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Understanding the Influence of IoT Advertising on the Customer Choice: A Conceptual Framework

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Abstract

With the revolution in marketing 4.0, there has been an immense shift in the business processes. One of the technologies revolutionizing the business processes in contemporary times is the Internet of Things by making significant impact in marketing and communication. The data exchange mechanism of the Internet of Things technology facilitates the seller to customize the advertising experience for the customers through real time interactivity and data analysis. The data driven advertising enforces Personalized marketing based on geographical location of the users and usage behavior of the product. This paper aims at developing a conceptual framework for understanding the moderating effect of the Internet of Things technology on the customer choice. The paper proposes variables to understand the impact of IoT based advertising on the buyer and the variables that influence the choice of customers

Keywords: Customer behavior, Internet of Things, Personalized marketing, Privacy

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Introduction

IoT– An Overview

As the name signifies, the Internet of Things is the technology which facilitates the connection of a product with the internet and their interoperation nature. The inter connection of the various types of products with the internet ranges from the products used by humans on daily basis as well as non-daily use products. As defined by the American Marketing Association, Internet of Things enabled devices are the devices and sensors connected to computing systems and networks. The use of lucrative concept of connecting everything and anything to the internet has gained significant pace in the business world. According to a recent estimate by International Data Corporation (IDC), Asia Pacific region shall be the leading region spending on the Internet of Things by forming 40% of the estimated $1.3 trillion in the year 2019 (Wu, Chen & Dou, 2017). Such growth of IoT technology will push frequent interactions between the users and the smart products and objects which shall further enable the sellers to develop and offer a wide range of innovative services like notifications of product upgrade, unique customization of user experience, better and conveniently controlled products, and self-analysis and facilities.

In present day situation, the connection of the physical devices with the internet using the Internet of Things technology has revolutionised various segments of the business like manufacturing, logistics and supply chain, advertising, customer service etc. The success of the most primitive form of IoT dates back to the success of RFID technology which is currently a prominent tool for tracking objects and other targeted subjects. The technology behind RFID tracking is a RFID tag placed on the object to be tracked and a huge network of sensors placed at different locations which scan, track and locate the devices. Internet of Things technology taking few steps ahead has made it easy to connect the physical objects with the internet and exchange of data to provide smart services with the exchange of data of the user as well as the environment. However, the internet connected and enabled devices require a whole ecosystem to function which comprises of various infrastructural components. The connection of the Internet with the physical device and the emerging technologies like data analytics facilitates the exchange of information for improvising over the service component for home as well as industrial products. However, the resultant internet enables/connected/smart devices, both industrial equipment and consumer products, comprise of three central components, namely, physical component, smart component and connectivity component. The physical devices form the physical component such as the mechanical and the electrical part. Further, the smart component is formed by the sensors, microprocessors, data storage, controls, software, an embedded operating system, and a digital user interface. Lastly, the connectivity component are the ports, antennae, protocols, and networks that enable communication between the products and the products cloud, which runs on remote servers and contains the product's external operating system.

As a contribution towards revolutionizing the internet advertising, the interactive nature of the internet connected devices generates data about the user's operational activities with the device. The data

generated from these internet connected smart devices is put to analysis using various techniques like data analytics and web analytics to draw much meaningful statistics and actionable insights. The conclusions drawn after the data analysis is not only limited to simple statistics but spreads out to the association and interaction between the device and the user. Other than data collection, the Internet of Things technology keeps track of the user's activities over the website, software application or any other interface. The information so collected is used in conjecture with the related information like the demographics, interests, profile and participative information of the user. Moreover, the information gathered is gathered, analysed and worked upon on real-time basis that the marketers are able to customize the online experience of the users by customizing the advertising and online content. Having tracked the browsing information of the users and its analysis generates immensely significant information about the users to remove the irrelevant or disliked content by the user and give a tailor-made feel to the users by showing relevant, browsed, frequently searched, and liked content.
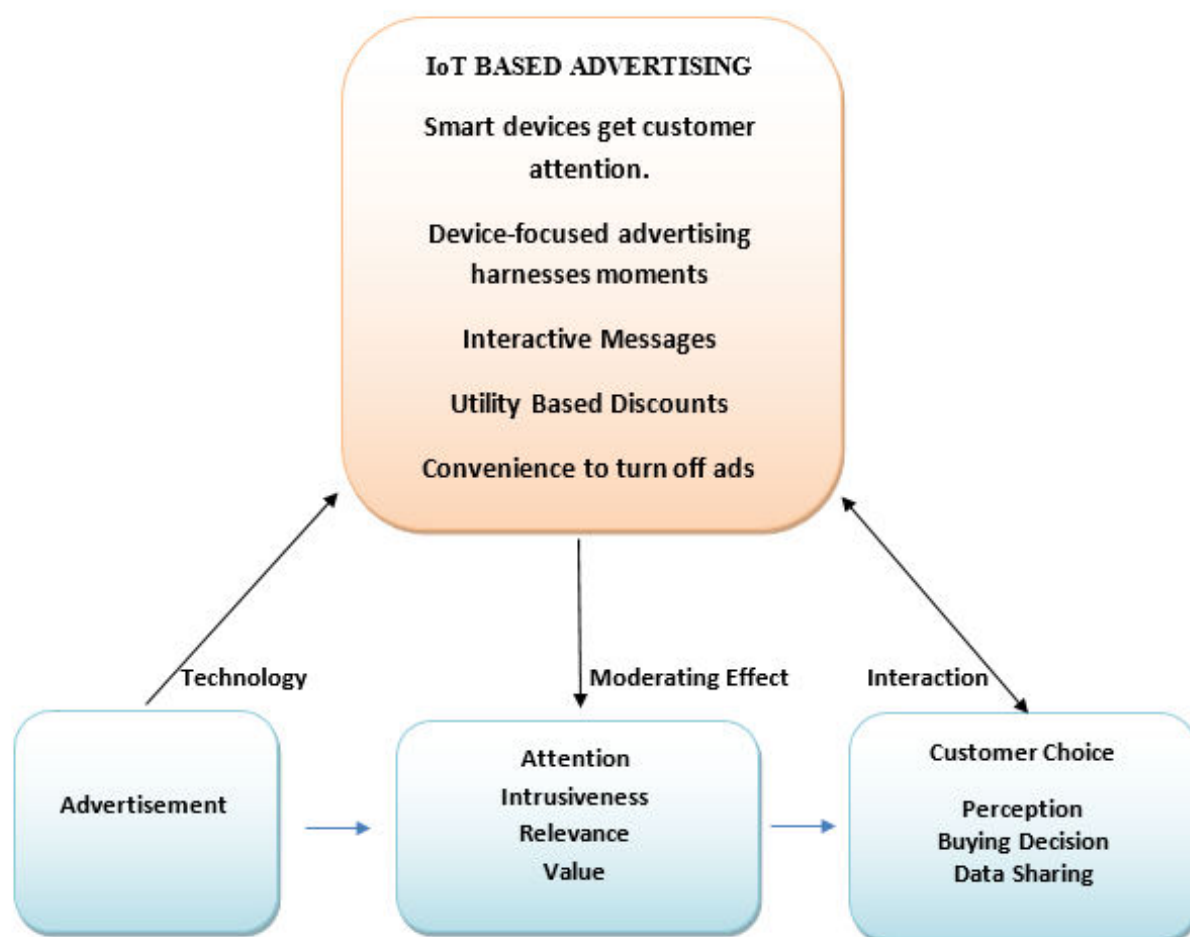
Conceptual Framework

Figure 1: Conceptual Framework of Impact of IoT based advertising on Customers' Choices Source: Author

Moderating effect of IoT based Advertising on consumer choice.

Based on comprehensive and in-depth review and varied dimensions and constructs which are identified in literature, a conceptual model for achieving advertisement effectiveness through use of IoT based advertising application.

In this conceptual model, it shows the relationship of advertisement on consumer choice, moderating effect of IoT based advertising on advertisement effectiveness and hence, IoT based advertisements can have impact on consumer choices, moreover it is two way, because consumer can interact with apps and it is totally customised. As apparent from the theoretical model, advertisement effectiveness for resulting in consumer choice can be by creating attention towards the product, more intrusiveness, creating relevance to consumer's need and showing the value benefit through advertisement, there have been many measurement tools to check the effectiveness and as technology is advancing so is the advertisement effectiveness to be enhanced. Hence, IoT based advertising which can give moderation to advertisement in following ways:

1. Smart devices get customers' attention.
2. Device-focused advertising harnesses moments
3. Interactive Messages
4. Usage Based Discounts

Objectives

1. To understand the concept of IoT in data driven advertising.
2. To understand the impact of IoT based advertising on buyer.
3. To develop a conceptual framework of impact of IoT based advertising on customer choice.

Research Methodology

For this conceptual paper, data is collected through secondary resources like research papers from journals, articles on the subjects written by experts and expert reviews on the applications.

For the purpose of understanding the concept, the research papers are collected and classified as follows:

a) Consumer behaviour in digital environment
b) Internet of Things technology
c) Personalised Marketing and its impact on consumer choice
d) Privacy concerns of IoT.

Articles are collected on various IoT advertising application to understand the benefit, it will give to advertiser and consumers.

Based on the previously established constructs in literature and review of IoT based applications by expert, the concept of impact of moderation effect of IoT based advertising on advertising and hence

on consumer choice is made through conceptual framework model, which can later be tested through measurable variables

Literature Review

Consumer behaviour in Digital Environment

Previous researches have established the fact that a customer follows various steps during a buying process starting from becoming aware, then gathering information, identification of alternatives, evaluation and selection of the most suitable and ultimately makes a purchase. In addition to this, the customer loyalty is also dependent on the value induced in a product offering by a product or a service. It is when the customer acquires something of value that he makes a repeat purchase and shows loyalty towards a product. Contrastingly, the consumer decision making journey is shorter in a digital shopping environment as compared to a conventional offline environment since the buying process eliminates three steps from a conventional buying journey (Edelman & Singer, 2015). In a digital environment, the initial stage of gathering information can completely influence the decision making of the customers since the customer can gather information from search engine and also be influenced from the review posted by the users online on the user's website and third party websites. Therefore, the customers in the digital environment can make buying decision in new ways.

With increasing number of researches about the customer buying decisions in the practical territory of the digital environment, the outlook towards the buying journey have been evolving due to the influence of interactive social media and convenient information access of the customer with lesser choices. Moreover, agreeing to the research by Edelman & Singer (2015), Court et al., (2009) states the buying behaviour of potential buyers can be influenced by the reviews on social media, retail platforms and can influence consumer behaviour before and after making the purchase.

The difference in the customer journeys in the digital and conventional offline purchase environment has formed the base for a number of researches in the buyer behaviour. Few researches have ascertained the difference in the amount of money spent by the customers in digital buying environment as compared to the offline buying environment. A research by Kushwaha and Shankar (2013) which is established on the analysis of the shopping database of one million customers for 4 years across 22 product categories. The analysis was made by comparing the data of the customers who did online vs the customers who did offline shopping or did both. Based on the conceptual framework developed which is based on the two features of the product categories, the findings revealed that the customers who buy from multi channels do not find it valuable as compared to the customers using single channel of purchasing.

In continuation with the studies of customer behaviour in the multichannel shopping, Neslin et al (2006) reviewed the behaviour of multichannel shoppers in the information search, actual purchase decision and post purchase stages. The research proposes five imperative challenges in the research about data integration, developing insights of customer behaviour, evaluation of the channels of

shopping, distribution of resources, and synchronization in the channels. However, with technology getting close and accessing the data of the customers with the distance of just a touch away, the data volumes at individual touch points furthers the complexities in the above mentioned challenges.

Another research by Ratchford, Lee, and Talukdar (2003) studies the impact of the online information search on the customer journeys. The study finds out that in the case of an automobile purchase, the digital environment the customer decision making process by eliminating the consideration and evaluation stages. Moreover, the authors infer that the customers would have searched for longer periods of time if the information was not gained through digital platforms. In addition to this, another research for the same automobile context by Ratchford, Talukdar & Lee (2007), it was ascertained that the customer's time spent at the dealer was saved by using the internet for information search. Moreover, relying on the internet would save their time in negotiating the terms as well in the final purchase stage. Further, the results of the research lay emphasis on the reducing search costs in the internet environment in turn making the process of customer purchase shorter and more efficient.

Internet of Things

With the end of 20th century, internet technology has been ever evolving and improving field of development and worldwide attention (Martínez-Caro et al., 2018). As stated by Yang et al., (2013), the concept of Internet of Things was introduced in the year 2005. Since then the field of IoT has been of interest to researches which has further stimulated international attention due its diverse applications in various business as well as non-business fields along with supportive multidisciplinary technologies (Gubbi et al., 2013). In today's situation, the internet technology has connected technological devices to the internet for exchanging the information and form the component of IoT environment (Wang and Hsieh, 2018). In addition to this, the impactful role of the IoT in the diverse aspects of governing the people's life is one of the pillars due to which the technology is being implemented at such a high pace. Further, the application of the Internet of Things in assessing the behaviour of the users has developed further of researchers in the field. The IoT has revolutionized the speed of interaction and transmission of information and simultaneously provide real-time results.

As an accepted fact that the Internet of Things Technology is a communication technology which facilitates information transmission through connecting everyday objects with the internet for digital communication. However, for digital interaction between the physical devices and the receptors, the compatibility and configuration of the two components is necessary (Atzori et al., 2010). The Internet of Things technology highly incorporates the role of the customers in the internet environment. With growing application of the Internet of Things, devices like smartphones, consumer durables, and security devices are connected to the interaction for real time management experience. The IoT driven devices are capable to collect and store a huge chunk of information from the users in order to improve the overall experience of the users in terms of product and service improvement, people management etc. Not only does the Internet of Things technology applies to the business management

but has a wide variety of applications like healthcare, intelligent energy solutions and management, automation etc. (Bellavista et al., 2013).

The growing and diverse field of applications of Internet of Things impacts the availability as well as identification of opportunities can are in line with the requirement of the Internet of Things. This in turn increase the challenges for the innovative environment of the Internet of Things. However, the strengthening challenges have increased the number of proposals for the IoT systems which however cannot be suitable. Taking into consideration the technical challenges in the implementation of the IoT systems, the lack of unacceptance of the business models based on the IoT infrastructure is another challenge which restricts the exploration of the technological possibilities in the field (Laya et al., 2013).

Personalized marketing

Pepper et al. (1999) suggests identification of the customer base as the primary step in the process of personalization. Additionally, it is necessary for the company to understand the needs, wants and preferences of the customers. The information of the customer needs and wants is a continuous process which goes on to the latest period to understand the choice behaviour of the customers. Further, discrimination of the customers on the basis of the level of value they show and on the basis of the difference in their needs. The next step in the process is to initiate interaction with the customers in order to improve the cost efficiency and clear understanding of the customer. Moreover, the company or the marketer needs to figure out the channel of interaction with the customers. Lastly, the final step for the company is to customize the enterprises behaviour. The identification of the customer behaviour and synchronization of the same with the adaptive nature of the company impacts the effectiveness of the personalization. Moreover, it is necessary to understand customer behaviour through access to information and provide the customers with what they want and need.

Vesanen & Raulas, (2006) suggest eight components to the implementation of the personalized marketing. The eight steps suggested are the identification of the customer, establishing communication with the customers, extracting customer data, processing of the customer data, developing and understanding customer profile, working on customization, producing marketing content, and delivery of the marketing output. The first stage is the same as suggested by Pepper et al. (1999). Further, the interaction with the customers helps in obtaining data from the customers through multiple ways like the customer interaction, alterations or future prospects in the customer status, external data sources and matching external data with the internal data of the customers. The processed data forms the basis for creating the customer profile and further discriminating the set of customers according to their needs. Further, the customer profile so formed assists in developing customized content for marketing purpose. The development of marketing content in the form of electronic as well as non-electronic form is delivered to the customers. The collection of further

feedback about the same creates a loop for interaction and thus improving the personalised aspect of the marketing.

As stated by (Andrews, 2012), social media platform Facebook has enormous amount of its user data stored. Digging deeper, this gives rises to a situation where the information can be used to improve user experience and earn huge profits through personalization, and also has its own risks involved. A major challenge or the risk involved in such type of data sharing and information sharing practices is the risk of privacy exploitation since personalized user experience requires highly sensitive data of the users (Arora et al., 2008).

Privacy Concerns

According to Smith et al. (2011), the individual privacy of the customers and the users of the connected devices is at a high risk in contemporary era of connected devices. One of the technologies which is trading high on risking the privacy of the customers is the connected devices under the Internet of Things technology which possess the potential for immense data collection for diverse purposes like surveillance, communication, and storage. In addition to this, Smit, Dinev & Xu, (2011) also emphasize that other concepts such as confidentiality, secrecy, anonymity, security and ethics are all linked to information privacy. In addition to this, another aspect of the information exchange mechanism in the IoT technology is that it vitalises the decision makers to make more informed decision. Ess, 2005; Mason, 1986; Stahl, (2005), raise questions over the implementation of the IoT technology as the interaction algorithms would be collecting user's information without permission therefore exploiting the right to privacy.

A study by Malhotra, Kim & Agarwal (2004) identifies three information privacy concerns associated with Internet users: 1) the act of personal data collection, 2) the user's control over collected data and 3) the user's awareness of how collected data is used. Clarke (1999) discusses individual data privacy in the context of *personal space* comprising different dimensions: the person, its behavior, communication and data. Clarke also mentions the danger of surveillance and identifies three different ways of realizing data surveillance: front-end verification (through forms checking), computer matching (by merging data from different sources), and profiling (through data mining based on past experiences). Furthermore, Ferber (2013) emphasizes that in a new economy where Web-based business models are the new basis of revenue streams; companies from different horizons will need to work closely together through partnerships and acquisitions. This emphasizes the links and interconnectivity that IoT technology will bring between different services, in addition to the frequency of sharing data between companies (including personal collected data) on a regular basis.

Yaqoob et al. (2017) stated traditional security mechanisms are no longer valid in the landscape of IoT, mainly because IoT devices have limited processing resources to combat threats. Similarly, in edge computing, Stojkoska and Trivodaliev (2017) observed security issues related to the latency of data transmission. However, the most significant threat to devices is ransomware, which affects the

entire information security triad: confidentiality, integrity, and availability. Yaqoob et al. (2017) stated device layer security is required to ensure the security of data. Secure booting of the device is recommended. Mansfield-Devine (2016) also suggested secure code updates and access controls. Mansfield-Devine observed that devices do not securely boot up on startup, representing a potential point of security exploitation between the hardware of the device and the software of the device. By exploiting this, an attacker can take control of the device and the application. Ideally, IoT needs to have some level of trust embedded into the hardware of the device (Mansfield-Devine, 2016). Data integrity, however, is increasingly challenging because of the volume of data transmitted.

Sfar et al. (2017) also explored the constraints and security challenges related to IoT devices. The researchers posited that typical security challenges are not currently included in the knowledge base of mitigation and solution. The Defense Advanced Research Projects Agency identified security risks in IoT as being more extensive than the risks associated with the Internet (Sfar et al., 2017). Alaa et al. (2017) concurred with Sfar et al., who recommend addressing issues of privacy, trust, identification, and controlled access to systems, although traditional security frameworks of confidentiality, integrity, and availability may still apply. However, IoT devices are affected by the number of devices connected to the system, congestion, processing power required, and connectivity to unsecured networks as opposed to secured, closed networks. The concept of power and congestion poses a major threat to increasing bandwidth and complex computation for home-based IoT devices.

Research Motivation/Gap

As per the pre conceived notion of the authors, IoT is the future of marketing as well as other business related operations. A number of researches examine the impact of IoT on the privacy of the consumers due to the data transfer ability of the device in the IoT environment. Further, researches have also studied the acceptance of the IoT based products among the consumers. Researches also establish that the data-driven advertising helps to produce customized advertising for the customers. However, the researches do not establish a conceptual model which emphasises on the moderating effect of the IoT in contemporary advertising environment.

Analysis /Comments

Findings

Advertisements have an impact on consumer choices, by creating attention, interest and desire to take action. The products which are not advertised are not in consideration set of most of the consumers. Advertisement's effectiveness measurement is difficult, so most of the advertisement budget go wasted to the audience, which may never use the product. To make advertisement effective and impactful, technology has played a big role, due to digitisation of devices, it has become easy to collect data and monitor consumer's activity online. With the advancement of technology and machine learning era, the Internet of Things technology has made the internet more accessible and

compatible with physical objects to further the interaction among the machines like health monitoring tools, smartphones, security devices and consumer durables etc. The inter-operative nature of the IoT based devices prompts the collection of huge amount of user data which is further utilised under new and varying business and non-business applications. IoT can be applied to a large number of business segments, such as mobile healthcare, elderly assistance, intelligent energy management and smart grids, industrial automation, medical aids, etc. (Bellavista et al., 2013).

The broad field of IoT applications influences the ability for identifying solutions that can fit and satisfy their requirements, thus creating a challenging innovative environment.

Discussion

The impact of advertisement can be further moderated by the construct of IoT based advertising application, it can enhance the impact on consumer choices as per the study. Although this is not an established construct in previous study and hence need to be tested by further empirical studies.

Smart Devices get consumers' attention easily as in the previous studies, it has been reported that usage of smart devices is increasing than any other media, internet penetration is rising and time spent on smart devices is more than time spent on other media per day.

Device- focused Advertising harnesses moments help consumers in getting the advertisement of the product in the time when they actually in need of the product because device monitors the moment of the consumer and knows about the needs of the product. Also, as other electronic devices are linked with it, it shows the exact time when customer has to order. It is for the mutual benefit of advertiser as well as consumer for effectiveness.

Interactive messages as feature of IoT based advertising makes it more efficient and effective as when consumers are indulged in the interaction it increases.

Usage based discounts is also the benefit, which help in promoting the goods and services based on when the item is required, then advertiser is giving discount so that consumer can immediately plan to consider it based on the need and discount at the same time.

Conclusion and scope for further research

This conceptual research can help academician and advertiser to understand the role of IoT based advertising, advertiser would understand the need for moving to data based advertising which has benefit to consumers and as well as marketers. Also, in further research more factors can be explored that can explain effect on consumer behaviour using this application. This model can further be tested by empirical data from different consumers and relationship of constructs can be established by pre-established modelling technique such as ISM and structure equation modelling. Advertisers have always felt challenging to measure the effectiveness of advertisement and wanted advertisement to be more target oriented and result oriented.

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