

Review Article

Impact of Technology 4.0 on Quality Service, Customer Satisfaction Pertaining to E-Commerce Platforms

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ABSTRACT

With the continuous changes of fashion and demands of customers, it is necessary for the shopkeepers to maintain various kinds of products in their shops but it is impossible for one shopkeeper to make an arrangement of all products and services so e-commerce platforms play vital role to fulfill the all kinds of desires of the customers. With the rise of technology 4.0, e-commerce platforms have the opportunity to provide best quality services and improve customers' satisfaction. Industry 4.0 includes Blockchain, Cloud computing, Internet of Things, Artificial Intelligence, Machine Learning, Robotic Process Automation, Cyber Physical Security etc. has capacity to bring great revolution in e-commerce business. It is mandatory to apply all the new trends to the business to be stable and compete, otherwise business can't survive for longer time. By adopting this 4th revolution e-commerce companies will be able to offer best quality services, secured payment options to their customers which impacts on customer satisfaction level and increase sales.

1. Introduction

Technology is used to increase the speed and efficiency of customer interaction [1-5]. Technology is always developing and helping to meet the requirements of customers, it also helps to complete the job by saving time and efforts. E-commerce has opened several platforms for the customers therefore they can buy products by their home, there is no any need to go anywhere with the help of several ecommerce platforms customer can compare the price, delivery time, shipping charges etcetera and place an order according to her comfort [6-10].

Every revolution brings the changes in the life of human being as like technology 1.0 to technology 4.0 that has changed the working structure of industries, With the assistance of industry 4.0 e-commerce platforms have opportunity to enhance their working style and improve customer satisfaction. This fourth revolution enables the customer to buy a product on online apps conveniently and securely. Industry 4.0 combines technologies such as blockchain, cyber physical system, artificial intelligence, cloud computing etc., these technologies have great probability to increase the efficiency and the customer's experience. Nowadays, people have a lot of options to make online transactions like mobile phones, it is one of the best modern inventions in single touch customers can fulfill their demands. Internet of Things helps to search product for example if a customer finds same kind of products on websites IoT helps to show the products list related that searching, artificial intelligence helps to track the orders, blockchain helps to prevent overbooking, preventing double spending, lower transactions cost and preventing fraud. E-commerce platformers will have to invest huge portion of amount to automate their works and adopt new features of technology 4.0. The aim of this study is to know the impact of technology 4.0 on quality service, customer satisfaction pertaining to e-commerce [11-15].

2. Statement of the Problem

Technology 4.0 has brought tremendous changes in the working of e-commerce platforms. The purpose of conducting research work is to examine the impact of this revolution on e-commerce platforms.

3. Review of Literature

Reviewing relevant research literature works help the researchers to gain deep knowledge regarding research area so, it is very necessary to take a review of published, unpublished research papers, books, websites before proceeding to start written work. Actually, it enables to do comparison and what can new fact be found for further explanation of the given research topic.

Gacelia Weny Martasari in the research 'Impact of Technology 4.0 in improving service quality and customer experience on e-commerce platforms' has concluded that technology has tremendous potential in improving service quality and customer satisfaction.

Nogueira Edith Oliveira in the research work 'Industry 4.0 impact on the development of retail e-commerce' has conducted the work to highlight the importance, impact of technology on retail e-commerce platforms and also written this technological revolution enable to communicate between humans and machine in factories with cyber physical system.

Paulo Rita and Almira farisa in their research work 'The impact ex-service quality and customer satisfaction on customers' behaviors in online shopping' conducted research work to develop new knowledge to better understand the most important dimensions of e-commerce platforms.

Wahya Sardjono, Gacelia Martasari and Andess Gai in their research work 'Impact of technology 4.0 in improving service quality on e-commerce platforms' have studied the impact of Artificial Intelligence, Internet of Things, Blockchain etc. on e- service platforms and rightly told to be stable and success or failure of e-business would depend on using artificial intelligence.



Kurniawati Elya, Al Siddia, Imamul Huda and Idris in their research work ‘E-commerce opportunities in the 4.0 era innovative entrepreneurship management development’ era 4.0 is used to seize opportunities in developing innovative management. AI helps to produce new design brand product by which customers get attract also suggested that era 4.0 generate employment opportunities.

4. Objectives

Objectives show something that is trying to gain and fulfill the needs each activity has some specific objectives and without objectives the research work is pointless it shows the path on which researcher works and try to achieve predefined goals following are some important objectives.

1. To know how technology 4.0 impact on customers satisfaction and quality service of products.
2. To understand the basic concepts of industry 4.0 and other related fields.
3. To know how AI and IoT automate the works of industry and help the customers to find out their products easily.
4. To see what different changes have brought the 4th industrial revolution compared to old technologies.
5. RPA automate the works of industry and with the help of sensors robots will be able to communicate and command each other, so to understand this will improve shipping process, customer satisfaction etcetera.
6. To study technology 4.0 helps to improve the quality services even after purchasing products.

5. Research Methodology

It is a systematic effort of gathering, analyzing and interpretation of data, it is orderly means to gain deep knowledge about the prescribed research topic and helps us to provide methodology to conclude the research work. For the given research work data has been collected with the help of primary as well as secondary means.

5.1 Primary data

It is newly structured data that has been collected by applying following ways.

1. Observation Methods
2. Interview Methods
3. Questionnaire Methods
4. Survey Methods

secondary data secondary data that is already written, that has been collected by applying following that has been collected by applying following ways that has been collected by applying following ways.

1. Books
2. Magazines
3. Websites
4. Journal Papers (Published and Unpublished)

5.2 Study of Hypothesis

Hypothesis is inference that is derived keep disparate in different situations. it is women tendency. After watching

everything this arises in our mind and think whether the events will happen or not so this research work has the following hypothesis.

H0: Technology 4.0 has much significant and positive impact on quality service, customer satisfaction pertaining to ecommerce platforms.

H1: Technology 4.0 has not much significant and positive impact on quality service, customer satisfaction pertaining to ecommerce platforms.

5.3 Sample Designing

It is the method to choose the sample for research studies. Samplings designing defines the researcher has to make a careful selection of a few items among the whole, researcher should select a sample which is reliable and appropriate for his research study.

Sample size: sample should not be much large and so small, it should be according to research work, it is collection of small units among universal sample as like to diagnose the disease few drops of blood are taken as a sample and identify the disease. In research work sample is the presentation of large units in small one. There are 800 respondents have been taken as sample for the present research work.

5.4 Data Collection

There are number of online platformers and mobile applications which can be used to place online order. Out of them following 4 e-commerce platforms are taken and overlooked the importance impact of technology 4.0 on them and also gathered information from the users who use them.

Table 1. Information related to the Respondents

Sr. No.	Companies under Research work	No. of Respondents
1	Amazon	275
2	Flipkart	200
3	Meesho	175
4	Myntra	150
	Total	800

Figure 1. E-Commerce Companies



Above table 1 and figure 1 shows the information related how many respondents are preferred which online platform to buy goods and services in which 275 exponents prefer Amazon whereas 200 exponents like to buy products on Flipkart the users using Meesho are 175 and 125 exponents use Myntra.

The data has been collected by container methods and also other means so questions were asked from 800 exponents who are engaged with e-commerce and also most of them are belongs to it sectors so they can answer the questions which were asked them during the research work.

Following are some important questions.

1. How will technology 4.O help e-commerce platform to improve their performance?
2. Do you think that all the components of this 4th revolution people understand?
3. On application when the product is surged then list of product is shown so does IoT help the customers to select appropriate product out of them?
4. Does AI increase the efficiency and customer satisfaction to do automation of works?
5. Most of the times the products are seen on mobile screen that kind of products are not dispatched to the customers so this is the reason of dissatisfaction, so will industry 4.0 help to solve this barrier?
6. People don't have much time to find out appropriate product from long list so does ChatGPT suggest the customers to find the best one?
7. Will technology 4.O prove beneficial to generate employment opportunities in e-commerce industries?
8. Cyber Security, most of the times customers hesitate to provide their personal information like mobile number, debit/credit card number, so they avoid sale on online, will this technology improve security, be confident the customers to do online shopping more?
9. Will technology help to reduce waste, improve efficiency of work, render timely services after transaction do?
10. Last but not least customers satisfaction is the most important in each and every business that encourage them to buy the product again from the same platform so will it assist to maintain customer satisfaction by providing best amenities by the online traders?

6. Tools for data analysis and interpretation

1. Simple Percentage
2. Rank Analysis
3. Chi-Square Test
4. Anova
5. Trend Analysis

7. Data Analysis and Interpretation

Data has been collected with the help of primary and secondary sources and this collected information has been shown in the following table 2 and figure 2.

Table 2. Technology 4.O AI helps to increase cyber security, highly targeting advertising, better customers service efforts etc.

Responses	No. of Respondents		Percentage
	Male	Female	
Strongly Disagree	24	17	5.125
Disagree	81	28	13.625
Neutral	105	45	18.75
Agree	113	78	23.875
Strongly Agree	192	117	38.625
Total	515	285	100

Graphical Presentation

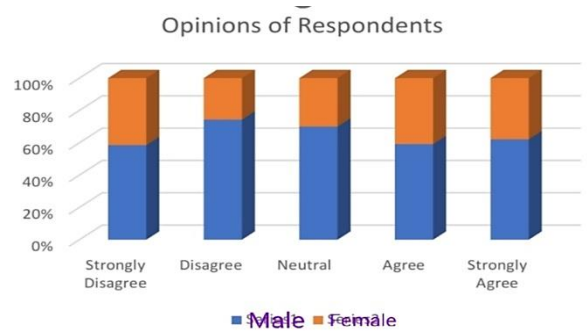


Figure 2. Options of REspondents

Above table highlighted the importance of technology 4.O and its impact on e-commerce platforms with the help of respondents in which only 41 respondents out of 800 (including male and female) strongly disagree but 309 respondents are strongly agree and know the significance of this revolution.

Table 3. ChatGPT helps to provide real time personalized support to customers and also product recommendations.

Responses	No. of Respondents		Percentage
	Male	Female	
Strongly Disagree	21	18	4.875
Disagree	34	37	8.875
Neutral	72	42	14.25
Agree	130	75	25.625
Strongly Agree	258	110	46
Total	515	285	100

Graphical Presentation

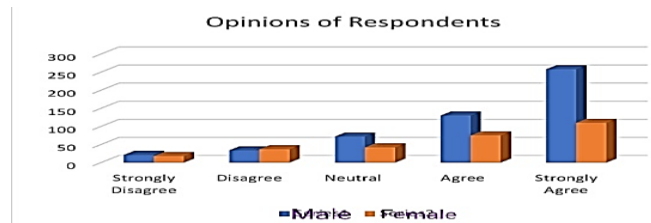


Figure 3. Opinions of Respondents

From the table 3 and figure 3 Change GPT helps to select best product map providing description about the products in only 39 respondents (including male and female) are strongly disagree as they still don't know the importance of it but 368 respondents (including male and female) are strongly agree and they are satisfied by using it.

Table 4. Blockchain in and Cloud-Computing help to cost cutting, inventory management, decision making process, reduce shipping cost, decentralization etc.

Responses	No. Of Respondents		Percentage
	Male	Female	
Strongly Disagree	23	14	4.625
Disagree	48	35	10.375

Neutral	64	48	14
Agree	124	67	23.875
Strongly Agree	256	121	47.125
Total	515	285	100

Graphical Presentatuon

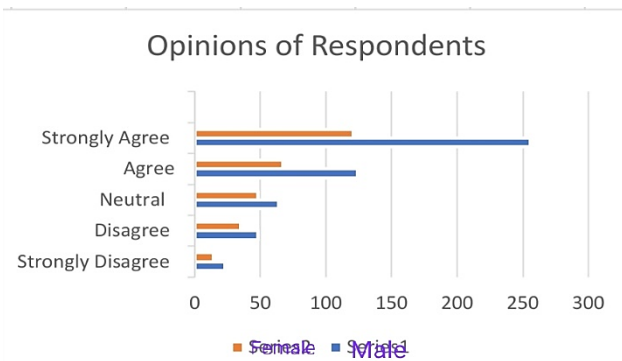


Figure 4. Opinions of Respondents

The above table 4 and image 4 highlighted the significance of blockchain and cloud computing on e-commerce platforms. The users of online platforms in which 37 respondents (including male and female) are strongly disagree but there are 377 respondents (including male and female) are strongly agree and replied that blockchain and cloud computing have made significance and the positive impact on ecommerce platforms.

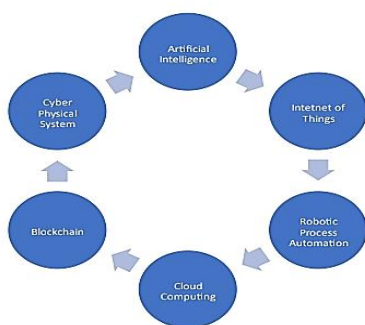
8. Impact of Technology 4.0 on these E-commerce Platforms

8.1 Amazon

Amazon has grown tremendously over the last decades. It is one of the first retail companies in the world to use artificial intelligence and machine learning, it has helped Amazon to strengthen its supply chain. The company collects vast information about payment detail, purchase order etc. with the help of cyber-Security it has risen confidence of users and got outstanding satisfaction.

8.2 Flipkart

Flipkart is the second most popular e-commerce platform



which is widely used. The 4th revolution has done impact in a way Flipkart uses ASRS system that use robots to store products and for making delivery of products. It uses MYSQL for data storage on Linux. Using AI for executing

series of tasks, advertng transaction fraud, consumer support, image speech etc.

8.3 Meesho

It is popular e-commerce platform for various types of sales like rocket deals, every day deals, deals on selling price, limited offer deals, so There is sudden crowd seen on websites among various aspects Meesho focuses on cost optimization, therefore customer will be given product at cheap prices so is easier because of using AI technology.

8.4 Myntra

Myntra Is the fashion organization mantras vision to make the world stylish, colourful, as market trend is frequently changed and customers demand products according to the fashion. So, e-commerce platforms have to avail the product and dispatch them on time, so Artificial Intelligence, Machine Learning help to track market situation and help to maintain inventory improve logistics etc.

8.5 Hypothesis Testing

Data has been collected with the help of various methods and to prove the hypothesis, parametric and non-parametric test of hypothesis have been used and derived the final conclusion. Table 5 shows the Chi-Square Test observation.

Table 5. Chi-Square Test

Observation Value	Expected Value	(O-E)	(O-E) ²	(O-E) ² / E
410	376	34	1156	3.07
240	274	-34	1156	-4.22
105	103	2	4	0.04
45	47	-2	4	0.09

Responses	Observati on Value	Expecte d Value	Observati on Value	Expecte d Value	Tota l
	Male		Female		
Favorable	410	376	240	274	650
Unfavorab le	105	103	45	47	150
					-1.02

By applying Chi-Square Test

Ans. = - 1.02

Conclusion: The calculated value of Chi-Square is less than tabulated value so here null hypothesis is accepted.

9. Components of Technology 4.0

There are infinite numbers of customers who use e-commerce platforms for buying and selling goods. Nowadays mobile has become integral part of human life and is simple way to make online transactions, online platformers also provide number of payment options like debit/credit cards, UPI, cash on delivery etc. and it is convenient for the customers.

The important thing is technology 4.0 improve the quality service and arise confident to make transactions securely. The components of this fourth revolution helps the e-commerce platformers to provide best quality service.

Following are the components of Technology 4.0

Figure 5. Components of Technology 4.0

9.1 Blockchain

Blockchain helps to boost transparency, digital marketing and security. It increases trust of data shared across a

business network that can be only accessed by member with permission. At present e-commerce industries are advancing, quickly with the help of blockchain safe the confidential data of customers from leakage and eliminating the potential tempering.

9.2 Cloud Computing

As demand for the product is fluctuating and because of continuously changing fashion customers also create demand for different products so cloud computing helps to scale their resources up or down based on market conditions, ensuring optimal performance and cost efficiency it helps to eliminate financial risk at that time of holidays when customers demand more for particular products it helps to manage inventory.

9.3 Artificial Intelligence and Machine Learning

AI helps to provide more faster and efficient services. There are several ways by which AI and ML assist e-commerce platforms like increase efficiency, raise productivity, reduce cost, enhanced security better decision making and prevent fraud. AI can also assist to reviews of customers to improve the product design and marketing strategies.

9.4 Cyber Security

Cyber Security plays vital role in e-commerce shopping. It aims at safeguarding the data of the customers. The e-commerce industries do not immune to save from danger of cyber threats, as the data can be stolen and misused by any other hands. It increases integrity reliability, authenticity and allowing only authorized person to access the data. The data includes debit card numbers, address, mobile number etc. that is the most confidential data so cyber security helps to support this data.

9.5 ChatGPT

E-commerce customers always look out high value satisfaction and that makes their shopping journey exciting. ChatGPT helps to provide real time personalized support help with product recommendations. A customer can frequently ask questions on ChatGPT by giving descriptions and it can help to give best information and directly jump on that web page that provide or suggest us best quality product. So therefore, ChatGPT improves customer engagement and satisfaction.

9.6 Internet of Things

IoT revolutionizes the delivery process in e-commerce. It is useful to find the information related with the product easily. IoT helps to decrease waste by providing analytics of market situation. One of the most important uses is logistics improvement as many products which can't be stored for longer time like meat, milk product etc. they are perishable by nature so IoT helps to track the ways on which there will be no much traffic and product is easily reached in the hands of customers.

10. Conclusions

As we know that 'Necessity is the mother of invention' means needs whether big or small has to make an effort and work hard to fulfill them. So with the rising demands of customers, their wants are unlimited as one completes another automatically generates to fulfill their needs industries make continuous efforts and those efforts gave

birth to the 4th revolution that means technology 4.0. It was originated in 2011 in Germany but since few years it has got much popularity and is being adopted in many industries to increase their work efficiency, provide quality service make the efforts for getting more and more customer satisfaction.

Invention of technology 4.0 brought remarkable changes as Blockchain, Internet of Things, Cloud Computing, Robotic Process Automation, Cyber Security etc. help to bring changes in working structure of e-commerce platforms as customers don't have much time to go to the market and select the product so e-commerce platforms help them to buy product from their home, there is no any time restrictions e-service allows them 24* 7 customer services in which Internet of Things helps to raise the speed of Internet as a customers don't wait if loading takes more than 4 - 5 seconds, Chat-GPT helps the customers to suggest best product among available product lists. The most important is to provide confidential information at the time of making payment like mobile number, debit/credit card numbers etc. To search product on different websites, add to cart is a common thing but providing personal information is a big deal so Cyber Physical System helps to increase security, safe payment and arise confident in the minds of customers. It is also seen that there has been drastic increment in the numbers of online customers and this revolution has significant and positive impact on e-commerce platforms.

11. Findings

This research paper has been written after reviewing many journal papers so following are the findings which were found during the research work.

After Covid-19 pandemic more than five times customers have increased who use e-commerce platforms to buy or sell products.

1. Artificial intelligence powered-robots help to reduce workload, transport facilities. By adopting AI there is lot of help to inventory management, reduce cost, enhance customer satisfaction, efficiency etc.
2. AI algorithm can assist to increase the price of products while the competitors stock is low and vice versa.
3. If a customer searches same kind of product frequently on Google so Cloud-Computing helps to search and show best result, it knows what kind of products do you actually want?
4. It has projected that ecommerce market rise of \$ 17.53 trillions by 2030. Technological components help to decline operational cost as technical expenses are very high.
5. At the time of holidays, festivals people demand more so the speed of the search engines low and sometimes the problem of over loading arise so Cloud-computing helps to manage inventory and Internet of Things helps to maintain speed of the Internet.
6. Blockchain technology uses advanced features to secure arrangements, so it makes difficult for the hackers to access the data, this means there is lower risk of fraud.

7. With the help of Robotic Process Automation is used to automate daily time-consuming tasks and also produce quality products by decreasing waste i.e. production capacity increase with decrease cost.

12. Suggestion

It is undoubtable that technology 4.O would bring major changes on the working of e-commerce platforms. Although following are some suggestions to be adopted to achieve better result.

1. There should be made an arrangement of free workshops in which experts provide the information and convince the importance of this revolution to the people. So, people will encourage to use online platforms.
2. Artificial intelligence is deep concept, its uses are an unlimited or countless. E-commerce platformers must know it properly and utilize them in their working activities.
3. In remote areas there is still major problem of Internet so they can't place an online order, so take some necessary steps to sort out this problem.
4. Most of the people think that technological revolution will bring unemployment because robotic process automation so solve this illusion by understanding them technology will not replace human being even it will help to ease and improve the quality of work.
5. To adopt and take full benefits there must be used experts skill and intelligence so hire the workers who are experts in technology fields.

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