

The Internet of Things: A Marketing Tool for the Food Industry?

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ABSTRACT

Marketing activities such as promotions or advertisements are often targeted at wide audiences to address as many people as possible. Predominately, these activities, however, do not connect or build relationships between businesses and individual customers. Smart established databases for better CRM practices, communicating packaging designs or automated social media posts - all of these examples offer marketers the chance to connect with costumers on a new level through the integration of the Internet of Things. Within the Industry 4.0, an increasing number of physical products are equipped with sensors or RFID that connect them to the Internet. A network of interconnected smart objects is known as the Internet of Things. Large amounts of data are generated through this network, which promotes digital transformation and leaves businesses or specifically marketers with the challenge of how to use this amount of data effectively. Although IoT data is expected to be of great value for businesses, it is not yet known how this data can be used as a marketing tool in the food industry and what value this might have. Therefore, the purpose of this study is to identify the value of an IoT- implemented marketing tool in the food industry. By means of a literature review, expert interviews in the field of digital marketing and an interview at a confectionery - producing company being an example for the food industry, this study examines three applications such as (1) smart CRM, (2) smart packaging and (3) predictive social media activities. All of the three options deliver promising outcomes in regard to the optimization of targeted promotions. Both literature and experts agree that social media activities are of high value when implemented as a marketing tool. The interview at the company shows that smart CRM is the most likely option to be adopted for their case.

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Keywords

Internet of Things, Marketing Tool, Food Industry, CRM, Smart Packaging, Social Media

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1. INTRODUCTION

Today, almost half of the world's population is using the Internet for several activities. As more and more people use the Internet to communicate and gain global information, an even more advanced period of interconnectivity and coordination through smart objects is expected (Miorandi et. al., 2012). The idea of the Internet of Things (IoT) implies that an unlimited number of tangible objects are interconnected with each other through the Internet via sensors, RFID and other mobile transmitting devices (Bandyopadhyay & Sen, 2011). These objects are enabled to interact, communicate, network, dialogue, perform and dictate actions, as well as store and retrieve data. This data can provide insights into the context and usage of the product or object, depending on where sensors are being implemented. With the IoT, the next wave of internet development, new opportunities as well, as challenges for businesses, arise. (Porter & Heppelmann, 2014).

Theories on the IoT describe a variety of different applications in several industry domains: retailing, security, smart homes, logistics, supply chain and other industries. Being able to interact with customers through a device or by gathering data about one specific customer leaves firms with the advantage to engage in more advanced marketing behaviors, such as the optimization of targeted advertising and more effective promotion activities. Examples such as smart customer relationship management (CRM), smart packaging and predictive social media actions underline this claim and show positive results when it comes to improving marketing activities and making them smart (Leung, 2014). However, not so much of this theory is applied in the food industry or more specifically in the confectionary or sweets industry. As a result, a breach in empirical research on the application of the IoT as a marketing tool in the food industry presents an interesting research gap.

The aim of this study is to identify the possible application and values of the IoT as a marketing tool in the food industry. The company used for this research is a global sweets producer who would like to optimize their promotions in order to be more targeted and aimed at the consumer. The company will be used as an example of the overall food industry.

1.1 Research Problem

The goal of this study is to investigate the options, possibilities, and effects of the implementation of the IoT as a marketing tool. By identifying the most suitable implementation approaches in the literature and based on a case study, conclusions can be drawn as to the implementation of the IoT as a tool to improve targeted promotions. To structurally identify the outcomes of the implementation of the IoT as a marketing tool in the food industry, the following research question will be investigated: **What is the value of implementation of the Internet of Things as a marketing tool in the food industry?**

This question will be answered with the help of sub-questions, which are derived from examples of the IoT when implemented as a marketing tool. These sub-questions

deliver a structured and more detailed elaboration to answer the main research questions:

- *Does the implementation of IoT as a marketing tool improve the targeted promotions through smart Customer Relationship Management (CRM)?*
- *Does the implementation of IoT as a marketing tool improve targeted promotions through smart packaging designs?*
- *Does the implementation of IoT as a marketing tool improve targeted promotions through predictive social media activities?*

1.2 Academic and Business relevance

This study is of academic relevance due to multiple reasons. First of all, it fills the research gap as to what extent the IoT implementations can be used as a marketing tool in the context of the food industry. Secondly, the design research method which has been designed for this individual study could be relevant for similar academic reports.

Moreover, the results of this research are also of business relevance. New developments in technology leave firms with the urge to keep up with the ever-changing environment in order to stay competitive. Since the IoT presents itself as a major influence in terms of technology improvements, this study helps businesses to keep up and stay competitive by informing them about new trends and possibilities. Lastly, it gives other businesses being active in the food industry an indication to move towards an innovative environment and build a more dynamic and effective customer relationship.

1.3 Methodology

This paper will review developments around the IoT, the corresponding digital transformation and its consequential effects on marketing applications. In addition to that, industries who engage in the IoT in marketing and communication activities will be reviewed. The theoretical background, covered by the literature review in chapter 2, will provide examples that contribute towards forming a foundation for an expert study as well as an interview at the for this research analyzed firm itself. Due to the integration of a company for this research, the desired outcome for their individual strategy is taken into consideration throughout this study and can be referred to as the baseline of smart marketing applications. Articles used in the literature derive mainly from scientific papers published in journals or non-scientific papers issued by agencies or research departments from firms. The reason for this is that only in the past years, the IoT has grown in acceptance, even though the possible scale of this concept was already known many years ago. The literature study will deliver a baseline, showing how the IoT contributes towards digital transformation and its use in marketing applications across different industries. Furthermore, how targeted promotions can be optimized compared to today's marketing activities is analyzed by the literature review in chapter 2.3. In the previous named chapter, applications before the implementation of IoT are analyzed in order to exemplify later on in chapter 4 what value the technology offers as a marketing tool. The study

will make use of three different application examples (CRM, smart packaging and social media) which can all be used to optimize targeted promotions in the food industry. Primary data originates from expert studies as well as an interview on site. For the expert study, marketing media agents who work on behalf of the analyzed company will be asked to give their opinion and an assessment on the effect of the IoT as a marketing tool on targeted promotion optimization, based on their experience and expertise. Experts are being involved because the study shines a more critical light on the analysis. This is due to the fact that there was not much literature available which could be used to argue the tools to be used in the food industry. In addition, an interview with the marketing manager at Storck Ibérica in Barcelona will deliver a complementary insight to the expert study based on their experience in the food industry. Secondary data from a literature study and primary data from an expert study and an interview will build the basis for data generation of this research. In Figure 1 below, the outline of this research design model is illustrated. As demonstrated, the literature review or secondary data acts as an umbrella of the model. The expert study focuses on the marketing aspect as well as the IoT when used as a marketing tool. On the other hand, the interview will be based on the idea of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. It will also be used to gain valuable information about the food industry and what factors could hinder or encourage the implementation of the IoT as a marketing tool in this specific industry. The fact that this research can be categorized as an explorative study is one reason why such qualitative research approach has been used. The method of conducting a design case study by combining an expert study with conducting interviews appeared to be the most suitable method for this qualitative research because of several reasons.

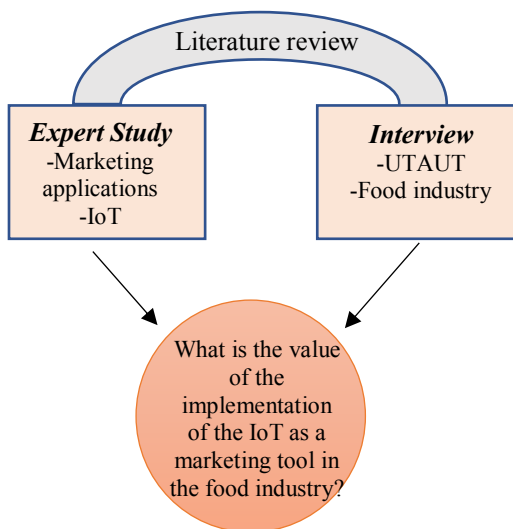


Figure 1: Research design model

Firstly, doing research on innovative technology and its application for marketing purposes requests expertise and knowledge in those domains. By consulting experts being strategic and digital marketing agents who build promotion campaigns for companies within the food industry, familiarity with the IoT as marketing tools and aspects of

marketing activities within the food industry was assured. Also, by conducting an interview with the marketing manager of a global confectionery producer gave more insights regarding the willingness to implement such technology and what value it may bring. Secondly, according to Zaidah Zainal “a case study method enables a researcher to closely examine the data within a specific context” (2007, p 1). This helped to gain a deeper understanding of the topic, participants, and their contexts. Third, the design of this case study has been constructed to close the research gap between the IoT implementation as a marketing tool as such and at the same time the several IoT examples within the food industry. Lastly, interviewees provided detailed information and ruled out misunderstandings by having the opportunity for a comprehensive understanding through face-to-face sessions and time for clarification if necessary. The overall result of the design case study may allow for the generalization of findings to other industry sectors (Zainal, 2007). Once all data is gathered and all results are discussed, a summary is conducted to identify which possible effects the IoT as a marketing tool has in the food industry. The delivered data will help to close the given research gap being the IoT executed as a marketing tool in the food industry. This can be done by combining expert opinions on marketing tools performed through diverse IoT examples, with the onsite gathered information from Storck. This research method will deliver valuable insights on both sides, enabling to build a sufficient understanding. Limitations of the research will be given as well as recommendations for future actions.

2. LITERATURE REVIEW

2.1 Internet of Things

Internet of Things (IoT) means connectivity among objects, devices and other gadgets consisting of sensors, RFID (Radio-frequency identification) and other mobile transmitting devices (Constantinides, 2016) that enable a continuous connection to the internet and its advantages in all situations throughout daily life (Want, Schilit, & Jenson, 2015). The internet as such certifies to be a valuable source allowing people to connect to global services and interact with or spread information. The IoT will build upon that by revolutionizing manufacturing and operation infrastructures, healthcare, retail, security, and engineering systems (Want, Schilit, & Jenson, 2015). These different industries will benefit from the different applications based on the potentialities offered by the IoT. Only a few of these applications are deployed today, however in the future, from a business point of view, there will be applications for smarter retail and logistics systems, smarter manufacturing infrastructures, and smarter communication channels. (Bandyopadhyay & Sen, 2011). Smart retailers can use IoT applications to monitor in real-time product availability and maintain accurate stock inventory (Miorandi, et.al., 2012). “IoT can provide a large savings potential in a retail store since it has been found that 3.9% of sales loss happens worldwide when shelves go empty and customers return without getting the desired products” (Bandyopadhyay & Sen, 2011, p. 62). If this data is made available to suppliers, logistics and the whole supply chain can be improved, because the right amount of needed quantity is known, thus

over – or underproduction can be avoided. Taking the environment into consideration, the carbon footprint can be minimized through smart logistics and distribution. Consumers doing their shopping in a smart retailer can experience applications such as guidance according to their shopping list, automatical check-outs through biometrics which speeds up the payment process, allergen indications for a given food product, or personalized marketing (Bandyopadhyay & Sen, 2011). Miorandi et. al. specify that for specific industries, such as the food industry, production process control, final product quality and shelf life deterioration are factors desirable to know for producers and consumers. RFID technology in combination with bio-sensor technologies may allow controlling the above-mentioned factors (2012). All these examples are applications which can be used to communicate directly with the consumer and understand one's wishes.

According to Miorandi et. al (2012) the "IoT builds on three pillars, related to the ability of smart objects to (i) be identifiable (anything identifies itself), (ii) to communicate (anything communicates) and (iii) to interact (anything interacts) – either among themselves, building networks of interconnected objects, or with end-users or other entities in the network" (p. 1498). The IoT allows users who are acquainted with the so-called 'smart products or objects' to be part of an extensive network which collects, shares and retrieves big data for everyone. 'Things' are empowered to co-operate with each other and contribute to reaching a mutual goal without the support of human interaction. (Li, et. al, 2018) The implementation of the IoT has led to different ranges of predictions about the future. Bauer et al. (2014) predict that 20 - 30 billion devices will be connected by 2020. "What makes smart, connected products fundamentally different is not the internet, but the changing nature of the things" (Porter & Heppelmann, 2014, p. 2). New capabilities arise, new communication channels are being used and more information is generated. Companies must look further than conventional technologies in order to stay competitive during this transformation taking place (Porter & Heppelmann, 2014).

2.2 Customer – centricity through digital transformation

The evolution of technologies such as the IoT enables digital transformation. "Digital transformation is a journey with multiple connected intermediary goals, in the end striving towards continuous optimization across processes, divisions and the business ecosystem of a hyper-connected age where building the right bridges in function of that journey is key to succeed" (i-Scoop, Digital Transformation, n.d. p. 1). Within this transformation, new competencies are being developed, such as turning attention towards people-oriented and customer-centric perspectives as well as innovative apprehension. (i-Scoop, Digital Transformation, n.d.). According to Jara et. al., the integration of the IoT in the marketing area is called participative marketing and they present it "as the new extension of the marketing based on the interaction with the product through the ubiquitous identification to empower the customers to offer their experiences, opinions and to retrieve the knowledge from the customers" (2013, p. 998). Identification and interaction capabilities are the drivers of participative marketing. Those

capabilities are being embedded into smart objects such as smartphones and tablets. Participative marketing is made up of both the value-driven marketing and the social media marketing. Given the positive influence from value-driven marketing such as taking into account things like sustainability and the ability of social media to create a social experience are fundamental components for customer – centricity and participation (Jara et.al., 2013).

Nowadays, according to the State of Marketing Report 2015 published by Salesforce; "Marketers are shifting attention from traditional metrics like conversion rates and return on investment to metrics that better reflect customer satisfaction" (Salesforce, 2014, p. 4). Furthermore, based on a survey and interviews conducted by Stephanie Jernigan, Sam Ranbotham, and David Kiron, it becomes obvious that engaging in interconnected devices which build networks, stimulates the relationships between an organization, its suppliers, and customers. Organizations can design and address new preferences of their customer. This is done most effectively through context awareness. Sensing the context of a user can help to adapt communication activities and target promotion more effectively. The more context is acknowledged, the more likely the user gains data which is specifically helpful in that certain context (Jernigan, Ranbotham & Kiron, 2016).

There are several examples available to customers which are acquainted with IoT technology and can be referred to as smart products. Examples like Alexa from Amazon or Nest Thermostats show consumers' interaction with smart objects. More and more IoT is becoming indispensable for customers as across different industries including home, consumer packaged goods, entertainment, cars, healthcare and security, the growth of smart products booms (Novak & Hoffmann, 2018). However, as Novak and Hoffmann (2018) point out that, "smart objects are very different from conventional brands and products, and that these differences will require some rethinking about the nature of relationships consumers have with smart objects" (p. 3). Since the IoT enables Digital Transformation, a more customer-centric perspective is empowered. „It expands the opportunities for multiple interactions between customers and products and services from which customers' experience emerge" (Balaji & Roy, 2016, p. 10). Accenture emphasizes the understanding of a more customer-centric perspective and highlights in their report, that for communication industries, "IoT presents a unique market opportunity to form a one-on-one link with customers, nurture closer relationships, and ultimately gain usage and opinion-based consumer feedback that could lead to substantial product design developments and ultimately deliver a huge competitive advantage" (Loozen, McNeil, & Salama, 2015, p.12). A better product design based on customer preferences can help marketers to understand their customer better and target promotions more effectively. Furthermore, through a one-on-one link, organizations can create personalized offerings and diminish non-valuable advertising practices. This benefit is strongly linked to marketing and promotion activities (Loozen, McNeil, & Salama, 2015).

2.3 Targeted promotion optimization

The aim of this study is to analyze what possible effects marketers will face when using the IoT as a marketing tool as well as what value the implementation delivers. Targeted

promotion optimization means that advertisements or interactions with consumers are tailored or targeted well and efficient in regard to one specific customer. In general, improving tailored advertisements deliver several benefits, such as customer satisfaction. As mentioned in section 2.2 the customer moves more and more into the center of attention and should be satisfied when interacting with businesses. According to Leung (2014), there are five ways how the IoT can make marketing practices smart (1) Smart CRM, (2) Accessible Sales Data, (3) Product Lifetime, (4) Predictive Social Media and (5) Click-through-rate. Out of the five ways, two methods (Smart CRM and Predictive Social Media) are the most suitable applications for this study in terms of optimizing promotions effectively targeted at consumers. The other three examples are not taken into consideration in this study because of the lacking possibility to analyze the value they may bring. The third application which is analyzed throughout this research is the idea of smart packaging. This is because smart packaging has already been involved in the food industry and builds on the innovative idea of IoT as such.

The following section will go into more detail how the three applications are dealt with today exclusive of the IoT integration.

Knowing customer requirements, the right packaging, as well as, social media marketing can all lead to an overall better understanding of customers, which eventually can be used to optimize targeted promotions. Promotions can be easily targeted when marketers know who their customer is. In terms of the food industry, his or her preference or how much is bought can help to understand the customer journey. Creating a good relationship with your customer is highly valuable for targeting promotions. However, there are some difficulties with fitting promotions to customer requirements, since the organization may not have the resources to know what its customer specifically wants (Schilling, 2013). Furthermore, Schilling (2013) elaborates that companies do not know which requirements are most valued by the customer. When focusing on the confectionary industry, there are lots of different brands offering a great variety of small delicacies. For some of the products, the company has elaborated a well working targeted promotion, but for others, they do not know what the requirements are. Additionally, they do not know on which requirements to focus on the individual products since all brands deliver a different message with distinctive target audiences.

Packaging can deliver a message which draws the customer's attention positively or negatively. According to Baines et al. (2012), the packaging, as well as features and design, is part of the embodied product, consisting of the physical product or delivered service that provide the expected benefit. In terms of sweets, the packaging among other features exemplifies the expected benefit of taste and texture. Therefore, in this case, the packaging and design are important as it attracts the customer's first impression of the product. Many factors influence customers in their buying decision including the packaging design. However, the packaging itself does not disclose any additional data which could be helpful to optimize targeted and more effective promotions.

Regarding Chaffey and Smith; "Social media sites are amongst the most popular sites on the Internet, along with

search engines" (Chaffey & Smith, 2013, p. 214). Because of its scope, businesses may use social media as a tool to communicate messages to potential or actual customers. Social media marketing represents both a challenge as well as an opportunity. Social media offers a user to socialize and communicate with friends, families or colleagues. Once using social media, users do not want to be interrupted by ads or promotions which may not even affect them. This bears a challenge for marketers using social media sites to communicate a message to possible or actual customers. However, at the same time, it allows an integration within the business process to better understand the customer and manage a valuable customer relationship (Chaffey & Smith, 2013) which could help to target promotions more successfully.

All of these examples show distinct difficulties when trying to effectively communicate with consumers and efficiently target promotions. Therefore, the following questions which will be directed at experts in this field are based on the three marketing areas in combination with the IoT:

- *What effect do you expect the IoT as a marketing tool to have on target promotion optimization through smart CRM for businesses in the food industry?*
- *What effect do you expect the IoT as a marketing tool to have on target promotion optimization through smart packaging designs CRM for businesses in the food industry?*
- *What effect do you expect the IoT as a marketing tool to have on target promotion optimization through predictive social media activities CRM for businesses in the food industry?*

3. THEORETICAL MODEL

The theoretical background of this qualitative research method will be based on the idea of a model which describes the adoption or acceptance of technologies by consumers or industries. The Technology Acceptance Model (TAM) is tailored for modeling user acceptance of information systems (F.D. Davis., 1989). According to Boddy et al. (2009), the TAM model consists of two factors, perceived usefulness (PU) and perceived ease of use (PEU). Davis defines PU as the prospective user's subjective probability that using a specific application system will enhance his or her job performance. PEU can be defined as the degree to which the prospective user expects the target system to be free of effort. Exemplified by Venkatesh et al. (2003) the integration of eight different acceptance models has led to the development of the Unified Theory of Acceptance and Use of Technology (UTAUT), shown in Figure 2.

This model in combination with the original TAM model helps to assess the user adoption success of any information system. The UTAUT includes more factors than the original TAM model and suggests that in addition to PU and PEU, there are four direct determinants of user acceptance:

- **Performance expectancy:** The degree to which users believe the technology will enhance their job performance.
- **Effort expectancy:** The level of simplicity linked with using the new system.
- **Social influence:** The extent to which users are influenced by others who are using the technology and perceive this as a starting point for their own sake.
- **Facilitating conditions:** The level of support mechanisms offered by companies to those who are using the system.

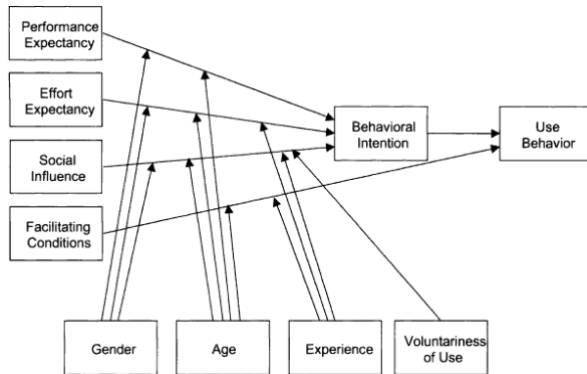


Figure 2: Unified Theory of Acceptance and Use of Technology (UTAUT) Source: Venkaesh et al. (2003)

The first three determinants have either a positive or negative influence on the *Behavioural Intention* of the user. That is the person's attitude towards using this particular system. It can either be positive or negative. However, the intention of the individual does not alone ensure the usage of a system – it also depends on how much support is offered by employers to facilitate the whole process. Illustrated in Figure 2, the four variables on the left in the model are intervened to some extent by key moderators such as gender, age, experience and voluntariness of use.

Originally this model is used to analyze consumer adoption and acceptance of a new technology. For the purpose of this study, the company used as an example is seen as the consumer of IoT and therefore, the idea behind this model will be used to analyze the likelihood of adopting IoT and how it influences the business in their marketing operations. However, parts of this model will not be taken into consideration, because they do not play a powerful role in this research. For example, the factor social influence will not be further investigated since it does not convey any additional information in terms of adopting IoT within the food industry. Moreover, the key moderators gender, age, experience and voluntariness of use are not taken into account because the sample of people who could give a statement on behalf of Storck consisted of one person only. When questioning a larger sample size, the moderating factors have a more perceptible influence.

Another set of sub-questions will help to combine the evaluated effects on marketing activities after the IoT implementation and the adoption concerns or effectiveness of IoT in the food industry. The following questions are

based on three factors resulting from the UTAUT model in combination with the three explored examples and their corresponding effect when implemented in the food as an IoT marketing tool:

- *Will the use of Smart CRM/Smart packaging design/Predictive social media activity enhance your job performance?*
- *Will the use of Smart CRM/Smart packaging design/Predictive social media activity ease your current marketing activities?*
- *Will the use of smart CRM practices/Smart packaging/Predictive social media activities be supported by your superiors?*

Exhibit A in the appendix exemplifies the research design model build and used for this study.

4. IoT IMPLEMENTATION AS A MARKETING TOOL

This section discusses how the IoT implementation can lead to efficiently targeted promotions based on the same marketing tools mentioned in section 2.3. The literature which was analyzed exemplifies the benefits of the various tools.

In terms of a marketing aspect, the IoT facilitates digital transformation and at the same time, marketers are left with the urge to focus on a more customer-centric view, as well as to draw the attention to a more satisfactorily customer experience (i-Scoop, Digital Marketing Transformation, n.d.). Marketo defines the IoT as “the interconnectivity of our digital devices that provides endless opportunities for brands to listen and respond to the needs of their customers – with the right message, at the right time, on the right device” (Marketo, n.d., Sl. 1). Moreover, applying the IoT in a marketing environment leaves room for different experiences by combining the digital world with the physical world (i-Scoop, Integrated marketing opportunity, n.d.).

The overall goal of the IoT as a marketing tool is the assurance of a continuous customer relationship and the provided guarantee for the consumer to gain maximum value of the product. The implementation of the IoT as a marketing tool carried out within one of the three tools, empowers the aim of a customer-centric perspective in the context of digital transformation. The three examples could all serve as a tool to optimize target promotions: (1) easy customer data access through smarter customer relationship management (CRM), (2) smart packaging designs and (3) predictive social media activities.

4.1 Optimizing targeted promotions through smart CRM

The IoT enables marketers to track how a product is being used which can help in the process of maximizing customer value. Firstly, through the implementation of the IoT as a marketing tool, sales data can be easily accessed and analyzed. How, where and when a product is used or

purchased is being tracked, which helps to understand the customer's journey and eventually tailor marketing actions, such as relevant advertisements or targeted promotion offers (Leung, 2014). Continuous customer relationship management (CRM) adds upon that; a way of how the IoT turns marketing practices into smart ones. Through smart CRM, marketers can trace the buyer's journey, nurture the relationship and close the deal earlier and more adequately than before. "As the focus shifts to providing continual value to the customer, the product becomes a means of delivering that value, rather than the end itself. (...) Companies are beginning to see the product as a window into the needs and satisfaction of customers, rather than relying on customers to learn about product needs and performance." (Porter & Heppelmann, 2015, p. 10). This practice leads marketers to new ways of segmentation and customization and revolutionizes the traditional way of receiving customer data. The uncertainty of what customer requirements can be eliminated with the help of implementing the IoT in the marketing process. Data from smart, connected things provides information which enables companies to do more advanced customer segmentation. For example, segmenting by industry, topography, number of units, and other particularized demographics can be applied by marketers to tailor offers. Developing more elaborated pricing strategies that embody a more appropriate price-value relationship for one specific segment seems to be valuable in this case as well. (Porter & Heppelmann, 2015).

4.2 Optimizing targeted promotions through Smart Packaging

As elaborated in section 3, the right packaging creates a power position in the communication process. Smart packaging is a practical example which has already been established and used in Finland. Finish Magic enables packages to communicate and interact with users and offers deals when purchasing their products. As an example, they collaborated with the packaging company Huhtamaki and requested to include a code with their hot beverage cups, connecting the packaging with a digital content. Once a beverage is acquired, the code connects itself to the internet via the buyers mobile and rewards them with a specialized offer (Lawrence, et al., 2016). The smart packaging even encourages the collection of sales data, personal data or other helpful information about consumers. Linking smart packaging to food industry leaves firms with promising advantages, such as reduction in food waste. This is due to the fact that unique codes implanted in the packaging tell the consumer when the food expires and alert them to deals. Moving towards a more segmented customer analysis, marketers may use collected information and identify those who watch their food intake in the context of a healthy lifestyle. Providing product information on the ingredients and production circumstances in combination with a personalized shopper profile enables the buyer to regulate whether a product fits his dietary requirements (Lawrence, et al., 2016). Sensors are already being embedded in the retail industry, for instance, a German grocery store relies on smart shopping carts that deliver information about products in the shop as well as store and calculate data every second, answering requests and enabling quick checkouts. This is an example of an upgraded retail ecosystem that allows for instant and two-way interplay with the consumer. In

addition, this retail ecosystem can help customers to make decisions and give them an overall satisfying shopping experience (Balaji & Roy, 2016). "IoT can anticipate customer needs and provide a more comprehensive and specific information tailored to their needs" (Balaji & Roy, 2016, p. 10). Miorandi et. al. specifies that IoT delivers information in the food industry such as production process control, final product quality and shelf life deterioration. RFID technology combined with bio-sensor technologies may allow controlling the above-mentioned factors which will eventually help to reduce food waste (2012). "For example, RFID devices can be used to identify and track the product, while the bio-sensors can monitor parameters such as temperature and bacterial composition in order to guarantee required quality of the final product" (Miorandi, et.al., 2012, p. 1511).

4.3 Optimizing targeted promotions through predictive Social Media

The impact of social media is growing, and marketers may make use of this development by engaging in predictive social media activities through formulating automated posts which pop up depending on the user's online history (Leung, 2014). This phenomenon is already being used however, the IoT has the advantage to connect the physical world with the digital world. In that way, additionally to a user's online history, more information can be obtained which increases the chance of understanding a customer's journey. Subsequently, target promotions or predicting automated posts which are exceedingly adapted to this specific user are not so unrealistic anymore. This is a sub-data collection process of the CRM practices but can be of higher assistance for specific segments.

Furthermore, exemplified by Jara et. al. "social media marketing is enabling the potential for voluntary participation and interaction with the consumer" (2013). It is the new medium to validate, confirm and check experiences of customers after purchasing their product or undergoing their services. Additionally, customers can verify that promises given by companies match with reality.

Table 1 summarizes the findings of the literature found for the three optimization practices after the IoT has been implemented. Those findings build the basis of the empirical analysis that follows in chapter 4.5.

Literature	CRM	Smart Packaging	Social Media
<i>Leung (2014)</i>	+Understand customer journey + Tailor marketing actions The + Targeted promotion offers		+ More information available enabling segmentation + Sub-data collection process of CRM
<i>Heppelmann (2015)</i>	+ Products are means to deliver customer value		

<i>Lawrence et. al. (2016)</i>		+ Interact with users + Offers deals + Reduction of food waste	
<i>Balaji & Roy, (2016)</i>		+ Easy decision making + Customer satisfaction	
<i>Miorandi et. al. (2012)</i>		+ Production process control + Product quality + Shelf life deterioration	
<i>Jara et. al (2013)</i>			+ Customer interaction

Table 1: Summary of literature findings found for the three IoT examples

4.5. Empirical Results

4.5.1. Expert Study

The experts which were included in this study agreed that smart CRM practices work very well to identify the buyer. In other words, once you receive data from your buyer, you can identify him or her and eventually target promotions. However, the strategic marketing manager of a marketing agency in Barcelona that is active in digital and traditional promotions also for Storck, mentioned a problem considering the industry. Records on customers for a CRM database are easily accessed when engaging in digital promotions, i.e. identifying a client with databases or using social networks, which has not been done by Storck yet or by other companies within the confectionary industry. This is mainly due to the nature of sweets and their emotional aspect. Today sweets are rather promoted through a point of sales or street marketing as well as TV and other traditional marketing activities. The marketing agent states that right now it is difficult to imagine how to use CRM in a confectionary-producing company. Additionally, the digital marketing manager at IPG Mediabrands sees a potential for CRM practices but also difficulties in how to get the data which is necessary to optimize targeted communication to customers. When engaging in 'Sign-up' campaigns for customers to receive discounts or other benefits, the offers must be good enough for people to sign up. Conversely, to his knowledge, customers in grocery stores often do not have the time or are not willing to sign up.

Expectations of the effects of smart packaging were equal, such as the identification of customers and following optimization of targeted promotions. Conversely, skepticism could be observed, due to the innovative nature of the procedure. Experts believed that it is a way to receive data and can be related to CRM. However, it may turn out to be costly and it may also raise ethical dilemmas. The strategic marketing agent agrees that for companies like Storck in the orientation towards identifying their buyers and to be able to create a useful database for the development of CRM actions, smart packaging seems to be a valuable source. She states that smart packaging would allow them to connect and

identify our buyer, which is extremely important to build a database about our customers, their preferences, and their purchasing trends.

Considering the optimization of target promotion through predictive social media activities, experts agreed that those activities have already been used in the past and therefore can easily be implemented. Additionally, they were certain that the implementation of the IoT will enhance the possibilities for marketers in the future, because the more information is available the more likely it is to understand the customer's journey and create targeted promotions. In addition, the agent from SideCar states that they can enjoy a real dialogue between buyers and potentials to develop promotions and products tailored to their expectations. The agent from IPG Mediabrands mentioned that data being produced on social media platforms help to target promotions by interest, which depends on the online behavior by the user, and resultantly by topic.

Experts	CRM	Smart Packaging	Social Media
<i>Strategic Marketing Manager: SideCar</i>	+ Consumer are easy to identify - Nature of sweets make it difficult to get online data	+ Good source to receive data for CRM database	+ Easy to implement + More information available + Real dialogue
<i>Digital Marketing Manager: IPG Mediabrands</i>	+ Tailor marketing activities - Difficult to get data	+ Identify customer - A costly & ethical dilemma	+ Easy to implement + Tailor promotions by interest

Table 2: Summary of expected effects on optimizing target promotions through IoT examples

Table 2 summarizes the expected effects of optimizing targeted promotions through three different examples. Those effects can either be positive, indicated with a '+', or negative, indicated with a '-' in the table above. In the end, all three examples can be seen as opportunities because of their positive outcomes. However, at least two out of three may show difficulties when implementing them in the food industry, and more specifically in the confectionary industry.

4.5.2. Interview at Storck Ibérica

During the interview with the Marketing Manager at Storck Ibérica, the integration of the IoT within the named marketing tools and the consequential likelihood of adopting this technology by Storck were discussed. One of the main findings was that Storck Ibérica, the Spanish division of the German, traditional-pooled sweets producer, has a slightly different interpretation on possible effects of the implementation of the IoT as a marketing tool than marketing agencies. This is due to the fact, that Storck comes from a very traditional background with old established brands, such as Werther's Original. For this brand, the IoT may not address the right audience. Moreover, the company other than the marketing agencies do not apprehend this innovation yet.

It becomes clear that promotion activities for sweets must be different from those for necessity products within the food industry, such as dairy products, grains, fruits and vegetables or water. Still, the confectionary industry is a sub-division of the food industry but to some degree encapsulates itself because of the nature of products it offers. Sweets are impulse products which yield emotional memories and experiences. The interviewee clarified that to some extent, they already focus on building a customer relationship management (CRM) database. Storck Ibérica engages in point of sales promotions through direct and indirect gifting, TV promotions for their well-established brand Werther's Original or price-off promotions. Some are more effective than others, and some are already used for the establishment of a CRM database. For a successful indirect gifting campaign, the cooperation of the consumer is needed by signing up, sharing their personal data, agreeing to terms and gaining the chance in winning a raffle, trip to Disneyland or other events whilst buying a product of Storck. To her knowledge, when implementing the IoT, CRM effects will be easy to implement, to measure, and to get results. It will not only enhance her job performance by accelerating task executions, it will also ease marketing applications as in Spain it is not common of retailers to share customer data with their suppliers on a permanent basis, unlike in Germany. More information on consumers such as where they buy their products or who is more receptive towards specific promotions will be helpful to construct plans for the future and make certain decisions.

According to the marketing manager, buying sweets is not a premeditated purchase where the consumer would put candies or chocolates on their shopping lists. However, she agreed that smart packaging delivers the most direct input and feedback which feeds CRM. It is easier than sign up practices for indirect gifting campaigns where one leaves the active step with the consumer to sign up and share personal data. Whereas smart packaging involves the consumer passively, where one does not intervene in the data generation process, and still valuable data will be gathered and stored. To some extent, it would enhance her job performance and ease current marketing activities because of similar reasons as for the CRM example. In addition, it could be a source for a more detailed and tailored CRM database. However, she addressed some concerns about the maintenance of a certain packaging quality or not meeting the control standards coming from the headquarters in Germany. Furthermore, Storck produces all of its products in Germany and they never develop one single packaging design for one single country. Depending on the pack size and where the products are shipped to, different languages are printed on the package and used for distinctive markets. Therefore, codes or sensors have to be acquainted with information about which language is spoken in this specific market. She said that including smart packaging devices should not interfere with the logistics strategy which is followed at the moment.

Regarding predictive social media activities, just like CRM and smart packaging, it could enhance the information flow and therefore ease marketing activities. However, Werther's Original is the oldest, most established and most traditional brand of Storck which speaks to an elderly target audience. The interviewee believes that due to the addressed audience social media is not the perfect fit because a younger group of people use social media in their daily lifestyle. Since in Spain

Werther's Original is the only established brand, social media will not be of high importance to be used as a marketing activity at Storck Ibérica. Nevertheless, for brands such as Toffifee or Nimm2, for which the target audiences are families and children, social media activities could create positive effects. This, however, would be more successful in Germany or the USA because in these markets well-established brands can address people who are using social media on a permanent basis.

Lastly, the marketing manager mentioned the support which is offered by superiors of Storck Ibérica. The superiors she was referring to is the central management at the headquarters of Storck in Germany. She states that for the smart CRM system, Storck Ibérica would receive support because of the relatively easy implementation and the fact that Ibérica already focuses on building a database through indirect gifting promotions. She agrees that the smart CRM would build up on that and therefore superiors would be encouraging. The interviewee was ambivalent in regard to smart, given by a Yes and a No for offered support by superiors. When facing the positive outcome of this question, the Yes was given because, as pointed out earlier, the idea behind smart packaging has a lot of potentials. Nonetheless, due to the raised concerns, such as quality and standard conditions, superiors might hesitate in giving their approval or support.

Factors UTAUT	Will the use of...	Effect
<i>Performance expectancy</i>	<i>smart CRM</i> enhance your job performance?	Yes
	<i>smart packaging</i> to improve data generation enhance your job performance?	Yes
	<i>predictive social media</i> enhance your job performance?	Yes/No
<i>Effort expectancy</i>	Will the use of...	Effect
	<i>smart CRM</i> ease your current marketing activities?	Yes
	<i>smart packaging</i> to improve data generation ease your current marketing activities?	Yes
	<i>predictive social media</i> ease your current marketing activities?	Yes
<i>Facilitating support</i>	Will the use of...	Effect
	<i>smart CRM</i> be supported by your superiors?	Yes
	<i>smart packaging</i> to improve data generation be supported by your superiors?	Yes/No
	<i>predictive social media</i> be supported by your superiors?	No

Table 3: Summary of effects based on UTAUT factors

When focusing on predictive social media activities, many answers were given but most of them steered towards a non-

supportive attitude concerning social media activities performed by Storck Ibérica. The reason for this is firstly the nature of the product and secondly the elderly audience to which their only well-established brand Werther's Original speaks. By nature of the product is meant, that sweets are impulse products which target emotions and to which consumers do not have the need to be interactive with. Here must be added, that in Storck Germany, social media is actively used for promotion purposes even though the nature of the brand is the same as in Spain. The main difference is the established brands within either the German or the Spanish market. Since central management at Storck Germany acts as superiors for Storck Ibérica, managers do not believe in social media yet for the Spanish market, due to the fact that Storck Ibérica was not able to turn it into a business model yet. According to the marketing manager, it does not pay out for the time being. Another issue was raised, which can also be linked to the point that only one brand is well established and unfortunately addresses the 'wrong' audience for social media purposes. In order to be successful on social media, Storck Ibérica needs enough information to communicate with the consumer. From another point of view, the consumer needs to know what the brand is about. Therefore, an established brand is crucial in order to receive a lot of input to be active and build a relationship with the consumer. On one last note, German managers say no to social media for the Spanish markets at the moment, but this does not mean it won't change in the future.

5. CONCLUSIONS AND DISCUSSION

The research question; **What is the value of implementation of the Internet of Things as a marketing tool in the food industry?** - can be answered that the value of this implementation is the chance to optimize promotions in regard to effectiveness and efficiently aiming or targeting them at consumers. Mainly through larger amounts of data generated by the IoT, customers build the center of attention. The sub-questions illustrated in section 1.1 have helped to come to this conclusion. CRM, Smart Packaging as well as predictive Social Media activities all potentially improve targeted promotions to some degree. They all show positive effects when implementing them as a marketing tool. Nevertheless, the implementation of these applications may result in difficulties for businesses within the food industry due to negative effects clarified by experts. However, the overall outcome of the three examples leads marketers to better tailor promotions which in regard to the general research question can be seen as the valuable result this research was conducted to find.

Throughout this study, it became obvious that there is a difference in the marketing applications that are successful for specific goods in the food industry but may not be the ideal fit for sweets. That is because confectionaries do not belong in the category of necessity products and therefore promotion activities must be adapted in regard to the nature of these goods.

The sources declared mainly positive effects, but experts mentioned also negative effects on the possible ways of implementing the IoT as a marketing tool in the food industry. In addition, the interviewee gave feedback on

which of the three examples are likely to be implemented at Storck based on the idea of the Unified Theory of Acceptance and Use of Technology Model (UTAUT). This can be relevant for other businesses who may face similar challenges within the food industry. Table 4 summarizes the expected effects exemplified by articles, experts or the marketing manager on optimizing targeted promotions through three different examples. Those effects can either be positive, indicated with a '+', or negative, indicated with a '-' in table 4. Any '/' indicates that the article did not address this certain factor. A 'yes' or 'no' in the last table indicates whether the specific system integrated with one of the examples influences the determinants of the UTAUT model. In the end, all three examples can be seen as opportunities because of their positive outcomes. However, at least two out of three may show difficulties being implemented in the food industry, and more specifically in the confectionary industry.

Literature	CRM	Smart Packaging	Social Media
<i>Leung (2014)</i>	+	/	+
<i>Heppelmann (2015)</i>	+	/	/
<i>Lawrence et. al. (2016)</i>	/	+	/
<i>Balaji & Roy, (2016)</i>	/	+	/
<i>Miorandi et. al. (2012)</i>	/	+	/
<i>Jara et. al. (2013)</i>	/	/	+
Experts	CRM	Smart Packaging	Social Media
<i>Strategic Marketing Manager: SideCar</i>	+/-	+	+
<i>Digital Marketing Manager: IPG Media brands</i>	+/-	+/-	+
Interview	CRM	Smart Packaging	Social Media
<i>Performance expectancy</i>	Yes	Yes	Yes/No
<i>Effort expectancy</i>	Yes	Yes	Yes
<i>Facilitating support</i>	Yes	Yes/No	No

Table 4: Overview of expected effects

Exhibit B in the appendix demonstrates a more detailed summary of expected effects.

The implementation of the IoT of smart CRM, smart packaging designs or predictive social media activities have positive effects on targeting promotions. Most of the sources agreed on this and exemplified possible effects such as being able to understand a customer's journey, tailoring marketing activities or identifying a customer once established a database. For smart packaging devices, one positive effect

was the reduced food waste through identifiable shelf life deterioration. Lastly, more information is made available when engaging in predictive social media activities in combination with the IoT which can help to segment users. So, it can be concluded that all three IoT examples deliver positive effects when used as marketing tools in the food industry. However, due to the fact that both marketing agencies mentioned difficulties in terms of gathering data when building a database for Storck within the confectionary industry, the smart CRM may not be the perfect fit for this specific industry. The concern was raised due to the nature of sweets, which are impulse products that yield emotional memories and do not get much online attention from customers. When buying sweets, mostly it is not a premeditated purchase and therefore point of sales promotions have been most successful but do not build a database which is needed for smart CRM. Reversely, smart packaging can be an ideal source for CRM practices. Overall a combination of Smart Packaging and CRM seems to be successful and an innovative way to implement the IoT as a marketing tool. Smart Packaging will deliver data, which then can be used for a database to identify the consumer. However, privacy and ethical issues were given attention by two different sources. It may also result to be rather costly to implement sensors in packages and make use of it. In terms of the results of the interview, CRM seems to be the most likely tool which could be considered to be implemented at Storck. In general, smart CRM and smart packaging show the most likely effects to be adopted by Storck. Firstly, because it accelerates the task execution so that employees have more time for other things and secondly because Storck would receive more information from their customer so that optimized targeted promotions are possible. Social media is the least likely example to be adopted, simply because the audience of their well-established brand is too old to be active on social media on a daily basis.

To conclude, experts believe that predictive social media activities could be a successful IoT marketing tool, due to the easy implementation and the general knowledge of users. However, when taking Storck as an example for the food industry, predictive social media activities do not seem to be the right solution, because of the audience it addresses. From Storck's point of view, a smart CRM is the most likely tool to be adopted because it is believed that it would enhance job performance, be easy to use and be supported by superiors. However, given the concerns raised by experts, it may be difficult to actually receive the data necessary to build a CRM database. The mentioned effects of each example build a respected source for targeted promotions optimization, which is the value of the IoT implementation as a marketing tool in the food industry.

5.1 Discussion

This section will examine research limitations, as well as future research topics which may be interesting to analyze based on the conclusion of this research. Lastly, suggestions for a better research design will be evaluated.

5.1.1 Research Limitations

During the primary data generation phase time was limited and therefore, only two experts in the field of marketing and the IoT could have been interviewed. Due to the innovative

nature of this research topic, experts were not extensively familiar with some of the examples addressed to them.

Throughout this study, it became clear that there is a difference for marketing applications that are successful in the food industry as such but may not be the right fit for confectionaries. That is because sweets do not belong in the category of necessity products and therefore promotion activities must be adapted in regard to the nature of sweets. It must be taken into consideration that the confectionary industry may not be the best subdivision of the overall food industry for this research topic. Adding to that, Storck Ibérica is a very small division and operates in Spain, a country which is not known for being a technology pioneer. Therefore, it may be of great value to move this research to a country like Germany where technology developments are of high standards and great variety.

5.1.2 Recommendations

Given all the encouraging and hindering effects of CRM and predictive social media activities, smart packaging has been used in the food industry and showed successful executions for different food products. It is a valuable source for data collection and an innovative application in the area of the IoT. In my opinion, the combination of CRM practices and smart packaging devices go hand in hand. Supposedly, smart packaging collects and delivers data to the responsible marketer building a database. This database is a valuable source to undertake customer relationship management which can be used to understand users, tailor advertisements and optimize promotions. In the case of the practical example guiding this research, I would recommend Storck to focus on smart packaging developments, given that taking quality and control concerns into acknowledgment is assured. It would diminish the challenge to receive consumer data on impulse products which are often bought because of emotional desires and not because they are needed. This can be generalized to some extent for the overall food industry. Food waste can be reduced by letting the packaged food inform consumers or retailers how far it has expired. This idea should be considered when moving towards a more digital technology-driven future. In general, digitalization is approaching and, in several industries, already been implemented. To stay competitive firms should start engaging in IoT applications, be it for marketing reasons or other departments' purposes.

5.1.3 Future Research

Research has shown that the smart packaging example has the highest potential for a successful implementation of the IoT as a marketing tool. However, concerns about control and quality were raised, as well as unfamiliarity was observed. Future research could be done to obtain more expertise in this specific area as well as identify ways to counteract the mentioned concerns.

Furthermore, a distinction between the food and the confectionary industry should be made for future research due to the nature of products which cannot be generalized within the food industry. Adding on that, brands within the confectionary industry should not be generalized by promotion activities due to different audiences each brand addresses.

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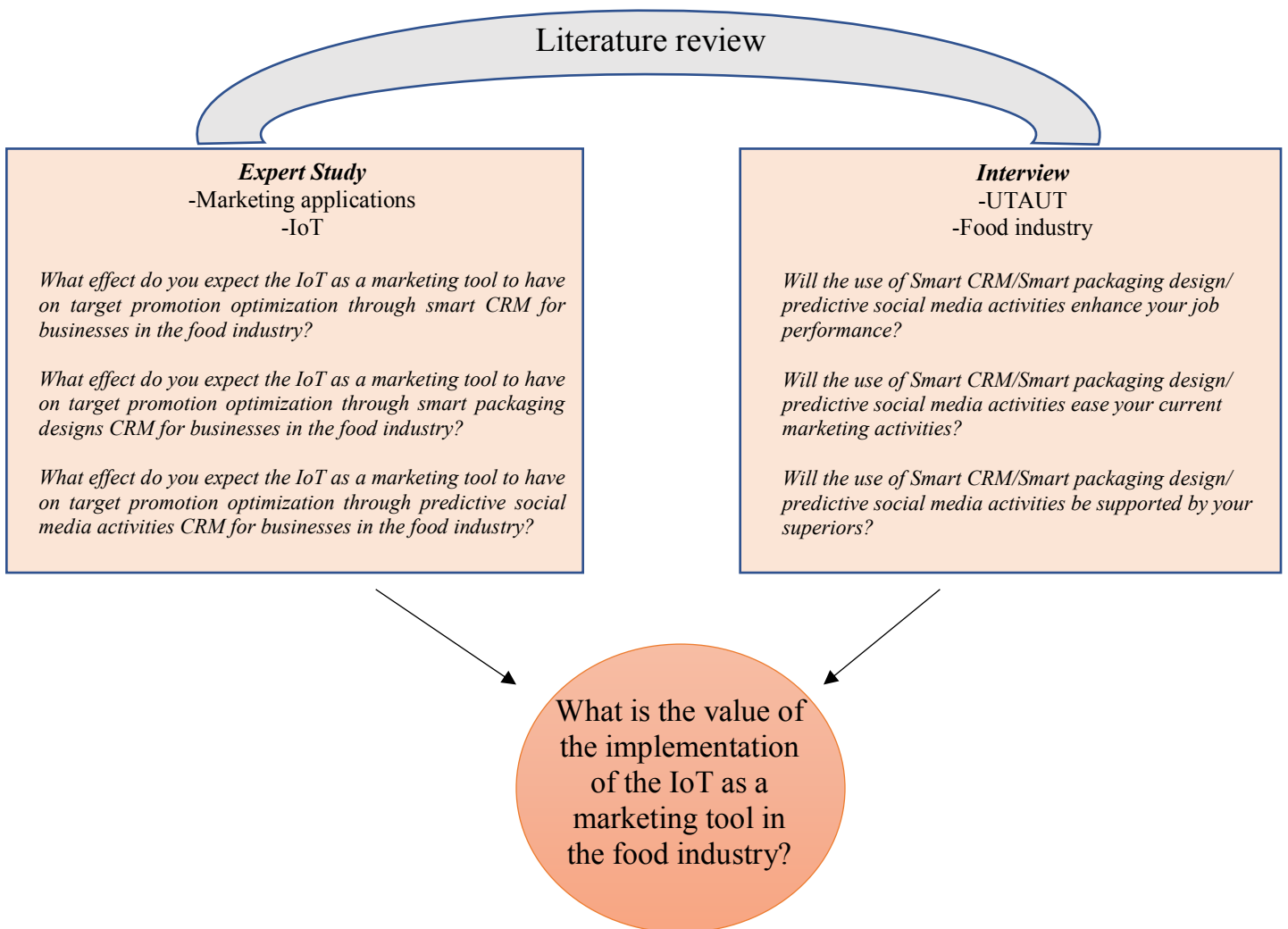
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8. APPENDIX

A: Research Design Model



B: Summary of expected effects on IoT example

Literature	CRM	Smart Packaging	Social Media
<i>Leung (2014)</i>	+ Understand customer journey + Tailor marketing actions + Targeted promotion offers		+ More information available which enables segmentation + Sub-data collection process of CRM practices
<i>Heppelmann (2015)</i>	+ Products are means to deliver customer value		
<i>Lawrence et. al. (2016)</i>		+ Packages communicate and interact with users + Offers deals + Reduction of food waste	
<i>Balaji & Roy, (2016)</i>		+ Retail ecosystem that allows for instant and two-way interplay with the consumer. + Easy decisions making + Customer satisfaction	
<i>Miorandi et. al. (2012)</i>		+ Production process control + Product quality + Shelf life deterioration	
<i>Jara et. al. (2013)</i>			+ Voluntary participation and interaction + Verification of promises
Experts	CRM	Smart Packaging	Social Media
<i>Strategic Marketing Manager: SideCar</i>	+ Consumer are easy to identify - Nature of sweets	+ Good source to receive data for CRM database	+ Easy to implement + More information available + Real dialogue
<i>Digital Marketing Manager: IPG Mediabrands</i>	+ Tailor marketing activities through more information - Difficult to get data	+ Identify customer - A costly & ethical dilemma	+ Easy to implement + Target promotions by interest
Interview	CRM	Smart Packaging	Social Media
<i>Performance expectancy</i>	Yes → accelerating task execution	Yes → more information available to build an understanding of consumer	Yes → decent information flow) No → addressed audience; social media is not the perfect fit for a younger group of people use social media during their daily lifestyle
<i>Effort expectancy</i>	Yes → in Spain it is not common of retailers to share customer data with their suppliers on a permanent basis, unlike in Germany → CRM can help with that	Yes → Effective targeting whilst decreasing costs for ineffective/inefficient campaigns	Yes → information flow, more information to construct a strategy
<i>Facilitating support</i>	Yes → already building a database	Yes → Potential No → concerns about quality and control	No → traditional brand → coming from Germany