CUSTOMER RELATIONSHIP MANAGEMENT IMPROVEMENT USING IOT DATA

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ABSTRACT

Customers are becoming more and more interested in the Internet of Things (IoT) and are willing to pay for it. According to studies, there will be more than 30 billion linked devices by 2020, and the market for IoT platforms would reach $7.6 billion by 2024. The goal of this essay is to identify potential benefits of IoT data to improve customer relationships (CRM). Based on qualitative data, an empirical investigation has been carried out study techniques with twelve specialists in CRM or innovation marketing in 2020 who have already involved in IoT initiatives for the retail sector. The outcomes show that businesses will be able to that it is possible to predict the customer's behaviour by helping to more precisely satisfy the customer's wants examining produced data Additionally, most businesses only need to establish a standardised CRM system as a result of their ignorance of software development and interface possibilities. In this manner individual IoT data collection can be combined with previously obtained data from all other channels. This alignment creates a comprehensive awareness of the customer's needs, desires, and acquired goods and services will be purchased, marketing efforts can be directed appropriately.

Keywords: Customer-centered approach, Internet of Things, and customer relationship management.

1. INTRODUCTION

Because of technological advancements and the growing Due to the global population's interconnectedness, the Internet of Things (IoT) is now a reality (Abdul-2015 Qawy et al)gadgets like smartphones,appliances, machinery, containers, and vehicles used in the home, and individuals, as well as entire cities, are growing able to access the internet. the presence of sensors, they are able to converse with one another (Hanselmann 2015). They give an update on their situation, get directives, or act independently depending on the knowledge they obtain. According to American estimates the leading market research organization is Gartner Inc.There will be around 26 billion connected devices by 2020 worldwide. Due to the significant expansion that is anticipated Experts are paying close attention to the IoT (2018 Lo and Campos).

Additionally, the IoT has the potential to profoundly alter how people interact with their surroundings. Electronic monitoring and control of physical things provides automated, data-driven decision-making to enhance the effectiveness of systems and processes and the quality of life. By connecting the physical and digital worlds, the IoT has the potential to greatly expand the reach of information technology (Lo and Campos, 2018). Companies must take use of new technologies and have adaptable, agile structures if they are to keep up with this development. In addition to updating their technology foundation to reflect this shift, businesses must look at customer needs. This important information can be used, for example, to enhance project management so that consumers receive even better results (Ploder et al., 2020). Additionally, marketing gains from technology advancement. After a contract is signed or a networked device is purchased, staying in constant contact with the consumer enables new, service-supported business models (De Cremer et al., 2017). Every customer has various expectations for their customer service encounters, interactions, and company partnerships (Nguyen and Simkin, 2017).

The technological features of IoT have been the subject of a number of research papers (Atlam et al., 2018). Developing a thorough understanding of IoT and its potential effects on content relationship management could become challenging (CRM). The potential of IoT data acquisition seems to be underutilised. In addition, while considering customer issues, system partnerships will have entirely new significance. Despite the fact that there is a sizable body of literature focusing on the technological application of IoT in business, marketing prospects and customer interactions have not yet been thoroughly investigated. Marketers in the B2C space should concentrate on the myriad new opportunities that technological advancements provide for society (Jara et al., 2012).Although traditional marketing strategies are still in use, technology advancements have made it possible for consumers and organizations to interact more frequently. The integration of IoT channels and communication strategies or consumer engagements are two areas where Nguyen and Simkin (2017) uncovered some research gaps in IoT Marketing. Companies need to adapt to the most recent trends and fulfill client requests as rapidly as they can as this evolution will continue (Oglesby, 2018). Consequently, this study demonstrates how IoT technology can enhance CRM. It is meant to give readers "food for thought" about potential IoT scenarios in CRM and how best practices might apply in various contexts. As a result, the following is the research question that is relevant to the consumer

products and retail industry: How does Customer Relationship Management benefit from IoT data?

Following the introduction in Section 1, Section 2 describes the theoretical notions, and Section 3 describes the empirical study design. Section 4 presents and discusses the findings, while Section 5 offers a conclusion. Finally, Section 6 lists the drawbacks of the suggested strategy and makes some suggestions for further investigation.

2. BACKGROUND THEORY

This part provides definitions and explanations of the most pertinent terminology for the research at hand, including digital marketing, IoT, and CRM in digital marketing, so that readers will have a thorough understanding of all the concepts used in the paper. The final subheading discusses the application of IoT in CRM as a way to tie the terms together in order to respond to the research question.

2.1 Internet Marketing

Beginning with Marketing 1.0, which focuses on a product, and moving through Marketing 2.0, which focuses on the customer, up to humanistic Marketing 3.0, which transforms a customer into a human being, Kotler, Kartajaya, and Setiawan (2010) became the first authors to discuss the evolution of marketing. Successful firms must create goods, services, and corporate cultures that represent human values as a result of these forces. In order to deepen and expand customer-centric marketing, businesses are already making the journey to Marketing 4.0. It does not suggest that conventional forms of advertising, such as print, posters, and television, will vanish overnight. A mix of physical and online marketing will continue to serve its intended purposes, such as introducing a brand to the public. However, online channels are already producing major impulses for sales promotion, and they will do so more frequently in the future. That represents a change in power in favour of consumers (Kotler et al., 2017).

Parallel to this transition, marketing conditions have been constantly evolving ever since the widespread use of the Internet in the early 1990s. Web 1.0 also refers to the programmes and possibilities available during this early stage of the Internet. O'Reilly (2009) first used the term "Web 2.0" in 2004 to refer to online users. Kreutzer (2016) claims that Web 2.0's primary characteristic is active user interaction. Therefore, the ability to alter the contents on one's own and present one's innovations allows for the most effective use of collective intelligence. A key component of Web 2.0 is so-called user-generated content, which is content developed and published by internet users themselves. Internet forums and blogs for diverse themes are a few examples.

2.2 Internet of Things

It is not unexpected to discover numerous definitions of the IoT given the buzz surrounding the notion in recent years. The literature lacks an official or clear definition (Dorsemaine et al., 2015). Numerous definitions exist because businesses, research organisations, or stakeholders view the Internet of Things from either a thing- or an internet-oriented perspective, according to Atzori et al. (2010). As a result, different definitions can be found. IoT is credited to Kevin Ashton, head of the Auto-ID Center at MIT (Massachusetts Institute of Technology), and his colleagues; nevertheless, they used a somewhat elaborate and

lengthy definition (Ashton et al., 2000). Due to the advancement in IoT technology since then, numerous terminologies have been created (Abdul-Qawy et al., 2015). The Internet of Things is defined succinctly and precisely by SAP Research's Stephan Haller as "a future in which physical items are smoothly integrated into the information network and where the physical objects can participate actively in business activities. IoT BDS 2021 - 6th International Conference on Internet of Things, Big Data, and Security sues services are available to communicate with these "smart objects" over the Internet, query their state, and any information associated with them. (Haller and colleagues, 2009, p. 15) "IoT can be considered both a dynamic and global networked infrastructure that controls self-configuring items in a highly intelligent way," the authors (Atlam et al., 2018, p. 928) further state. Since it contains all necessary details and is understandable, Stephan Haller's description of the Internet of Things is used wherever the term is mentioned in this work. The integration of the real world with the virtual one is a feature shared by all IoT definitions, notwithstanding their many variations. Additionally, the majority of authors concur that the IoT is intended to provide an IT infrastructure that enables reliable and secure data transmission between objects (Weber, 2010). IoT is used in conjunction with the appropriate technology, such as RFID, according to Nicholas Negroponte, who states that "it's about embedding intelligence, so objects become wiser and do more than they were proposed to do" (Vidalis and Angel opoulou, 2014, p. 15). So, the Internet of Things (IoT) is more than just connecting physical objects to the internet. "A smart object' is any object or product that is - by way of embedded technologies -aware of its environment and state, and it may have the ability to make its own decisions about itself and its uses, communicate state information, and achieve actuation under its control," (L'opez et al., 2011, p. 285) restricts the definition. It is not sufficient for a smart item to merely be readable, identifiable, localizable, and addressable in the context of the IoT. (Ibarra Esquer et al., 2017). Having data stored is insufficient. Data processing is required to respond dynamically to changes (Minteer, 2017). A smart item should also be capable of acting independently (van Deursen et al., 2019). It must therefore be outfitted with software that allows it to behave autonomously online without human input. This calls for the smart device to connect to the Internet (Fortino and Trunfio, 2014). It can be viewed as a smart item in the IoT and utilised to assist CRM if these requirements are met.

2.3 Digital marketing CRM

To effectively disseminate the offered goods and services, all entrepreneurial activities must maintain a constant market focus (Herhausen, 2011). According to Bruhn (2016), marketing is the analysis, planning, implementation, and control of internal and external company operations that are intended to increase sales by coordinating corporate success with customer benefit in the sense of constant client orientation. Bloching et al. (2012) claim that the effectiveness of traditional advertising has been falling for years in all markets. The key causes include the expansion of client categories, products, and brands, as well as media and distribution methods, as well as the escalating worldwide competitiveness (Bloching et al., 2012). While digital marketing has relatively minimal expenses and produces a more precisely focused audience (Dodson, 2016). It will be significantly simpler to recognize essential

elements of consumer demand in a more precise way thanks to IoT's technical capabilities (Nguyen and Simkin, 2017). It gives businesses the ability to comprehend clients and customize technical goods and services (Hoffman and Novak, 2018). On the other hand, higher customer satisfaction fosters stronger customer loyalty, which benefits the business (Kumar and Reinartz, 2018).

A sales and marketing idea known as "customer centricity" puts the customer first rather than the product (Shah et al., 2006). The value chain is constructed as follows: The beginning point for marketing initiatives is the individual's expectations, requirements, and wishes (Gummesson, 2008). Human requirements are a deficiency of something that they naturally require. Purchase intents are the choices made by specific pleasure seekers who wish to purchase something under specific circumstances. The acquisition of the particular gratifying person is then what constitutes a purchase (Lo and Campos, 2018). The person will offer fresh first data because they are a new client. Returning consumers enable a more intimate relationship to develop between clients and the business (Waisberg and Kaushik, 2009). Long-term efforts of how a corporation deals with clients who have already purchased things become apparent at the post-sale stage (Reynolds, 2002). Client-centricity is more on long-term customer relationships that may last a lifetime than it is about first-time sales because of the cost advantages of keeping a customer (Shah et al., 2006).

2.4 IoT use in CRM

According to Kouhne and Sieck (2014), location-based technologies make it possible to leverage a customer's present location for marketing reasons, using location-tracking technology on mobile networks, location-based advertising (LBA) "is a novel form of marketing communication that targets customers with location-specific advertising on their mobile devices" (Telli Yamamoto, 2010, p. 125). Contrary to location-based marketing, proximity marketing enables the specific position of consumers down to the inch and even more efficient content delivery (van Deursen et al., 2019). For instance, this enables a retailer to connect with customers who are simply passing by. Utilizing IoT Data, Customer Relationship Management can be improved using geofencing or GPS. WLAN and Bluetooth Low Energy beacons are the most widely utilised technology in proximity marketing (Rieber, 2017). Some department store companies' offer tailored promos when customers download their apps using a mobile marketing platform and Apple's iBeacon technology. While shopping, beacons can tell the buyer about the goods or special offers in the store. He can find out precise background information on a product, such as its size, ingredients, warranty, instructions for usage, and cleaning instructions, by reading the QR code or NFC tag on it (Kruse Brand ao and Wolfram, 2018). NFC tags, which are tiny transponders that provide information on the mobile phone, are an additional option. It is sufficient to position the phone a few inches away from the transponder. The NFC tag can also be buried, making it possible to incorporate it into items, unlike a QR code (Kruse Brand ao and Wolfram, 2018).

Every interaction a customer has with a smart product, a supplier's personnel, a store, or a call centre is a chance for the brand to be directly impacted (Nguyen and Simkin, 2017). As an illustration, Google offers the Nest smart thermostat, which replaces the traditional

thermostat with intelligent temperature control (Gregory, 2015). It learns which room the owners are in and when they are at home. The temperature in each room is then changed appropriately to ensure that the client is constantly at ease. Additionally, by using less energy, the environment is safeguarded while also saving on energy bills. Customer Experience Management (CXM) is a significant differentiator used by companies like Google to draw in, engage, and keep consumers. CXM hence suggests a transition from pure product sales to supplied services, producing added value and a tight exchange between a brand and its clients instead of just selling a product (Gregory, 2015).

3. DESIGN OF EMPIRICAL STUDIES

Since the intersection of IoT and marketing as well as CRM activities is not thoroughly examined, the qualitative technique of Mayring (2010) was thought to be the most appropriate methodology to acquire insights into this study field and address the supplied research question in section 1. This makes an exploratory study the greatest method for obtaining both fresh information and recommendations.

The focus of an expert interview, according to Flick (2007), is less on the interviewee as a person and more on his or her status as an authority in a certain field of endeavor. Interviews with experts can provide more in-depth insights into the present status of IoT Marketing and Services by taking into account their knowledge, personal definitions of IoT, and practical experiences.

The following criteria were used to choose the experts for this study: (1) restricted to the consumer goods and retail sectors, (2) employed by a multinational corporation, (3) between the ages of 25 and 50, (4) with an educational background and experience working on data-driven marketing projects. Based on many searches, the specialists were hired through telephone. 12 interviews total—mostly in Europe—have been undertaken. For each of them, the professional background of the specialists and their work history in the retail or consumer products industries are disclosed.

The experts were initially invited to read through three business scenarios that the researchers had presented in order to spark their imagination. The scenarios also provided the respondents with the opportunity to use those examples when responding to the subsequent interview questions. These were developed in response to the gaps in the literature that were found. The questions were not posed in a rigid order in order to get as much information as possible from the interviews and to maintain the expert's unbroken speaking.

The experts were quizzed on the following subjects: (1) their concept of the Internet of Things; (2) current and potential uses of IoT technology for CRM initiatives; and (3) qualities of a strong CXM and ways to engage customers; and (4) IoT support opportunities in marketing and CRM. Participants were thus given the option to go into further detail about their expertise and experiences. At the conclusion of the interview, the experts were also asked to reflect on it and make any additional remarks.

All of the interviews were recorded, and then they were denaturalizedly transcribed using the software Trint1. This streamlined approach concentrated on the information. The researchers tried to normalize the data and fix minor grammatical or interview noise issues

(Oliver et al., 2005). By using the inductive approach, categories were drawn directly from the content after viewing it rather than by using previously employed theoretical notions (Mayring, 2010). The expert analysis tool MAXQDA22 was selected to evaluate all of the material gathered. By filtering the content, dominant themes that looked pertinent for the investigation were found and retrieved. This required the text to be coded, which was done after constructing a keyword index.

The authors also advise checking the codes once you've read through 10 to 50 percent of the information. The categories were examined by the authors for proper ratios and potential designations beyond 30%. Individual types were then summarised. A test was conducted in accordance with Krippendorff's Alpha to gauge the intercoding's dependability, and the results revealed a score of 70,31. The minimum values required by Mayring (2010) and Krippendorff (2004) are 67. Since the coefficient is higher than the advised 0,67 and the intercoder only received a brief introduction to the subject and coding system, this can be regarded as sufficient reliability testing (0,73). The following part will present the study's findings after describing the data collecting.

4. RESULTS

More than 450 codes were found during the data analysis of the twelve expert interviews using Mayring's inductive research strategy, which is based on qualitative research methods (2010). The expert opinions were divided into 17 separate groups based on the codes, and then they were categorized into the three primary areas of (1) Internet of Things, (2) IoT Marketing/CRM, and (3) Future Implementations. The frequencies of the aforementioned categories are displayed in Table 1.

Table 1: Coding Process Results.

Main Topics / Categories	Frequency
Internet Of Things	
Analyzing Data	29
IoT Data vs. Big Data	29
IoT Definition	21
IoT Marketing/CRM	
Customer Experience Management	47
Data Collection & Tracking	37
Measurability & KPIs	37
Targeting	37
Purpose Marketing Activities	32
Engagement & Review	27
Changing Customer Journey	25
Customer Needs & Behavior	23
Customer-Centric Service	17
Future Implementations	
Future of Retail	48
Future of Wearables	29

General Future Perspective	20
Recommended Actions	20
Future of Dash Buttons	19

A thorough explanation of terms that are frequently brought up in the interviews is provided in the following subsections. Based on their applicability to the study's subject matter and frequency of occurrence, the categories of data analysis, customer experience management, and the future of retail were selected. As a result, each quote is associated with a certain Interviewee (I) via a text mark for traceability purposes (number).

4.1 Data Analysis

Despite having access to abundant data, companies only examine already generated data insufficiently, according to I2 (31). One frequently claimed cause is time constraints. In other instances, there are also insufficient credentials to analyse the pertinent facts (I2, 33). Data analysis presents a hurdle, according to a separate respondent, "if you mix the data from two different sources. You don't actually receive that value. Before taking new action, you must make sense of what is emerging from both (I9, 11). "I have to argue that perhaps 95% or even 100% of the advertising I see isn't really pertinent to me. I would prefer to only see advertisements that might be relevant to me (I9, 7). Because you cannot create any correlations, having terabytes and terabytes of data is essentially meaningless (I9, 21). I9 (31) notes that, of course, the employees would not be able to determine how the data should be handled and analysed.

"The worst thing that a firm or individual can do is first acquire the data and then start wondering what do I need to do with all of this before collecting the data," states I9 (29). You must be certain of your end goal before taking any action. Therefore, before organisations begin to collect data for use in future marketing initiatives, it is important to consider the correct questions. For instance, what goods are purchased when and how much of them are purchased? (I5, 16).

Additionally, a review of consumer behaviour should advise orders depending on customer preferences. "I promptly decided to plan a BBQ, so I drove by the store and purchased Jever. The following time I order a beer, Alexa may recommend Jever to me. Because of this, branding is crucial. Instead of telling Alexa to "get a sixpack of Jever," I probably say to her to "order a six-pack of beer" (I4, 20).

4.2 Management of the Customer Experience

Customer enthusiasm is key to the success of customer experience management (I2, 21). An appropriate client experience for the product is important to Interviewee 10 (19). "I don't want to be made to go through an arduous customer experience for a pointless product" (I10, 19). Additionally, "it is simply important that the communication is not overblown," says Customer Relationship Management Improvement utilising IoT Data. I believe that if you are continually presented with materialistic items, you will get flattened out or sealed off. Therefore, it will be crucial that the customer experience takes into account giving the client the right amount at the right time to satisfy their needs. Perhaps you could try that with wearable technology(I10,s19). The corporation might send an email that matches my tonality rather than

the original slogan by "talking to my Alexa" in the hopes that it would learn which tonality I prefer (I4, 32). The effective utilisation of previously obtained consumer data is not only advantageous but also desired for I3 (29). "Now I use the same e-mail address to download the Smart Home App for my dishwasher. In the best case scenario, this would already offer a link based on the information you provided about your order. Are you okay with us using the data for the order? (I3, 29). Due to this, businesses may target clients accurately, evaluate them based on where they live, and take their socioeconomic status into account (I3, 29). I3 (21) goes on to illustrate using the example of a broken, smart dishwasher that service personnel might already see in their CRM system the customer's model, how frequently they've used it, and which application is most frequently used. As a result of networked technology, sensors can identify a dirty pump. The consumer is now free to choose whether he wants to handle the issue himself or if a professional should have a look. Even more cutting-edge solution providers might think about identifying the failure before the consumer realises that something isn't working and then informing the customer to present them with alternative options (I3, 21; I7, 29). However, I1 (35) states that while businesses should act transparently, they should also avoid scaring off customers by telling them they have detailed data saved (I3, 27). As a result, I3 (27) suggests routinely reviewing data and touch points for enhancements, which might result in the creation of new products and do away with user research.

4.3 Future of Retail

"Given the current regulations, I'm not sure if we will experience an Amazon Go-like scenario in Germany. However, I believe it will go in this direction (I12, 3). This type of notion is already intended for the food industry because customers don't want much consultation: "In general, I believe consulting will decline because it's possible to obtain knowledge through the internet, emerging technologies, smartphones, wearables, etc., or even while making a purchase" (I12, 3). On the other hand, it could be more challenging for pricey items that require justification (I12, 3). The time factor (17, 5; I1, 3; I4, 5) and consumer convenience (I7, 3; I2, 3) were noted as benefits of IoT retail, but businesses can also save money by employing fewer people (I8, 3). I8 (3) thinks that this idea might be appealing to a number of players in the industry, including payment providers as well as marketplace suppliers. Shop owners and organisations like PayPal or Mastercard would be drawn in by the advantages of having all the client information. I10 (3) believes that Apple Pay may become a standard method of payment in the future because contactless smartphone payments are quick and safe. "I think that there will be less of a barrier to these services, which are mostly based on sensor technology and networking with RFID technology, and that acceptability will grow and then spread very quickly. This will very certainly be disruptive, in my opinion (I20, 3). The expert continues by saying that deploying this technology in nations like Asia or the US will be developed pretty rapidly. However, in terms of data security, it can take longer in Europe. Additionally, the cost of operating overhead and technological equipment is still high.

However, the majority of the experts concurred that ideas like Amazon Go are what retail would look like in the future. "I believe that when it comes to privacy or anything else, ease will win out" (I6, 3). Furthermore, according to I6, "the pain at the checkout is high

enough." I2 (5) could picture a similar idea being used for gas stations. People today are quite busy, and if they are on the highway, they want to arrive at their destination as soon as possible. An automatic recording system that can recognise the licence plate number and debit the credit card amount is advantageous, according to the interviewers. The usage of IoT technologies could be advantageous for the fashion industry as well (I6, 5; I7, 9). I6 (5) gives the following illustration: "I can peer inside virtual shopping trolleys, so to speak, and see what individuals are trying on and what they don't like" (I6, 5). Businesses can therefore assess if they no longer order specific clothing cuts.

5. DISCUSSION

The authors examined how IoT data can be used for CRM and which effects occur in the interaction between businesses and customers based on literature research and a qualitative empirical investigation.

All of the experts who were consulted predicted that the retail sector will eventually move toward self-service options like Amazon Go. Additionally, it is essential to build a standardised CRM system, combine the individual's IoT data that has been collected, and align that data with data that has previously been generated from all other channels. Through the alignment of all data, a comprehensive awareness of the customer's needs, desires, and IoT BDS 2021 - 6th International Conference on Internet of Things, Big Data and Security products, services, and purchases will be attained.

Once a customer buys an IoT device, businesses can obtain data and get in touch with them. According to Lo and Campos (2018), businesses will be able to more readily meet their customers' needs as a result. Additionally, using data analysis to examine the gathered information, it is even possible to forecast the behavior of the customer. As Shah et al. have previously discovered, it is crucial to concentrate on conducting all operations in a customer-centric manner (2006). The customer-centricity strategy helps the development of new business models in the context of IoT by providing a customized customer experience. To that extent, the integration of IoT into CRM enables the provision of more specialized services and, consequently, higher income. To reach their respective customers, businesses must align their Omni channel and cross-channel communication strategies. Campos and Lo (2018).This is so because the client chooses the mode of communication. In other words, businesses should not only stay in touch with their clients through all possible channels, but also take special care to avoid alienating them depending on their communication preferences. A completer and more enhanced ecosystem can be built by the retail sector in particular, allowing for bi-directional real-time engagement with customers both inside and outside of the stores Simkin and Nguyen (2017). Retailers should leverage smartphones as a touch point for all interactions since the majority of customers are constantly online via them in order to fully utilize the potential of IoT integration. Therefore, as shown in the interviews, location-based beacon technology offers retailers a way to engage with customers as they walk inside the store. The customer can receive real-time information about products or exclusive deals at the retail store thanks to beacon technology. That encourages a customer to make a purchase, in their opinion. All in all, this demonstrates how CRM may benefit from the use of IoT data.

6. LIMITATIONS AND UPCOMING STUDIES

This empirical study only spoke with twelve specialists;therefore, the results may not accurately represent what the general public thinks or understands about IoT applications in CRM. Since the majority of the experts are from Europe, the results are therefore not generally valid. Results may be skewed as a result of the experts' subjective selection. Due to their disposition and proximity to the survey issue, it is also possible that the specialists have a favorable viewpoint on the subject. Additionally, it wasn't simple to group the interviewers' responses into the appropriate categories. The content frequently overlapped, making it difficult to establish boundaries. This study attempts to provide the first impetus for IoT in marketing by focusing on future CRM and marketing procedures. However, a much deeper knowledge of the consequences of IoT is still required. IoT communication and marketing methods that target clients in accordance with their needs should receive special consideration. It is important to perform more quantitative research to understand how consumers feel about customised offers and services compared to conventional marketing strategies.

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