Journal of Theoretical and Applied Information Technology
31st January 2021. Vol.99. No 2

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

THE REALITY OF INTERNET OF THINGS (IOT) IN CREATING A DATA-DRIVEN MARKETING OPPORTUNITY: MEDIATING ROLE OF CUSTOMER RELATIONSHIP MANAGEMENT (CRM)

DR. TAREQ N. HASHEM

Associate Professor
Marketing Department
Isra University, Amman, Jordan

E-mail: tareq.hashem@iu.edu.jo

ABSTRACT

Internet of things is a word used in many industries and it refers to the spread of devices and programs that have the ability to capture information, record it or send it automatically. Current study aimed at examining the ability of Internet of Things (IoT) in creating a data-driven environment that supports marketing approaches through the mediating role of customer relationship management (CRM). Achieving aim was done depending on quantitative approach, and utilizing a questionnaire which was distributed on (94) marketing managers within e-marketing and advertising organizations in Jordan. Results of study indicated that IoT facilitates the data gathering, classification, and identification for marketers in order for them to be able to target their customers and present better oriented marketing strategies. The fact that CRM highly depends on data appeared to help IoT in presenting marketing opportunities for marketers around the world. Study recommended increasing investments in developing smart applications that are able to tackle the massive amount of data generated by IoT applications and developing personal and relevant customer experiences without being intrusive. Implications of study can be summarized in the fact that Internet of things can be considered as a powerful tool in the marketing industry, but it has just begun to use its potential in order to reach high-quality modeling. The current study can be a source for organizations to make a difference in the marketing industry by realizing the real value that will come from the Internet Things related to machine decision-making and decision-making

Keywords: *IoT, Data-Driven, Marketing Channel, Pop-up Ads, FRID, CRM, Marketing*

1. INTRODUCTION

All interest nowadays is connected to technological development somehow; all managers, stakeholders and entrepreneurs are looking for ways for broadening the economy and present more marketing chances for better performance up on all levels. Currently, technology is transforming the way the market looks, it helped in building virtual markets, virtual customers and played a role in defining a more (out of boundaries) markets for all organizations regardless of their geographical locations [22]. With the course of time, there appeared the concept of Intern of Things as a result of the massive booming that technologies have caused over the years, Internet of Things (IoT) is now seen as an approach that is employed on all levels starting from large and major organizations and down reaching the smart houses that people live in [14].

IoT is defined as internal communication or interconnection between physical objects and computing devices, it was also defined it as a wide range of emerging technologies such as virtual power plants, smart transportation systems, and smart cars [33]. In other words, IoT is a communication between two ends of the devices or between a device and a person, and they all communicate over the Internet [9].

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

2. LITERATURE REVIEW

2.1. Internet of Things (IoT)

When the dawn of the Internet revolution came, people were amazed that they could communicate with each other and get information across time zones with just a few clicks of a mouse. But, to be able to do so, they must face a computer connected to a global network. Today, they can use mobiles and laptops. The next logical step in this technological revolution is the connection between inert objects. This is the vision behind the concept of "Internet of Things" known as (IoT).

Many scholars and researchers have tried to fit the idea of IoT into a specific definition and criteria of description; however, given the fact that there is no specific owner of IoT then then there would be no space for one specific definition for it. Internet of things (IoT) refers to a developed concept of internet network where everything in our life has the ability to connect to the internet either to develop certain set of data or to do a set of specific duties according to the functions that it is able to do [11]. The concept of the word "thing" in IoT refers to really "anything", it means that IoT refers to anything that has the ability to be connected to the internet which includes things, clothes, furniture, human body parts, streets, appliances or any other thins that can be attached [21]. An example of employing IoT is when it is used in cow farms, through connecting the body of cows to the internet through a chip, this way producers can monitor cows' fertility, health, hormonal actions and the best time to milk it, in other words, in cow farms IoT is used in order to develop production line and enhance its end results.

2.2. IoT in Marketing Field

In marketing field, IoT appeared in different and novel approaches which all aimed at enriching the customer experience and drive them towards adopting the brand and carry a better image of the brand [16]. An example of IoT in the marketing field appears in many forms like the electronic devices which are called (beacons), those devices are built on sending notes, ads, and notifications to customers on their smart phones whenever they pass by the store, other example of the same idea is the devices that are mounted on shopping carts and aim at analyzing customers' behavior and what aisles would attract them and form that send them notifications to their smart phones that attract them towards promotions, discounts and offers of the sections and aisles that they prefer [9].

Another example of IoT in marketing is the initiative which was taken by Ralph Lauren in New York, USA. This initiative was a smart mirror that enables customers to try on clothes without the need from them to actually try clothes on or taking off their own clothes; all what a customer has to do is to stand in front of the mirror and chose the piece of clothing that they want, the mirror will simulate the clothing item on the customers' body and will give them the chance to try it on in many colors [6].

However, IoT can be employed within marketing in the following fields [3]:

- **Contextual Advertising**

With the increase in number of people who own smart devices; targeted advertising became an option for marketers thanks to IoT. The applications have the ability to send (pop up ad) for them on customers' smart devices informing them of a discount of some kind or a promotion or an offer that is taking place at the same time. In addition to that, the tendency towards owning smart cars also increased the chances through sending pop up ads to those who own the same car informing them of new applications, accessories or gadgets for their cars which will increase the chances of them visiting the store of making the purchase online [4].

- **In-store Advertising**

It is not necessary now for the customer to go online on the brand's website or visit any social media pages, all they have to do is to go to any store and the "beacons" that are available in the stores will send them info regarding more offers and promotions that may grab their attention. An example of that is when a customer goes to the groceries and picks up a pasta pack, immediately the beacon will send them info on offers on pasta sauce or pasta cheese which increases the chance for a customer to go and picks up those items, this means more profit [43].

- **Location-based advertisement**

Among the uses of IoT in marketing is when a customer opens their location (GPS) on the smartphone; IoT application in this state will send customer info regarding nearby activities, promotions, offers and discounts. An example of that is when a customer goes online looking for a library, when they open their location; IoT will pop up ads that are related to libraries like book clubs, stationaries and other places within the same interest [28].

- **Targeting customers**

For sure IoT applications can target customers; multiple searches on a certain item will pop up hundreds of advertisements on the same item from different places and difference prices. The idea is based on collecting data regarding customers' intentions, behavior, orientation and preferences, and then it launches its smart advertising into sending more ads for customers based on their interest every time they go online as an approach to give them more different results [3].

- **Interactive marketing**

IoT presents opportunities for marketers to give customer an enriched marketing experience; this can take place through the interactive marketing campaigns. An example of that is the previously mentioned Ralph Lauren smart mirror; and of course the huge tablet that is available within McDonald's branches all over the world which gives the customer the chance to interact with it through ordering their meal. Other IoT applications include the QR code that a customer can scan in order to get an offer or a discount, or even install an application that would ease the process of purchasing [41].

2.3. Data-Driven Marketing and CRM

It can be said that data-driven marketing is the type of marketing adopted that is based on studying, analyzing, and connecting data and information related to product/service and customers' behavior in order to reach informed decisions on how to market for the items and target interested customers [42]. This type of marketing requires the use of all data gathered by the organization in order to analyze it, organize it and reach results that are considered to be valid to use within any marketing strategy [20]. Data-driven marketing is based on utilizing all data available for the organization about customers, this helps the organization to predict customers' behavior in the future and synthesize a marketing mix that best fits those predictions [7]. It is worth to mention here that data-driven marketing is based on technologies and strategies that generate more data in order to target customers through personalized advertisements [18].

Launching from the fact that data-driven marketing is based on generating data for marketers to use in the marketing process; one can vividly see the interconnected relationship of data-driven marketing and customer relationship management applications (CRM). On that idea and looking at the basic definition of CRM which is an approach to manage, direct and develop the relationship of organization with its customers, it can be seen that it also depends on gathering data and information which would help to better understand customers and serve them better [25]. CRM won't be of great help if it wasn't based on data, the idea of CRM stems from using all the information, processes, metrics and data gathered about customers in order to serve them in a personalized way which can help in creating an atmosphere that is based on loyalty and satisfaction of customers [19].

CRM in its nature gather data about customers like demographics, preferences, desires, orientations, purchase behavior and tendencies. Those metrics and information can be utilized as a "drive" towards building a marketing strategy that fits each customer individuals. How is that possible; through utilizing those data in the data-driven marketing approaches which chooses the best and most appropriate strategy to give customers a sense of individuality in their shopping experience and increase the chances of purchase among them [8]; [12]; [45]; [32].

To sum up, the vast amount of data provided by Internet of Things is a marketing wealth that increases the accuracy of decision-making processes and moves positively towards appropriate options. However, the precise matter here is to think about the quality of the data collected from Internet of things, as data without quality does not represent any value for marketers [26]. If there is no high-quality data from Internet of things, the marketing measures taken by the organizations would be misleading considering that the origin is the use of high-quality data [39].

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Main hypotheses:

H1: IoT has the ability to build a convenient environment for data-driven marketing

IoT is an approach that gave marketing a chance to analyze and dissect the targeted markets through the bulk of data and information that IoT has the ability to give. It widely known that organizations seek to analyze the market they work within in order to have a fuller view on the targeted customers, their orientation, their approaches and their purchasing behavior [10]. Through IoT, the marketing strategies became more vivid through the opportunities presented by IoT which helps in deciding whether the organization is planning the target individuals as a form of B2C or markets and organizations as a form of B2B [36].

On the other hand, IOT has the ability to collect huge bulk of data and information through the sensors that are connected to it. Marketers must have what it take to reach such data and use it in a suitable way within the framework of marketing [1]. The huge amount of information that IoT can reach will help marketers in examining the behavior of customers, purchase patterns, locations, and their behaviors in order to decide on the best and most suitable approach to use such data in developing the next marketing approaches and strategies [27].

From another perspective and in gathering between intent of things and marketing strategies; IOT managed to present a very valid approach to build a data driven marketing approaches, this can happen through artificial intelligence, machine learning and internet-based applications [36].

Also, employing IoT within marketing strategies is a powerful tool that facilitates the decision making process among both marketers and customers. For marketers, the decision making process will appear much simpler through utilizing IoT due to the availability of data and information regarding customers and their purchase behavior, from that point, reaching customer satisfaction wouldn't be a problem since all information and data are available or marketers and they can target their customer to ease the process of shopping and purchasing for them [2].

H2: IOT has the ability to influence the shape of CRM outcomes

Claiming a positive influence of IOT in marketing means that there is a positive influence of IOT on customers' management and especially in the field of customer relationship management [32] and (De Cremer et al, 2017); however CRM is an approach that helps in the field of managing customers' relations, behavior, orientation and satisfaction [2]. When talking about IoT in the framework of CRM it can be found that IoT helped developing CRM outcomes through the main the most apparent benefit of IOT which the data gathering feature; IoT is a tool that has the ability to gather a huge amount of data and information about customers, their visits, orientation and purchase behavior, through this data; CRM specialists would have the chance to be better presenter of services for customers [12]. Through IoT tools and prediction, there would be a space for marketers to know when there are problems that face customers in reaching the service/items and based on that they can act fast on it and deal with it professionally in order not to lose customers [24]; [45]; [38].

Based on what was mentioned above, current study seeks to realize the following hypothesis:

H3: IoT has the ability to build a convenient environment for data-driven marketing attributed to the new shape of CRM outcomes

The above hypotheses were included in the following model:

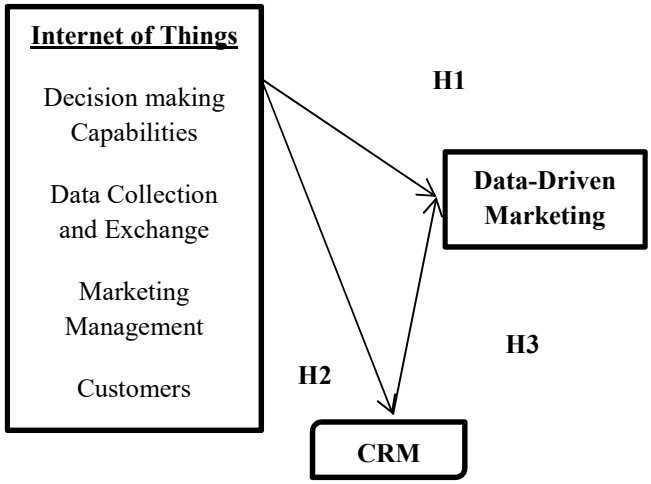

Figure 1. Study Model [10]; [36]

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

3. Methods

Quantitative approach was adopted in current study in order to reach its aim and answer its questions. A questionnaire was used as a tool of study in order to gather data from sample of study which was derived from a population of (124) advertising and marketing organizations in Jordan. Sample reached (94) marketing managers or/and who represent them from marketing and advertising organizations. SPSS was used in order to screen and analyze gathered data through which Cronbach alpha test was used in order to measure the stability of the measuring instrument, as the alpha value for each variables is an excellent percentage because it is higher than the acceptable ratio of 0.60 [34].

As shown in the following table:

Table 1. Cronbach's Alpha

	Alpha
Decision Making Capabilities	0.762
Data Collection and Exchange	0.848
Marketing Management	0.91
Customers	0.859
Data-Driven Marketing	0.901
CRM	0.914

4. Results and Discussion

Analysis of gathered data was done depending in SPSS and utilizing AMOS approaches given the study adopted a mediating variable. Following section presented analysis of study data according to responses of sample individuals.

4.1. Demographics

Table 2. Sample Characteristics According to Demographics

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	66	70.2	70.2	70.2
	Female	28	29.8	29.8	100.0
	Total	94	100.0	100.0	
		Age			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25-31	10	10.6	10.6	10.6
	32-37	21	22.3	22.3	33.0
	38-43	32	34.0	34.0	67.0
	+44	31	33.0	33.0	100.0
	Total	94	100.0	100.0	
		Educational Level			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	BA	20	21.3	21.3	21.3
	MA	51	54.3	54.3	75.5
	PhD	23	24.5	24.5	100.0
	Total	94	100.0	100.0	

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3-7	8	8.5	8.5	8.5
	8-11	13	13.8	13.8	22.3
	12-15	34	36.2	36.2	58.5
	+16	39	41.5	41.5	100.0
	Total	94	100.0	100.0	

In table (1), it was seen that demographic variables included (age, gender, experience and educational level. Results of study indicated that majority of sample individuals responded to the questionnaire was makes forming 70.2% of total sample compared to females who represented 29.8% of total sample. Also table showed that 34% of total sample was within age range of 38-43 years old followed by those who were above 44 years old forming 33% of total sample. As for educational qualification, it was seen through analysis that 54.3% of sample had an MA degree in marketing or any other equivalent degree which was seen to be a very positive results and explained sample individuals' awareness of marketing and e-marketing strategies within their organizations.

Finally, it was seen within table that majority of sample (41.5%) had an experience in marketing more than 16 years which was also seen to a be indicators that explained individuals" high awareness of marketing strategies and the involvement of IoT within the concept of data-driven marketing strategies.

4.2. Questionnaire Analysis

Table 3. Responses to Questionnaire Statements

	N	Minimum	Maximum	Mean	Std. Deviation
Internet of Things					
Decision making Capabilities					
Through IoT, associations can make an impetus for customers through information drawn from different customers	94	1	5	4.04	.775
IoT is one of the marketing tools that helped to lessen costs and give marketing campaigns more efficiency	94	2	5	4.13	.820
Marketers are now more able to take solid decisions based on info presented by IoT	94	2	5	3.91	.863
Through control of IoT, marketers now have more time to take decisions regarding the market and the market share	94	2	5	4.16	.794
IoT has the ability to help marketers take informed customer decisions based on data flow presented	94	2	5	4.04	.815
Data Collection and Exchange					
IoT eases the data collection process	94	1	5	4.28	.809
Exchanging data and sharing it is a part of IOT benefits	94	1	5	3.89	1.102
IoT as a tool supports the strategies adopted through CRM	94	2	5	4.23	.754

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Not only IOT gives data, it also has the ability to classify it for better usage	94	1	5	4.20	.911
Knowledge sharing is a prominent benefit of IoT	94	3	5	4.12	.746
Marketing Management					
IoT support e-marketing and e-marketing mix	94	2	5	4.22	.764
IoT presents one of the best tools to manage marketing campaigns	94	3	5	4.32	.707
The Internet of Things helps secure a competitive advantage to create new opportunities and new markets	94	3	5	4.16	.677
With IoT, there can be a chance to apply various technologies to create new market opportunities and innovate new ideas to advance over all competitors	94	2	5	4.32	.793
Internet of Things helps them gain knowledge related to technological developments, gain a professional workforce, and introduce new equipment	94	2	5	4.05	.932
Customers					
IoT has the ability to build equivalent customer and solicitation profile	94	3	5	4.43	.647
With IoT, associations can join the usage direct of various customers to extend the estimation of the principal customer.	94	2	5	4.13	.858
The Internet of Things helps to give the marketer an opportunity to know the behavior of the customers who visited them today and got connected to the Internet and could target them by message	94	2	5	4.03	.909
IOT helped to build unique customer experiences	94	2	5	4.01	.783
Analysis presented by IOT collected data allows targeting more customers through advertisements	94	2	5	4.29	.713
Data-Driven Marketing					
Flood of data presented by IoT gave marketing a pool of information to utilize	94	2	5	3.91	.743
Data in marketing help to exploit and track e-marketing methods to achieve success and increase competitiveness	94	2	5	4.10	.817
Through the Internet of things, the marketer can manage the data and analyze the flow of information to collect the huge data collected by the sensors	94	2	5	4.24	.772
IOT helped to improve data analysis and build unique customer experiences	94	3	5	4.30	.653
IOT has greatly contributed to changing the look of digital marketing.	94	3	5	4.49	.699
CRM					
CRM frameworks targets connecting and making both organization worth and client esteem along the worth chain.	94	3	5	4.49	.635
CRM is the driver change from item direction to client direction	94	2	5	4.01	.836
CRM is all about satisfying client needs rather than "simply" selling item	94	2	5	4.30	.701

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Advancement concerned structure client connections , key organizations, coalitions, and systems , exchanges to connections were introduced by CRM	94	3	5	4.32	.707
CRM improves organization's capacity to catch cross and upselling potential, lessen costs, give verbal promotions, and increment exchanging expenses	94	2	5	4.12	.841
CRM understands the client experience and the client venture	94	3	5	4.41	.663

From table (2), it was seen that respondents had a positive attitudes towards statements of questionnaire given that all statements' means scored higher than mean of sale 3.00 which was an indicators of positive attitude from them.

Table 4. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Decision Making Capabilities	94	2.60	5.00	4.0574	.58263
Data Collection and Exchange	94	2.60	5.00	4.1447	.68934
Marketing Management	94	2.40	5.00	4.2149	.66832
Customers	94	3.00	5.00	4.1766	.62963
Data-Driven Marketing	94	2.60	5.00	4.2085	.62556
CRM	94	3.00	5.00	4.2748	.61430

In table (3), there appeared statistics of study variables, and it also showed that all variables scored higher than mean of scale 3.00 which is an indicator that all variables were positively answered by respondents.

4.3. Multicolleniarity

Both the VIF and Tolerance tests were used to ensure that the independent variables did not correlate with each other. Following results were found:

Table 5. VIF

	Tolerance	VIF
Decision Making Capabilities	.651	1.535
Data Collection and Exchange	.394	2.539
Marketing Management	.214	4.677
Customers	.203	4.933

Table (4) indicates that the VIF value is less than 10, and the Tolerance value is greater than 0.10, indicating that there is no cross-correlation problem [13].

4.4. Validation of Model

Before starting structural analysis, the proposed study model must be validated by a set of indicators to check the suitability of the model of this study, as follows:

Table 6. Fit model

Indicator	AGFI	$\frac{X^2}{df}$	GFI	RMSEA	CFI	NFI
Value Recommended	**> 0.8**	**< 5**	**> 0.90**	**≤0.10**	**> 0.9**	**> 0.9**
References	[35]	[37]	[35]	[23]	[17]	[17]
Value of Model	0.881	3.68	0.917	0.081	0.959	0.945

Results shown in table (5) shows that the model is fit since the indicators have passed the accepted values mentioned in the references, this lead to the hypothesis testing:

4.5. Hypothesis testing:

Structural equation analysis is used to test the research hypothesis. The hypothesis will be accepted if p-value is less than 0.05:

Table 7. The Results of Testing Hypotheses

			Path Coefficients (β)	Standardized Total Effects	Standardized Indirect Effects	T-value	P	Decision
CRM	<---	IOT	.84	0.84		12.618	***	accept
data-driven marketing	<---	IOT	.61	0.893	0.283	6.287	***	accept
data-driven marketing	<---	CRM	.34	0.34		3.666	***	accept

H1: IoT has the ability to build a convenient environment for data-driven marketing

Above table (6) showed that (β = 0.61; P < 0.05; = 0.000). This means that IOT has the ability to build a convenient environment for data-driven marketing

H2: IoT has the ability to influence the shape of CRM outcomes

Above table shows that (β = 0.84; P < 0.05; = 0.000). This means that IoT has the ability to influence the shape of CRM outcomes

H3: IoT has the ability to build a convenient environment for data-driven marketing attributed to the new shape of CRM outcomes

Above table shows that (β = 0.34; P < 0.05; = 0.000). This means that IoT has the ability to build a convenient environment for data-driven marketing attributed to the new shape of CRM outcomes

Above results were concluded in the following chart:

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

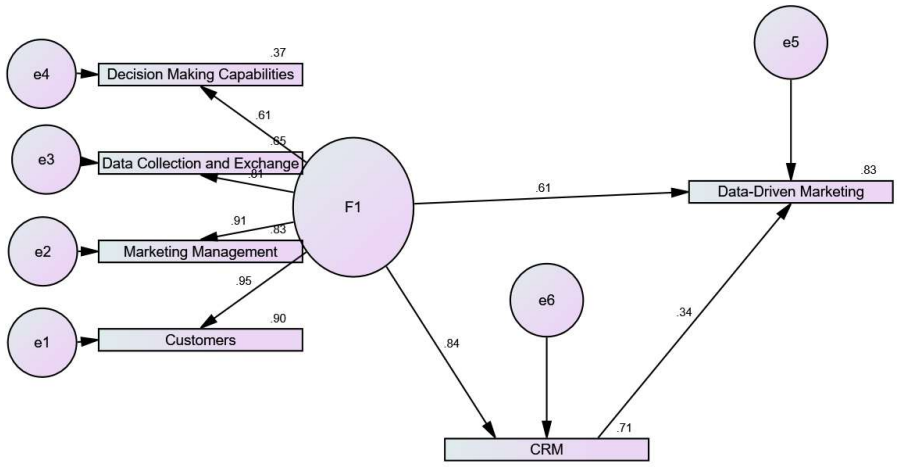

Figure 2. Study Analysis Chart

4.6. Discussion

Current study aimed at examining the influence of IoT on creating a data-driven marketing environment through the mediating influence of CRM. In order to achieve the aim of study; quantitative approach was adopted depending on self-administered questionnaire which was distributed on (94) managers within e-marketing and advertisement organizations in Jordan.

Results of study reached the following results:

- There appeared high level of awareness regarding IoT involvement in marketing which appeared through the positive attitudes of respondents to questionnaire statements
- IOT has the ability to build a convenient environment for data-driven marketing
- IOT has the ability to influence the shape of CRM outcomes
- IOT has the ability to build a convenient environment for data-driven marketing attributed to the new shape of CRM outcomes

Study results were able to highlight the fact that IoT in marketing is able to give a new opportunity for the marketing process through presenting data; this huge amount of data appeared to be helpful on more than one level which included creating a data-driven marketing approach which is based on collecting data and create a marketing strategy that is based on information, in addition to developing CRM which also appeared to be dependent on the huge amount of data and information in order for it to manage customers and their relations to the marketers and work on satisfying them.

However, and as according to study results; influence of IoT on creating a data-driven marketing appeared on 4 main levels which are:

4.6.1. Decision making Capabilities

IoT managed to give the process of decision-making within marketing a much simpler approach; for marketers, all data are available for them regarding their products, warehouses and customers; they have the ability to make informed decision based on information they have and in a way that avoids any errors or bad decisions. The fact that IoT has the ability to connect any device on the internet and retrieve data from it gives marketers the opportunities for many marketing spaces; they can use any factor within IoT results to form a marketing channel for customers. However, the main idea remains is in their ability to make the right decision at the right time, the variety of devices presented like mobiles, laptops, and smart cars and how they interact with IoT presented a chance for marketers to take the best decisions, this can be based on the data that they get in which they market for items/services that are compatible with each other for the same audience at the same time. An example of that can be when marketers promote for a washing machine and at the same time promote for the washing liquid that matches the washing machine for the same audience who is interested in both items. This

result rhymes with [30] the idea of Internet of Things will not be of value if it does not help the marketers to make decisions regarding marketing campaigns that are based on the foundations of predictive intelligence and obtain reliable data from the techniques associated with accurate modeling programs. That is, through the Internet of Things, marketers can simulate the results of live data related to campaign budgets and know what factors affect the budget allocated for that.

4.6.2. Data Collection and Exchange

On the level of data collection and exchange, IoT helped in creating an environment that supports knowledge sharing and exchanging, all the data are available and can be exchanged within different branches and stores. Normally, such data includes information regarding customers and their behavior in terms of dealing with the brand and their attitudes towards it, those data and information give a prospect towards developing marketing strategies that are able to suit the taste, needs and desires of customers. Again, as most studies indicated Wamba (2015); [43]; [28] and [3], in addition to results of current study, the massive amount of data gathered by IoT in marketing field won't be of great help if it weren't employed in the suitable way. Tackling such dilemma means that organizations must have what it takes to deal with this huge bulk of data and the information that stems from it, in addition to processing such information, store it, and employ it in the field of marketing in a way that is suitable for both the customer and the organization. The only problem here is that collecting that amount of information from customer opens the door for the organization to look as an intrusive; IoT in marketing is a huge responsibility for organizations as they have to tackle it without bothering customers and jeopardize their privacy.

4.6.3. Marketing Management

On the level of marketing management, it was seen through results that IoT provides the marketing industry with the needed infrastructure in order to facilitate the process of marketing in the best way possible. On that sense, the massive data that are generated through IoT applications in marketing will help on feeding the machine learning matrixes of marketing which will facilitate the process of analyzing customer behavior and preferences into a better level [9]. In addition to that, study indicated that employing IoT within marketing approaches means to create more connection points that are able to harvest more data through tracking customers which will help in analyzing the market and identify the circumstances that effect this market and influence purchase decisions of customers. This was in rhyme with many previous literature including [27]; [33] and [40] who stated that Internet of Things is one of the most wonderful sources of marketing data through the idea of continuous consumer communication through the addition of devices, and therefore marketers can manage marketing ideas by providing tailored and targeted contextual messages to the consumer, whether it is related to trade or other industries, the main strengths of Internet of Things in marketing have everything related to an essential part of Internet of Things, such as: data collection and analysis by connecting the digital and the physical world and this is called "thinking outside the box".

4.6.4. Customers

IoT in marketing proved it ability to help a brand find its place within customers' minds, this happens through the process of presenting a richer customer experience based on increasing the level of interaction with customers. Through IoT, the idea of interacting billboards and signs was a reality considering its ability to interact with the user whether this interaction was through touch, voice or merely a move from client and their ability to deal with simulating objects within the virtual environments available in the design. The result of employing IoT in marketing is more satisfied customers based on a rich experience which leads to better customer involvement and experience, internet of things contributes to analyzing the repurchase patterns that customers make through the systems that are being used, which provide marketers with more data that could not be obtained previously and related to the ways consumers interact with products / services [3].

5. Conclusion and Recommendations

Study resulted in the fact that IoT managed to change the shape of many administrative and marketing logistics, those changes might not be totally sensible by customer as they may not have the ability to follow them, but giving the fact that the number of customers who are

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

depending in IoT in increasing by the minute gives an indication that they actually enjoy its benefits. When it comes to customers; all organizations know that customers are always looking for convenience, but IoT has taken convenience into a whole new level.

To sum up, IOT was found as an approach to change the way people live and make their world more connected and smarter, through IOT; the world now is more convenient and modern through the adoption of smart devices that are based on connectivity and automation which helped a lot into changing the conventional shape of digital marketing into a much smarter approach. However, this is just a start for the revolution of IoT in marketing; there is a whole world of IoT applications and devices which weren't developed or used till now but ever since the invention of smartphones; the shape of marketing changes dramatically and it appeared to be more dependent on technology in all its processes and approaches. But for sure, IoT in marketing will speed up the marketing process and present many more chances for marketers to help them utilize connection points and tunnels that are dedicated for marketing and targeting customers.

Current study faced many limitations among them:

- Due to COVID19 researcher was unable to distribute questionnaires manually and had to be done online through Google forms, this managed to take a lot of time to gather the needed data from participants.
- There appeared a lack in recent empirical studies which took into perspective actual application of IoT in marketing industry.

5.1. Current study recommended the following:

- The need to increase investments in developing smart applications that are able to tackle the massive amount of data generated by IoT applications.
- Organizations has to develop personal and relevant customer experiences without being intrusive
- Marketers will take more responsibility in designing campaigns without compromising the privacy of their customers.
- Focus on selective use of customer data, device authentication, strong encryption, and other security mechanisms to prevent penetration of IoT devices
-

REFERENCES

[1] Abashidze I, Dąbrowski M. Internet of Things in marketing: opportunities and security issues. Management Systems in Production Engineering.;24(4), 2016 , 217-21.

[2] Abdel-Basset M, Mohamed M, Chang V, Smarandache F. IoT and its impact on the electronics market: A powerful decision support system for helping customers in choosing the best product. Symmetry. 11(5),2019,611.

[3] Aldossari MQ, Sidorova A. Consumer acceptance of Internet of Things (IoT): Smart home context. Journal of Computer Information Systems. 60(6),2020,507-17.

[4] Apthorpe N, Shvartzshnaider Y, Mathur A, Reisman D, Feamster N. Discovering smart home internet of things privacy norms using contextual integrity. Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies.2(2), 20181-23.

[5] Bahirat P, He Y, Menon A, Knijnenburg B. A data-driven approach to developing IoT privacy-setting interfaces. In23rd International Conference on Intelligent User Interfaces 2018 Mar 5 (pp. 165-176).

[6] Bandyopadhyay D, Sen J. Internet of things: Applications and challenges in technology and standardization. Wireless personal communications. 58(1),2011,49-69.

[7] Chiang, W. Y. (2019). Establishing high value markets for data-driven customer relationship management systems. *Kybernetes*.

[8] De Cremer D, Nguyen B, Simkin L. The integrity challenge of the Internet-of-Things (IoT): on understanding its dark side. Journal of Marketing Management.;33(1-2),2017,145-58.

[9] Decker R, Stummer C. Marketing management for consumer products in the

era of the internet of things. Advances in Internet of Things. 2017;7(3).
[10] Fahrurrozi M, Purwanto MR, Sitaniapessy RH, Roreng PP, Toding A. STUDY OF MARKETING MANAGEMENT USING IOT. Journal of Critical Reviews.;7(1):2020.
[11] Gao L, Bai X. A unified perspective on the factors influencing consumer acceptance of internet of things technology. Asia Pacific Journal of Marketing and Logistics. 2014 Apr 8.
[12] Ghazaleh MA, Zabadi AM. Promoting a revamped CRM through Internet of Things and Big Data: an AHP-based evaluation. International Journal of Organizational Analysis. 2020.
[13] Gujarati D, Porter D. Basic Econometrics 5th edition, ed. Anne Hilbert. 2009.
[14] Guo Y, Liu H, Chai Y. The embedding convergence of smart cities and tourism internet of things in China: An advance perspective. Advances in Hospitality and Tourism Research (AHTR);2(1),2014, 54-69.
[15] He Y, Bahirat P, Knijnenburg BP, Menon A. A Data-Driven Approach to Designing for Privacy in Household IoT. ACM Transactions on Interactive Intelligent Systems (TiiS).10(1),2019,1-47.
[16] Hsu CL, Lin JC. An empirical examination of consumer adoption of Internet of Things services: Network externalities and concern for information privacy perspectives. Computers in Human Behavior.;62,2016, 516-27.
[17] Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural equation modeling: a multidisciplinary journal. 1;6(1),1999,1-55.
[18] Jeffery M. Data-driven marketing: the 15 metrics everyone in marketing should know. John Wiley & Sons; 2010.
[19] Konovalov N, Gromoff A, Vladimirova AV, Gorchakov Y. Can CRM Flexibility Raise Bank Efficiency?. Global Journal of Flexible Systems Management. 2020, 1-2.
[20] Kumar V, Chattaraman V, Neghina C, Skiera B, Aksoy L, Buoye A, Henseler J. Data-driven services marketing in a connected world. Journal of Service Management. 24(3),2013,330-52.
[21] Lee I, Lee K. The Internet of Things (IoT): Applications, investments, and challenges for enterprises. Business Horizons.;58(4),2015,431-40.
[22] Lucero S. IHS TECHNOLOGY IoT platforms: enabling the Internet of Things. technology. ihs. com. 2016.
[23] MacCallum RC, Browne MW, Sugawara HM. Power analysis and determination of sample size for covariance structure modeling. Psychological methods.;1(2),1996,130.
[24] Marek L, Woźniczka J. The Internet of Things as a customer experience tool. Jagiellonian Journal of Management.;3(Numer 3),2017,163-76.
[25] Micheaux A, Bosio B. Customer journey mapping as a new way to teach data-driven marketing as a service. Journal of Marketing Education.;41(2),2019,127-40.
[26] Mohammadian A, Mirbagheri F, Khanlari A. Identification and Classification of Innovative Applications of Internet of Things in Digital Marketing. Journal of Business Management.11(4),2019719-41.
[27] Nguyen B, Simkin L. The Internet of Things (IoT) and marketing: the state of play, future trends and the implications for marketing. Journal of Marketing Management. 33(1:2),2017, 1-6
[28] Nobre GC, Tavares E. Scientific literature analysis on big data and internet of things applications on circular economy: a bibliometric study. Scientometrics.;111(1),2017,463-92.
[29] Pflaum AA, Gölzer P. The IoT and digital transformation: toward the data-driven enterprise. IEEE pervasive computing.;17(1),2018, 87-91.
[30] Provost F, Fawcett T. Data science and its relationship to big data and data-driven decision making. Big data. 2013 Mar 1;1(1):51-9.
[31] Riggins FJ, Wamba SF. Research directions on the adoption, usage, and impact of the internet of things through the use of big data analytics. In2015 48th Hawaii International Conference on System Sciences 2015 Jan 5 (pp. 1531-1540). IEEE.
[32] Rizvi M. Implications of internet of things (IoT) for CRM. 2017
[33] Santoro G, Vrontis D, Thrassou A, Dezi L. The Internet of Things: Building a knowledge management system for open innovation and knowledge management capacity. Technological Forecasting and Social Change. Nov 1, 2018;136:347-54.

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

[34] Sekaran U, Bougie R. Research methods for business: A skill building approach. John Wiley & Sons; 2016 Jun 27.
[35] Shevlin M, Miles JN. Effects of sample size, model specification and factor loadings on the GFI in confirmatory factor analysis. Personality and Individual differences. 1998 Jul 1;25(1):85-90.
[36] Swayne, L. The Internet of Things (IoT): A Marketing Perspective. International Journal of Computational Engineering Research (IJCER). 2017 7;12: 51-57
[37] Tabachnick, B.G. and Fidell, L.S. Using Multivariate Statistics (5th ed.). New York: Allyn and Bacon. 2007
[38] Tao F, Zuo Y, Da Xu L, Lv L, Zhang L. Internet of things and BOM-based life cycle assessment of energy-saving and emission-reduction of products. IEEE Transactions on Industrial Informatics.;10(2),2014, 1252-61.
[39] Tariq B, Taimoor S, Najam H, Law R, Hassan W, Han H. Generating Marketing Outcomes through Internet of Things (IoT) Technologies. Sustainability. 2020 Jan;12(22):9670.
[40] Taylor M, Reilly D, Wren C. Internet of things support for marketing activities. Journal of Strategic Marketing, 28(2),2020,149-60.
[41] Weinberg BD, Milne GR, Andonova YG, Hajjat FM. Internet of Things: Convenience vs. privacy and secrecy. Business Horizons.;58(6), 2015,615-24.
[42] Williams DS. Connected CRM: implementing a data-driven, customer-centric business strategy. John Wiley & Sons; 2014.
[43] Winter JS. Surveillance in ubiquitous network societies: normative conflicts related to the consumer in-store supermarket experience in the context of the Internet of Things. Ethics and Information Technology.;16(1), 2014,27-41.
[44] Wortmann F, Flüchter K. Internet of Things. Business & Information Systems Engineering, 57 (3),2015,221-224.
[45] Yerpude S, Singhal TK. Internet of things based customer relationship management–a research perspective. International Journal of Engineering & Technology.;7(2.7) 2018,444-50.