsynski, 1999). One such example is Nike ID, the company's website that has enabled customers to design Nike shoes which are completely personalised to their preferences in terms of materials, colors and style (Ramaswamy, 2008). Therefore, in order to establish whether the adoption human RFID implants can have an impact on Personalisation, it is worth including this element in the study's framework.

Politics

Politics refers to the company's ability to influence external parties such as distributors, middlemen, industry officials, legislators and government officials. It is based on the concepts of Politics (Baumgartner, 1991) and Power (Kotler, 1986). A recent report accentuates the importance of big data for the companies' competitiveness and ability to innovate (Chui, Manyika & Bughin, 2011). Furthermore, access to big data can have an effect on B2B negotiations as it provides new bargaining points like security and privacy issues, among other aspects (SmartData Collective, 2017). It is possible that if RFID implants became common, it would allow companies to track customer data more easily and in larger quantities. As a consequence, it is important to determine if and how these implants would affect a company's ability to negotiate, thus motivating why the Politics dimension is part of the framework.

Performance

This element represents a combination of Baumgartner (1991) and Kotler and Keller's (2012) definitions. Therefore, in this study, Performance refers to the way success and both financial and non-financial results are measured, for example customer satisfaction, sales volume or profit. Past research has shown that technology can enable companies to better measure their performance, as demonstrated in an article by Della Lucia (2013). The author elaborates how RFID-powered action-tracking technologies helped measure daily expenditures of visitors during a festival (Della Lucia, 2013). Additionally, the innovation was also able to track the behaviors of the festival-goers, thus allowing the organizers to improve decision-making for future editions of the festival (Della Lucia, 2013). As a result, the Performance dimension has been included in the framework with the purpose to determine whether human RFID implants can enhance a firm's performance measurement.

3 Methodology

Having presented in the previous chapter a review of the relevant literature and the analytical frameworks which shall be used as a basis of this study, Chapter 3 will be dealing with the methodology of the research. Firstly, the research approach will be introduced, along with a detailed reasoning as to why and how the study's research design was chosen. Additionally, the selected data collection methods will be presented, followed by a description of the analysis process. Finally, we will reflect on the chosen methods and outline the ethical considerations of the study.

3.1 Research Philosophy and Approach

According to Easterby-Smith, Thorpe and Jackson (2018), it is essential to understand and specify the philosophical assumptions of the study before one starts to design their research, as it enables evaluation of research design choices. The authors further state that the way one formulates research questions and conclusions regarding the examined reality is dependent on the assumptions that result from the adopted paradigms. This, they state, enables researchers' reflexivity and comprehension of their choices. The present study carries this out in terms of ontology and epistemology.

Ontology is concerned with the nature of reality (Bryman & Bell, 2011) whereas epistemology is concerned with theory of knowledge and how this knowledge is acquired (Bryman & Bell, 2011). This study adopts a critical realist ontology and epistemology which is suitable for research in marketing as it acknowledges both external reality and complexities within the marketplace (Sobh & Perry, 2006). Furthermore, Sobh and Perry (2006) suggest that these complexities should be explored using qualitative methods, which is line with our chosen research design. As critical realists, we understand the world through theory however as outlined by Fletcher (2016), theory cannot be used in isolation. In this way, critical realists rely on multiple views of one reality, both from primary data sources and from scholarly interpretations, thus allowing for triangulation (Healy & Perry, 2000).

In regards to our study on RFID technology, the research questions have been answered using two constructs, namely the UTAUT 2 model and an extended marketing mix framework. Additionally, we familiarized ourselves with research within the field of RFID implant technology, UTAUT 2 studies as well as the effect of technology on marketing activities. This allowed for the generation of focus group and interview questions which were in line with existing literature. We continued to unfold the literature around emergent themes from focus groups and interviews as suggested by Sobh and Perry (2006). This enabled us to make adaptations to the preliminary constructs so as to be more suitable to our study. Previous studies within the field of RFID implants have also applied this approach by considering several perspectives on the technology by referring to previous literature on the subject matter as well as new insights from gathered empirical data.

In line with the critical realist ontology and epistemology, an abductive approach was used in the study. An abductive approach is a mixture of deductive and inductive reasoning and was therefore suitable for this thesis since it fits our aim to discover novel findings in the rather unexplored area of commercially used RFID implants (Dubois & Gade, 2002). Also, an abductive research approach allowed us to develop and adjust the theoretical framework throughout the research process (Dubois & Gadde, 2002).

3.2 Research Design

According to Easterby-Smith, Thorpe and Jackson (2018), the concept of research design refers to the choices regarding what will be researched, as well as the means through which it will be researched. The authors further add that a research design should also include information about the data that needs to be gathered, where it should be collected from, how it will be analysed and why that particular data is relevant to the research's purpose. Furthermore, the authors state that the research design is also dependent on the researcher's philosophical stance, meaning that the data collection method and data analysis style will vary according to the researcher's ontological and epistemological approach. Consequently, for the purpose of this master thesis, a qualitative design has been selected as we stem from the critical realism ontology and epistemology.

According to Easterby-Smith, Thorpe and Jackson (2018), qualitative data is represented by information collected in a non-numeric form and often takes the shape of language data which can be used in order to discover perceptions, views and opinions of individuals and groups. Additionally, Miles and Huberman (1994) indicate that one of the strengths of qualitative data lies in its richness and holism, allowing it to reveal complex insights through vivid and thick descriptions. On the one hand, this thesis aims to understand what would determine the adoption human RFID implants according to the views of potential consumers. On the other hand, another purpose of the study is to gather the opinions of academic and professional experts on the implications this technology could have on marketing processes. Taking into account the two previously-stated research purposes, qualitative data which is rich in nature is required to gain in-depth insights which could aid in answering the research questions.

Easterby-Smith, Thorpe and Jackson (2018) further highlight that the main methods which allow the collection of perceptions and opinions through language and text are qualitative interviews and other participatory methods. Therefore, we will employ two such methods, specifically, focus groups for first research question and interviews for the second. The data for the first research question will be gathered from university students (see sampling composition depicted in the next section's Table 3.1), while the second research question will be answered through insights gathered from academic and professional experts with knowledge in the fields of human RFID implants, marketing and ICT research (see sampling composition in the following section's Table 3.3).

Further, the gathered data will be analysed in accordance with our philosophy, the type of data and the nature of the methods that will be employed. Despite the advantages of qualitative data, Miles and Huberman (1994) emphasize that the extent to which it is valuable is dependent on the competence with which the analysis is carried out. As such, the present study will follow

Miles and Huberman's (1994) process of conducting qualitative analysis which consists of three activities: data reduction, data display and conclusion drawing. The analysis of the data will be supported with the use of Nvivo 12, a software which allows the storing and organisation of data, as well as providing aid in its categorisation and analysis.

3.3 Data Collection Methods

Focus Groups

In order to gather insights from youth on RFID implant adoption in Sweden, the study utilized focus groups to answer the first research question. Easterby-Smith, Thorpe and Jackson (2018, p. 227), state that the term focus group is used to indicate a group interview in which the group has been put together by the researcher. Additionally, Kitzinger (1994) notes that focus groups are designed to explore and gather insights in terms of views and experiences of the chosen participants. Wilkinson (1998) goes on to state that focus groups also benefit from group interaction and thus focus groups allowed us to access data which is more available in group settings rather than in one on one interviews. This is also noted by Stewart and Shamdasani (2014), who state that an important factor within focus groups is group dynamics, therefore, researchers must carefully consider aspects such as group composition, interpersonal influences and research environment factors. This ensures full group participation and compatibility if done successfully (Stewart & Shamdasani, 2014).

When choosing an appropriate method of data collection for the first research question, we considered the purpose of the study. According to Wilkinson (1998), the focus groups are deemed appropriate when the purpose of the study is to gain an understanding of people's views and how it is expressed within a social setting. Focus groups were therefore fitting given that the study purposed to gain an understanding on the youth's views on human RFID implant adoption in Sweden.

The study utilized purposive sampling, which refers to a non-probability sampling technique where participants of the study are selected based on the relevance of the information they can provide regarding the research questions (Gentles, Charles, Ploeg & McKibbon, 2015). Young adults' perceptions were explored in this study as they tend to be early adopters of novel technologies all over the world and early adopters are a strong force in propelling technology adoption in general (Valor & Sieber, 2003). Young adults can be categorized as people aged from 18 to 35 (Petry, 2002). As RFID implants also could be seen as a new, emerging technology, it is critical to gain an understanding of what factors the young generation is considering when thinking about adopting this technology. Such insights gathered from young people will help us understand how RFID technology may emerge in the future and what improvements in the technology could lead to novel business opportunities for marketers. Also, young consumers were chosen as they may become future consumers that may constitute the later adopter group of RFID technology.

The target population for the focus groups was university students, as they were representative of young adults as well as willing participate in the study. We created a list of potential participants within this target group and based on their availability and willingness to participate, created five focus groups. A total of twenty-two participants were placed into five focus groups, with three focus groups having four participants each and two focus groups

having five participants each. The selected number of participants and their division in focus groups allowed us to reach data saturation and was congruent with the recommended saturation point suggested by Breen (2006) in a Practical Guide to Focus-Group Research.

The focus groups were conducted over a one week period (from 6th to 10th May 2019) on university campus and we served as moderators in all the focus groups conducted. The university campus was chosen as a location due to the convenience and familiarity for participants. Furthermore, the focus groups were composed of both Swedish and international students (see the Table 3.1 below). At least one international student was placed in each focus group to ensure diversity of opinions. However, the country of origin was not investigated as a moderating factor as all the participants were living in Sweden. Some participants were well acquainted with each other and therefore more open to sharing their viewpoints and interacting with other participants, even those they were not familiar with during discussions.

Table 3.1 Sampling composition for focus groups

Number of Focus Groups	Duration of sessions	Number of Participants /Group	Age of Participants	Countries of origin of Participants
5	26-60 min	4-5	21-35	Sweden, UK, Thailand, Ecuador, China, Romania, Finland, Denmark, Guatemala

Prior to starting the sessions, participants were provided with consent forms and informed of the purpose of the study. The discussions were recorded for transcription and analysis purposes with the consent of the participants. In addition, the participants watched a four minute video (DW News, 2018) on RFID implants with a variety of viewpoints presented on its uses, benefits and repercussions. Due to the estimated length of the focus group sessions, that is, 60 minutes maximum, participants were also provided with refreshments and snacks. This also served to make them more comfortable in the setting.

The questions posed to participants within the focus groups were based on the determinants within the UTAUT 2 model in relation to the adoption of human RFID implants. The question guide is illustrated in Table 3.2 below:

Table 3.2 Question guide for focus groups with potential consumers

UTAUT 2 Model Element	Question
Performance Expectancy	1. In which ways do you think using an RFID implant would make tasks easier for you? 2. How would having an RFID chip make you more or less motivated to carry out tasks using the chip? 3. Do you think having and using an RFID implant would make the quality of your completed tasks better than if you didn't use the implant? How so?

	4. How would having an RFID implant make certain individual goals more or less attainable?
Effort Expectancy	5. In your opinion, would an RFID implant be easy to use and understand? Please elaborate.
Facilitating Conditions	6. Do you think you have the necessary knowledge and resources to use an RFID implant? Please elaborate. 7. If today you chose to get an RFID implant, do you know where to go to get one and/or how to care for it? 8. In what ways do you think having and using an RFID implant would or would not be compatible with your daily life and tasks?
Social Influence	9. In what possible ways would having an RFID implant impact your social status or image? 10. Would you get an RFID implant if your family or close friends had one? Why? 11. Does the opinion of those close to you have an impact on whether or not you would get an RFID chip? Why?
Hedonic Motivation	12. What scenarios can you imagine it being fun/not fun or enjoyable/not enjoyable to have an RFID implant? Would that affect whether or not you would consider having one?
Price Value	13. Would you be willing to pay a price premium to get an RFID implant? Why or why not?
Experience and Habit	14. What would make you want to use an RFID implant? 15. Has your opinion on RFID implants changed overtime? How so?

Interviews

In order to gain an understanding of how the widespread adoption of human RFID implants would affect various marketing processes, a series of semi-structured individual interviews were conducted. According to Easterby-Smith, Thorpe and Jackson (2018), a qualitative interview is a directed conversation based on questions and answers given on a certain topic. The authors further add that the interview facilitates the exploration of a subject or experience in an in-depth manner. The individual interview, in particular, is the most commonly used method in qualitative research (Beitin, 2014).

With regard to the sample of the individual interviews, the responses of four participants have been registered for the purpose of this study (see Table 3.3 below). A well-known challenge that qualitative theorists have historically encountered has been agreeing on the optimal sample size of qualitative studies, with the concept of theoretical saturation being the most commonly used (Beitin, 2014). According to Low (2019), in qualitative studies there is no fixed number at which saturation is surely reached, nor is there a numerical formula that can determine it. Therefore, the present study uses the concept of theoretical saturation in order to establish the point where no further interviews need to be conducted, as it is defined by Starks and Trinidad

(2007, p. 1375): “when the complete range of constructs that make up the theory is fully represented by the data”.

We used the purposive sampling technique to select participants for the individual interviews. Purposive sampling refers to a sampling technique in which participants are chosen based on the qualities they possess, whether in terms of knowledge or experience (Etikan, Musa & Alkassim, 2016). In order for the participants to be able to respond to the questions, they had to possess prior knowledge either in the fields of marketing, human RFID implants or technology. Therefore, this condition represents the eligibility criteria for participating in the interview. This type of purposive sampling is called expert sampling (Etikan, Musa & Alkassim, 2016). The interviewees and their respective fields of expertise are represented in Table 3.3 below:

Table 3.3 Sampling composition for interviews with experts

Expert	**Area of expertise**	**Occupation**	**Interview Conduction Method**	**Date of Interview**
Expert 1	Digital culture/ human RFID implants research	University Professor	Face to face	9th May 2019
Expert 2	Information and communication technologies	ICT Researcher & Expert at Consumer Lab in communication technology company	Face to face	10th May 2019
Expert 3	Human RFID implants & Biohacking	CEO of company selling biohacking-related products	Phone	17th May 2019
Expert 4	Retail marketing	Director for a Centre of Retail Research at University	E-mail	14th May 2019

Using the extended marketing mix framework presented in Chapter 2.4 (Figure 2.4) as a basis, a total of 11 questions were developed and assigned to each marketing mix element (Table 3.4). The questions were not always asked using the exact wording in order to maintain the flow of the discussion. Moreover, as mentioned, the interviews were semi-structured, thus allowing for additional questions to be posed. Using laddering up and down techniques, we were able to get a more detailed account of the participant’s ideas, meaning and thoughts (Easterby-Smith, Thorpe and Jackson, 2018). However, these additional questions are not noted in the question guide as they were addressed spontaneously during the interview.

Table 3.4 Question guide for the interviews with the experts

Marketing Mix Element	Interview Question
Product	1. If human RFID implants become a commonly adopted type of technology, how do you think that it would change the way products or services are designed?
Place	2. Try to imagine that the majority of people in Sweden have an RFID implant - how would that impact the offline and online channels through which products or services are distributed?
Promotion	3. If one day most people in Sweden had an RFID implant, would products or services be promoted or advertised in a different way? How?
Price	4. Do you think that the mainstream adoption of human RFID implants would bring changes as to how products and services are priced? Why?
People	5. Imagine a future Sweden where most people have RFID implants. Would that have an effect on how employees engage with potential customers? 6. Would this technology diminish or increase the number of interactions between employees and customers in an in-store setting? Why?
Procedures	7. Would human RFID implants have any impact on the process of getting the final product or service to the customer? In what way?
Physical Assets	8. Again, try to imagine that the majority of Swedes have RFID implants. Do you think that the setting of a physical store would change in any way? How?
Personalisation	9. If human RFID implants become common, would that help businesses provide more or less personalized products and services to customers? How?
Politics	10. Human RFID implants could possibly enable companies to collect more data about their customers with implants. As a result, do you think that this would positively or negatively affect the company's ability to influence or negotiate with external parties such as distributors, legislators or government officials? Please elaborate.
Performance	11. Last but not least, do you believe that companies would be able to track the performance of their product or service better if the majority of their clients used an RFID implant to interact with the company? How?

With regard to the conduction of the interviews, three participants were initially contacted via e-mail and one through LinkedIn. They were requested to participate in a 60-minute interview about human RFID implants and the technology's effect on the marketing mix. Two of the interviews were conducted in person, in locations chosen at the convenience of the participants,

in order to improve the likelihood that they would accept the interview invitation and to make the participants feel more comfortable. Prior to starting the interview, the respondents were informed about the purpose of the study and signed consent participation forms. The audio of their responses was recorded using a mobile phone for later transcription and analysis. These interviews lasted on average 42 minutes.

The remaining two interviews were conducted remotely, due to time and location constraints expressed by the respondents. Remote interviews have the advantage of giving the interviewees greater flexibility and more time to think about their responses (Easterby-Smith et al. 2018). An e-mail containing a consent participation form and a Microsoft Word document with the interview questions and a short background about human RFID implants was sent to one of the participants. The participant then signed the consent form and edited the document with their responses, then sent them back to us via e-mail for further analysis. The remaining participant's interview was conducted over the phone after virtually completing the consent form and sending it to us on LinkedIn.

3.4 Data Analysis

Firstly, a literature review was conducted in order to assess previous academic studies written on the topic of human RFID implants and to gain a theoretical understanding of the two models which can help answer the research questions. The UTAUT 2 and marketing mix frameworks served not only as a basis for developing the question guides for the focus groups and interviews, but they also provided start codes which were utilised during analysis. However, in the case of the first research question, additional codes were created due to the fact that participants identified determinants that were not part of the original UTAUT 2 framework.

Further, the focus groups and interviews were recorded and then transcribed, ensuring that not only the responses of the participants were noted, but also their emotional reactions such as gesturing, laughter or agreement, as well as the tone of voice. This followed both an analysis based solely on text and an ethnomethodological analysis which included the social context as well (Rennstam & Wästerfors, 2018).

In line with Miles and Huberman (1994), the first step of the analysis is data reduction. In this sense, we applied a hybrid approach to coding the data, using both a priori and emergent coding methods, as recommended by Blair (2015). This therefore allowed for an initial deductive approach based on the elements of the two conceptual frameworks, namely the UTAUT 2 model for the focus groups and the extended marketing mix model for the interviews. Furthermore, the hybrid approach allowed for an inductive approach to be applied, thus identifying and coding new themes as per the respondents feedback. The process of coding was facilitated by the use of qualitative data management software Nvivo 12, which helped us to organize a vast amount of data collected and create a coding structure (see Table 3.6 and 3.8). Even though Nvivo made the analysis process easier and more efficient, it should be noted that it was used not as a method of analysis but rather as a tool to organize data.

Focus Groups Analysis
As previously mentioned, the start list of codes for the focus groups data was created based on the UTAUT 2 model. In Table 3.5 below, examples of how the Performance Expectancy

determinant was coded can be seen. We began with seven master codes representing each determinant of the framework: Performance Expectancy, Effort Expectancy, Facilitating Conditions, Social Influence, Hedonic Motivation, Price Value and Experience and Habit. Further, sub-codes were assigned to each master code in order to represent more detailed segments of data belonging to each determinant, leading to the generation of a start list of codes as seen in Table 3.6 below:

Table 3.5 Coding example of determinant Performance Expectancy (PE)

Performance Expectancy	**Question**	**Examples of responses**
Task Ease	1	"Because I mean you have chips in your phone now. What's it called, the NFC thing, right? So you can just - you can do basically the same, so I'm not sure. I mean is it much easier than just putting up your phone? It's not that different, really." (Participant 1, Focus Group 3)
Task Motivation	2	"I feel like it's two sides of the coin, as well. Cause you can measure it, but then you don't get the results that you want and you get less motivated when you have to track everything. Sometimes you just want to work out because it's fun and then it focuses too much on the numbers." (Participant 4, Focus Group 3)
Task Quality	3	"I think in general the quality wouldn't change. It would just make it everything easier and more convenient [...]" (Focus Group 2, Participant 2)
Individual Goals	4	"How good your body is or if you're gonna get sick or if you have cancer or whatever. I think that could make your life way worse. Because if you know you're sick, if you know you're gonna die, basically, then you might give up on life." (Focus Group 3, Participant 1)

Moreover, additional codes were created as the processing of the transcriptions progressed and more relevant themes were identified using the procedure of surfacing (Miles & Huberman, 1994). A number of new sub-codes were added to existing master codes, and five new master codes were generated due to the frequency with which the themes were mentioned by the participants and their relevance to the study. These codes are Functionality, Health, Invasiveness, Privacy and Safety (highlighted in green in Table 3.6 below).

Table 3.6 Final code list for focus groups

Determinant (Master code)	**Sub-code**	**Corresponding Question**
Performance Expectancy	Task Ease	1
	Task Motivation	2
	Task Quality	3
	Individual Goals	4
Effort Expectancy	Ease of Use	5
Facilitating Conditions	Knowledge & Resources	6
	Accessibility & Care	7
	Compatibility	8
Social Influence	Social Status & Image	9
	Family & Friends	10-11
	Society's Openness to Innovation	New sub-category
Hedonic Motivation	Fun Scenarios	12
Price Value	Willingness for Price Premium	13
Experience and Habit	Willingness to Use	14
	Opinion Change	15
Functionality	Benefits over Existing Technology	New determinant with sub-categories
	Features of the Technology	

Health	-	New determinant without sub-categories
Invasiveness	-	New determinant without sub-categories
Privacy	-	New determinant without sub-categories
Safety	-	New determinant without sub-categories

Interviews Analysis

The expert interview analysis procedure was similar to that of the focus groups. The interviews were transcribed and organized using the Nvivo 12 data management tool. The data was re-read multiple times by each of us to ensure all important details were included. A thematic analysis method was used since the starting list of codes was created based on the extended marketing mix model outlined in the theoretical framework (see Table 3.7 below). Subsequently, the transcriptions were analysed and supporting quotes for codes were identified (see Table 3.8). While systematically reviewing data gathered, we did not find any emerging themes as all responses fit into the elements of the extended marketing mix model.

Table 3.7 Coding list for interviews

Category in Adjusted Marketing Mix/Code	**Corresponding Questions**
Product	1
Place	2
Promotion	3
Price	4
People	5-6
Procedures	7
Physical Assets	8
Personalization	9
Politics	10
Performance	11

Table 3.8 Coding examples from interviews with experts

Category in Extended Marketing Mix/Code	Question	Examples of Responses
Product	1	"Absolutely, I am thinking about how much more information we would have on human behavior in different circumstances. We also have this with our phones but this is something we for sure always carry around." (Expert 4, Retail Marketing Expert)
Place	2	"I think the most important effects would come with online channels, and it becomes an internet of things but with humans." (Expert 4, Retail Marketing Expert)
Promotion	3	"Well, again, we have this individualised... Both the marketing and the style of the marketing and also the content of the marketing, I guess, will be more directed to the individual in a way." (Expert 1, University Professor)

3.5 Method Reflection

According to Bryman and Bell (2011) qualitative research should not be evaluated in the same way as quantitative research. In line with that, Lincoln and Guba (1985) established criteria that are alternative to validity and reliability commonly used in quantitative research. The two main criteria that should be used to assess a quality of qualitative research suggested by the authors are trustworthiness and authenticity (Bryman & Bell, 2011).

Trustworthiness
In terms of trustworthiness, this research will be assessed based on credibility, transferability, dependability and confirmability (Bryman & Bell, 2011). Credibility is concerned with confidence in the *truthfulness* of findings (Bryman & Bell, 2011). To establish credibility in this study, we have used investigator triangulation when analysing an empirical data, which is also congruent with our critical realism ontology and epistemology (Korstjens & Moser, 2018). In this study, investigator triangulation involved utilizing multiple researchers to review gathered data, from our focus groups and interviews. This helped to ensure no faults in the analysis and data interpretation process.

Furthermore, transferability is perceived as the applicability of findings in other contexts (Bryman & Bell, 2011). As this research is qualitative in nature, the findings are based on contextual uniqueness and significance of the phenomenon being researched (Bryman & Bell, 2011). This study is unique as it is the first to explore young adults perception about RFID in the context of Sweden and interview experts about the phenomenon. Furthermore, it has produced a thick, detailed description about the data collected in the findings section when

answering both research questions. These thick descriptions of data gathered from focus groups and interviews with experts enables transferability to other contexts (Bryman & Bell, 2011).

Regarding dependability, to establish trustworthiness we adopted an auditing approach, which refers to keeping and presenting complete records of the research process in an accessible manner when required (Bryman & Bell, 2011). We did so by describing the data collection and analysis processes, illustrated the contents of important documents through tables and added descriptive quotes to present empirical data.

Confirmability refers to objectivity and subjectivity (Lincoln & Guba, 1985). While it is almost impossible to be completely objective in qualitative studies, we acted in *good faith*, meaning that we did not allow personal beliefs or theoretical inclinations to influence the research results or process (Bryman & Bell, 2011). Regarding first research question, qualitative data was obtained from focus groups, where we did not interfere with participants expressing their opinions but acted as moderators to facilitate the discussion. For the second research question, data was gathered using semi-structured interviews with experts from different fields, allowing us to gather various perspectives on same topic. Lastly, multiple authors selected quotes for specific codes to ensure no personal biases.

Authenticity
Authenticity in qualitative research is concerned with wider issues regarding the impact of the research (Bryman & Bell, 2011). Fairness is one of the criteria used to assess authenticity and in this research and it was ensured by including all viewpoints from empirical data gathered. This includes perspectives from both young adults in Sweden and experts (see Table 3.3) from different fields. Also, direct quotes were presented to reveal the authentic feelings, emotions and experiences of our participants. Finally, it can be said that this research had an educative authenticity as some of the participants in the focus groups expanded their knowledge about RFID technology and learned about the perspectives of other members in their social setting (Bryman & Bell, 2011).

3.6 Ethical Considerations

Participants within both the focus groups and interviews signed consent forms prior to participation in the study (see Appendix B and C). This process was voluntary and participants were made aware that they can revoke their consent and participation in the study. This allowed us to use the responses provided by the students and experts for purposes of this study. Participants were also given information on the aim of the study and informed that their responses would only be used within an academic context. Additionally, in order to ensure anonymity, the names of the students within the focus groups have not been used in the study. Lastly, participants were informed that the focus group and interview sessions would be recorded and transcribed, this was also stated in the provided consent form.

3.7 Chapter Summary

Overall, this chapter focused on the methodology applied within the study, describing various facets. Firstly, the research approach in terms of the ontology and epistemology of the study was discussed. Secondly, the chosen research design was elaborated on. Thirdly, we outlined the data collection methods applied, the sampling used in each chosen method as well as the motivations behind each method. This section also focused on how the data was analysed, method reflection and ethical considerations of the study.

4 Results and Discussion

The aim of this chapter is to present and discuss the findings from the five focus groups and four interviews conducted. Structure-wise, the results will be divided into two sub-chapters which correspond to each research question. Furthermore, illustrative quotes will be included throughout this section in order to support and strengthen the insights that have been discovered. In terms of the discussion, the findings of the study will be compared to previous research that has been conducted as presented in Chapter 2 Literature Review. This section will be concluded with a summary of the discussion in order to highlight the main findings of our study and to present an amended version of the UTAUT 2 analytical framework.

4.1 Determinants of Human RFID Implant Adoption

This section focuses on relaying and discussing the findings in respect to the determinants of RFID implant adoption by potential consumers in Sweden. As outlined in Chapter 3 Methodology the research question was answered through conducting focus groups with university students as our participants/respondents. The following section discusses the findings in each determinant in the UTAUT 2 model as well as additional determinants which are new considerations brought to light by participants.

4.1.1 Performance Expectancy

As mentioned previously, Performance Expectancy relates to the degree to which an individual believes that using a system will him or her attain gains in a job (Venkatesh et al. 2003). Under Performance Expectancy, participants were asked questions relating to situations in which human RFID implant technology could potentially impact their ability to carry out tasks. Specifically, the questions asked related to the ease and motivation to carry out tasks, the impact on task quality and the impact on the achievement of their individual goals.

Participants saw human RFID implants as able to reduce their time spent on certain tasks and able to provide a seamless experience when commuting or shopping, this provided was seen as convenience. They also saw health and fitness monitoring as a future potential benefit which could assist in the achievement of individual goals, if the implant technology advances. This allowed participants to see human RFID implants as a technology which could both motivate them and make their tasks easier. This is illustrated in the following excerpts:

> "Yeah, I think just in your daily life it can help a lot, because for example now you have so many cards and you can always link them to your phone and then pay with that. So I guess you wouldn't have to worry about so many like so many cards and IDs and keys. And for example I, in my key, I have like in my keychain, I have like the one for the

> gym, the one from my apartment the one for like, so so many things. So I guess would just make life easier." (Participant 2, Focus Group 2)
>
> "I feel that's good motivation for people. Like you should lead a more healthy lifestyle, I should lead a more healthy lifestyle. I think it's good that they push us so we don't just sit and just…" (Participant 2, Focus Group 1)
>
> "I mean yeah sure. If you can see progress quicker or easier. Then for sure, you'd be able to achieve your goals I reckon. Well, it's highly individual if you're going to achieve your goal but I mean if you can if you can see the progress in much more precise way, it would be easier to track then if you are then then if you're going to to actually fulfill the goal that's different. But yeah, for sure, be easier to." (Participant 4, Focus Group 2)

This illustrates the importance of convenience when participants considered RFID implant adoption. The emphasis on this could be related to the mainly utilitarian features offered by the RFID implants, making it easier for participants to associate it with easing everyday tasks. Convenience expectancy was also identified by Slade, Williams and Dwivedi (2013) as a way in which consumers assess their willingness to adopt technology.

In contrast, other participants were skeptical about the technology due to its limited features, with some comparing it to other technologies already serving similar purposes, namely, smartphones and contactless payment. This is further illustrated in the quotes below and under functionality in the Additional Determinants section (4.1.8).

> "Because I mean you have chips in your phone now. What's it called, the NFC thing, right? So you can just - you can do basically the same, so I'm not sure. I mean is it much easier than just putting up your phone? It's not that different, really." (Participant 1, Focus Group 3)
>
> "For different tasks I don't really like that idea, if you want it to be like so convenient why didn't you just merge all the functions, then I would probably consider to like, injecting this chip because getting connected is not something you can avoid now, it's just it happens." (Participant 3 , Focus Group 5)

Some participants highlighted privacy concerns as being a potentially demotivating aspect of carrying out tasks using the implant. This played a role in their acceptance of the technology as they were unwilling to use it for this reason. This is further elaborated on in privacy in the Additional Determinants section (4.1.8).

In relation to improvements in the quality of their tasks using an implant, participants had difficulty identifying how the technology could improve task quality. They cited limited features as the reason, noting that the technology currently provided convenience rather than quality enhancements. Moreover, some respondents even suggested a decrease in quality as they would be less involved in performing the task.

> "I don't think it has any like, the functionality that it has now, it doesn't have any quality, like what the quality of opening doors and making a payment? But if it develops and ends up doing more advanced things like you exemplified with the laptop then yeah, probably the quality would be better because it's automated. But then the quality that

> you yourself would have, like the work you would do yourself would probably decrease because you're not so invested in it anymore." (Participant 4, Focus Group 5)
>
> "Yeah, I'm trying to picture how, how it would improve my life in other sort of senses and I, the quality aspect, yeah it's kind of difficult to distinguish how. In what sort of sense…" (Participant 1, Focus Group 4)

As mentioned previously, participants highlighted health as the main goal which could potentially be achieved with this technology. Some participants believed that the potential enhanced tracking provided by implants would not guarantee fulfillment of goals. Informants also suggested that productivity could perhaps decrease with improvements in technology. Additionally, another respondent believed that having too much information would be detrimental to one's overall well-being. This is highlighted in the fragments below:

> "Yeah, let's say it was super advanced and you could see all your like... How good your body is or if you're gonna get sick or if you have cancer or whatever. I think that could make your life way worse. Because if you know you're sick, if you know you're gonna die, basically, then you might give up on life. If you have no idea that you're gonna die in 10 years, you'll probably live a happy life until then. But if you know everything about your body and you can pretty much predict what's gonna happen, that might screw you up mentally, I think. So that might not be good to know too much." (Participant 1, Focus Group 3)

Overall, the participants noted both benefits and drawbacks in terms of how the technology affects the performance of tasks. In relation to the benefits, participants mainly cited convenience and health monitoring in terms of fitness and illnesses. Drawbacks exemplified by respondents were in regards to limited features of the technology, a decrease in task quality and privacy concerns. As a whole, Performance Expectancy served as a dimension which influenced participants willingness to adopt RFID implants. The importance of performance expectancy in technology acceptance is in line with the applied UTAUT2 model put forward by Venkatesh, Thong and Xu (2012). The present study is also consistent with findings that Performance Expectancy affects the adoption of other technologies such as learning management software (Raman & Don, 2013), mobile banking (Alalwan, Dwivedi & Rana, 2017) and smartphone technology in the form of phablets (Huang & Kao, 2015). A summary of the findings for this determinant is illustrated in Table 4.1 below:

Table 4.1 Summary of findings for Performance Expectancy

Performance Expectancy	
Sub determinant	**Main findings**
Task Ease	• Convenience of the implant was very important to participants • The implant could not assist with a lot due to the feature limitations
Task Motivation	• Some participants were motivated to achieve fitness goals using the implant

	• Once again feature limitations led to limited situations where they would be motivated to use the implant • Privacy concerns demotivated participants from using the technology
Task Quality	• Some participants did not see the implant changing the quality of tasks • Possibility of implant decreasing task quality due to lower involvement in tasks
Individual Goals	• Possibility of achieving fitness goals • Implant monitoring health does not guarantee goal achievement • Too much data gathered from the implant could be detrimental to mental health and inhibits goal achievement in general

4.1.2 Effort Expectancy

As previously stated in the literature review, Effort Expectancy relates to the degree of ease associated with using a system (Chang, 2012). This was measured in terms of how easy participants found RFID implants to use and understand. Participants sentiments seemed split when addressing this question. Some participants affirmed its ease using existing technology and knowledge on the Internet of Things as a reference point.

> "Obviously if I get a chip with my credit card on it or my debit card, then I would know how to use it, because it's everywhere you have contact free." (Participant 3, Focus Group 2)

> "I mean it seems very intuitive and its this whole, I mean it's IoT technology, I guess or similar or the RFID so it's sensor based, so I mean, just as we said, you still need your phone but using it seems very, very easy…" (Participant 1, Focus Group 4)

We also posit that higher Performance Expectancy may lead customers to be more willing to learn about the technology. In this way, improvements in what the technology could do would encourage consumers to learn about it. This is brought out in a study by Morosan and DeFranco (2016) which found customers to be more willing to learn about how to use technology if it fulfilled its set out tasks.

Others found it difficult to understand, posing questions as to its compatibility with technological infrastructure, confusion relating to how it works, as well as issues related to implementation. Further, participants saw no need to use the technology if it was complicated to use. Such responses are highlighted below:

> "I mean I'm kind of confused, like when you get it does it like automatically like... But I guess you would need to have a lock that understand that and then you would need to have a card that, I don't know, transfers to that and... So where do you get those things from then, how do you go about that?" (Participant 1, Focus Group 5)

> "I think also the interface of how, if you have multiple functions in the chip, how the interface works to change which one you want to use for the moment. If it's as easy as go on an app and then scroll, then yeah maybe, but if its complicated, then what's the point." (Participant 3, Focus Group 2)

As a whole, many respondents seemed unsure of how much effort would be needed to use and understand the technology. Some dealt with this uncertainty by comparing the implants to existing technologies, while others questioned how the technology functions and the additional considerations to use it. A higher Effort Expectancy therefore deterred participants from wanting to adopt the technology. The importance of Effort Expectancy when determining willingness to adopt technology is also outlined as such in previous studies (Alalwan, Dwivedi & Rana, 2017; Venkatesh, Thong & Xu, 2012; Herrero, San Martin & Garcia-De los Salmones, 2017). We propose that acceptance and overall willingness to use RFID implants could be improved if more information about the technology was available to consumers and if the technology offered higher performance capabilities. Additional information regarding knowledge and resources is provided in the next section, that is, subchapter 4.1.3. Table 4.2 below illustrates a summary of the findings within Effort Expectancy.

Table 4.2 Summary of findings for Effort Expectancy

Effort Expectancy	
Sub determinant	**Main findings**
Ease of Use and Understanding	• Participants used existing technologies to understand the implant • Participants did not understand many aspects of how the technology worked leading to less interest in wanting to use it • Lower effort expectancy could result in higher performance expectancy and adoption of the technology

4.1.3 Facilitating Conditions

Facilitating Conditions, as previously stated, relates to the level to which an individual believes that organizational and technical infrastructure exists to use a system (Chang, 2012). When addressing the question of how participants would access the knowledge and resources to use the technology, participants seemed unsure of where to start. Internet based searching was seen as useful to participants when searching for information about the technology. Questions regarding how the technology worked were also prevalent in discussions. Some participants noted that although they are able to look into this technology, they are unwilling to do so. One participant, who had in fact accessed information via a conference, was still unconvinced of the benefits of the technology. This could allude to a lack of acceptance regardless of the accessibility of information. Some participants pointed out the lack of consumer insights on this matter only having heard about it from companies and news. These sentiments are expressed in the following excerpts:

> "I don't think I've ever really heard about this before. I mean I heard some yeah some tattoo things. Some scan, I don't know what it is, something, it's similar but it's not the chip thing" (Participant 1, Focus Group 2)

> "Yeah no, I feel like it's been highlighted a little bit in media and I think it was a thing, I think SJ were very like they went out and went public like oh now we're going to have train tickets and it was like more of a marketing thing for them, to be like oh we are doing something for the future and similar but, otherwise I haven't, from the consumers side like I haven't seen a lot of information regarding that…" (Participant 1, Focus Group 4)

> "Participant 4: Well, not at the moment, but I guess you can just do a Google search and you find out everything. We're pretty good at these things now [...]
> Participant 3: ...But the other thing is that we don't want to Google search them." (Participant 3 and Participant 4, Focus Group 5)

As mentioned under Effort Expectancy (subchapter 4.1.2), it was evident that participants pulled knowledge from other existing technology and attempted to build on it to understand RFID technology. Issues to do with lacking knowledge on the features, the qualifications of the people who carry out implanting procedures, where they would go to get an implant and health related matters were also discussed by participants. This pointed to a lack of access to information and other resources which could curtail willing participants from adopting technology. This is illustrated below:

> "Like I don't really know this guy who like pushes it into your skin, does he sanitise the needles, like is he authorised to do this? Like are they illegal? Can they like move under your skin, like I don't know how safe they are like if they can become dislodged and like move around your body…" (Participant 5, Focus Group 4)

An important finding in facilitating conditions is the consistent mention of resources in terms of technical infrastructure by participants. Some participants noted that improvements in this area could make them more willing to adopt the implants. What is interesting is that some participants, even those who were less aware of the technology, were still willing to adopt it if the technical infrastructure was made available to them. Such accounts are presented below:

> "I could predict some issues, for sure. I mean, even now it's just hard if you have an Android phone or an iPhone, it's hard sometimes. And if you have a chip that only 3000 people in this country use, then it might not be compatible with much." (Participant 1, Focus Group 3)

> "[...]At the current stage I don't think I would implement the chip. Not because of the lack of features, but because of the immense costs that come with it. I mean 150 euros is not much for implementing a chip according to me. However, you don't just implement the chip, as I mentioned it earlier, and everything is fine. You have to do the other stuff as well to make it accessible everywhere." (Participant 2, Focus Group 3)

> "I think it has to do with a lot of other technologies and how they develop so it's kind of in similar and also how other technologies are um, adopted in society because as said I mean when it's, when you have all these things your home which you can actually use

> the chip for then yeah, people will probably adopt it to a greater extent and if, I mean if you can have the chip and you can open your car I mean that's even more value, so it needs these other things as well." (Participant 1, Focus Group 4)

Furthermore, participants were unsure of how access and care for the implants in the event that they would get one. It remained unclear to participants if special facilities were available in order to get the implants. Questions about where to get implanted and how the technology works also illustrated a lack of mass sensitization. Some joked that their only source for this type of information was the video clip played at the beginning of the focus group session:

> "We have the guy [refers to implant specialist from the video] and we can call him." (LAUGHTER) (Participant 1, Focus Group 1)

> "But is also a thing like would you go to a store where they just implant these chips or would you go to like a tattoo shop?" (Participant 4, Focus Group 2)

Regarding compatibility with daily life, participants expressed mixed sentiments about the technology. In a positive regard, convenience was the main benefit highlighted, participants envisioned a less cumbersome lifestyle. This seemed to encourage participants to use RFID implants, as seen in the scenarios below:

> "But sometimes like it's hard if you go swimming, or you're running or whatever, and sometimes you don't want to carry a lot of things especially during the summer if it's hot. So I mean then it would be kind of convenient, not to bring anything." (Participant 1, Focus Group 2)

> "I think I would use it a lot cause I hate carrying stuff. I put all my cards in my phone so I can only bring my phone everywhere so that chip would make it actually easier. Also going out to club without your purse…" (Participant 3, Focus Group 1)

In a negative regard, some participants were less inclined to use the technology. Feature limitations of the implant were consistently highlighted by participants (explained further in the Additional Determinants section), thus reducing the scenarios in which participants could use the implants in their daily life. One example of the uses participants saw for the technology is commuting, as SJ has already adopted this technology (SJ, 2017). Other participants were satisfied with current technologies such as their smartphone with some mentioning infrastructural concerns to support the implant. One participant related the lack of infrastructure to the technology still being seen as new, therefore not compatible with some tasks in their daily life. Newness of the technology therefore dissuaded participants from adoption. The fragment below further illustrates this:

> "Yeah, obviously, I mean and probably now, I'm very questioning of the whole technology and more like mmm, is this, because it's so, it's still new and we have the early adopters now who, who have inserted it, but in the future and I mean if everyone is having it yeah I mean you, I would probably use it all the time I would wake up and then go check my health things, start the coffee, start to, it senses that I'm, I'm waking up and then the coffee machine starts, I would like open my door, go to, go on the train to get to work, like it's, it would be something that would be used daily for sure." (Participant 1, Focus Group 4)

In summary, a lack of knowledge, resources and accessibility of the RFID implants was prevalent in discussions. Participants were also concerned about the legalities surrounding the use of the implants and the people involved in carrying out the implants. In addition, the technology was seen as too new to use by participants, although some seemed willing to adopt it when it is normalized and as such infrastructural improvements have been made. In terms of daily life compatibility, participants were split with some willing to use it as it coincided with tasks and offered higher levels of convenience and other citing its novelty as a drawback. Facilitating Conditions are therefore termed as relevant in understanding technology acceptance. The determinants' relevance is also argued for in other studies set in different industries such as banking and technology (Venkatesh, Thong & Xu, 2012; Alalwan, Dwivedi & Rana, 2017). Improvements in facilitating conditions such as the aforementioned knowledge and resources, accessibility and care, compatibility with daily life would therefore affect willingness to adopt the technology. Specifically, technical infrastructure resources are seen as important in impacting willingness. A summary of findings for Facilitating Conditions is illustrated in Table 4.3 below:

Table 4.3 Summary of findings for Facilitating Conditions

Facilitating Conditions	
Sub determinant	**Main findings**
Knowledge & Resources	• Participants lacked knowledge about the technology. • Participants who were aware of it were unwilling to search for information about it since it was still very new and invasive • Lack of resources to facilitate the use of the implants (technological infrastructure was the main resource)
Accessibility & Care	• Participants did not know where to go to get the implants • Legal concerns arose surrounding the use of the technology and the parties involved in carrying out the procedures
Compatibility with daily life	• Implant could offer a less cumbersome lifestyle leading to higher convenience • The novelty of the technology would mean additional changes would be to be adopted into participants

4.1.4 Social Influence

Social Influence explores the degree to which an individual feels that other people's belief that he or she should use a technology, is important (Chang, 2012). Venkatesh et al. (2003) explained that social factors relate to an individual's internalization of a reference group's subjective culture and the interpersonal agreements that the individual made with others in social situations. Thus, in order to understand how the participants felt that they would be socially influenced to get an implant, questions related to their social status, image and the opinions of family and friends. When it came to social status, the participants had differing

beliefs. On the one hand, a few informants perceived the RFID implants as possibly having a positive effect on one's social status, as shown in the quote below:

> "I think I would, but not maybe brag. But if I would've met someone with it I would've wanted to know some more. And I would've thought that "Wow, that's really cool, he or she made that change"." (Participant 2, Focus Group 1)

On the other hand, the respondents felt that if they received an implant now, they would feel judged by the society, using words such as *crazy*, *weird*, *stupid* and *tech nerds* to describe the perception that people would have of them. Furthermore, many believed that getting an implant would not be something they should be proud and excessively vocal about. On the contrary, they mentioned that they would hide the existence of the implant as it could be detrimental to their personal image or could even pose security issues, these opinions are illustrated in the fragments below:

> "I agree, I think you would tell it, but I won't brag about it. But it's also a bit scary to brag because then people know that you have everything in your... And then I'm afraid that someone would murder me (LAUGHTER) or something like that, because then they know that it's there. If you just know that it's in your hand and nobody else knows it, then it's still like same. Everyone knows it and... Yeah, I don't know. I wouldn't put on my Facebook: *Ooh, I got a chip in my hand*." (LAUGHTER) (Participant 3, Focus Group 1)

> "The other day... Sometimes when I need to go get something small at the grocery store, because the grocery store is just 2 minutes away, instead of taking my entire wallet, I put the card like... Like slide it in my sleeve so I don't have to carry the wallet, so... I was paying and I did this to the thing (gestures with wrist) and the lady looked at me and gave me this subtle weird smile. I think she thought that I did it with the chip…" (LAUGHTER) (Participant 1, Focus Group 5)

> "Well, I heard about this, a few years ago, but I didn't follow it, like he said, it's just gimmick and it's just um, tech nerds that want to be hip and have something to brag about" (Participant 3, Focus Group 2)

When it came to the degree of influence exerted by friends and family, the responses were yet again divided. Some informants felt that once their close ones adopted the implants they would feel more inclined to get it, citing *peer pressure* and the need to fit in the group as the main reasons. Furthermore, a few mentioned that if their family and friends got the implant they believed the technology was safe enough to adopt themselves, thus correlating the trust in their close ones with the level of the technology's security. This is shown in the quotes below:

> "Because I feel if they all get it and then I feel like "Yeah, it's probably safe." and I will be left outside if I don't. It's like the same thing with Swish we have in Sweden." (Participant 5, Focus Group 1)

> "I would probably do it too, but that is because my family is like... They don't really go on trends that much so if they actually would it would be like life-changing (LAUGHTER). It has to be something, in that case." (Participant 1, Focus Group 1)

> “Yeah. I think if my close friends or family would have a chip, I'd probably get one. Isn't that like this the most powerful marketing tool?” (Participant 4, Focus Group 2)

An additional note here is that participants referenced family and friends as potential resources in terms of knowledge about the workings of the technology. Therefore, Social Influence is used in this sense as a facilitating condition making the willingness to adopt the technology stronger. Another consideration is that participants found word of mouth to be an important tool in marketing this technology. This could be due to the overall nature of the technology which may require more trust to be established before one gets implanted.

In relation to reference groups, many of the participants expressed that if they were considering getting the implant, they would take into account the opinions of their friends and family, regardless whether they are positive or negative towards the RFID implants. However, they would only consider their views that to a certain extent, as they mentioned that they would still need convincing arguments to become fully influenced by them.

> “I agree with that. I think it's good to listen to the opinions of your close ones, they know you better and sometimes you think what is good for yourself is not good for yourself. So it's good to hear like a different opinion from people who really care about you and know you better than maybe even yourself. But, the decision would be mine, like they have to have good arguments (PEOPLE AGREE) to prevent me from doing it. If I'm really set, like if I really want a chip and I ask my dad and he's like "No, you shouldn't", then I'll really want to know why, like give me your arguments why not. I care, but it's still my own decision.” (Participant 3, Focus Group 1)

> “Depends on the argument as well. Like, is it my grandma saying that, it's bad for me?” (Participant 4, Focus Group 2)

Other respondents believed that they would not be influenced if friends and family received implants. They mentioned that they would prioritise their own opinion over the need to follow their peers in adopting the technology.

Furthermore, an aspect that was often mentioned by the informants when talking about Social Influence was that they felt influenced by both the degree to which the technology is viewed by the society as normalised and by how open the society is to innovation. Additionally, the only instance where they saw themselves possibly getting the implant was a future where the technology became adopted by the whole society, achieving a normalised status. In some instances, participants having considered the repercussions, were still open to the technology if it was majorly adopted. This point of view is exemplified by the following quotes:

> “Because I'm not personally ok with it right now. And I don't think my perception will change in the near future, but like you said maybe if it becomes like a normalised thing… Although, whatever is the norm doesn't necessarily mean it's ok, but (LAUGHTER) it becomes like a normalised thing... Perhaps I will be influenced by it.” (Participant 4, Focus Group 5)

> “Crazy in a bad way, not crazy in a way "Woah, that's cool". But I think that people need to be educated about that, like the benefits, the disadvantages. So that you have a better opinion about it and now it's just scary, it's still something like "a future thing", and only in movies. Or if you have it now then it's cool but it's also kind of like weird.

But I think if it will be normalised like in a few years, everyone has it then, yeah, that's fine. (PEOPLE AGREE)" (Participant 3, Focus Group 1)

This adds to the understanding about Social Influence as a determinant explained by Venkatesh et al. (2003) who regards innovation use as way to enhance one's image. However, if the society is not yet open to RFID innovation and does not consider it to be normal, then one's image might be not enhanced but negatively influenced. This could be explained using Belk's theory of the extended self which states that possessions could be used to form perceptions about individuals and thus impact one's image (Belk, 1988).

Overall societal adoption of technology is not expressly outlined in the UTAUT 2 model, and as such will be included under the Social Influence determinant in the revised framework under the name of Society's Openness to Innovation. In summary, many participant sentiments leaned towards confirming that social influence from friends and family has an effect on whether they would get an RFID implant or not. This finding confirms the results of the study by Venkatesh, Thong and Xu (2012) who consider social influence as an important factor for consumers when deciding on whether to adopt a technology. Table 4.4 provides a summary of the findings within Social Influence:

Table 4.4 Summary of findings for Social Influence

Social Influence	
Sub- determinant	**Main findings**
Social Status & Image	• The implants were rarely seen to positively influence social status • In their current state, the implants were seen to have more of a negative impact on one's image
Family & Friends	• The opinions of family and friends played a key role for participants in determining whether participants would use the technology • Family and friends were also seen as resources to gather additional knowledge illustrating the importance of word of mouth communication. • Social Influence was also seen to be connected to facilitating conditions through the use of family and friends as knowledge providers
Society's Openness to Innovation	• Participants would be more willing to adopt the technology if the society was open to adopting it as well • Participants related society's openness to the technology to improvements in technological infrastructure.

4.1.5 Hedonic Motivation

Participants were asked to imagine scenarios in which having an implant would be enjoyable and others where it would not. Further, participants were questioned on the effect this would have on their willingness to adopt the technology. Social scenarios were often imagined by respondents as scenarios which would yield the most enjoyment. Participants noted situations such as bragging to friends, using it as an icebreaker, and at parties. Interestingly, although participants could envision fun scenarios, some noted their motivation to get an implant themselves was unchanged as seen in the quote below:

> "I don't think I maybe would've done it if I just saw it for fun, actually. But, if it's fun as well, it's just a big plus." (Participant 2, Focus Group 1)

> "...the main reason is convenience, I think. It's not *Oh yeah, it's a fun thing*!." (Participant 3, Focus Group 1)

Movies were also used to illustrate scenarios of being implanted. This could also be attributed to the newness of the technology thus causing participants to relate this to how other internal technology is portrayed in media. One participant recounted the instance below:

> "Yeah, I mean if I can have other like, Jarvis to Iron man then I would be totally fine of implementing anything into my body." (Participant 3, Focus Group 5)

Respondents spoke of seeing the implant as a convenient rather than fun technology due to its limitations in functionality currently. This was seen as a de-motivator to some participants. Future uses however were seen to be fun and of interest to participants, possibly motivating implanting. Such a response is seen in the quote below:

> "I mean like basically having everything, like your passport or being able to pay with it. Not sure... Like possibly even if you go in further, having like a small screen here (gesturing to wrist) where you can see your balance so you know you're not over-exceeding. But I think like, I don't really have that many cool examples, but I think the possibilities are endless with what you can do." (Participant 2, Focus Group 3)

> "Like for instance if the chip like I don't know, somehow read my mind and I had all these tasks in my head that I need to plan and it somehow like on my phone, like in a hour I had an entire like schedule for me, because somehow it was wired with my brain and it understood what signals it was sending, yeah, that's something like wow, I would want to have that, but not to open doors and make payments no." (Participant 1, Focus Group 5)

Participants were increasingly concerned about privacy and safety related issues when using the implant leading these to be seen as additional determinants. Participants used terms such as *freaks me out*, *uncomfortable* and *big brotheresque* when describing their feelings towards using the implant. This could speak to the discomfort some participants felt when thinking about having an implant themselves. This is further illustrated in the additional determinants sub-section (4.1.8).

To sum up, informants were torn between whether or not the technology was fun to have and how this would affect their intention to get one themselves. We noted that positive sentiments

expressed by participants were often in a futuristic context. This could be attributed to the limitations in features leading to an association with convenience rather than fun. Functionality issues were highly prevalent from respondents, leading to functionality being considered as an additional determinant. Additionally, motivations to get implanted seemed unaffected for some participants even though they expressed that it could be fun to have.

Hedonic Motivation in this case was therefore seen as relatively unimportant in predicting technology acceptance. This could be due to the participants associating the technology with more utilitarian features thus reducing its hedonic value as outlined by Venkatesh, Thong and Xu (2012). However, the inclusion of new features in RFID technology may make it more appealing and enjoyable. This study differed from findings in other studies which found hedonic motivation to be one of the most relevant determinants of technology acceptance and use (Alalwan, Dwivedi & Rana, 2017; Yuan et al. 2015; Huang & Kao, 2015). A summary of the main findings in Hedonic Motivation can be seen in Table 4.5 below:

Table 4.5 Summary of findings for Hedonic Motivation

Hedonic Motivation	
Sub-determinant	**Main findings**
Fun Scenarios	• Limitations in the features of the technology did not allow participants to see more hedonic uses. • Hedonic Motivation played a limited role in whether or not participants would adopt the technology • New features in the technology could allow for higher Hedonic Motivation

4.1.6 Price Value

The price value factor investigated how cost and pricing structure has an impact on consumers use of technology (Venkatesh, Thong & Xu, 2012). The willingness to adopt RFID implants based on advanced features supports Venkatesh, Thong and Xu (2012) theorization that price is a tradeoff between cost and benefit obtained. More specifically, the determinant explored the willingness to pay a price premium in order to receive an RFID implant. In this respect, the opinions of the participants were divided yet again.

Respondents who were willing to pay a premium for the implant viewed cheap RFID implants as suspicious and dangerous due to how invasive the technology is. Moreover, some expected that a higher price will come with better quality and improved safety, an opinion reflected in the fragments below:

> "I mean if would say if I wanted to get one I would pay the higher amount of money, so I know I got a good one. Because usually I think most people see, like, more money, better quality. So I would go to the one who is, maybe... I would say had the like, it could be more pricey, but at least it was better quality, more safer and whatever. Because

> I rather would pay more to get a good one than to pay the lowest price and it's shit and I get an infection in my hand." (Participant 1, Focus Group 2)
>
> "I think in general I'm always like a early adopter in technology. So I think I would definitely pay for like a price premium on the chip if i decided to get one. Of course I would like want to get the best one at the moment because I mean since you're putting something in your hand, you'd go for the safest one or whatever. So yeah I think I would pay more." (Participant 2, Focus Group 2)

In addition, there were some participants who were not willing to pay a price premium for various reasons. Firstly, some suggested that the quality of the microchip itself would be the same, regardless of the company or manufacturer that provides the implant as the technology behind it is not complex. Additionally, participants unwilling to pay the premium cited a lack of value for the current offering. The following excerpts exemplify these views:

> "I wouldn't pay a premium because... Just because this... It's kind of unnecessary. It's not... There are other options. And if there were to be different manufacturers of these chips. Like I said before it's the same passive technology. I don't think there can be much quality difference between them. But, yeah, I wouldn't pay a premium." (Participant 4, Focus Group 2)
>
> "Yeah, I think if you got more for it, like, if it could do more things, then I would pay. I would pay that easily like if it monitored my health and stuff, then I think it would be worth it. But for right now, for the metro and my door lock, no, I don't need that." (Participant 5, Focus Group 4)

On the whole, some participants were willing to pay a higher price for the technology, while others would only do so if the implant would develop to support advanced features such as health monitoring. This is illustrated in a study by Hall and Khan (2003) who state that the uncertainty of the benefits of novel technology may lead to delayed adoption as customers are inclined to wait until costs reduce. Uncertainties also related to the additional costs due to changes that would need to be made to infrastructure in order for it to be compatible with the RFID implant. Such changes include replacing the locks in the house which would in turn lead to unwillingness to pay the price of the implant itself. Participant concerns and comments related to infrastructural changes and compatibility are further detailed under facilitating conditions (4.1.3). The present study therefore finds price to be relevant in determining the adoption of RFID implants. This finding is concurrent with other studies which have assessed adoption of other technologies such as mobile banking software, health and fitness applications and phablets (Alalwan, Dwivedi & Rana, 2017; Yuan, et al. 2015; Huang & Kao, 2015). The findings within this determinant can be seen in Table 4.6:

Table 4.6 Summary of findings for Price Value

Price Value	
Sub-determinant	**Main findings**
Willingness for Price Premium	• Price of the technology itself played a limited role in whether participants would adopt the technology

	• Participants were concerned about costs surrounding the implants in terms of changes to their surroundings • The price of the implants were equated to value received which at the moment was seen as minimal due to the novelty and the lack of assurance of the benefits received.

4.1.7 Experience and Habit

None of the participants in the study had been implanted therefore questions related to their willingness to use the technology and how their opinion has changed overtime. Participants noted that additional features would lead to them possibly being implanted and could lead to habit formation in consumers. This is in line with findings from a study conducted by Yuan et al. (2015) which argues that features play a significant role in forming habitual use patterns in consumers.

In contrast, some participants were unwilling to adopt this technology due to recurring themes such as the invasive nature of the technology, health, privacy and safety. Regarding privacy, one respondent exemplified a scenario in which having an implant could negatively affect them. This is illustrated in the excerpt below:

> "I think there are functions that I wouldn't want like if... you might get into that I suspect, like integrity and stuff. But, let's say that someone can access your medical data for example, I would never have that chip in me. Because you would never get insured in the future, for example. Like which company would want to insure if they know that you'll have cancer in 5 years, for example. Stuff like that. So there are many many reasons why I wouldn't want it but it's maybe hard to think of a reason why I would want it." (Participant 1, Focus Group 3)

With regard to how the participants' opinion of RFID implants changed over time, most specified that they had heard of the technology before, while others had not heard of it until attending the focus group. Out of those participants who were already familiar with the RFID implants, the majority had a negative initial impression after learning about it on the television or from friends.

However, after they received more information from the video presented in the beginning of the focus groups, and after discussing about the technology with the other focus group participants, some respondents still remained true to their initial belief, while the majority changed their opinion by becoming more accepting of it. Respondents from the former category motivated their choice by mentioning the lack of features or their belief that technology should not intrude in the human body. Those who became positive towards it were able to identify some advantages and to see it as a possibility for the future. The fragments below show these points of view:

> "For me it changed. I heard about this, like a year ago or something, on Dutch television. It was someone in a talk show talking about it and I remember that when I first heard it I was like *Oh, so weird, you're putting something in your body*! But now, you're reading more and I didn't know that so many Swedes are doing it. I think Sweden is a cool country, they are really innovative in those things. If they are already doing it and have

> faith in it, it makes you change, Yeah, I will consider it in a few years if I have money to buy it or whatever. It definitely has changed for me from the first time I heard it until now." (Participant 3, Focus Group 1)
>
> "I don't think I've heard really about it before. Maybe I've seen something but not something I really... I also feel like it's a little... CSI...since science fiction" (Participant 1, Focus Group 2)

The informants who had never heard of RFID implants before expressed that they experienced a change in opinion at the end of the focus group due to the discussions among themselves. They mentioned that one major reason why they felt more open to RFID implants was the fact that an unexpected number of Swedes adopted the technology:

> "I agree. It has changed for me during this whole session here. I think that the second I heard that it's that many Swedes that are using it, I immediately became more... I accepted it more. I am not conservative always, but I like to know what I'm doing. I don't want to be tracked, I don't like to feel that I am exposed. Not on social media, not like anywhere, when it comes to my health information and stuff like that. I mean, I got the Fitbit after a year of consideration. Since I heard that so many Swedes have it now and it's not even a thing yet... I mean I get more open." (Participant 1, Focus Group 1)

As participants were not implanted, they were unable to form use habits. However, some participants alluded to the possibly returning to technologies they are more familiar with even if they were implanted:

> "I think in the beginning. Like obviously you get something and you know and then it's like oh yes I want to do this, I want to use it. But for me I don't think I would change the way I the way I live. Like obviously OK I have something that can take my pulse and I can record if I'd work out then I'll probably do that for three weeks then I realize I don't like to work out so I'll stop doing that anyway. Saying what using it, like obviously if I'd get rid of my cards then I can do it use my hand but other than that I think is something you're going to forget in a while then you use a card because that's in the back your head." (Participant 3, Focus Group 2)

In totality, Experience and Habit was difficult to discern as participants were not implanted and therefore had not used the technology. Participants willing to use the technology spoke of both current and future benefits citing convenience and health as main motivators. Aspects which dissuaded participants from using the technology related to privacy, safety, health and the nature of the technology, which are further elaborated on in Additional Determinants (4.1.8). In terms of opinion change, the majority of the respondents who had heard of the technology before became more accepting of the technology after participating in the focus group, thus receiving more information and exchanging ideas. Those who had not heard of RFID implants before expressed openness to the technology due to the fact that a number of Swedes had already adopted it. This illustrates the importance of societal influence on the willingness to adopt technology.

A finding worth noting is that participants did not see themselves routinely use this technology as they had become accustomed to their current gadgets. Therefore participants although lacking experience from using the technology did not see habit formation due to pre-established automatic behaviour (Venkatesh et al. 2003) formed with other technologies. In this case, habit

formation of other technologies would be an inhibitor to the adoption of RFID implants. Habit is therefore considered relevant in determining adoption of this technology as found in previous studies (Venkatesh, Thong & Xu, 2012; Morosan & DeFranco, 2016). Table 4.7 illustrates the main findings within this determinant:

Table 4.7 Summary of findings for Experience and Habit

Experience and Habit	
Sub-determinant	**Main findings**
Willingness to Use	• Participants were already used to their current technologies making it difficult to form habits using RFID implants • Difficult to establish experience and habit as participants had no prior experience with the technology • Main motivators to use the technology were related to health and convenience • Main de-motivators to use were related to privacy, safety, health issues and the nature of the technology
Opinion Change	• Opinions towards the technology changed as participants who had heard about it before were more open to it • Other participants expressed openness towards the technology when they heard that other Swedes had adopted it

4.1.8 Additional Determinants

During focus group sessions with participants, several new aspects were prevalent as they addressed what would impact their decisions to adopt RFID implants. The following section will therefore describe and discuss findings to do with functionality, health, invasiveness, privacy and safety and their importance in the adoption of RFID implants.

Functionality
Functionality relates to the extent to which potential consumers believe that RFID implant functions impact their adoption of the technology. The motivation to include Functionality as a separate determinant lies in the fact that participants viewed it as a primary influence in the adoption of the RFID implants and could not be integrated in the original analysis framework. Two sub-determinants have been found in connection with Functionality, namely Benefits Over Existing Technology and Features, which will be presented in detail below.

Functionality: Benefits Over Existing Technology
Focus group participants often compared RFID implants with already established technologies such as the phone, credit cards or smart watches. These comparisons allowed the respondents to assess whether the new technology could replace gadgets that they use routinely. As a result, if RFID implants were found to be superior to existing technology in terms of functionality, the respondents were more likely to express positive sentiments towards adopting the microchips.

Furthermore, the participants were able to identify both benefits and drawbacks of the implants in comparison to existing technology. Those who were in favour of the RFID implants saw benefits such as not having to carry your phone and keys, decreased likelihood of the technology's failure to function, easier identification in case of emergency and enhanced security and safety as opposed to the phone, credit card or smart watch. The fragments below illustrate these beliefs:

> "I actually have a Fitbit that does everything like that and it checks your sleep and everything and if I could put that in a chip I would because this always breaks." (Participant 2, Focus Group 1)

> "Yeah, I agree with you and maybe another benefit would be for the healthcare system, I guess. For example, if you're in a car accident it's way easier to identify you, who you are, your record, if you have a chip implanted. In comparison with your phone and other things that must have been, I don't know, lost in the accident." (Participant 3, Focus Group 3)

> "Participant 3: A government thing, army stuff.
> Participant 4: In that case I think it's better than a phone, but as it is right now I think the phone is like better than the chip. But, yeah, with security it would be better to have it." (Participant 3 and Participant 4, Focus Group 3)

The notion that RFID implants could offer higher security is in line with a study by Perakslis and Michael (2012) which specifically analysed responses from the youth demographic. In contrast, several other studies have outlined privacy as a concern in respect to RFID implants (Clarke, 2010; Patel, 2018; James, Pirim, Boswell, Reithel & Barkhi, 2008; Perakslis et al. 2014). Privacy concerns are further addressed under Additional Determinants as an emergent element.

However, many respondents felt that existing technologies are superior to RFID implants and thus did not see an advantage in adopting them. They mentioned that by using the implants the increase in convenience and speed of doing tasks would be minimal as compared to phones or credit cards. Another aspect that they highlighted is that the RFID implant could not replace phones as they would not be able to make calls through the microchip or read the data that it tracks without a phone screen. Finally, they felt that other devices already provided them the necessary tracking capabilities in order to monitor their health and thus found no incentive to adopt the implants. Several drawbacks expressed by the participants are found in the following quotes:

> "A chip wouldn't replace the phone so I don't know... If it's enough to just have it in the phone like everything there. Because you wouldn't be able to contact people with the chip maybe, or maybe you could but you don't know." (Participant 4, Focus Group 3)

> "But I mean the current ones are not that bad either your can your phone or a card and I think it's essentially the same thing you, you basically put a device or whatever up close with something and that scans and it would be the same with your, with your hand as well, so it's just like that extra probably second or taking out your card or your phone. So again I think the time saved is so minuscule that it doesn't really, I don't know, it

> doesn't, it doesn't pan, I don't think there's much benefit to it…" (Participant 5, Focus Group 1)

> "Yeah, especially for all the other things they mentioned like the opening doors, ticket [...] everything can be done through the phone and I think we will have digital locks in the future and then you have the digital code on the phone. So, I mean the phone will kind of fill the same purpose and the phone can also be used for a lot of health monitoring things, but yeah I think the health is probably the main thing." (Participant 1, Focus Group 4)

Overall, participants seemed more inclined to adopt the RFID implant technology if it offered more benefits over current technology. In the case that they felt it did not do so, participants turned to the technology they were already acquainted with to serve the same purpose. This in turn illustrates the relationship between habit formation with existing technology and functionality. Habit formation is further elaborated in section 4.1.7. We therefore recommend that improvements to the implant technology in comparison to existing technology could limit the impact of habit and result in a higher willingness to adopt from consumers.

Functionality: Features

An aspect that was mentioned frequently by the respondents related to the features of the RFID implants and therefore was identified as a sub-determinant of the Functionality element. The participants questioned the features of the technology in order to determine its value and decide whether the implants are worth adopting. Many believed that, at the moment, the features of the technology are not advanced enough to justify purchasing it and would have expected the microchip to have multiple integrated functions:

> "I think it's useless. If I am going to have the chip, it has to be able to use with everything. But you can go to the restaurant, you can go to the banks, use the transportation and the readable and the devices used to read the card should be able to read one chip." (Participant 4, Focus Group 1)

> "Yeah… If it could do something revolutionary then I might consider it you know, if it just helps you in a way in life which is oh wow, this is, you have like a personal assistant with you all the time. But if it's just doing the things that you, you do in like very mundane tasks and just save time on those, I think that's really, what's the point?' (Participant 1, Focus Group 5)

Furthermore, some respondents expressed concern regarding the issues they might run into should the implant fail to perform as intended. This was in regard to the reliability of the technology, the possibility of the implant moving under the skin and the inability to prove ownership due to the implants' subcutaneous nature. These concerns are illustrated in the fragments below:

> "I think it's a bit like the cash question, like if the cards stopped working what do we now if the shops don't take cash and if the chips stop working what do we do then if we don't have anything to pay with?" (Participant 1, Focus Group 1)

> "Yeah and let's say your key doesn't work to your house, how do you prove that you live there and that you have a key and all of these fears. Like, it's convenient when it works, but as soon as it stops working you'll be faced with all these um, problems with

> just, convincing people that you're actually supposed to be there." (Participant 4, Focus Group 2)
>
> "I'm also thinking like about, because when you use your phone to scan tickets, sometimes it doesn't work, what if it doesn't work with the implant, like, then you can't even like…" (Participant 4, Focus Group 4)

Additionally, the participants saw potential in the implant's features, but not in its current form. In particular, they seemed most interested in the future prospect of the technology being able to measure bodily functions and improve their task performance:

> "For me would be like it would motivate me. If the features that you gave me would be like what I'm looking for because I use like a smart watch. Like when I exercise, when I run, when I swim, whatever like I love to look at the numbers and all the statistics. So for me I use a smartwatch when I do all these activities. So, I think it's like if the chip would provide me all the features or like that the watch gives me or even better, then I would definitely use it. But if it's not comparable to the technology available now with the watch then I don't think I would go for the chip. If I can do that with the watch. Yeah. So I think it depends on the features." (Participant 2, Focus Group 2)
>
> "Like for instance if the chip like I don't know, somehow read my mind and I had all these tasks in my head that I need to plan and it somehow like on my phone, like in a hour I had an entire like schedule for me, because somehow it was wired with my brain and it understood what signals it was sending, yeah, that's something like wow, I would want to have that, but not to open doors and make payments no." (Participant 1, Focus Group 5)

Some informants were also confused about how the technology functions as they could not understand some of its features and capabilities. In addition, a few respondents attempted to navigate the complexity of how they could interact with the implant in the future by using existing technology such as smartphone applications to envision the possibilities. The following excerpts exemplify their thoughts:

> "So I wonder about ID identification and passport identification. Because in our passports currently we have this chip that is read by the US Government and it's around 30 countries or 30 different passports that have that. And it's something that you read every time you go and travel to the US. Can we have some kind of identification in our wrists instead? Or is that too dangerous?" (Participant 1, Focus Group 1)
>
> "And do I program it myself? Like I decide okay, today I'm at ICA, I want to use my ICA card and then when I'm going to my front door how do I know? Like is there an extra step to change it. Because that also makes a difference. Like I go to ICA then I have to take out my phone and change to my ICA card and oh I'm coming home I have to take out my phone and then um…" (Participant 3, Focus Group 2)
>
> "I think also the interface of how, if you have multiple functions in the chip, how the interface works to change which one you want to use for the moment. If it's as easy as go on an app and then scroll, then yeah maybe, but if its complicated, then what's the point?" (Participant 3, Focus Group 2)

Features, in the present study, was therefore regarded as highly relevant in the adoption of RFID implants by youth. Unexpectedly, utilitarian features and the integration of these features seemed to persuade participants to adopt the technology more so than fun or hedonic features did. This differs from a study conducted by Yuan et al. (2015) which found Hedonic Motivation to be highly relevant in determining technology acceptance for health and fitness applications. Once again this could relate to the implant being physically invasive and thus would require more features which are not just fun but also functional for consumers.

Functionality in terms of features also enhances performance expectancy in that it may result in easier task completion, higher levels of motivation to use the implant as well as possible quality enhancements. Further discussion regarding performance expectancy is outlined in 4.1.1. Similar findings have been presented by Negahban and Chung (2014) who state that functionality-fit evaluation is a combination of performance expectancy, multifunctional use, ease of use, symbolic value and enjoyment. Feature improvements could also benefit facilitating conditions such as compatibility with daily life, as participants would be able to envision themselves using it more. This is also elaborated on in 4.1.3.

Health

A predominant theme that was discussed by the respondents in all of the focus groups was health. Matters such as the health and wellness benefits that the implant could provide, as well as the physical and mental threats it could pose to those who receive it, seem to be of great importance to the respondents. Firstly, several participants identified potential future uses of the implant such as accurate tracking of bodily functions, enhanced response in emergency situations and improvements in the treatment of illnesses such as diabetes. The quotes below represent some of these advantages as expressed by the participants:

> "The health part (PEOPLE AGREE), because I think it's really important and like to save that data it can track a lot of things about yourself: sleep, heart beat, it's very important to see like where you're at in your health and then improve yourself where you lack." (Participant 2, Focus Group 1)

> "I agree, and also I think you said it, like if you passed out somewhere or you're not able to be identified anymore or something, and you still have the chip (LAUGHTER) it's more like now if you, I don't know, if you get hit or something, you have to have a wallet with all your cards, so that people know who you are and what your blood type is. Or if you go to a hospital and then it would make the whole process easier and it's convenient." (Participant 3, Focus Group 1)

> "Again health wise probably, I mean if you are diabetic, or you have other health conditions that you need to monitor, everyday, all day. Then that would probably help you because you wouldn't have to take your blood or have that other patch thing on your arm so it would tell you and maybe alert you if your blood pressure's gotten too high or whatever then that could be beneficial I think…" (Participant 5, Focus Group 4)

On the other hand, several respondents expressed concern regarding the negative consequences that the implant could have on their health. These concerns included thoughts about suffering allergic reactions, infections or cancer as a result of getting the implant. Participants also used words such as *scary*, *anxious* and *stressed out* when describing their feelings about using the implant to carry out tasks. This illustrates the concern participants had about the implant compromising their mental health making it difficult to imagine using it at all. Some

participants attributed this to the fact that the technology is more invasive as it is placed under the skin and therefore different from other technologies. The invasive nature of the technology is further elaborated in the next subsection. These negative aspects are highlighted in the fragments below:

> "But also now I think I would think about like if I have like an allergic reaction to it. Because for me as you said I didn't think about it about this before. But for example I can only use like gold earrings because like whatever other stuff that I use I get an allergic reaction so maybe like the material it's made of or whatever gave me an allergic reaction now, I would like also think about not getting it since you can't know that in advance because since you put it inside and then maybe like two weeks later your hand is like ooh swollen or something. So yeah maybe I hadn't considered all the...I mean that that thing about the chip." (Participant 2, Focus Group 2)

> "Or, maybe like if it causes, like cancer or something, I don't know, I have no idea about it." (Participant 5, Focus Group 4)

> "Um, I don't know, I'm really struggling like when I was watching the video I felt really anxious, because I feel we are so connected all the time, and I feel like there's this huge trend where we want to go out more in nature where we really want to do disconnect from our phones, where we don't want to feel so connected, and I know like, there was a good point, with it, it works like a pacemaker but, I don't know if I would feel like I have this chip inside me I feel like I'm always connected and I... I don't know, I think like mental health is such a big thing in society today so I don't know if I want to be that connected." (Participant 2, Focus Group 5)

Health overall was seen in both a beneficial and detrimental light. In respect to benefits, the present study is in line with other studies which highlight healthcare system improvements as a potential benefit of RFID implant technology (Michael & Michael, 2013; Patel, 2018). This could also be looked at as subcutaneous technology being more suitable to the health industry. An interesting finding is that participants were more open to using the technology if it offered healthcare benefits. This follows the findings of a study conducted by Smith (2007) which found a higher level of acceptance to use RFID implants if it offered medical applications. As both the present study and Smith (2007) focus on RFID implants, further research is required to determine if health plays a role in determining willingness to use technology for non-invasive technologies.

In a negative light, the implants were seen to be potentially damaging to the mental health of the participants due to the tracking possibilities and overall invasive nature of the implant. In this regard, this deterred participants from wanting to adopt the technology. Invasiveness and privacy concerns are expounded in the next two sub-categories.

Invasiveness

Invasiveness in the present study is understood as the level of intrusion a particular technology exerts on an individual. The topic was seen as valid as multiple participants identified the subcutaneous nature of the technology as a reason not to adopt it. Many respondents claimed that they specifically would not adopt the implants because they found it uncomfortable while others motivated their choice by invoking their fear of needles. The following quotes represent these findings:

> "I don't know, I just like have such a hard time imagining something being inside of me, especially if it would be placed here, like in my hand and then I could feel it and then I would just feel like... I don't know, I would get like a bit anxious because if I feel like "I'm so stressed out", I just feel like so many things are going on then I would just like want to rip the chip out of me." (Participant 2, Focus Group 5)

> "I will not get it because it's needles and I wouldn't get it because I feel like I don't need it, it's not necessary for me…" (Participant 1, Focus Group 2)

> "...I don't know, I think ok technology has advanced a lot, but it's still supposed to be kept separate from us as humans even if we wear a watch or like a fitness band or the Google glasses, whatever it's supposed to be separated from our bodies." (Participant 4, Focus Group 5)

These findings are consistent with those of James et al. (2008) on biometric devices which found that the increased level of physical invasiveness impacts the intention to adopt a technology.

Apart from concerns related to the general discomfort that implants may cause, the participants also suggested that the technology would pose some privacy and safety issues. They mentioned that the implant would allow their actions to be tracked in detail, intruding in their personal life and habits, while others feared that the conditions in which the implants are perform would be unsafe and lead to health issues. The fragments below illustrate these concerns:

> "Well, I think I first heard about it like a couple of years ago, like not this specific chip, but like about the idea of getting a chip implanted and I thought it was just you know like very advanced crazy tech people testing things out. I didn't think it will ever become like a reality. And then I saw it in Black Mirror in like two episodes, I think, the one with memory and the one with the small kid having an implant because her mom crazy about losing her and... I don't know […]"(Participant 4, Focus Group 5)

> "For sure. I think especially since it's an invasive thing that you put in your body. If someone says it's terrible, I mean you wouldn't want that in your body, I guess. (LAUGHTER) Or the opposite, if you see that someone has it and it's ok and it's no issue, it doesn't have any physical reactions to it, then I think you would feel much safer. So... for sure, it's important." (Participant 1, Focus Group 3)

Overall, participants seemed more weary of this technology since it was under the skin and due to the features offered by the technology. The invasive nature and novelty of the technology also had an impact on participants as they noted that they would be less concerned about the invasive nature of the technology if more people adopted it. This illustrates the impact of social influence on the relevance of this determinant in technology adoption. This is further elaborated in the social influence subsection (4.1.4).

Privacy

Another topic that was extensively discussed during the focus groups related to privacy and the use of personal data. Consequently, due to the importance that participants awarded to this issue, a new determinant titled Privacy will be included in revised version of the theoretical framework. The majority of informants believed that RFID implants could pose a serious privacy risk, as more data would be easily collected and shared with companies. They added

that these companies might misuse their personal data recorded through the implants for their own benefit. Furthermore, they also questioned whether implants could be hacked as it could lead to personal data being leaked. The invasive nature of the technology was also considered in line with privacy concerns which resulted in a higher level of concern. The quotes below illustrate these findings:

> "But when a company can track where you are it's also scary as well, because then they'll figure out your lifestyle and then try to perhaps... Marketing will try to sell you stuff like, that's suitable for you and you can already see that today when you Google something. (PEOPLE AGREE) So it's scary to have that on you and they can just collect data, they know exactly." (Participant 5, Focus Group 1)

> "Yeah. You can't turn it off. So I think in general like not knowing, how they're using all your data. I mean of course it depends with the features that it's going to have in future because you said right now it just opens doors but or like oh I don't know what all the features can be but in general like maybe if the technology keeps developing then I don't know what, how they're going to use all that information. And I think that's also like with all the computers, your phone. I think that's like, so everybody's like becoming aware of these issues. So I think that would be most like worrying for me." (Participant 2, Focus Group 2)

> "It is interesting because we put a lot of other things in our bodies that are like artificial but now when it's this um, this, um, implant with the technology and everything and because it has the sensor and it can monitor where I am, I'm more, I'm questioning it more than if it would be something other…" (Participant 1, Focus Group 4)

However, there were some respondents who did not see the privacy risk as high. They motivated this belief by saying that companies already have access to a great deal of their personal data through their phones. They also added that if *bad people* wanted to gain access to their data, they would do so anyway even if the RFID implants did not exist:

> "I think, for me, the privacy sensitive is not really an issue because if bad people want to know more about you or getting all this information, they will find a way to do it. Like all these hackers are getting smarter, so I don't see the whole... That's why I think I'm more positive to this idea." (Participant 3, Focus Group 1)

> "So I mean if, for me it's like... If I'm not scared of using my phone and people know where I am with my phone, then I'm not scared of using my… Or if I'm like, I'm not scared of people using my data online. Then they can have my data on where if I bought at ICA or if I went to the gym then it's…" (Participant 3, Focus Group 2)

Another interesting finding relates to the trust that the participants had in the handlers of their personal data. In that respect, a few respondents expressed positivity towards the way Swedish companies and the Government manages and protects the data of its citizens, making comparisons with other countries such as China and Germany:

> "If this was like a thing started up in China, I would be very skeptical of that because the Government is involved in every part of the decision, but it's in Sweden and it's like a company they want to like do innovation stuff, and Sweden is an innovation hub. So

> I would have more trust for a Swedish product compared to other countries." (Participant 5, Focus Group 2)
>
> "And even in Germany, they… They don't, they are not so technology… Technologically advanced, they kind of resist technology so, I think Sweden is like a special special case that it's so advanced in technology… Not so advanced in technology, but that also people are willing to use um, a lot of technology and also are not afraid that they are going to use, misuse the data… Um, yeah that's what I think it's both culture and infrastructure of the country." (Participant 2, Focus Group 2)

Privacy concerns were cited by some participants as a deterrent in the adoption of human RFID implants. This is in line with studies on RFID implants which cited privacy and tracking as ethical concerns (Clarke, 2010; Michael & Michael, 2013; Patel, 2018). Participants who felt privacy was less of a concern focused on Sweden's infrastructure, high level of innovation and trust in data handlers. Additionally, some participants mentioned that their data was already available and therefore privacy was not a concern. Motivations behind some participants lack of privacy concerns differ from those presented by Herrero, San Martin & Garcia-De los Salmones (2017), who found that consumers saw the risk of privacy as a trade off for sharing their experiences. This finding could be considered important to explore when establishing this determinant in future studies of a similar nature.

Safety

A subject that the respondents often touched upon was the safety of the RFID implant, weighing whether it is more or less safe than existing technologies. Most of the respondents were concerned that the implant would put them in danger. They believed it would facilitate money and data theft or that it would give rise to more kidnappings and other crimes. Furthermore, participants provided vivid descriptions as to how the technology would injure them. The quotes below illustrate their beliefs:

> "What I'm scared of is [...] if I would be a powerful person, if I would be a politician, if I had a lot of money, if I would, you know, run a company whatsoever, it could be so easy to kidnap me and have access. If they are cruel and cut off my hand and then just carry it in the bag and chip it everywhere to get my bank accounts and like I feel stressed about it." (Participant 1, Focus Group 1)
>
> "If you're… If someone drugs you and you know, take your hand and makes you pay things." (Participant 1, Focus Group 2)
>
> "I just keep having this Kingsman in my head, where the chip just exploded (LAUGHTER) like behind people's ears and the head just blew off and just constantly happens in my head. Have you seen that movie?" (Participant 3, Focus Group 5)

Adoption of the RFID implant in this case was associated with dangerous situations which in certain instances were based off of participants relating the implants to the portrayal of the technology in media. This demonstrates the impact of media on perceptions towards technology in which there is limited information. Safety has also been highlighted in other studies on RFID implants as a barrier towards the adoption of RFID implants (Perakslis et al. 2014; Patel, 2018). It is however important to consider that the nature of the technology could have increased safety concerns specifically those of a physical nature. There is therefore a need for future research on

other types of technology. A summary of the findings within additional determinants can be seen in Table 4.8 below:

Table 4.8 Summary of findings for Additional Determinants

Additional Determinants		
Determinant	**Sub-determinants**	**Main findings**
Functionality	Benefits over Existing Technology	• Participants seemed more willing to adopt the RFID implant technology if it offered more benefits over current technology • Some of them preferred existing technologies to serve the same purpose as RFID would
	Features of the Technology	• Utilitarian features and the integration of these features seemed to persuade participants to adopt the technology more than fun or hedonic features did • Additional features seemed more interesting to participants than the current ones
Health	-	• Healthcare system improvements were seen as potential benefits of adopting RFID implants • Consumers were more open to using the technology if it offered healthcare benefits • Some perceived RFID as potentially damaging to their mental health
Invasiveness	-	• Participants seemed skeptical about RFID implants since it was under the skin • Some of the participants would be less concerned about the invasive nature of the technology if more people adopted it
Privacy	-	• Privacy concerns seemed to be a hindrance to the adoption of RFID implants • Participants expressed trust in Swedish infrastructure and data handlers • Some believed that privacy is not a concern as their data is already available
Safety	-	• RFID implants were associated with dangerous situations • Media seemed to play an important role in forming these perceptions

4.2 Effects of Widespread Adoption of Human RFID Implant Adoption on Marketing Activities

This chapter is concerned with presenting and analysing the findings related to the effects of human RFID implants on marketing activities. As previously stated in Chapter 3, the responses have been gathered through interviews with four experts from four different fields: a university professor specialized in digital culture and human RFID implant research; an ICT researcher working at a communications technology company; a CEO who is specialized in biohacking and a director of a university's center for retail marketing research. As human RFID implants and its effects on marketing have not been previously investigated in research, the diversity of the interviewees' specializations enabled us to provide multiple perspectives on this emerging topic. This chapter is structured according to each element of the extended marketing mix framework in ten sections as follows: Product, Place, Price, Promotion, People, Procedures, Physical Assets, Personalisation, Politics and Performance. At the end of every section the main findings will be presented in the form of a figure to allow a better visualization of the results.

4.2.1 Product

The Product dimension encompasses the combination of products and services a company provides to its target customers and can include features such as quality of the product, packaging, kind and quality of the service (McCarthy, 1964; Kotler et al. 2013). The interviewees had differing opinions on the effect that implants would have on this particular element of the marketing mix, with some saying that there would be a movement towards more digitalized services, while others believed there would be few implications for product and service design. However, Expert 4 felt that there would definitely be implications on the design of the products and services due to the fact that more information on consumers behaviour would become available to firms:

> "Absolutely, I am thinking about how much more information we would have on human behavior in different circumstances. We also have this with our phones but this is something we for sure always carry around." (Expert 4, Retail Marketing Expert)

In addition, Expert 3 considered that if RFID implants became commonly adopted, products and services would become more customer-centric. In addition, instead of customers acquiring products, devices would be provided in exchange for the customers' data. In this way, existing business models would shift to become more subscription-based as firms would need to subscribe to the customers' data.

> "It would be way more customer centric and the business model of making the user the product would be flipped. People would have to subscribe or companies or any company who leans on a business model where they aggregate data from the user and sell and thirst for it fits would have to start providing hardware and subscribe to the user's data." (Expert 3, CEO & Biohacking Expert)

The propositions made by Expert 3 in regards to customer centricity support Porter and Heppelmann (2015), who found that company interactions with customers will be enhanced as the companies will focus on maximizing customer value. Porter and Heppelmann (2015) also

state that customer analytics could be used to improve product and service design. This supports Expert 4's contributions on product and service implications through customer analytics.

On the other hand, Expert 2 did not agree that there would be major changes made to the Product dimension if human RFID implants became widely-adopted. The interviewee added that both the product and service design implications would be minimal due to the fact that smartphones function in a similar way. The only area where he considered that microchips would be more successful was in commuting situations where users do not want to use their phones for fear of damaging them:

> "I think the products and service design implication would be relatively small, because um, actually today we have smartphones with similar functionality and and, the just sort of implementation of issues or let's say implications for services and so on I think are fairly similar between smartphones and imbedded chips. [...] One area we found where, an implant like that would have major, potentially major implication is actually, in commuting situations um, people are, sometimes worried about touching their device on...so you have an entry gate kind of into the subway system and stuff and then people are saying I don't want to do that with my device because I can drop it to it can get um, scratched if I do it often so putting your hand there could be uh, kind of an improvement." (Expert 2, ICT Researcher)

However, Expert 1 felt that human RFID implants would lead to some changes, in particular in the service sector. As the implant is a very personal device, firms would be able to provide more individualized services, an aspect which is further detailed in Chapter 4.2.8 Personalization. Furthermore, another implication would be that services would become more and more digital, which would come with security issues. The expert further states that not all firms might be able to adapt to the level of security that they need to provide. The following quote illustrates this:

> "Well, obviously more services would be digital. There is also a big question about security here that has to be taken into account, so I'm not sure how different types of services could keep pace with that, really. It will be hard for some of them to do that and I wonder what happens with those that fall out of the frame, kind of. That will not provide the security level that is required, but…" (Expert 1, University Professor)

The digitalization of services is also pointed out by Porter and Heppelmann (2015) who found that smart and connected technologies would allow for future delivery of many services online and for the alteration of products remotely. Expert 1, however, offers additional insights into possible security concerns which could arise from this digitalization.

In brief, majority of the experts believed that there would be product and service implications should human RFID implants become widespread, but each expressed different ideas such as customer centricity, companies subscribing to clients' data by providing them free products and increased digitalization of services. One expert believed that there were few implications for product and service design as human RFID implants have similar functionalities to smartphones. The main findings of this section are summarized in Figure 4.1 below:

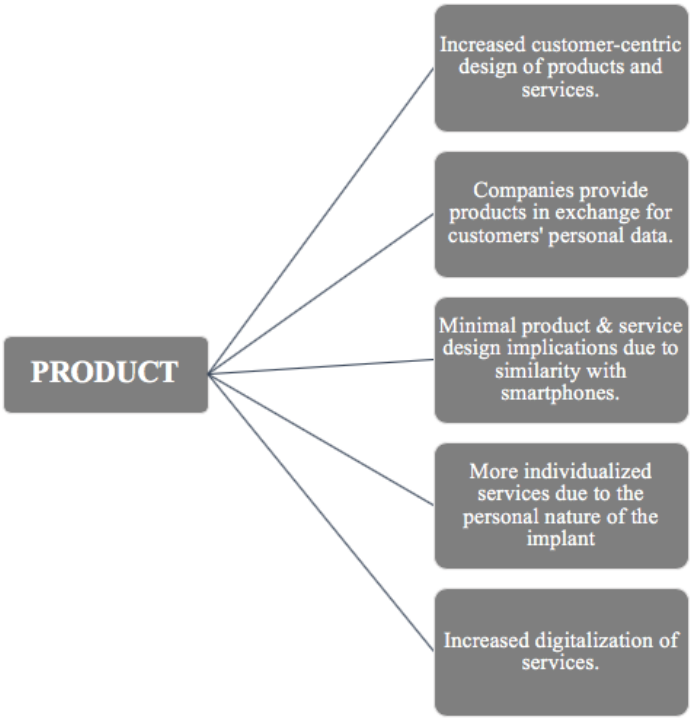


Figure 4.1 Summary of findings for the Product element

4.2.2 Place

This particular element of the marketing mix refers to the channels through which the products and services are distributed with examples including retailing, wholesaling, logistics and the touchpoints through which customers can acquire the goods (McCarthy, 1964; Kotler et al. 2013). Some interviewees considered that RFID implants could facilitate the development of even more online channels through which products and services can be distributed. However, one expert mentioned that in order for that scenario to happen, there is a need for the development of a *user-friendly platform* to which the user's implant is connected. This confirms the findings of Joseph and Stone (2003), who, after studying technology's impact in the banking sector, found that any platform which utilizes technology, should be designed to be as user-friendly as the situation allows. The fragment below highlights the ideas above:

> "I think the most important effects would come with online channels, and it becomes an internet of things but with humans." (Expert 4, Retail Marketing Expert)

> "I think for the chip to work there has to be some kind of user friendliness that has to go through some kind of platform if we compare it to Apple Store. There will have to be something like that also for the chip, I guess. So... And if we look at what happens with Apple Store, everything is online there, it's digital. It's not so much offline. And I think the... if there is a development of such a platform that makes it more user-friendly it could absolutely boost the online services and consumption of things, sure, sure. But this is IF it happens, right?" (Expert 1, University Professor)

Furthermore, Expert 1 also added that human RFID implants would have an effect on the supply chain, as it could eliminate middlemen. The interviewee provided an example from their

research within RFID implant adoption in which implanted respondents viewed doctors as middlemen who could be replaced by an AI or software. This is similar to findings of Álvarez López et al. (2018) who explained that RFID technology systems in medical systems can reshape the distribution of drugs. However, the authors did not consider doctor replacement, which represents our study's point of departure. Expert 1 indicated that the machine would automatically be able read and interpret health data from the RFID implant, possibly giving a more accurate and quicker diagnosis than a human doctor:

> "But I also think about the health sector, for example, but the people I've talked to a lot... They're talking about the doctors as the middlemen here and that is crazy because they have hopes that this chip could collect data from their bodies. A lot of data, big data. And that could be used for diagnosing much more accurate than if a doctor would feel your forehead or ask you questions or anything. So this data will make much more accurate diagnosis. And I have had some informants that say maybe we don't even have to give them, this data, to doctors, but instead to an AI of some kind that [...] could process the data and extract exactly what it's looking for."

Another expert, specialising in ICT research, explained that RFID implants could be used to the benefit of both online and offline channels. On the one hand, RFID implants could be used to digitalize logistics services. On the other hand, as RFID implants do not need an internet connection to work, they could facilitate offline interactions at a more local level. This is congruent with the findings of Sun (2012) who highlights the importance of RFID technology in supply chains. The author discovered that RFID can, for instance, replace old barcodes and increase the visibility of goods. The quote below illustrates the expert's point of view:

> "I mean potentially of course what you can with RFID, you can do various kinds of tracking. So, potentially if you know that everyone has a chip in his or her wrist or something like that yeah, you, you could of course implement types of services that are more related to tracking so that would potentially have an impact on let's say logistics oriented services moving much more online than they are online. [...] Because it could be handled only locally, so if I have, if you have your RFID and you have a sensor device, it doesn't have to be connected, you can do a local kind of interaction somehow that isn't leaving a digital footprint behind. [...] I mean it depends again on the perspective of people so how would RFID build sort of, implanted RFID play into a system like that. I think it would, it could play in both sides." (Expert 2, ICT Researcher)

In addition, Expert 3 presented a distinct perspective based on their belief that companies would subscribe to their customer's data by providing them free *hardware*, as previously explained in Chapter 4.2.1 Product. The interviewee considered that due to this subscription model, companies would need a more direct channel to interact with customers, while marketing activities would be on a request basis:

> "I mean, when user's the root key, you would need a direct channel. Marketing activities would be on request, like, can, is there someone that wants to sell this type of data, we want to target you with this and someone would accept and there would be a transaction between the two but it would be peer to peer transaction rather than the user being part of the, you know, a build of demography: Caucasian, male, 35, this area, likes golf." (Expert 3, CEO & Biohacking Expert)

On the whole, some experts believe that human RFID implants would shift the focus even more on developing online channels. One expert, in particular, considered that RFID implants would be beneficial not only for online channels, but also in offline channels as the technology does not need an internet connection to function. The findings of this section are summarized in Figure 4.2 below:

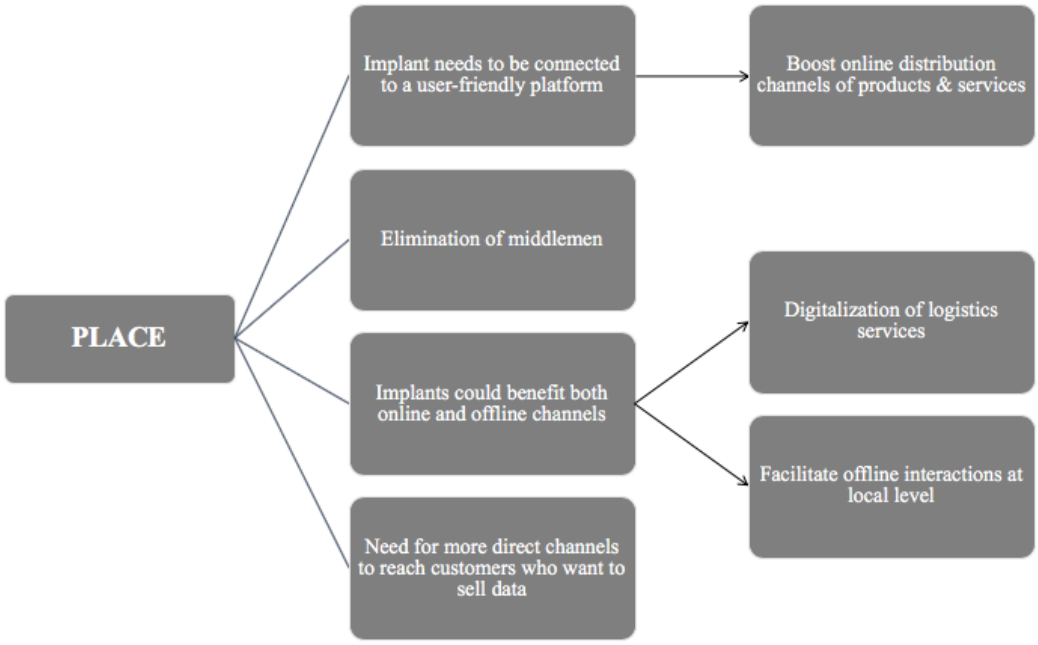


Figure 4.2 Summary of findings for the Place element

4.2.3 Promotion

Promotion is concerned with communicating the benefits of products and services to the target market in order to convince customers to purchase (Kotler et al. 2013). It includes activities such as advertising, public relations and sales promotion (McCarthy, 1964). The main insight that was drawn from the interviewees' responses is that the activities pertaining to Promotion would become more personalized to the individual buyer if human RFID implants became widespread. As a result, this chapter is strongly interrelated with Chapter 4.2.8 Personalization.

Expert 3 highlights that in a future where RFID implants are adopted by most people, promotions and advertising would be facilitated by machines equipped with Artificial Intelligence (AI). These machines would be able to read the data recorded from the customers' microchip and provide personalized product and service recommendations for its user, an aspect discussed in more detail in Chapter 4.2.8 Personalization. The expert further adds that in this way marketing would become an automated activity:

> "You know, I mean AI will take bigger and bigger market shares and decision-making in marketing [...] I think you'd kinda tune and tweak the preference on your AI and if you share that preference to anyone wanting to market Chinese food and that would be part of your subscription or it would be part of their subscription so they'd have subscribed to your preference and market everything on different channels in different ways because you basically market to an AI. So you would buy a preconceived notion

> from an AI of what the user will want soon or most likely depending on weather. So, I guess that would be very much automated in a way." (Expert 3, CEO & Biohacking Expert)

Expert 3's sentiments closely relate to those put forward by Sterne (2017) who found that artificial intelligence would be involved in the process of personalization, specifically through the creation of targeted advertising. In this way, RFID implants are seen as a complimentary technology to artificial intelligence. Expert 3 however goes a step further by stating advertising would no longer be companies to customers, but AI machines marketing to other AI machines.

In addition, several experts noted that the implants would allow firms to provide more individualized products and services to their customers. This finding is presented more in detail in Chapter 4.2.8 Personalization. An example is illustrated in the quote below:

> "Well, again, we have this individualized... Both the marketing and the style of the marketing and also the content of the marketing, I guess, will be more directed to the individual in a way." (Expert 1, University Professor)

To sum up, the most prominent finding regarding Promotion is that advertising activities would become increasingly personalized according to each individual buyer. This would be possible as data recorded by implants would paint a more comprehensive picture of the customer's behavior. This is in line with Kumar and Gupta (2016), who also find that this process of *mass customization* could lead to improved customer engagement. A summary of the findings presented during this section is illustrated in Figure 4.3 below:

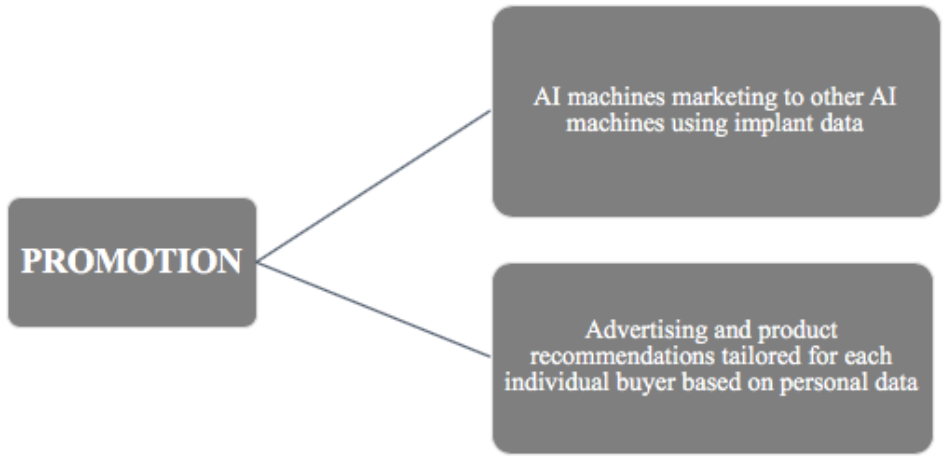


Figure 4.3 Summary of findings for the Promotion element

4.2.4 Price

As mentioned in Chapter 2.3.1, the Price element refers to the amount of money charged for goods and services (Kotler & Armstrong, 2006). The experts had varying ideas on how RFID implants would impact the prices of other goods and services. Expert 3 stated that price would be viewed in terms of an exchange, however not in the monetary sense. This sentiment is outlined in Chapter 4.2.1 Product, where the expert continues to state that customers would

receive products or *hardware* in exchange for their data. Essentially, this would transform the user's personal data into a powerful currency. This supports the findings of Eggers, Hamill and Ali (2013) who explain that personal data could be used as the new currency since many business transactions involve purchasing and selling data.

Moreover, two experts agree that prices would fall, although they provide different reasons for why that could happen. Expert 4 believes prices would decrease due to the fact that customers would be able to sell their data to companies in exchange for cheaper products and services. Furthermore, Expert 1 considered that the reason for prices falling would be the elimination of several processes, leading to seamlessness. Their beliefs are illustrated in the fragments below:

> "Yes pricing could be affected as I guess there is a build in effect depending in industry standard (if you can change, prices will fall, if you can not prices will stay up). In general I guess that pricing would fall as humans also get the option with implants to sell their data." (Expert 4, Retail Marketing Expert)

> "Well, I can't really see any immediate reasons for raising the prices really, with this technology, because the... If everything is more smooth, or seamless in this process, the prices will not have to be, to cover that kind of transition, well not transition, but the process that has been eliminated with the seamlessness, I guess. So, probably if I had to choose one I would say cheaper, then." (Expert 1, University Professor)

On the other hand, Expert 2 believed that RFID implants could lead to both the increase and decrease in the prices of other goods. However, the interviewee added that the price change would still rely on several factors such as the business model of the company, the targeted customers, cultural context or the type of service offered. The following quote represents the above:

> "Yes, of course RFID could be a technology potentially used for increasing personalisation and and... Which I think is very much related to advertising business model, so then it could have an impact on the pricing [...] Well I think it can be both so it depends both on the target group and the type of service and the cultural context of that so it can be, so but a lot of these, so technology are used for these things of course yes." (Expert 2, ICT Researcher)

In brief, some experts consider the adoption of the implants would lead to a decrease in other goods' prices, while one interviewee believed it could influence it both negatively or positively. Interestingly, one expert thought that the data collected by the implants could transform into a currency with which consumers could use to purchase products and services. The main findings of this section are summarized in Figure 4.4 below:

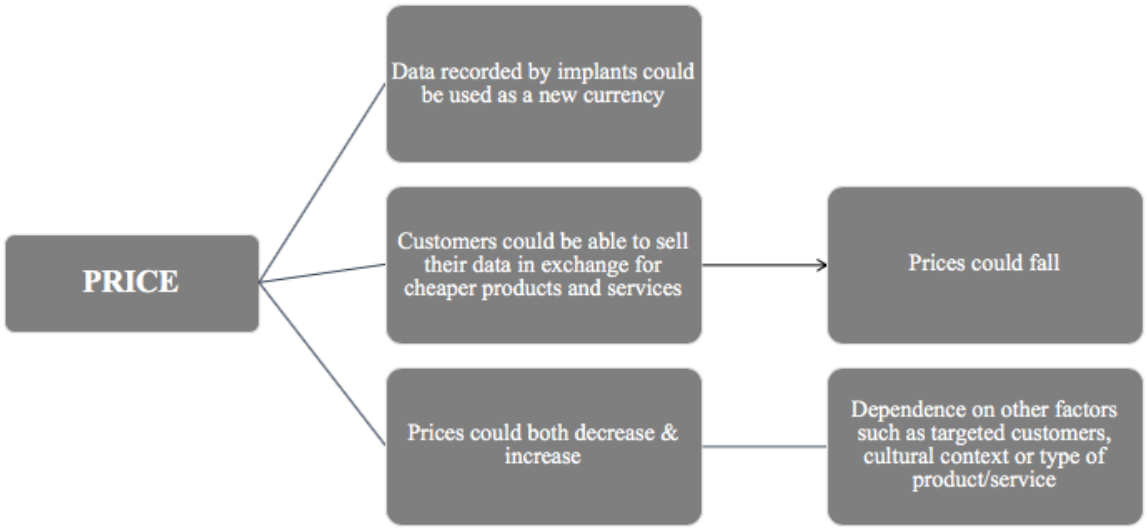


Figure 4.4 Summary of findings for the Price element

4.2.5 People

This particular dimension is concerned with the ways employees are able to influence the perceptions and purchase intentions of customers through interactions with them, especially but not limited to, the setting of a physical store (Booms & Bitner, 1982; Vignali & Davies, 1994; Goldsmith, 1999; Tracy, 2004; Kotler & Keller, 2012). The effect that RFID implants could have on the employee-customer relationship was heavily discussed by the interviewees, thus awarding it great importance.

Firstly, majority of the respondents believed that human RFID implants could prove to be beneficial in increasing not only the number of engagements, but also the level of trust in the customer-employee dynamic. An expert motivated this idea by explaining how the automation of some activities such as attending at cash registers would be enabled by RFID implants. The automation of certain tasks would then free up the employees' time, allowing them to focus on providing more attention and better service to customers. As a result, customers would benefit from an enhanced shopping experience which would motivate them to return to the same store to purchase again. The following excerpt illustrates the above:

> "On the other hand, you can also see stores where you have a high service orientation so you would imagine that rather than spending all this cost for people in cash registers, they can instead be available as consultants to you in the store so you don't, you don't lower the overall employment cost in the store but what you do is you focus all that cost of hiring personnel in actually serving the customers. So the cash register is not serving the customer, it's serving the store owner, getting the money and it's kind of, their job right? So not your, if you didn't have to pay you would be equally happy to go to the store, you would be even happier maybe, right? So, so cash registers don't serve you they serve the retailer, but then if you, you imagine if they put all that emphasis on actually serving you instead, of course this technology can actually increase the interaction very much." (Expert 2, ICT Researcher)

Furthermore, Expert 2 also added that in areas where the population density is low and hiring store employees could prove to be difficult, RFID implants could aid in operating fully-automated shops in these areas. As a result, even though there would be no employee interaction, the citizens of small towns could enjoy more convenient access to everyday-use products, while the business operating the shop would benefit from lower personnel costs. The quote below exemplifies the concept:

> "So, you have areas there are very few people living and the stores are every far away and one way to making it possible to have a store at all could be to have a fully automated one and actually they are using what's in Sweden called Bank ID. So, you actually use your bank ID, the same one you actually use to sort of authorize the Swish payment for example, just to enter the store, so that's... Yes they could potentially do that with the, RFID as well, but now they are using Bank ID because that's an infrastructure already available to people so, so in that case there would be no people in the store because the business model for making that possible would be to reduce costs." (Expert 2, ICT Researcher)

Another expert explained that due to the fact that in the future there will be more services rather than physical stores, the RFID implants could ease the delivery process by providing employees direct access in the customers' home in order to deliver packages. As a result, the expert argued that customers would become more trusting of employees as the implant would allow them to monitor when they enter and exit the house:

> "We can trust other people, to you know, the level of trust is increased so much that you can let someone enter your house, so deliver this, put in my fridge and you will know with a hundred percent certainty that that person opened the door within the window he had between eleven and eleven and fifteen, he went into my house, he took the exact route to the fridge and he put my groceries in there and he exited seven minutes later. And the camera, like shooting it, it will verify and the implant that the delivery guy used that verifies that he is he and he works in that place, he has been working there... I mean you don't need to know those data points but all you have to know: *Is this is the right guy doing this thing that I requested?* That's it." (Expert 3, CEO & Biohacking Expert)

Furthermore, Expert 4 believes that the number of interactions between customers and employees would be increased as a result of large scale RFID implant adoption. The interviewee suggests that data gathered by the implants could also provide insights about the improvements a company could make in their service and customer experience:

> "Hopefully increase as each customer carry more info and services can be adjusted. Implants could measure waiting time, what people bought last time etc etc more info available about the customer." (Expert 4, Retail Marketing Expert)

On the other hand, Expert 1 considered that if RFID implants were to become commonly adopted, this could possibly lead to the elimination human interaction, including that between employees and customers. Additionally, the interviewee expressed some difficulty in imagining a future where shops have no employees due to the fact that they believed it is in human nature to socialise with others:

> "I mean the chip is eliminating all human contact, really. That is the idea with it, I guess. And I had... I've talked to people who say that *I want a chip because it's so fascinating*

to think about that my body could talk immediately to a machine, you know. So there is no human interaction and there is no human in between that is part of the process, processing of anything.

But... I have problems to see how it can last forever. I mean, there will be some kind of backlash even if this happens to every store we know. It will be some kind of backlash because I think human beings, I mean psychological health, we need to have social interaction." (Expert 1, University Professor)

To sum up, the majority of the interviewees believed not only that the customers' interactions with employees would not diminish, but also that they could possibly increase along with trust. Consequently, with regard to the People element of the marketing mix, the findings of this study are in line with Pantano and Migliarese (2014) who demonstrated that new technologies such as self-service cash-desks and interactive information kiosks have a positive effect on the employee-customer relationship. Figure 4.5 below summarizes the main findings of this section:

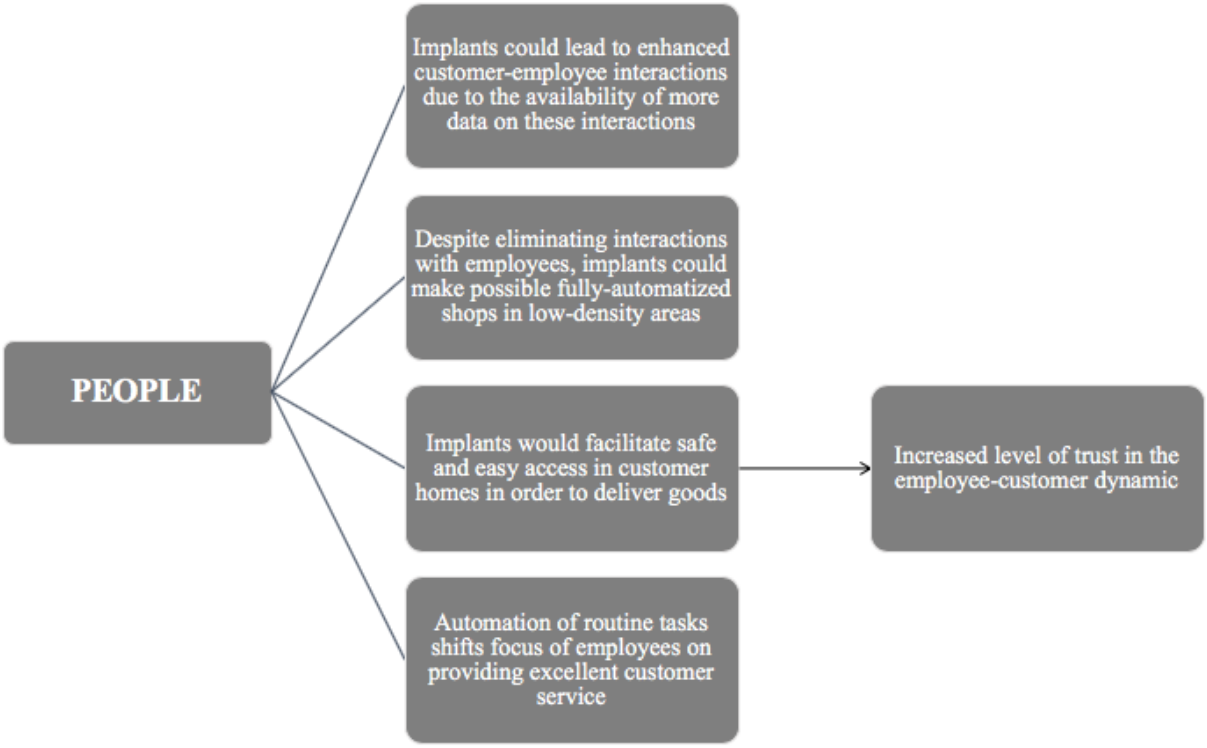


Figure 4.5 Summary of findings for the People element

4.2.6 Procedures

This element refers to the flow of marketing activities and processes which allow the product or service to reach the customer in a structured way (Booms & Bitner, 1982; Goldsmith, 1999; Kotler & Keller, 2012). This concept includes aspects such as in-store customer experience and supply chain logistics. The findings suggest that the flow of marketing activities would be affected if human RFID implants were normalized. Expert 4 believed that the companies would be forced to adjust their marketing processes due to disruptions in their business model:

> "Yes, I see a lot of companies having to change as their business models get disrupted". (Expert 4, Retail Marketing Expert)

This particular insight is supported by the other findings of this study which show that changes in Procedures would lead to shifts in the other marketing mix elements, such as Physical Assets and People. Generally, the experts pointed to the fact that RFID implants could allow more automation of certain processes such as in-store payments and logistics, which are further detailed in Chapter 4.2.7 Physical Assets.

Furthermore, Expert 1 believed that the adoption of the implants would lead to less employee-customer interactions. The interviewee expressed concern over how the customer experience would be improved if there was less or no engagement between customers and employees:

> "It's an experience and everything in society is so much experience directed right now and the social interaction is such a big part of that experience. So, there are two things clashing here, really. Removing the social interactions and pushing the experience part forward - I can't really see how those can exist at the same time. They're so different for me, yes." (Expert 1, University Professor)

However, most experts agreed that a consequence of automation would be the reassignment of employees to other tasks that involve direct contact with consumers. This would lead to an improved customer-employee relationship and a focus shift to providing superior customer service, as further elaborated in Chapter 4.2.5 People. These findings are congruent with Novotny, David and Csafor (2015) who found that innovations based on RFID technology such as smart mirrors or smart fitting rooms can improve customer experience and increase check-out ease. On the other hand, the findings departs from the aforementioned study in the sense that the enhancement of customer experience is mainly derived from improved interactions between employees and customers facilitated by RFID implants. The main findings of this section are illustrated in Figure 4.6 below:

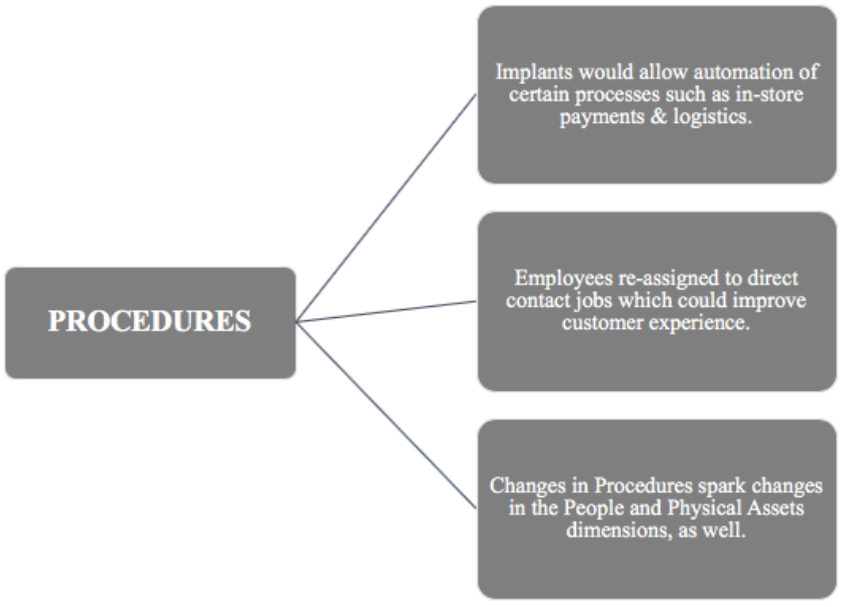


Figure 4.6 Summary of findings for the Procedures element

4.2.7 Physical Assets

This dimension of the extended marketing mix framework is concerned with the physical setting in which customers interact with the firm's employees and where products and services can be purchased. Examples that can be included in the Physical Assets dimension are store equipment, decor or product presentation. With regard to this element, the experts had varying opinions.

Expert 2 felt that stores could change as a result of RFID implants by becoming more automated, as cash registers would be eliminated. Along with automation of payments, the interviewee mentioned that by redesigning their shops in a showroom style, retailers would be able to focus more on providing superior service and an integrated customer experience.

> "But, so if the online retailers they sort of do more of the showroom kind of thing, maybe this way you can also have RFID technologies playing, more so they can link that back into their logistics systems [...] So the focus will be of course for providing this sort of integrated smooth experience for the consumer." (Expert 2, ICT Researcher)

Expert 2 further added that the merging of online and offline shopping is already a growing phenomenon, named *in-line shopping*. The interviewee suggests that human RFID implants could contribute to providing customers shopping in stores with more in-line experiences, which are already considered a competitive advantage.

> "But then you have all this new waves of, all this new types of technologies that come in, so I think again RFID could potentially play a part in this, and it would play both then so, on the one hand, how do you increase service level in the store? Then you can use RFID. But, on the other hand, if you think about the the traditional, online retailers I mean truly, typically the Amazons of the world, they are focused on the logistics side of this and of course there RFID is already playing a big role and that will continue to grow [...] Because the competition... To get the consumer to use your retail experience which is now a combination of... It's an in-line experience, it's a combination of on and offline. The competition will increase because you have players coming from both sides, into, and they are meeting in the middle so to speak so, all of these technologies will be used." (Expert 2, ICT Researcher)

Expert 3 provided an account of an even more technologically-advanced future by saying that there would be no more physical stores once human RFID implants become adopted by the majority. Instead, the interviewee viewed stores as more of a *social meeting place* and stated that the emphasis will be shifted to providing services. Therefore, customers would only order products online and have them delivered at home where they can be tested before buying them, eliminating the need for physical shops. The following fragment illustrates the expert's view:

> "If you wanna see stuff physically, if you wanna touch them before you kinda buy them, if you just kinda decide, ok this is what I want but then after three weeks, again just subscription and they will end up in your house or in your refrigerator by service. Because the people that kind of, only people standing in cash register will be, you know, they would be freed up. So, to be able to kinda put the HR to good use they will most likely be the ones delivering the groceries, so the things that people need, that people want." (Expert 3, CEO & Biohacking Expert)

However, Expert 1 found difficulty in expressing her thoughts as the interviewee felt that it would be difficult to imagine how human RFID implants could change the setting of the store. The expert also did not believe that the implants would allow customers to interact with store displays in order to receive more information about the products that are sold. This was due to existing technologies being sufficient in fulfilling this purpose:

> "But I have some problems to think about stores with, where you use your chips only [...] Well, I can't really see why that needs a chip, really. Because you could also push a button next to the product and you would get the information on a TV screen and stuff. Well, I'm not sure about that, but... Well, no, I don't see how a chip inside your body would be needed in that situation, really, to get information about the product." (Expert 1, University Professor)

In brief, majority of the experts believe that the store environment would be altered to some extent if human RFID implants became widely-adopted by consumers. According to the interviewees, the microchip would enable retailers to increase focus on providing higher quality services, as well as more in-line shopping experiences. These findings are in line with Sorace et al. (2015) who found that in recent years the retail landscape has been changed due to innovative technologies being incorporated in the physical store. Therefore, the present study strengthens the belief that the retail space will become increasingly digitalized in order to provide interactive customer experiences. A summary of the main findings can be found in Figure 4.7 below:

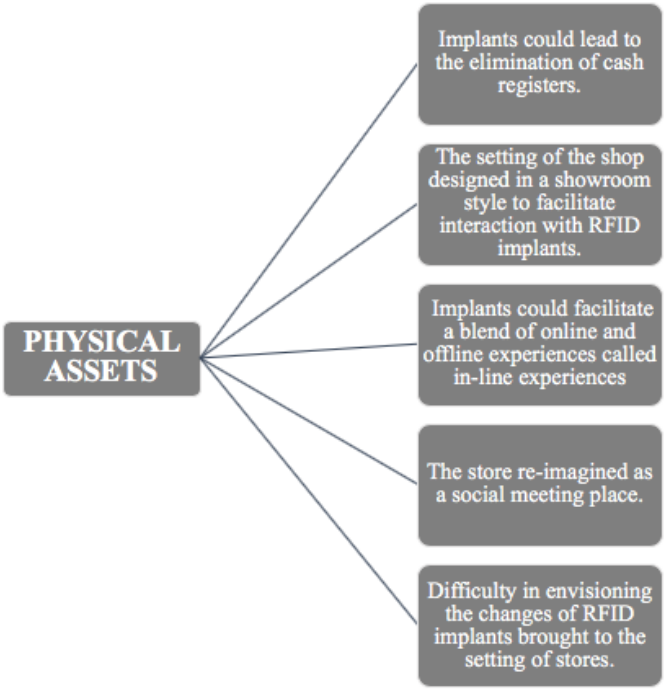


Figure 4.7 Summary of findings for the Physical Assets element

4.2.8 Personalization

The Personalization dimension refers to which aspects of the product or service can be customized for each customer, as well as the degree of their customization (Goldsmith, 1999). This element of the marketing mix has been mentioned the most often by all of the interviewees. The findings regarding Personalization suggest that the respondents only talked about it in relation to other dimensions of the marketing mix such as Product and Promotion.

All interviewees believed that RFID implants would enable companies to provide their customers with more customization opportunities. However, each expert talked about personalization in different contexts. Expert 4, specialising in Retail Marketing, believed that personalization will be the *main thing* that RFID implants would change when it comes to marketing activities, adding that companies would be more pressured to create products and services that are customised to each buyer: "No chance anymore to not do that for customers!" (Expert 4, Retail Marketing Expert)

Furthermore, Expert 3, specializing in RFID implants and biohacking, viewed the potential for personalization that an advanced version of today's microchip implants could provide in close connection with other technologies, such as Artificial Intelligence (AI). The interviewee specifically presented a scenario in which an AI device would be able to make personalized recommendations based on data recorded through the implant:

> "So, I'd say if any usage of AI in your everyday life to kind of optimise choice and *where do I eat today*? So depending on the sharing preference you have, if you use an AI to kinda let you, to let an AI big data. I wanna go out and eat. It will suggest: *Well, the weather is shit today and you had Thai and kebab for the last four times you were out in bad weather so now it's time for Chinese and these are the two best places in town and this one you haven't visited yet*. [...] And that would be a split second decision, like a microsecond and that would pop-up and that would automatically generate a reaction that's predefined.
>
> It probably would be personalised and controlled by the user so through the use and only accessed by an implant, not necessarily RFID because even though it is extremely robust and good way of using since it's subcutaneous I would say would have other means of transferring data because NFC is limited by bandwidth to the amount of data it can push in a second." (Expert 3, CEO & Biohacking Expert)

Expert 2 supported the idea that RFID implants could facilitate the personalisation of promotional activities, naming it *localized promotion*. In the example provided by the interviewee, the implant interacts with a machine in order to receive a product recommendation. This product would be suitable to the customer's preferences as it would be based on data that the implant shared with the machine. The interviewee envisioned the following scenario:

> "So I mean if I [...] go to the coffee machine here to buy coffee, as soon as I sort of start touching this panel, I'm going to be close enough for this device to, to uh, know that it's me somehow, so then of course it could tell me well you know normally, you would drink this kind of coffee, but the water here is actually, water quality is different here because you're in Stockholm and it's softer water than in Lund let's say, so we would recommend you to do, to have this kind of coffee instead or whatever." (Expert 2, ICT Researcher)

Another expert, a university professor specializing in human RFID implant research, also believed that the implant would mainly enable personalization in terms of services and advertising, their view was previously presented in Chapter 4.2.1 Product and Chapter 4.2.3 Promotion. According to this expert, there would also be great potential in medicine for the implant as it would allow for more customized treatments:

> "How could anything be individualized and optimized for me in a system that really... It relies on like research studies on 20-year-old males or whatever, you know, when they develop new kind of medicines. But this, the data here about me will give the machine or the doctor or whatever it is, the possibility to individualise my dosage of medicine, for example. Maybe this research shows that males in their 20s need like 4 tablets a day, but my data shows that I work best when I get 2 and a half, because I'm female and I'm 60. So, everything will be optimized for every individual." (Expert 1, University Professor)

However, the expert also vividly described a scenario in which personalization facilitated by implants could have a negative effect on humans. The availability of a large volume of personal data could impose more responsibility to lead healthy lifestyles on those who have the implant, thus making them feel controlled by the implant. In the following excerpt, the same expert also suggests that some products that are not healthy might even disappear from store shelves:

> "So, let's say that you walk through the aisle and you get like information about... Well, you need protein and you need (LAUGHTER)... You need some vitamin C and vitamin C you can get from this and this and this. There will surely be a lot of goods that will never ever be bought. Like all candy, all sugar, all everything, but what will happen when you still buy that and eat that. Will there be some kind of... Oh, this is scary! Will be some kind of feedback from the chip that ok, you didn't listen to me so now you've... I'm sorry, but it's worse than before now. And then your doctor sees this or your machine and like ok... You're doing this to yourself and it's back to the responsibility. It's all yours!"

In summary, all experts agreed that human RFID implants would greatly facilitate personalization in multiple areas of the marketing mix. These findings are supported by Bharadwaj, Bharadwaj and Konsynski (1999) who discovered that technology not only improves a companies' ability to provide products tailored to the customer's needs, but it also allows for better individualization of services. Furthermore, as the implants would record large quantities of personal data about their users, the experts suggest that it would allow companies to provide not only more customized products and services, but also more individualized advertising. However, they also alluded to the fact that there might be a need for other technologies to interpret that data, such as AI devices. As a result, the present findings expand on the study conducted by Bharadwaj, Bharadwaj and Konsynski (1999) by adding that technology, namely human RFID implants, could also provide more personalization opportunities in advertising. Figure 4.8 below illustrates the main findings related to this section:

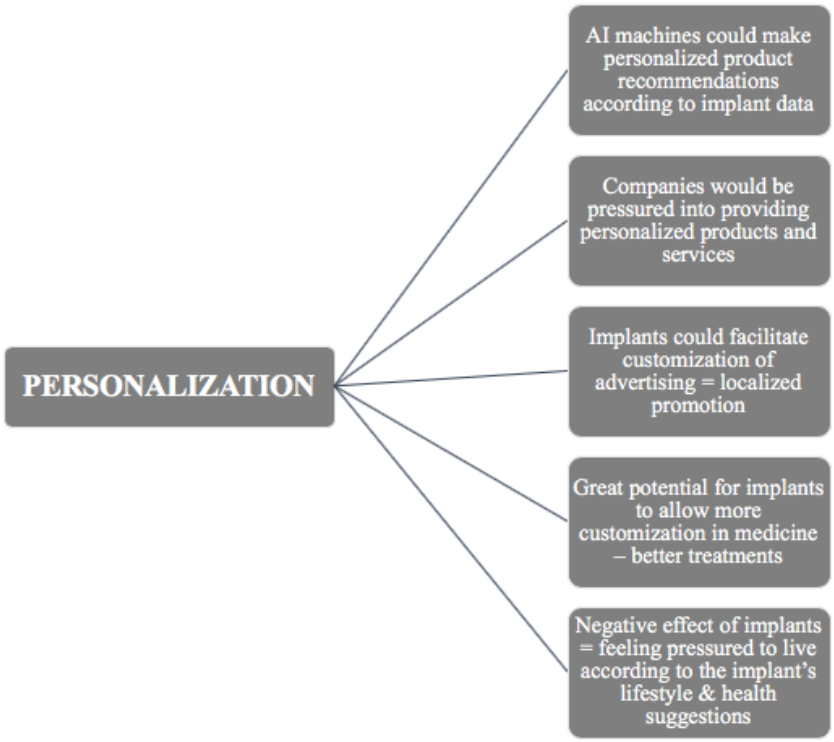


Figure 4.8 Summary of findings for the Personalization element

4.2.9 Politics

This element relates to the companies' ability to negotiate and influence external parties such as intermediaries, distributors or legislators (Kotler, 1986; Baumgartner, 1991). In this respect, the interviewees generally suggest that human RFID implants could possibly have an effect on the companies' negotiating power. According to Expert 2, there is already an existing trend in retail for firms to become more data driven. As human RFID implants could facilitate the collection of even more data, this would have an impact on the entire supply chain. Additionally, the power imbalance between platform owners and platform participants would become even more profound as platform owners could choose what data to share with the participants. The following quotes illustrate the expert's opinion:

> "The overall sort of change scenario is, of course, that we are becoming… Retail is becoming much more data driven. [...] If the tracking technology is sort of... Is then on the, let's say, the grocery store level then the retailer may have a lot of use of that but not necessarily the producer of that particular product. So, it depends on what is your role in this ecosystem and what is the platform and are you owning the platform or are you just participating in the platform? Because if you are participating in the platform then that technology will probably just as much, likely work against you." (Expert 2, ICT Researcher)

> "We see retailers from all walks becoming more data driven so in that sense yes of course, that data is also analysed to a higher degree than ever before and this will have, impact on the sort of suppliers and down the sort of, the chain in the ecosystem, of course, yes." (Expert 2, ICT Researcher)

Furthermore, Expert 4 also agrees that the adoption of human RFID implants would bring changes in a companies' ability to influence other parties. Despite the fact that this increased power would come with many opportunities, the interviewee warns it would most likely come with integrity issues, similar to those posed by smartphones, and not even those issues have not been solved yet:

> "Yes, it will influence and one of the main things will be not all the opportunities it creates but also all the integrity issues with it. Those are not dealt with concerning our phones yet and certainly not with implants. And that is the major barrier I think." (Expert 4, Retail Marketing Expert)

On the other hand, Expert 1, a university professor and specialist in RFID research, believed that while data is still considered a very valuable asset at the moment, the RFID implants would lead to a decrease in the data's value in the future due to the fact that there would be large volumes of it. The interviewee considered that instead of having large quantities of data, knowing how to manipulate and interpret the data instead would become more valuable for companies. This finding is in line with Eggers, Hamill and Ali (2013) who concur with the idea that data appreciates in value when relevant information is extracted, thus its value can be measured easily. The fragment below illustrates the respondent's thoughts:

> "But still, data is like a very respected currency [...] But who knows what will happen in the future, when it gets kind of inflation [...] Too much data and it will not be... I mean everyone will see that it's not worth so much anymore because you can do anything with data, really it's so malleable. You can... Whatever you ask to this big big data cloud, you can get an answer to that question. Because there are so many paths you can follow and so many conclusions you can make." (Expert 1, University Professor)

Expert 3, specialized in biohacking and RFID implants, had a contrasting point as compared to the other respondents. The interviewee specified that instead of companies holding the power to influence, the RFID implants would shift the power to the users. The expert also added that data, in particular, psychometrics, is an extremely powerful negotiating tool and those who have power over the data market also have the capacity to shape legislation and policies:

> "I mean power, leveraging power over data is extreme. So, what happens if the user is the actual sovereign owner and sovereign controller of the data? [...] So, the data market is so extremely powerful because of psychometrics and if you can govern the market you can govern a lot since the market is what kind of shapes policies and creates friends and not friends and I think it's an extremely powerful tool." (Expert 3, CEO & Biohacking Expert)

On the whole, the interviewees generally consider that human RFID implants would, on the one hand have the ability to influence the negotiating power in favor of the companies which gather data. On the other hand, implants could also instead shift the power to consumers. These findings are in accordance with previous studies and reports which have found that big data can provide enhanced competitiveness and an ability to innovate (Chui, Manyika & Bughin, 2011), as well as lead to the creation of new bargaining points in B2B negotiations (SmartData Collective, 2017). However, these results differ from the aforementioned studies in the sense that the authors had not taken into consideration that big data would be able to empower

customers instead of companies. A summary of the main findings is illustrated in Figure 4.9 below:

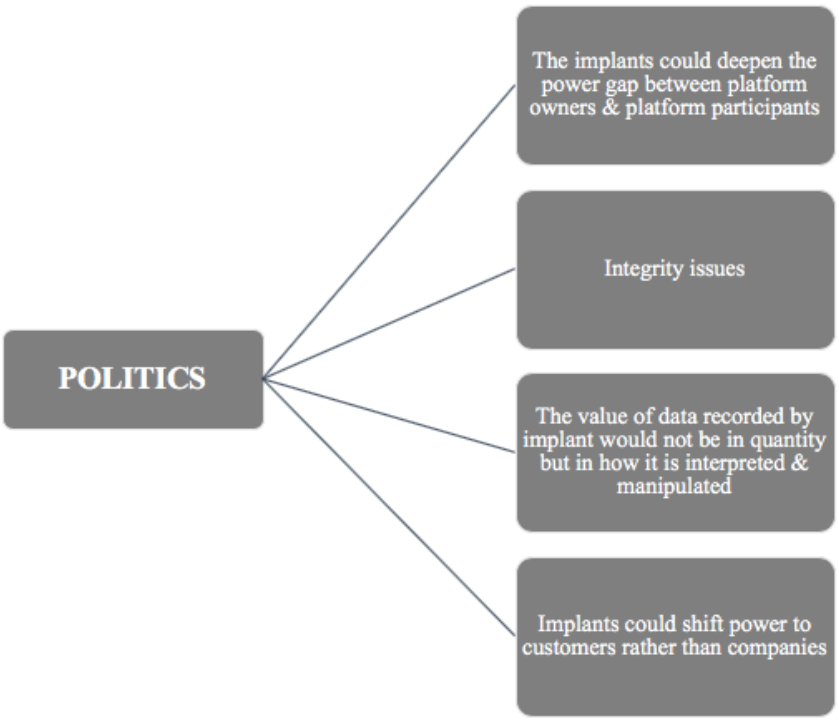


Figure 4.9 Summary of findings for the Politics element

4.2.10 Performance

The Performance dimension relates to how companies measure financial and non-financial results, such as customer satisfaction, profit or sales volume (Baumgartner, 1991; Kotler & Keller, 2012). All interviewees agreed that human RFID implants could allow for enhanced tracking of customers interactions with products and services.

Despite expressing confusion about technicalities, Expert 4 believed that the implant would be able to track how consumers interact with different products, this data would then allow companies to develop improved products. However, the expert questioned whether customers would share that data out of their free will and suggested that some incentives might be needed in order to boost acceptance. The quote below shows the expert's thoughts:

> "Not sure really how that would work, but as it works with radio signals I guess that would be possible, it could probably track how I use my Nespresso, giving Nestle valuable info on that – helping the product development. But will the customer get a fee for helping out? If they do the acceptance will be greater." (Expert 4, Retail Marketing Expert)

In addition, Expert 3 also considered that human RFID implants would enable companies to record customer usage of products. Moreover, the respondent emphasized the importance of adapting products to user behavior, adding that effective tracking would need a combination of monitoring techniques:

> "Well, you would definitely be able to track and look at usage, so user interaction [...] I mean the psychology is a major major piece in both marketing and products, production: how you shape products, how do we get people to interact with them, how do we collect data from interaction, what do we do with data. The idea is about tweaking products according to change, according to user behaviour change. It's a hard thing tracking if you don't combine a lot of protocols and a lot of different ways of monitoring use." (Expert 3, CEO & Biohacking Expert)

Expert 2 focused more on the information asymmetry between platform owners and platform participants, as it is further detailed in Chapter 2.2.9 Politics. The interviewee expressed difficulty in assessing the effect that only human RFID implants would have, as it would most likely work in conjunction with other technologies by forming a platform. The respondent further elaborated on the platform aspect by alluding to the fact that most likely not all data recorded by platform owners would be made available to platform participants, which would encumber the participants' assessment of their own performance:

> "It's very difficult to just single out one single technology saying will it have this effect or that effect because I think you need to think about these, platforms. [...] So the reason why Facebook is making a lot of money is because of all the advertising the all these companies are putting on Facebook of course but still, can they, what can they track and what can they not track? This is actually up to the platform to decide.[...] But this specific technology won't give you the information even though it does collect information, you would not be the benefactor of that information." (Expert 2, ICT Researcher)

Moreover, Expert 1 also believed that human RFID implants could be used by firms in order to track not only consumers behavior, but also their emotional reactions towards the products. Further, the participant expressed that there are many other parameters which the technology could track and that the data would be recorded with the purpose of improving services:

> "Well, I mean if the chips get advanced enough in a situation like that, they could track anything. I mean, they could track how many times they go to the bathroom and they can track... This is crazy, but they could... Maybe they could track like how they are feeling, how they have their levels of serotonin or whatever is happening and what they're reacting to. [...] I mean, there are so many parameters here that could be controlled or tracked. That could probably or that could be used for developing their services, of course, that's why they do it, right? They're not interested in just tracking cause they think it's fun. There is a purpose for this, of course." (Expert 1, University Professor)

To summarize, all experts believed that human RFID implants would enhance a firm's ability to track their performance, which in turn would allow them to develop products and services that are adapted to their customers' behavior. These findings support previous research which has demonstrated that technology could be used to provide more accurate measurements of performance (Erevelles, Fukawa & Swayne, 2016), such as tracking festival-goers' daily expenditures and behavior using RFID monitoring technology (Della Lucia, 2013). This strengthens the idea that data tracked through similar technologies could help improve decision-making, as well as product and service development. Figure 4.10 below illustrates the main findings of this section:

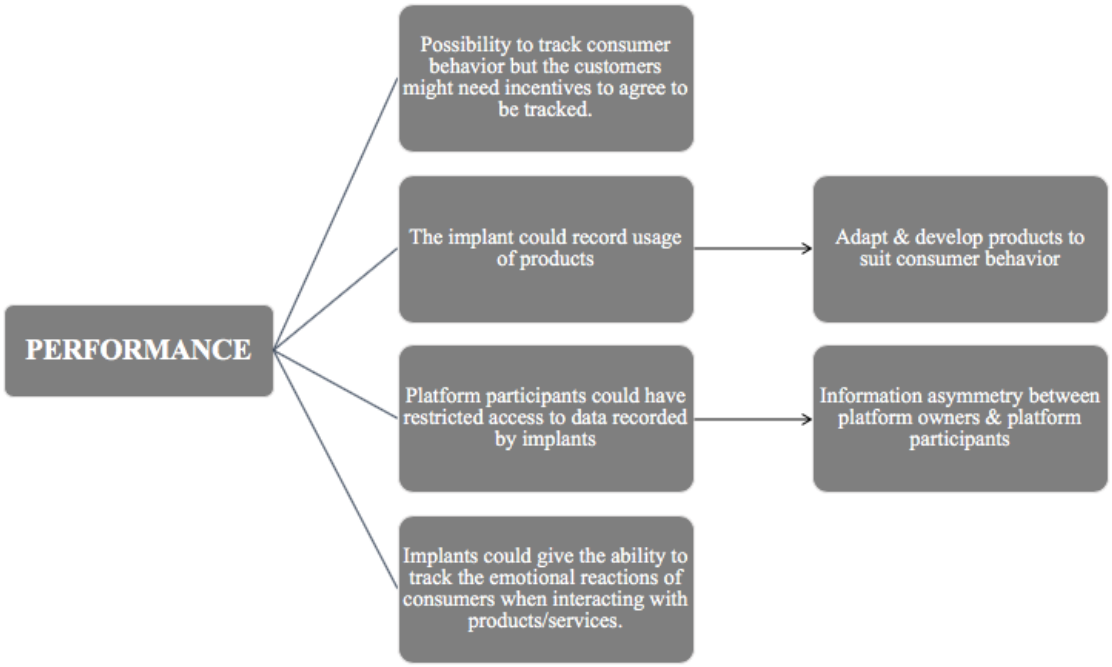


Figure 4.10 Summary of findings for the Performance element

4.3 Discussion Summary

In answering the question *what determines human RFID implant adoption for potential consumers in Sweden*, we gathered various insights from focus group participants. Participants spoke of both existing and new determinants which would influence their decision on adopting an RFID implant. The convenience offered by using the implant was highlighted extensively in discussions with many participants perceiving it as a replacement for items such as keys and gym cards. Convenience in this case also allowed participants to see the technology as compatible with their daily lives. Participants however pointed to the feature limitations of the implant as it offers simple functions which could not improve task motivation, quality or help them achieve individual goals. That being said, some participants were interested in the future applications the implant could offer, specifically those within the health sector in form of medical uses and monitoring for fitness purposes.

Both functionality and health were considered independent additional determinants as they had great impact on the participants' perceptions of RFID implants and on its adoption. Functionality in this case related to the features of the technology which were important considerations, as well as what benefits the technology offered over existing technologies. In terms of health, participants viewed it as a double sided coin. As mentioned earlier, the implant was seen as beneficial in the medical field for monitoring purposes, however, some participants felt it would negatively affect their mental health. This dissuaded them from wanting to have an implant.

Furthermore, participants were unsure of how to use the RFID implant and did not understand it. In trying to better their understanding many related the technology to the current technologies they are using. The limitations in understanding decreased Performance Expectancy for the implants, since participants could not grasp how it would be useful. It is therefore our recommendation that a lower effort expectancy would result in a higher Performance Expectancy and therefore improve adoption rates.

In relation to Facilitating Conditions, participants alluded to the limited knowledge and resources they had to facilitate the use of RFID implants. For those who were aware of it, many were unwilling to search for information regarding the technology. Resource wise, the participants stated there is lack of infrastructure in place to facilitate the use of the technology which did not encourage them to use it. This is an important consideration as even if consumers were to get the implants, they would be unable to use it in many places which have not adopted RFID readers. Participants also noted that facilities to get the implants were limited in nature and they were uncertain about the people involved in the implantation process and the legal issues surrounding it.

Social Influence also played a key role in determining the adoption of the implants for the participants. Participants did not see the implants as a bragging point and instead termed it as more *weird* relating the use of it to *tech nerds*. The negative connotations used by participants when describing current RFID implant users led us to believe that they felt it would, in fact, negatively impact their image at the moment. The opinions that family and friends would have on the implants was important for participants with many citing that they would get one if their family and/or friends did too. The opposite was also true, that is, if family and friends discouraged the use of the implants, participants would be inclined to listen. Interestingly, overall societal acceptance (or lack thereof) was also important to participants as it would indicate normalization of the implants. In addition, societal acceptance, according to participants, would lead to improvements in Technological Infrastructure.

Hedonic Motivation did not seem to play an important role in determining the adoption of the implants. Participants reasoned that the novelty of the technology alone was not enough to persuade them to use the technology. In addition, the features of the technology were related to convenience, as outlined in Performance Expectancy. This, therefore, limited participants from seeing the fun or enjoyable uses of the technology in its current state. The altered framework for the present study therefore does not include Hedonic Motivation (see Figure 4.1 below).

The price of the technology itself also offered limited insights into whether or not participants would use the technology. Some equated a higher price to better quality and value and this relation could be important due to the fact that the technology would need to be embedded in the skin. Additionally, when relating price to value, some participants did see that they were getting adequate value due to the changes they would need to implement in their surroundings to accommodate the use of the technology. The additional costs did not seem worth it to participants as they were still unsure of the benefits of the technology. Price was therefore considered an important element in terms of additional costs incurred compared to value and not precisely the cost of the implant itself.

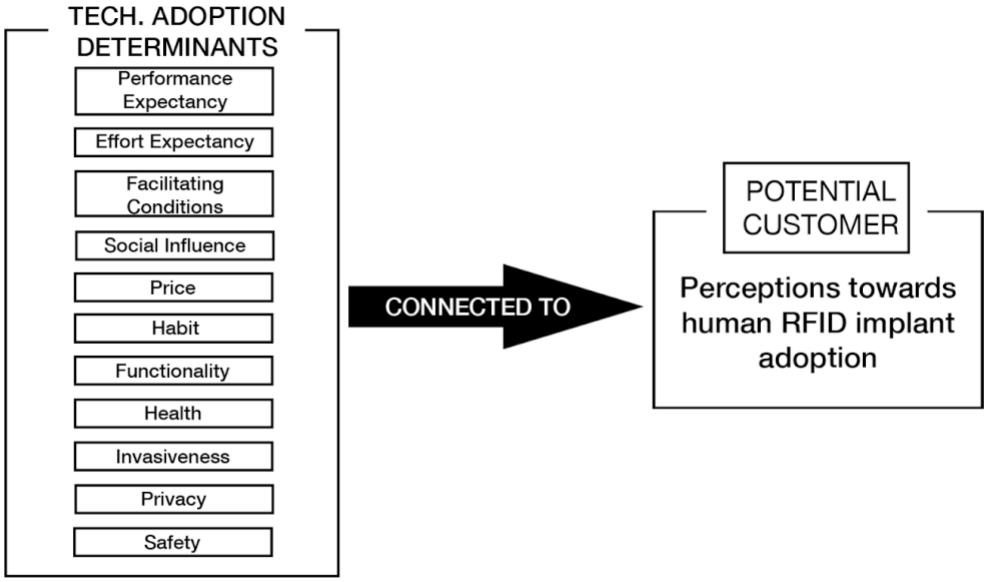
In terms of Experience and Habit formation, since the participants had not used the technology, experience played a limited role. It is however worthy of note that participants had already formed habits with their current technologies, that is, mobile phones, credit cards and so on. They, therefore, found it difficult to see themselves breaking away from that and using the

implants instead. New and unique features in RFID implants may however be useful in breaking the current habits formed by participants. Habit was therefore included in the altered framework.

The invasive nature of the technology impacted the participants perceptions of the implants with many stating that it would affect their mental health, increase their concerns about privacy and safety. We therefore find that the nature of the technology, in this case, the fact that the implants are under the skin, greatly affected how participants perceived the technology. Invasiveness was therefore considered a stand alone determinant which could be used to understand perceptions of other invasive technologies in the future. Privacy and Safety were also important considerations for participants when discussing the possibility of using the implants. It is important to note that the invasive nature of the technology heightened concerns related to tracking and overall threats to physical safety which served as de-motivators to using the technology.

Taking into consideration the findings of the research, we have developed an altered framework (Figure 4.11) to address the determinants of human RFID implant adoption for potential consumers in Sweden:

Figure 4.11 Revised analytical framework after examining consumer perceptions towards human RFID adoption



In answering the question *how would the widespread adoption of human RFID implants influence marketing activities,* insights were recorded through interviews with experts from various fields. In general, we found that the interviewees dedicated more attention to discussing People and Personalization than any other dimensions of the marketing mix. This means that these two elements would be greatly influenced if RFID implants became commonly adopted. In addition, it was found that Personalization was often talked about in relation to other elements such as Product and Promotion. Moreover, the experts often noted that the potential of human RFID implants would be enhanced if it worked in conjunction with other technologies such as AI machines, smartphones or even other conventional, everyday-use technologies such as coffee machines.

In terms of the Product element, the main findings suggest that if RFID implants become adopted by the majority, the experts believed that there would be some implications regarding product and service design such an orientation towards customer-centric designs and increased digitalization of services. Additionally, firms would be required to alter their business models, as they would have to subscribe to their customers' data by giving them free products.

Further, the experts considered that the Place dimension would see an increased focus on developing online channels, as RFID implants could aid the digitalization of the supply chain. This could then lead to the decrease in the number of intermediaries as certain channels become online or automated. On the other hand, experts also believed RFID implants could facilitate local interactions with offline channels as the microchips do not require internet connectivity to function.

The interviewees believed that the adoption of human RFID implants could have an impact on the Promotion element as well. The implants would enable companies to record more comprehensive information about their customer's behavior, information which could be used to create more convincing personalized advertising messages. Additionally, AI machines facilitated by data from RFID implants may play an important role in personalized promotions, especially if in the future the AI would send marketing messages to other AI's instead of humans.

In regards to Price, the interviews revealed that there is no clear outcome of how RFID implant adoption would affect the price of other goods. This is due to the fact that some experts considered that prices could fall due to RFID implant adoption, while another thought they could rise or fall depending on other factors. However, the interviewees suggested that the implants could allow customers to sell their data in exchange for products, essentially turning data into a new currency.

The three elements, People, Procedures and Physical Assets were found to be strongly interrelated, in the sense that transformations occurring in one dimension sparked changes in the other two as well. In terms of Physical Assets, the experts suggest that human RFID implants could change the setting of physical stores by eliminating cash registers and modifying the environment of shops to a showroom style, thus merging online and offline to create *in-line experiences*. These changes in the physical setting of the store would lead to changes in Procedures and People, as the elimination of cash registers would mean that routine tasks of employees would become automated. Further, the automation of these routine tasks would allow the re-assignment of employees to jobs that require direct contact with customers. This would shift the focus to providing a superior customer service and experience, integrating both online and offline channels.

One of the elements of the marketing mix that the experts highlighted was Personalization, especially in relation to other dimensions such as Product and Promotion. The interviewees noted that, as the implants would allow for the collection of personal data in large quantities, this would help companies provide not only more personalized products and services, but also advertisements that are better tailored to each individual buyer. This type of advertising customization was titled *localized promotion* by one expert.

The interviewees noted that the adoption of human RFID implants would lead to changes in the Politics element as well. As RFID implants could give companies access to even more data

about consumers, the experts considered that the recorded data would be able to give increased influential power to these companies. However, another scenario would be that customers could hold more power instead of companies if they were the sole owners of their data.

The final element, Performance, was also believed by experts, to be affected by human RFID implants. The implants would help firms track how and when customers use their products. Thanks to this information about customer behavior, companies would then be able to improve their products and services according to these insights.

To sum up, the interviews with experts revealed that all of the extended marketing mix elements would be influenced by the mass-spread of human RFID implant adoption. In light of the findings and discussion, the analytical framework that was developed for the purpose of answering the second research question does not require any amendments.

5 Conclusion

The purpose of this thesis was twofold. Firstly, we aimed to explore the perceptions of potential consumers' in Sweden on the adoption of human RFID implants. We did so by applying the UTAUT 2 model. Secondly, we investigated how the widespread adoption of this technology would influence marketing activities. This was carried out using an extended marketing mix model developed after extensively reviewing the literature on this topic. In order to fulfil the aim of the study, we conducted qualitative research in the form of focus groups and interviews. These methods enabled the collection of interesting insights on how consumers and experts perceive this technology.

In spite of the growing number of Swedes that are implanting themselves, our research showed that young potential consumers seemed to be quite skeptical about the adoption of RFID implants, in great part due to the lack of uses in its current state. Whenever they identified advantages, they were almost always related to how RFID implants would function in the future, often in terms of health benefits. This shows that even younger generations, who spend hours every day tapping away on various devices, are not yet quite open to a technology with such a high level of invasiveness and low functionality. Furthermore, due to the invasive nature of the implants, they fear that the technology would be detrimental to their health or that their personal data would be more easily hacked.

Problems related to infrastructural changes are also important to consider. Even in the current limited form of RFID implants, we found that changes would need to be made to the environment, in order to make it more compatible with the implant. An example of such changes would be the adaptation of security locks to include RFID readers. Of course, these changes would come with additional costs which are not included in the implants' initial price, and, could make consumers less likely to adopt the implants. This shows that if RFID implants are ever to take off, they would need infrastructural adjustments which are compatible with their functionalities.

Overall, our findings revealed a lack of sensitization about human RFID implant technology which leads us to question whose responsibility it is to inform society about the benefits and dangers of this emerging technology. This could be propelled by the fact that RFID implants fall under the biohacking phenomenon led by consumers and has just recently been adapted for commercial uses. In light of these findings, we could be further away than we may think from the mainstream adoption of RFID implants.

Once again, what was previously seen as a movement led by biohackers and transhumanists, has now grabbed the interest of companies as well. This technology, although far from an advanced state, could bring the transhumanist vision of the ideal human being to fruition and to the forefront of mainstream commercial use. This could create a trickle down effect to the way marketing activities are conducted in these companies. For instance, by making product design and advertising more personalized according to customer behaviour and preferences, gathered through implant data. An alternative example is employees no longer needing to focus on routine tasks such as handling payments at cash registers as the implants would provide

customers with means of automated payment. This would shift employee focus to the provision of customer service excellence.

Human RFID implants could also change the way companies gather and interpret data. This technology could facilitate the collection of highly sensitive, but very valuable customer data in the form of psychometrics. Currently, data handlers have access to fragmented data as customers use different applications for various purposes, such as shopping, fitness, sleep and other lifelogging activities. The implants could integrate all of this behavioural data to create more accurate profiles of customers. This is a double-edged sword as it could on one hand, enable companies to develop more tailored and superior product for customers. On the other hand, the high sensitivity of such data could also mean that companies could intrude more easily in customers' lives. For example, companies could use this data to increase purchase intention by creating well-timed advertisements which play on customers' emotions and vulnerabilities.

Broadly speaking, RFID implants seem to bring humanity one step closer towards merging with machines. Even though the concept might sound frightening, we need to keep in mind that technology is essentially neutral - it is neither evil, nor good. Thus, whether RFID implants will be used as a tool for the benefit of humankind or as a weapon against it, depends on those developing and using them. This is why, if RFID implants continue to surge in popularity, actors from various fields must get involved to safeguard the sustainable growth of this phenomenon. Consequently, collaborations between biohackers, companies, researchers and policy-makers are crucial to ensure that the implants not only offer features which suit the needs of consumers, but also that concerns such as privacy and health are addressed.

5.1 Theoretical Contributions

This thesis contributes to existing knowledge of RFID implants by providing a novel understanding of customer perceptions in Sweden and the implications that this technology could have on marketing activities. These results add to the rapidly expanding field of human RFID implant research in several respects. Firstly, through the application of UTAUT 2 model, that Performance Expectancy, Effort Expectancy, Facilitating Conditions, Social Influence, Price and Habit from the pre-existing model were particularly relevant.

In addition to these determinants, we identified five new determinants which were significant in understanding how young consumers in Sweden perceive RFID implants. Namely, Functionality, Health, Invasiveness, Privacy and Safety were integrated into the UTAUT 2 model established by Venkatesh, Thong and Xu (2012). The aspects of Privacy and Health were particularly highlighted in previous studies on RFID implants as important considerations in the understanding of RFID implant adoption (Smith, 2007; Michael & Michael, 2013; Clarke, 2010; Patel, 2018). The addition of these determinants provided more insights into the concerns and expectations participants had towards RFID implants. We further noted that all elements within the altered framework were interrelated, therefore, improvements in one area, for example Performance Expectancy, could lead to consumers being more open to adopting the technology despite previously expressing concerns to do other areas such as privacy, safety and health. This revised framework could be applied to other studies on the adoption of emerging technologies.

We were also able to draw connections between the adoption of human RFID implants and marketing activities. In developing the extended marketing mix framework, we were better placed to gauge the opinions of experts on the implications that this technology could have on the field of marketing. Consequently, the findings revealed that all ten elements of the framework, namely Product, Place, Promotion, Price, People, Procedures, Physical Assets, Personalization, Politics and Performance were relevant in furthering the literature on how the adoption of human RFID implants affects marketing activities. In particular, the experts paid considerably more attention to People and Personalization which led to the conclusion that these dimensions would see greater changes. This is supported by previous research which has demonstrated that new technologies enhance customer-employee interactions (Pantano & Migliarese, 2014) and provide new avenues for personalization (Bharadwaj, Bharadwaj & Konsynski, 1999). Further, this framework could be applied in the investigation of how other technologies may influence marketing activities.

5.2 Practical Implications

The present study proposes practical insights for managers as it explored the perspectives of both consumers and experts on the adoption of human RFID implants. It provides managers with an understanding of how the implants would affect the previously mentioned marketing activities. As a result, the findings in this paper could assist managers in preparing for and adapting to the changes that the technology would bring about. For example, in light of data becoming a form of currency and RFID implants being able to gather psychometric data, managers could consider the establishment of a system which would facilitate data exchange between consumers and companies. Companies quick to establish this system would likely gain a first-mover advantage.

As the implants would facilitate the collection of more and even complex data, companies will need to learn how to interpret it so as to provide more personalized products and services. This could be in the form of acquiring software for data interpretation or hiring data analysts for this specific purpose. Additionally, managers will also need to digitalize their services so as to be more compatible with the implant technology and this in turn could attract more implant users.

Managers will also need to arrange additional training to employees due to the focus shift from routine tasks to customer service oriented activities. Companies interested in using this technology within the workplace would need to install the required infrastructure and educate their employees on the benefits that could arise from getting these implants.

Furthermore, the managers who are considering making their products or services compatible with the RFID implants would find some insights as to how consumers feel about the adoption of this technology. For example, companies interested in adopting this software would need to employ informative advertising methods so as to educate their consumers on how to use the implants and possibly even where to get them.

In addition, the study would also be of interest to policy-makers, as the findings shed light on health, privacy and security concerns that consumers have towards RFID implants. For instance, privacy concerns from consumers should be considered when establishing a legal

framework for human RFID implants since if consumers would not feel that their data is not handled with care, they would be less likely to adopt this technology. What is more, the experts touched upon how the technology would place even more power in the hands of companies over customers' personal data. This would be of importance to policy-makers who wish to develop regulations in this area.

These findings could also be of particular interest to managers in the healthcare industry as our study revealed a wide array of applications that the technology could have. For example, RFID implants could improve personalization of treatments as well as store patients' health information to be used in the case of an emergency.

5.3 Research Limitations

The present study was limited in several regards. In relation to the methodology, there were sampling limitations regarding both research questions. The first research question in the study focused primarily on exploring perceptions of university students in Sweden, which may be not representative of all the potential users in Sweden. Furthermore, the age, gender and cultural contexts of the respondents in the focus groups were not considered as mediating factors in understanding their perceptions towards RFID implant adoption. Finally, due to the scope and explorative nature of research, the second research question was explored using limited expert samples that included experts from different fields, thus not providing specific, in-depth perspectives from one field of expertise.

5.4 Future Research

The current study opens up new avenues for research in the future in several respects. The exploratory nature of the study creates possibilities for more in-depth studies to be conducted on both the perceptions of consumers towards RFID implants and the impact of the technology on marketing activities. A more diverse group of respondents in terms of age could be utilized to gain a more holistic understanding of perceptions towards human RFID implant adoption. Future research could also focus on how older generations perceive RFID implant adoption as it would be interesting to compare it to the present findings on young consumers. Mediating factors such as cultural context and gender would also be important to consider in future research as they could reveal underlying differences in perceptions that were not accounted for in the present study. Future research could also test the applicability of the revised UTAUT2 framework in assessing the acceptance of other technologies.

In addition, we recommend that a longitudinal study could be relevant to undertake in the future as it could allow researchers to trace changes in consumer perceptions of human RFID implants over time and explore the reasons behind these changes. Furthermore, as the present study focuses specifically on Sweden, it would be interesting to explore how people perceive this technology in other countries. For instance, we discovered that RFID technology is also an emerging trend in the USA. In terms of implications on marketing activities, future studies could gather feedback from experts in particular fields so as to gain a more elaborate picture of

the effects of the technology. Lastly, a focus on how the technology could influence particular elements in the marketing mix could also contribute to a more in-depth understanding.

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Appendix A

RFID implants - External illustration and X-ray of embedded implants (adapted from Durden, 2018)

Appendix B

LUND UNIVERSITY
School of Economics and Management

Determinants of human RFID implant adoption: A review of the UTAUT 2 model & the effects of the widespread adoption of RFID implants on the marketing mix
Natasha Boella and Daria Gîrju

Focus Group Consent Form.

I have been given information about *Determinants of human RFID implant adoption: A review of the UTAUT 2 model & the effects of the widespread adoption of implants on the marketing mix* and discussed the research project with *Natasha Boella and Daria Gîrju* who is/are conducting this research as a part of a Master's in *International Marketing and Brand Management* supervised by *Burak Tunca.*

I understand that, if I consent to participate in this project I will be asked to give the researcher a duration of approximately 60 minutes of my time to participate in the process.

I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw from the research at any time.

By signing below I am indicating my consent to participate in the research as it has been described to me. I understand that the data collected from my participation will be used for thesis and journal publications, and I consent for it to be used in that manner.

Name: ……

Email: ……

Telephone: ……

Signed: ……

Appendix C

LUND UNIVERSITY
School of Economics and Management

Determinants of human RFID implant adoption: A review of the UTAUT 2 model & the effects of the widespread adoption of RFID implants on the marketing mix
Natasha Boella and Daria Gîrju

Interview Consent Form.

I have been given information about *Determinants of human RFID implant adoption: A review of the UTAUT 2 model & the effects of the widespread adoption of RFID implants on the marketing mix* and discussed the research project with *Natasha Boella and Daria Gîrju* who are conducting this research as a part of a Master's in *International Marketing and Brand Management* supervised by *Burak Tunca.*

I understand that, if I consent to participate in this project I will be asked to give the researcher a duration of approximately 60 minutes of my time to participate in the process.

I understand that my participation in this research is voluntary, I am free to refuse to participate and I am free to withdraw from the research at any time.

By signing below I am indicating my consent to participate in the research as it has been described to me. I understand that the data collected from my participation will be used for thesis and journal publications, and I consent for it to be used in that manner.

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Signed: .....