Project Dissertation Report
on
Impact of e-commerce Recommendation System on Consumer Behavior

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CERTIFICATE

This is to certify that the work titled **"Impact of e-commerce recommendationsystem on consumer behavior"** as part of the final year Major Research Project submitted by Aman Mittal in the 4th Semester of MBA, Delhi School of Management, Delhi Technological University during January-May 2022 is his original work and has not been submitted anywhere else for the award of any credits/ degree whatsoever.

The project is submitted to Delhi School of Management, Delhi Technological University in partial fulfillment of the requirement for the award of the degree of Master of Business Administration.

Dr. Deep Shree	**Prof. Archana Singh**
Faculty Advisor	Head of Department (DSM, DTU)

DECLARATION

I hereby declare that the work titled **"Impact of e-commerce recommendationsystem on consumer behavior"** as part of the final year Major Research Project submitted by me in the 4th Semester of MBA, Delhi School of Management, Delhi Technological University, during January-May 2022 under the esteemed guidance of **Dr. Deep Shree** , is my original work and has not been submitted anywhere else.

The report has been drafted by me in my own words and is not copied from elsewhere. Anything that appears in this report which is not my original work has been duly and appropriately referred/ cited/ acknowledged.

Aman Mittal

(Roll No 2K20/DMBA/16)

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Aman Mittal

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EXECUTIVE SUMMARY

Recommendation system is an information-filtering system which helps the consumer get best product recommendation's which matches their interests. The first ever known solution was the computer librarian Grundy, who took interviews of users about what they like and their preferences and then recommended books to them on the basis of information provided. This approach is outdated today as it's a time consuming process and technology advancements have made it easier and a seamless process but at that time it was a paradigm shift.

As we've seen in previous years, e-commerce is rapidly expanding, so it's critical to keep improving how customers interact with the platform and what they find useful, as well as understanding the actions they take before making a purchase decision, in order to build a better platform and plan for increasing customer satisfaction and sales. Customers are becoming more knowledgeable about the strategies utilised by marketers to convince them in this digital era. As a result, establishing a win-win scenario will benefit the organization's long-term growth, which is more significant than short-term profits.

Because every customer is different, we must find features that work for the majority of consumers when they engage with the recommendation system while making a purchase choice. Knowing what works well for customers and leads to a purchase decision allows a company to make adjustments that will benefit both the company and the customers by increasing sales and allowing them to buy what they want. Different aspects connected to recommendation systems are being investigated in order to determine how to run various parts in order to make it a more customer-friendly system that leads to increased sales.

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INTRODUCTION

We are involved in decision making process in our daily lives on a regular basis and most of the times we don't even realize it. In our lives we tend to seek advice from our friends or store attendants to suggest us the best service or product offered by them which suits our need and willingness to pay for it, but now that we have entered a digital age and most of our purchases are online with comfort of our house but now store attendant's recommendations are being replaced by recommendation system algorithms which suggests videos, web series, products and even paid advertisements are being displayed to consumers on the basis of their consumption history with which a consumer can relate as well. (Melville & Nagarajan, 2002). To give a specific definition torecommendation system it's an information-filtering system which helps the consumer to get best product recommendation's which matches their interests.

The first ever known solution was the computer librarian Grundy, who took interviews of users about what they like and their preferences and then recommended books to them on the basis of information provided. This approach is outdated today as it's a time consuming process and technology advancements have made it easier and a seamless process but at that time it was a paradigm shift at that time. However, Grundy's way of recommending books gained a lot of critics in the scientific world as the critics said that people often say or make choices which they make just to stand out from a crowd and create an image in the minds of their peers which defies the whole purpose of identifying their need at the first place but when they are using their devices for making decisions they are not being watched a physical human around them that is the reason recommendation systems of e-commerce platforms are more close to the preference of the consumers.

Different stages of recommendation system

There are different stages through which recommendation system has to go through to recommend products but the process is seamless as its technology driven.

1. **Information collection stage**

   This gathers important information about users in order to create a user profile or model for prediction tasks, such as the user's attributes, behaviors, or the content of the

resources they access. The user profile/model must be carefully created before a recommendation agent may work accurately. (Mehta & Nejdl 2008). To deliver reasonable recommendations right away, the system needs to know as much as possible about the individual. Recommender systems use a variety of inputs, including the most convenient high- quality explicit feedback, which includes explicit input from users about their interest in an item, or implicit feedback, which is inferred indirectly from user behaviour. Hybrid feedback is also possible when explicit and implicit feedback are combined. Auser profile is a collection of personal information connected with a single user in an E-learning platform. Cognitive talents, intellectual abilities, learning styles, interests, preferences, and interactions with the system are all part of this data. The user profile is typically used to retrieve the information needed to construct a user model. As a result, a user profile is a simple user model. Any recommendation system's capacity torepresent users' current interests is critical to its effectiveness. For any prediction technique to produce relevant and accurate suggestions, accurate models are required.

- **Explicit feedback**

  In order to create and refine his model, the system generally prompts the user to offer ratings for products via the system interface. The amount of ratings submitted by the user determines the correctness of the recommendation. The only disadvantage of this strategy is that it necessitates user effort, and users are not always willing to provide sufficient information. Despite the fact that explicit feedback necessitates more effort from the user, it is still regarded as providing more reliable data because it does not involve extracting preferences from actions, and it also provides transparency into the recommendation process, resulting in a slightly higher perceived recommendation quality and greater confidence in the recommendations.

- **Implicit feedback**

  The system infers the user's preferences automatically by tracking various activities such as purchase history, navigation history, and time spent on certain web pages, links followed by the user, e-mail content, and button presses, among others. By inferring their preferences from their behaviour with the system, implicit feedback minimises the load on users. Although the approach does not need any effort on the part of the user, it is less accurate. It has also been suggested that implicit preference data may be more objective than explicit

preference data since there is no bias coming from users answering in a socially desirable manner, and there are no self-image concerns or a desire to maintain an image for others.

2. **Learning phase**

   It uses a learning algorithm to select and exploit the user's characteristics based on the feedback received during the data collecting phase.

3. **Recommendation stage**

   It suggests or forecasts what sort of products the user would like. This can be done either directly using the dataset gathered during the information collecting phase, which might be memory or model based, or indirectly using the system's observed user actions during the recommendation phase.

Benefits of recommendation system

Recommendation systems are being used to make the decision process easy for the consumers as it filters information and presents information which is only relevant to the consumer. (Mehta, & Fankhauser 2007) This is basic purpose of the recommendation system many other are defined below.

- **Revenue**

  As a result of Amazon's years of study, experimentation, and execution, not only is there less of a learning curve for online customers today. Many alternative algorithms have also been investigated, tested, and proved to increase conversion rates when compared to non-personalized product recommendations.

- **Customer Satisfaction**

  Customers frequently refer to their previous browsing's product recommendations. Specifically, they believe they will be able to identify greater possibilities for good items. It would be helpful if their surfing data from the prior session was available when they left the site and returned later. This, like skilled assistants at brick and mortar businesses, might aid and lead their e-Commerce efforts. Client retention is a result of this sort of customer pleasure.

- **Personalization**

  We frequently rely on the advice of friends and family members because we trust their judgement. They have a greater understanding of our preferences than anybody else.

This is the only reason they're excellent at recommending items, and its what recommendation systems aim to replicate. You may utilise the information gathered in this way to improve the overall services on your website and guarantee that they are appropriate for the user's tastes. As a result, the user will be more inclined to buy your items or services.

- **Provide Reports**

  A customization system must provide this feature. Giving the customer accurate and up-to-date information enables him to make informed decisions regarding his site and campaign's direction. Clients might develop offers for slow-moving items based on these statistics in order to boost sales.

Objective of the Study

As we have seen in previous years, e-commerce has been growing exponentially, so continuous improvement is required in how the consumers interact with the platform and what they find helpful also knowing about the actions they take before making a purchase decision to create a better platform and plan for increasing customer satisfaction and organizations sales. In this digital age, customers are getting smarter and knows about the tactics being used by the marketers to persuade them. That's why creating a win-win situation will be beneficial for the organization to grow in the long run, which is more important than short-term gains.

To make a customer satisfied, an organization must recognize the requirements, and the organization must act according to the consumers' needs and preferences, which they have developed knowingly or unknowingly. This particular study identifies different aspects of consumer behavior while they evaluate a product while making a purchase decision.

Identifying consumers behavior as they interact with the recommendation system while making a purchase decision as every consumer is different but we have to identify aspects which works for a majority of consumers. By having the knowledge about the things which work positively for the consumers and leads to a purchase decision an organization can make changes which will be beneficial for the organization in increasing sales and for the consumersto buy which suits their motive. Different parameters related to recommendation system are being studied to identify how to operate different elements to make it more customer benefitedsystem which will lead to more sales.

LITERATURE REVIEW

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The aim of this study was to understand consumer's psychological outcomes linked to the useof e-commerce store's recommendation system, which will provide some insights into consumer behavior when their buying process is being supported with e-commerce recommendation system to recommend products related to their primary search. The e- commerce recommendation system is the most vital part of a consumers purchasing process asthere is an overload of information on the internet which makes it even more confusing for theconsumer to make a purchase decision where recommendation system comes into play as it recommends personalized products to the consumers on the basis of their purchase history andrecommending products which are similar to their primary search because of which the consumer has to analyses the filtered information to make a purchase decision. (Martínez-López, et al., 2015). It includes studyof consumer's personal aspects which are used while a consumer takes a decision to buy or notto buy a product recommended by the e-commerce recommendation system these are the factors which are apart from the technical factors which can make a recommendation system successful as the e-commerce platform can only use different types of recommendation system but the study of consumer response to it is also important. Flow state has been also studies which is described as the intensity of focus a consumer engages in while searching for the product and higher flow level is being associated with higher level of customer satisfaction. The study finds that the higher the customer satisfaction from the e-commerce recommendationsystem they are more willing to make add-on purchases..

E-commerce recommendation systems are technical tools which are being used by the platform to recommend different products to the consumers based on their purchase/watch history or on the basis of product rating system these recommendation systems are being used to make the consumer able to filter the information from the database which leads to consumer satisfaction and willingness to purchase. There are two popular recommendation systems which are being used by e-commerce platforms collaborative filtering and content based system. Collaborative

filtering recommendation system filters the data on the basis of ratings given to a particular product by a consumer and match it with peers that have similar choice of products in past its highly used in video streaming platforms, on the other hand content based recommendation system recommend products based on product attributes which the customer have purchase in past content based recommendation system attempts to match product recommendations with the previous purchases of the consumer. E-commerce platforms use recommendation systems to make best recommendations to their consumers which will result in consumer satisfaction and more lead to more purchases which is profitable for the platform. (*Joung, & Lee 2013)* Success of recommendation system is also influenced by the quality of products recommended to the customer with right information related to the product which matches customers taste and preference which also positively impacts the customer purchase decision. The study found outthat customer's awareness about the product recommended to them have higher chances of purchase decision than the products they are un aware of also when the customers buy products selected by themselves garnered higher satisfaction and willingness to purchase as compared to recommended products.

Personalization of the services offered by the e-commerce platform are just not a service but also a necessity because of large information which they have and the consumer will only be confused if all the information is being displayed to them, to make the process easy the recommendation system is being used so that the services can be personalized according to the needs of the consumers and its outcomes are positive for the organization as the customer satisfaction leads to higher purchases and consumers can buy what they want and need. This study aims to know about the consumer's attitude towards the e-commerce platform recommendation system which will measure the effectiveness of websites content and its important because it will define consumer's willingness to buy a product on the basis of their attitude their attitude towards the website. Consumers have become more aware about the tactic's used by the marketers to persuade them because of which they tend to analyse the recommendations to know that whether it's in interest of the consumers or the organization only. Consumers tend to infer a consumer serving motive or firms serving motive based on whether the products recommended to them are alternative brands or additional products which are not related to their primary search. *(Ju Jeong,, & Lee 2013).* Study found out that the customers who are recommended products related to their primary search of alternative brands are more satisfied

The digital economy has grown at an exponential rate over last 15 years. Large online service providers like Netflix in entertainment sector and amazon in all the various services offered by it have been dominating the market in their respective field's a both of them uses recommendation systems to suggest customers products and movies to make it easier for them to select from the suggestions the suggestions are based on the customer history or on the basis of peer reviews which matches with prior reviews of the consumer. *(Hostler, et al. 2012)* It has been also found thatrecommendation system influences customers purchase behaviour, but the behaviour of consumer towards the recommendation system depends upon the defined objective of the recommendation system it may lead to customer satisfaction if correct product is being recommended or dissatisfied customer if the recommendations were of no use to the customer. Effectiveness of recommendation system depends upon the quality of recommendations beingoffered to the consumer as the success of recommendation system will be measured by the purchases being made by the consumers out of the products being recommended to them. Sometimes products are being promoted as a part of their campaign as discounts are being offered on certain products but the customers are not searching for them at the first place but may be interested in the offers in these kind of recommendations the recommended products are not related to consumer's choice but may lead to a purchase decision as offers may attract the consumer but it can go the other way around also that's why the e-commerce platform should have a plan to execute a promotional activity in a subtle way

The study point outs the fact that most of the previous studies which has been done are related to the technology side of recommendation system and how to make it more efficient for the platform to suggest products to the consumers. Because of which this study has attempted to answer three questions (1) Related to the information which should present to the user in order to assist the user in purchase process. (2) How consumers perceive the usefulness of the recommendation system basis product recommended which better matches consumer

preferred product characteristics and (3) Is the reason for consumer's impulse purchase is due to good recommendations. Recommendation system helps the retailer to provide filtered and useful information to their consumers as consumers will not make a purchase decision if they are confused because of information overload. (*Ying, et al., 2018) Perceived* usefulness of a website is really important as a consumer won't put much of their energy and mental efforts to find out how tofind the right product that's the reason why, when clear and useful information is being provided by the platforms there are higher chances of a purchase decision and the better recommendations being provided to the customer the satisfaction level also gets higher. Findings indicate that enjoyment while shopping online can trigger impulse buying behavioral so perceived usefulness also plays a vital role in stimulating the unplanned purchase as perceived usefulness defines satisfaction which the consumer experiences which in turn can stimulate unplanned purchase

The e-commerce market has seen an exponential growth in recent times which makes it necessary for the marketers to study the consumer's decision-making process of online shoppers so that the marketers better design their platform according to the needs of the consumers as that's the ultimate motive of an online platform. This research attempts to studythe consumer decision making process in a more generalized way by studying the speed, cost,scope and quality offered at an e-commerce platform. *(Teo & Yeong. 2003).* Consumer decision making process begins with need identification which is followed by search for the product on e-commerce platform when shopping online and that's where right products should be recommended to the consumer to fulfil their need so that they purchase your products, after that if right recommendations are being provided to the consumer they will analyse all the information which they already have or they will try to gather some information where reviews come into play so an e-commerce platform must have reviews for all the products and genuine reviews will make it easier for the customer to move forward in right direction. After consumer finalizesand product on the basis of its specifications and use ability but financial and performance riskattached to the product. Perceived financial risk plays an important role whether the product evaluation will lead to a purchase decision or not on the other hand if the perceived benefits are higher consumer's evaluation of the deal is higher which has more chances of a purchase.

This research examines the response of a consumer to the tactics being used by the e-commerce platform to induce the customer to make unplanned purchases. Unplanned purchases occur because of impulse buying behavior which is examined from different factors like financial pressure, consumer impulse tendencies and time pressure these factors combined influence consumer impulse buying. This is important for the marketers to understand different factors which are related to the consumer impulse buying so that they are better prepared with what they have to offer to the consumers to generate positive results. (*Van Steenburg & Naderi, 2020).* Time pressure can be defined as the amount of time which is available with the consumer to make a purchase decision considering the limited information, they have gained is prior-research has not been done, whilefinancial pressure is defined as the means which are present with the consumer to make a purchase decision as compared to their willingness to purchase a product. The findings revealthat even non-impulsive customers act impulsively and raise their buy intention when confronted with a stimulus that promotes unexpected purchase thought and increases the individual's time pressure

Consumer behavior psychology is one of the most important factors to which most of the product and service offering organizations study to find out useful insights. Using correct methods by which you can predict consumer behavior which leads to a purchase decision a marketer can build a better and useful product or service for the consumer which will increase sales and consumer satisfaction also it will affect the quality of work as well. Before purchasing anything, consumers must go through a decision-making process. (*Rouzbahani, et al., 2013).* Consumer decision-makingprocedures are outlined, including recognizing issues, looking for answers, assessing, choosing, and reviewing results in order to pick amongst options. Consumers make judgmentsnot just about which brands to pick, but also about how much to pay for a product. Consumer decisions are made to meet their objectives, which include a variety of alternative activities toreduce decision-making effort, lessen unpleasant emotions, and increase the capacity to explainthe decision.

The goal of this study is to determine the impact of online cross-recommendation of items from e-retailers on customers' instant cross-buying intentions, as well as to compare the influence between the tough and simple decision-making contexts for the focal product. Instant cross-buying intention is influenced by confidence in the focused product and the perceived utility of cross-buying.(*Zhu, & Wang,2018).*When making a focal product decision is difficult, brand awareness of the recommended product, one-stop shopping convenience, and perceived price advantage are antecedents of perceived usefulness of cross-buying and choice confidence on the focal product, whereas brand awareness is not when making a focal product decision is easy. When it is simple to make a focal product decision, choice confidence favorably influences perceived utility of cross-buying, but when it is difficult to make a focal product decision, theeffect is not significant.

RESEARCH METHODOLOGY

The sample drawn for this research came from individuals who answered an online questionnaire spread across social networks and mailing lists. The questionnaire contains 8 sections which are being divided to know different characteristics of consumer behavior, first section is comprised of questions related to demographical aspect (Name, age and gender), second section comprises of questions related to consumer's pre-purchase behavior which will identify what actions they take before making a purchase decision, third section contains questions which identifies if a consumer is an impulse purchaser or not, fourth section is to know about what consumers think about the accuracy of recommendation system whether products recommended to consumers match their interests or are of any help to them, fifth section examines the originality of products recommended to consumers, so that they are interested in buying them as they are new to them and most likely of use also, section sixth and seventh comprises of questions which identify the perceived diversity and quality of recommendation system respectively and eight section which is the last section analyses customers purchase intention towards recommended products.

OBJECTIVE

- This particular study identifies different aspects of consumer behavior while they evaluate a product while making a purchase decision.
- Different parameters related to recommendation system are being studied to identify how to operate different elements to make it more customer benefitedsystem which will lead to more sales.

Research Hypothesis

The degree of attention, awareness, and effort spent toward acquiring environmental data or knowledge relating to the specific purchase under consideration is referred to as external search effort. To put it another way, it's a buyer's eagerness to look for more information. Consumers' ability to make this effort is influenced by the information they acquire before to making a purchase. Because of the variety of items available online, buyers are often unsure which website to purchase from. Buyers must seek knowledge in order to decrease their uncertainties. Buyers' willingness to seek for information is based on the perceived advantages of financial benefits, genuine product purchased but they have to invest their time in searching for the right product and e-commerce platform to buy from. More information gathered by consumers lead to better understanding of a product also of products which can be used with the product as an accessory, so there are higher chances of a consumer only buying products which they have intended to buy and they are unlikely to buy recommended products as they would have already identified products which they want to buy and recommendation of product may initiate or act as a cue for them to buy a recommended product.

H1: There is statistically significant linear relationship between prior research of product andwillingness to buy recommended product.

Unplanned purchases occur as a result of impulsive buying behavior, which is influenced bya number of factors including financial pressure, consumer impulse inclinations, and time constraint. It is critical for marketers to understand the many elements that influence consumer impulse purchasing so that they may better prepare what they have to offer customers in order to produce favorable results. Consumers having impulse behavior mostly take decisions very instinctively and will make a purchase decision if they find a recommended product interesting they will buy if even if they had no intentions to buy it earlier.

H2: There is statistically significant linear relationship between impulse purchasing behavior and willingness to buy recommended product.

Recommendation accuracy can be defined as the correctness of the product which has been recommended to the consumer on the basis of their purchase history or by matching their profile with other similar profiles and recommend products in the form of tangible or intangible items. When customer find recommendations helpful, they see them as accurate recommendations and most of the times they know about the product as recommendations are

based on the personal factors related to consumers because that's what a recommendation system does it collects information related to individual consumers and then recommend product/services to them because of which it has higher chances of selling the product. Same goes for the originality in a product which is being recommended to the customer as the product recommended will be of help to a consumer as they are personalized recommendations and when a new product which has been recommended to the consumer, they want to try it as it may be a better improved technology which will make the consumers task easier, so their chances of buying it are higher as well.

H3: There is statistically significant linear relationship between recommendation accuracy andwillingness to buy recommended product.

H4: There is statistically significant linear relationship between recommendation originality andwillingness to buy recommended product.

Recommendation system is all about making the job of the consumer easy by providing relevant recommendations to the consumer. Consumers are also aware about the motives which organization have by recommending products there are two motives first is organizational inclined motives which is to just trying to sell any product to the consumer to increase sales other motive is customer inclined motive which is to make relevant information available to the consumer so that they are benefited from it by finding right product for which they were looking for. When an organization offers different products to consumer, they tend to get confused by viewing so many different products and will not be able to make a purchase decision.

H5: There is statistically significant linear relationship between recommendation diversity andwillingness to buy recommended product.

H6: There is statistically significant linear relationship between recommendation quality and willingness to buy recommended product.

Data Analysis

Cleaning, converting, and modelling data to uncover relevant information for corporate decision-making is characterized as data analysis. Data analysis' goal is to extract meaningful information from data and make decisions based on that knowledge. A basic example of data analysis is when we make a decision in our daily lives, we consider what occurred the last time we made that decision or what would happen if we make that decision. This is nothing more than looking backwards or forwards in time and making judgments depending on our findings.

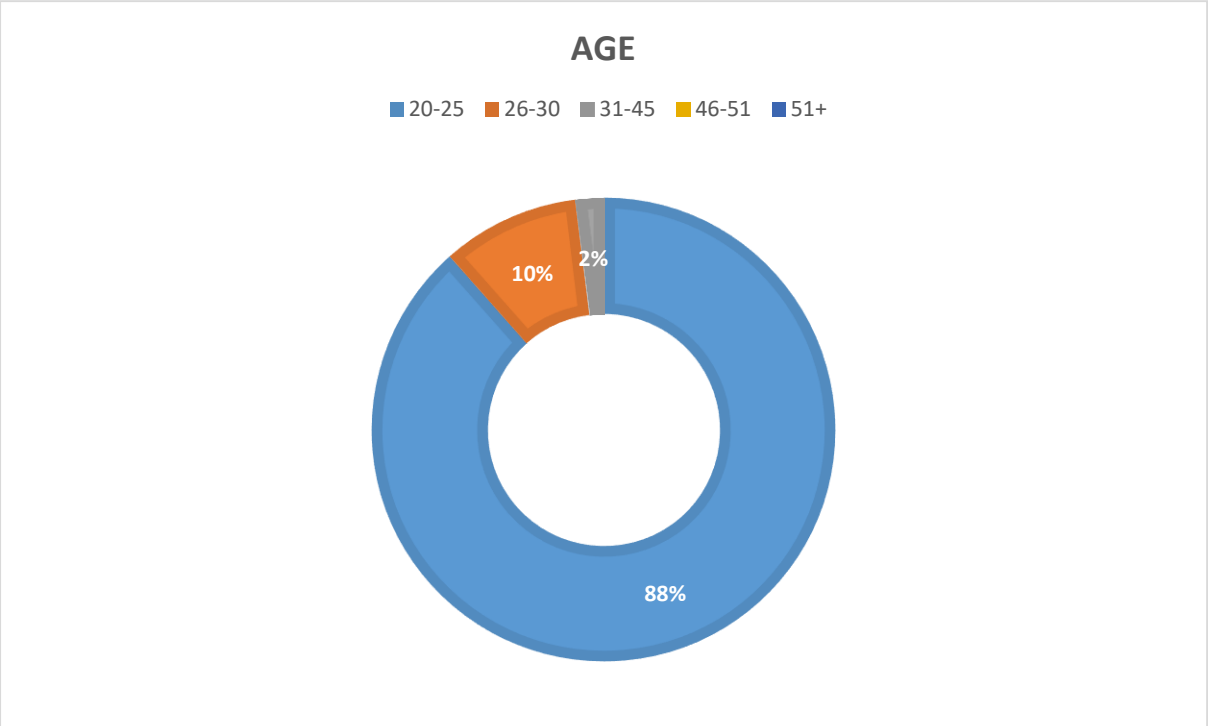


Figure (1.1 Analysis of Age Group)

First question aimed to know about the age of the respondents as our research was on recommendation system which is widely used by online shopping and streaming platforms which is used by younger consumers and its usage is increasing by all age groups gradually.

Out of 101 respondents 88% of them were in 20-25 years of age bracket which is a positive thing as they are frequently use online platforms to shop and get entertained so they are more familiar with the platform. Then 10% of respondents were in 26-30 years' age bracket and 2% of respondents were in 31-45 years' age bracket.

Next two questions were about gender and motivation to buy respectively which were intended toward knowing about the number of males and females filling a form as responses of consumers of different genders will provide a better understanding for the study. Out of 101 respondents 69 are male and 32 are female so we can say it has more responses from males.

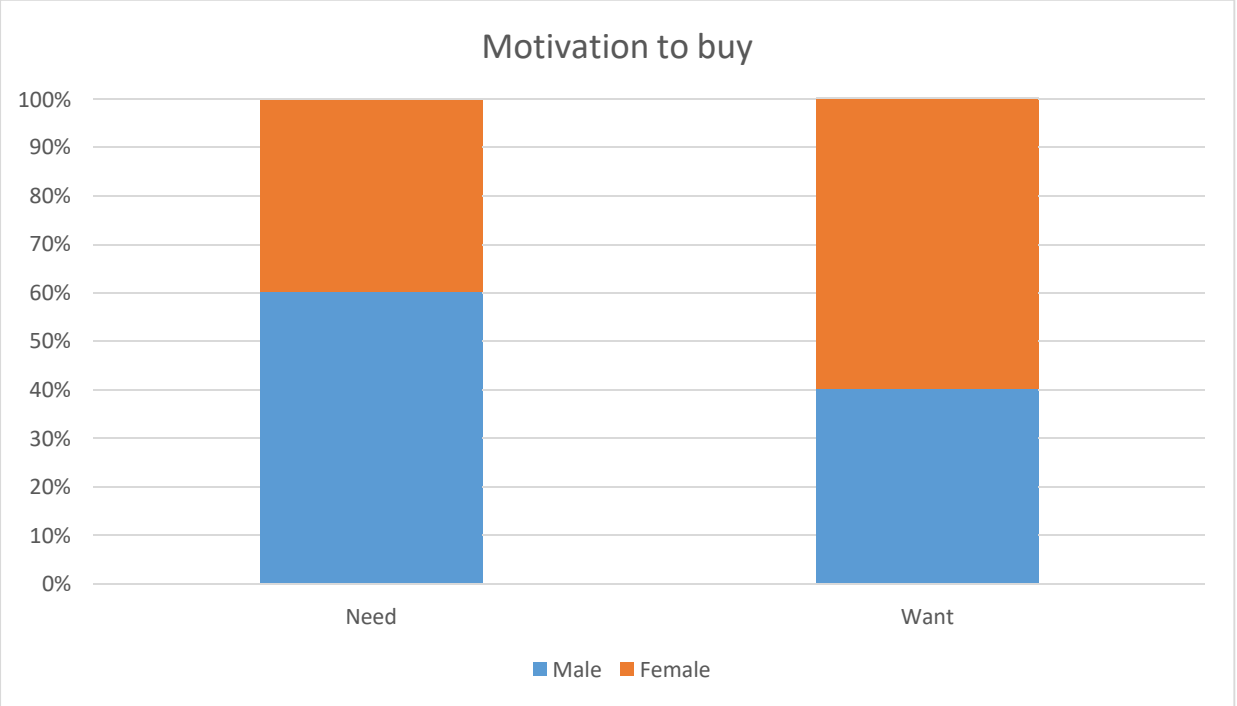


Figure (1.2 Analysis of Gender Diversity)

Consumers have a motivation deriving their purchase decision which may be in one of these two categories need and want. It was found out that 60% of the males shopped for their needs and 40% of them for their wants on the other side 37% of females shopped for their needs and 63% of their needs not much can be concluded from this as number of males and femalesare not equal also the meaning of need and want has evolved over the years and it can vary from person to person.

Research objective: To identify the impact of customer's pre-purchase behavior on willingness to buy recommended product.

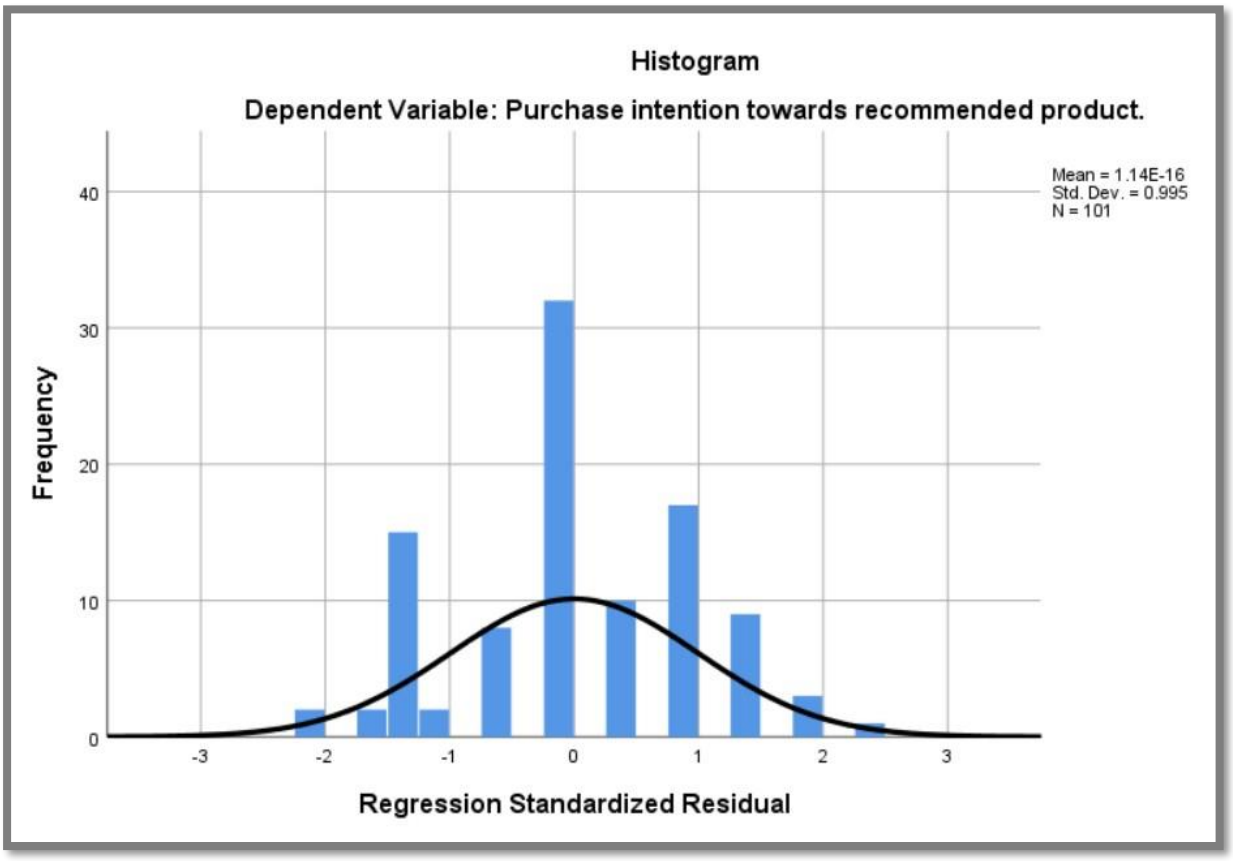
Linear regression is used to predict the value of one variable base on the value of another variable.

Ho: There is no statistically significant linear relationship between prior research of product and willingness to buy recommended product.

H1: There is statistically significant linear relationship between prior research of product andwillingness to buy recommended product.

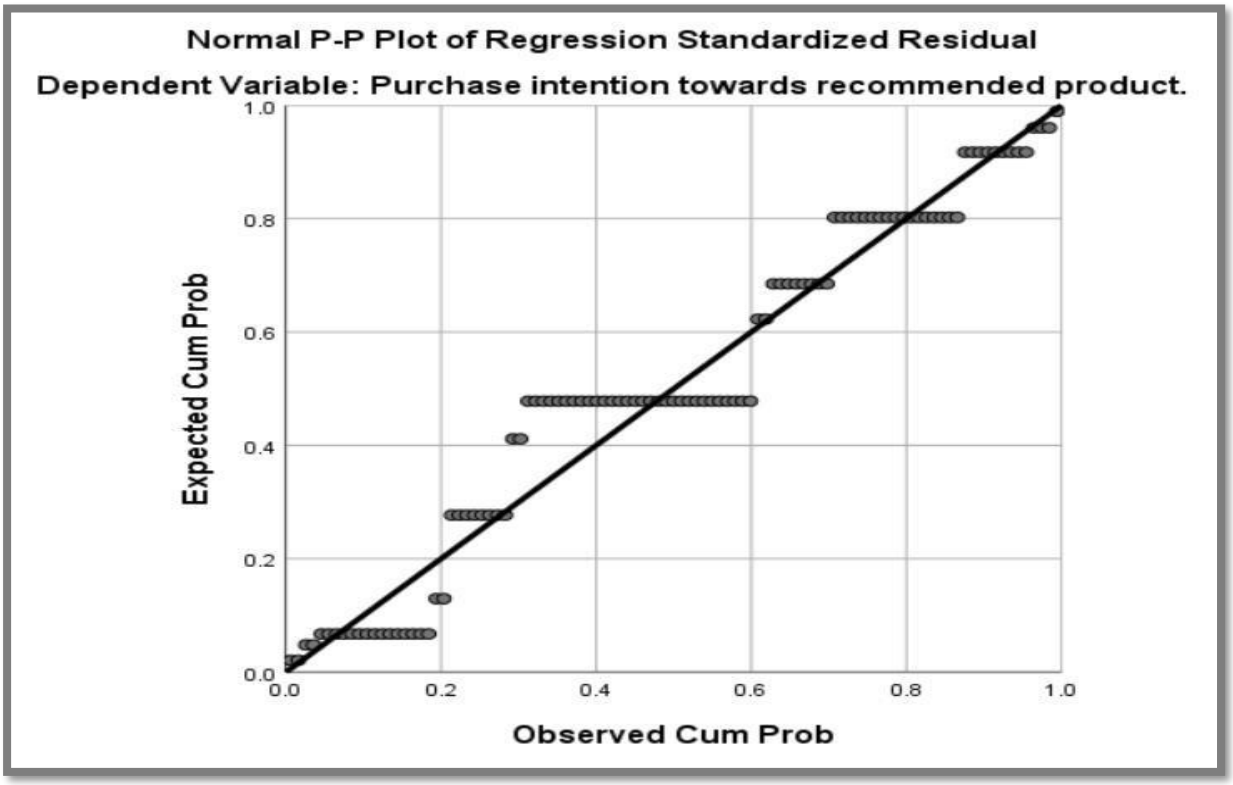
Assumptions of residual have to be checked

1. Residuals are normally distributed
2. Residuals are identically distributed
3. Residuals are independently distributed



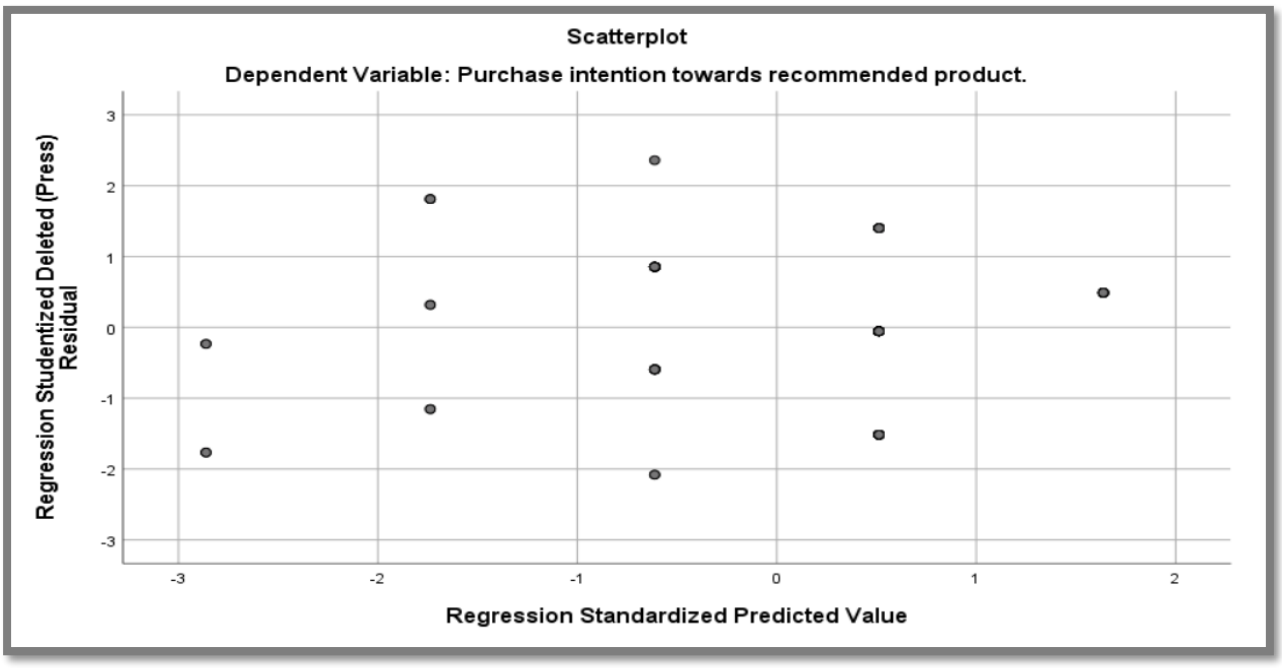
(Fig 1.3: Regression Standardized Residual)

By analyzing the curve, it can be said that residuals are normally distributed.



(Fig1.4: Observed Cum Probability)

P-P Plot show values fall on the 45° line which also indicates that residuals are distributed normally.



(Figure-1.5: Regression Standardized Predicted Value)

Scatter plot doesn't follow any pattern that shows residuals are identically distributed.

To check the third assumption Durbin Watson statistics, have to be checked, which should bein range of 1.5-2.5 which defines that there is no auto co-relation between the residual and they are independently distributed. It can be seen that Durbin Watson statistic is 1.931 whichis in range or 1.5 - 2.5, so we can say that residuals are independently distributed.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.629[a]	.395	.389	.694	1.931

a. Predictors: (Constant), Pre-Purchase behavior

b. Dependent Variable: Purchase intention towards recommended product.

(Table 1: Analyzing the variation of purchase intention due to Pre-Purchase Behavior)

Model summary

Now we will check the value of R from the model summary table, R should be between 0-1 and it cannot be negative. R value represents the multiple value correlation coefficient which calculates the correlation between observed and predicted value of dependent variables.
Value of R is 0.629. R^2 explains the amount of variation in dependent variable is explained by the model. It also explains the effectiveness or the reliability of the relationship. R^2 is .395 which means 39.5% of variation in purchase intention is due to pre-purchase behavior.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	31.139	1	31.139	64.665	.000[b]
	Residual	47.673	99	.482		
	Total	78.812	100			

a. Dependent Variable: Purchase intention towards recommended product.

b. Predictors: (Constant), Pre-Purchase behavior

(Table 2: Analyzing the Significance of the Model)

In Anova table we can see that P-value (sig.) is .000 which is less than .05 so we can say that model is significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.528	.285		5.358	.000
	Pre-Purchase behavior	.628	.078	.629	8.041	.000

a. Dependent Variable: Purchase intention towards recommended product.

(Table 3: Analyzing the linear relationship between pre-purchase behavior and willingness to buy recommended product.)

From the coefficient table we can see that p-value is .000 which is less than .05, Hence we reject null hypothesis and accept alternative hypothesis. By which we can say that there is statistically significant linear relationship between pre-purchase behavior and willingness to buy recommended product.

$Y = 1.528 + 0.628 X$

1 Unit change in X will result in 0.628 units change in Y

Research objective: To identify the impact of customer's impulse buying behavior on willingness to buy recommended product.

Ho: There is no statistically significant linear relationship between impulse purchasing behavior and willingness to buy recommended product.

H2: There is statistically significant linear relationship between impulse purchasing behavior adwillingness to buy recommended product.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.420[a]	.177	.168	.810	2.056

a. Predictors: (Constant), Impulse buyer behavior

b. Dependent Variable: Purchase intention towards recommended product.

(Table 4: Analyzing the variation of purchase intention due to impulse purchase behavior.)

Model summary

Now we will check the value of R from the model summary table R should be between 0-1 and it cannot be negative. R value represents the multiple value correlation coefficient which calculates the correlation between observed and predicted value of dependent variables. Value o R is .420. R^2 explains the amount of variation in dependent variable is explained by the model. It also explains the effectiveness or the reliability of the relationship. R^2 is .177 which means 17.7% of variation in purchase intention is due to impulse purchase behavior.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.924	1	13.924	21.244	.000[b]
	Residual	64.888	99	.655		
	Total	78.812	100			

a. Dependent Variable: Purchase intention towards recommended product.

b. Predictors: (Constant), Impulse buyer behavior

(Table 5: Analyzing the Significance of the Model)

In Anova table we can see that P-value (sig.) is .000 which is less than .05 so we can say that model is significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.092	.369		5.668	.000
	Impulse buyer behavior	.438	.095	.420	4.609	.000

a. Dependent Variable: Purchase intention towards recommended product.

(Table 6: Analyzing the relationship between impulse purchase behavior and willingnessto buy recommended product.)

From the coefficient table we can see that p-value is .000 which is less than .05, Hence we reject null hypothesis and accept alternative hypothesis. By which we can say that there is statistical significant linear relationship between impulse purchase behavior and willingnessto buy recommended product.

$Y = 2.092 + 0.438\ X$

1 Unit change in X will result in 0.438 units change in Y

Research objective: To identify the impact of recommendation accuracy on consumers' willingness to buy recommended product.

Ho: There is no statistically significant linear relationship between recommendation accuracyand willingness to buy recommended product.

H3: There is statistically significant linear relationship between recommendation accuracy andwillingness to buy recommended product.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.586[a]	.344	.337	.723	2.334

a. Predictors: (Constant), Recommendation Accuracy

b. Dependent Variable: Purchase intention towards recommended product.

(Table 7: Analyzing the variation of purchase intention due to recommendation accuracy.)

Model summary

Now we will check the value of R from the model summary table R should be between 0-1 and it cannot be negative. R value represents the multiple value correlation coefficient which calculates the correlation between observed and predicted value of dependent variables. Value o R is .586. R^2 explains the amount of variation in dependent variable is explained by the model. It also explains the effectiveness or the reliability of the relationship. R^2 is .334 which means 33.4% of variation in purchase intention is due to recommendation accuracy.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.078	1	27.078	51.817	.000[b]
	Residual	51.734	99	.523		
	Total	78.812	100			

a. Dependent Variable: Purchase intention towards recommended product.

b. Predictors: (Constant), Recommendation Accuracy

(Table 8: Analyzing the Significance of the Model)

In Anova table we can see that P-value (sig.) is .000 which is less than .05 so we can say that model is significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.595	.308		5.172	.000
	Recommendation Accuracy	.597	.083	.586	7.198	.000

a. Dependent Variable: Purchase intention towards recommended product.

(Table 9: Analyzing the relationship between recommendation accuracy and willingnessto buy recommended product.)

From the coefficient table we can see that p-value is .000 which is less than .05, Hence we reject null hypothesis and accept alternative hypothesis. By which we can say that there is statistically significant linear relationship between recommendation accuracy and willingnessto buy recommended product.

Y = 1.595 + 0.597 X

1 Unit change in X will result in 0.597 units change in Y

Research objective: To identify the impact of recommendation originality on consumers' willingness to buy recommended product.

Ho: There is no statistically significant linear relationship between recommendation originalityand willingness to buy recommended product.

H4: There is statistically significant linear relationship between recommendation originalityand willingness to buy recommended product.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.461[a]	.213	.205	.792	2.085

a. Predictors: (Constant), Recommendation Novelty / originality

b. Dependent Variable: Purchase intention towards recommended product.

(Table 10: Analyzing the variation of purchase intention due to recommendation originality)

Model summary

Now we will check the value of R from the model summary table R should be between 0-1 and it cannot be negative. R value represents the multiple value correlation coefficient which calculates the correlation between observed and predicted value of dependent variables. Value o R is .461. R^2 explains the amount of variation in dependent variable is explained by the model. It also explains the effectiveness or the reliability of the relationship. R^2 is .213 which means 21.3% of variation in purchase intention is due to recommendation originality.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.780	1	16.780	26.780	.000[b]
	Residual	62.032	99	.627		
	Total	78.812	100			

a. Dependent Variable: Purchase intention towards recommended product.

b. Predictors: (Constant), Recommendation Novelty / originality

(Table 11: Analyzing the Significance of the Model)

In Anova table we can see that P-value (sig.) is .000 which is less than .05 so we can say that model is significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.904	.366		5.208	.000
	Recommendation Novelty / originality	.482	.093	.461	5.175	.000

a. Dependent Variable: Purchase intention towards recommended product.

(Table 12: Analyzing the relationship between recommendation originality and willingnessto buy recommended product.)

From the coefficient table we can see that p-value is .000 which is less than .05, Hence we reject null hypothesis and accept alternative hypothesis. By which we can say that there is statistically significant linear relationship between recommendation originality and willingnessto buy recommended product.

Y = 1.904 + 0.482 X

1 Unit change in X will result in 0.428 units change in Y

Research objective: To identify the impact of recommendation diversity on consumers' willingness to buy recommended product.

Ho: There is no statistically significant linear relationship between recommendation diversityand willingness to buy recommended product.

H5: There is statistically significant linear relationship between recommendation diversity andwillingness to buy recommended product.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.420[a]	.176	.168	.810	1.957

a. Predictors: (Constant), Recommendation Diversity / Variety

b. Dependent Variable: Purchase intention towards recommended product.

(Table 13: Analyzing the variation of purchase intention due to recommendation diversity)

Model summary

Now we will check the value of R from the model summary table R should be between 0-1 and it cannot be negative. R value represents the multiple value correlation coefficient which calculates the correlation between observed and predicted value of dependent variables. Value o R is .402. R^2 explains the amount of variation in dependent variable is explained by the model. It also explains the effectiveness or the reliability of the relationship. R^2 is .176 which means 17.6% of variation in purchase intention is due to recommendation diversity.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.891	1	13.891	21.183	.000[b]
	Residual	64.921	99	.656		
	Total	78.812	100			

a. Dependent Variable: Purchase intention towards recommended product.

b. Predictors: (Constant), Recommendation Diversity / Variety

(Table 14: Analyzing the Significance of the Model)

In Anova table we can see that P-value (sig.) is .000 which is less than .05 so we can say that model is significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.332	.319		7.313	.000
	Recommendation Diversity / Variety	.393	.085	.420	4.603	.000

a. Dependent Variable: Purchase intention towards recommended product.

(Table 15: Analyzing relationship between recommendation diversity and willingness tobuy recommended product.)

From the coefficient table we can see that p-value is .000 which is less than .05, Hence we reject null hypothesis and accept alternative hypothesis. By which we can say that there is statistically significant linear relationship between recommendation diversity and willingness to buy recommended product.

Y = 2.332 + 0.393 X

1 Unit change in X will result in 0.393 units change in Y

Research objective: To identify the impact of recommendation quality on consumers' willingness to buy recommended product.

Ho: There is no statistically significant linear relationship between recommendation quality andwillingness to buy recommended product.

H6: There is statistically significant linear relationship between recommendation quality andwillingness to buy recommended product.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.652[a]	.425	.419	.676	1.902

a. Predictors: (Constant), Recommendation Quality (RQ)

b. Dependent Variable: Purchase intention towards recommended product.

(Table 16: Analyzing the variation in purchase intention is due to recommendation originality)

Model summary

Now we will check the value of R from the model summary table R should be between 0-1 and it cannot be negative. R value represents the multiple value correlation coefficient which calculates the correlation between observed and predicted value of dependent variables. Value o R is .652. R^2 explains the amount of variation in dependent variable is explained by the model. It also explains the effectiveness or the reliability of the relationship. R^2 is .425 which means 42.5% of variation in purchase intention is due to recommendation originality.

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.516	1	33.516	73.254	.000[b]
	Residual	45.296	99	.458		
	Total	78.812	100			

a. Dependent Variable: Purchase intention towards recommended product.

b. Predictors: (Constant), Recommendation Quality (RQ)

(Table 17: Analyzing the Significance of the Model)

In Anova table we can see that P-value (sig.) is .000 which is less than .05 so we can say that model is significant.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.420	.281		5.058	.000
	Recommendation Quality (RQ)	.653	.076	.652	8.559	.000

a. Dependent Variable: Purchase intention towards recommended product.

(Table 18: Analyzing the relationship between recommendation quality and willingness to buy recommended product.)

From the coefficient table we can see that p-value is .000 which is less than .05, Hence we reject null hypothesis and accept alternative hypothesis. By which we can say that there is statistically significant linear relationship between recommendation quality and willingness tobuy recommended product.

$Y = 1.420 + 0.653 X$

1 Unit change in X will result in 0.652 units change in Y

Findings

Consumers' willingness to purchase a recommended product is based on multiple factors whichare consumer's characteristics and efficiency of recommendation system.

Product awareness of consumers have a high influence on consumers' willingness to buy a recommended product as consumer has already done their research about the product which also shows that the consumer is serious about buying the product and is not indulging in just surfing the e-commerce platform.

Impulse buying behavior of consumers also have influence on consumers' willingness to buy a recommended product but not that high as compared to consumer's product awareness and the reason being impulse buying can be triggered when consumer will be attracted towards a product which will not happen all the time but when consumer is aware of what they are lookingfor the chances of purchase decision are higher.

When recommendation accuracy is high which means recommended, products are related to consumers purchase history or consumers search, probability of consumer making a purchasedecision is high as product recommended to them are according to their preferences or searcheditems for which the consumer is looking for.

Customers are looking for new and improved products which fulfil their needs and when recommendation system recommends personalized original/new products to the consumer which are based on their preferences as recommendation system's primary objective is to personalize recommendations for the consumers and make their search for a product easy, so the original a recommendation is condition being it is personalized higher are the chances of aconsumer buying it.

There is very less impact of recommendation diversity on consumers' willingness to buy a recommended product. When a recommendation systems results are not related to consumer preferences and are of different categories which leads to confusing the consumer as productswhich are preferred or searched by them are not being shown to them which leads to consumerswho are unable to make a right choice because of inefficient recommendation system.

Quality provided in any kind of service or product makes it successful which is true in the case of recommendation quality as well the higher the quality of a recommendation system the easier it gets for the consumer to find the product which fulfil their needs and they are willing to pay for it. Higher recommendation quality has high impact on consumer's decision as it is when products recommended are based on the consumer's preferences or search which makes it easier for the consumer to relate with the product, product awareness also have a similar effect as consumers are aware about the product which increases their willingness to buy the product.

Conclusion and Recommendations

To improve the recommendation system first, we have to realize what's the basic function/objective of recommendation system. Primary objective of a recommendation systemis to provide the consumers with product recommendations which are related to their search orpurchase history which is personalized product recommendation to consumers. By personalizing recommendations chances of influencing consumers to buy a recommended product is high as the products are of their preferences but only providing quality recommendations will not lead to success as consumer's characteristics also have an impact ondecision making, if the consumers having prior knowledge about the product are provided quality recommendations increases the chances of them buying the product as they are being provided with what they wanted.

Recommendation systems accuracy plays a vital role by recommending right set of products toconsumers on the basis of price and related category. Consumers patience level have gone down and they want right products to their need and they want it quickly by which we can conclude that if consumers are recommended products which are diverse and are not related totheir search or purchase history there are higher chances of them leaving the platform and considering another platform to make their purchases increases, because of which organizations should consider making the recommendation system such that it recommends products which are related to consumers purchase history or search as consumers are becomingsmarter day by day they know if a platform is working to achieve consumer focused motives of organizational focused motives, so an organization have to create a win-win situation for both the parties involved to run business successfully.

For increasing sales an e-commerce platform should recommend original/new products to consumers which are personalized as consumers want to use better and improved products to fulfil their needs/wants and by recommending personalized new products in the market increases the sales as consumers want to try the new offering in the market.

Recommendation system should also keep on learning about the consumer time-to-time as consumers grow in life their consumption pattern also changes to which recommendation system also have to adapt with changing consumer's to be effective in long run.

LIMITATION OF STUDY

In course of preparing Dissertation, few road blocks were faced that may be termed as the limitation of the study. These were:

1. Could not spend sufficient time required to make an in-depth study on such an important subject because of time constraint.
2. Sufficient records, publications were not available and some questions were avoided or not exactly answered by the respondents may be because of lack of idea.
3. The analysis will be based on the current data, as such it may lose its relevance in the future.
4. As the report was prepared by one person, this report seriously suffered manpower constraint.
5. The responses of the respondent may be biased.

Despite all these limitations, individual best efforts have been put in the preparation of this report and its been kept a priority that the report is an informative and comprehensive as possible.

Questionnaire

Name:

Age:

- 20-25
- 26-30
- 31-45
- 46-50
- 51+

Gender

- Male
- Female
- Prefer not to say

(Needs are something that you must have, in order to live. On the contrary, **wants** aresomething that you wish to have, so as to add comforts in your life.)

Your motivation while buying a product online is to fulfil?

- Need
- Wants

Pre-purchase information search (1= Completely disagree, 5= Completely agree)

Before buying a product, I search for it over the internet	1	2	3	4	5
Before buying a product, I gather as much information about it as I can.					
Before buying a product, I read reviews about it on social media and other platforms.					

Impulse buyer behaviour (1= Completely disagree, 5= Completely agree)

When, I buy online, I buy things that I had not intended to purchase	1	2	3	4	5
I am a person who makes unplanned purchases very often					
When, I see something interesting what really interests me, I buy it without considering the consequences					
It's fun to buy spontaneously					
I avoid things that are not on my shopping list.					

Recommendation Accuracy (RA) (1= Completely disagree, 5= Completely agree)

The items recommended to me matched my interests	1	2	3	4	5
I find many items appealing that the system recommended me					
The recommendations I received better fits my interests than what I may receive from a friend					

Recommendation Novelty / Originality (RN) (1= Completely disagree, 5= Completelyagree)

The recommendation agent recommended items to me that I did not expect	1	2	3	4	5
The recommendation agent helped me discover new products					
I could find familiar items through the recommender					

Recommendation Diversity / Variety (RD) (1= Completely disagree, 5= Completely agree)

The items recommended to me are not similar to each other	1	2	3	4	5
The items recommended to me are of various kinds					

Recommendation Quality (RQ) (1= Completely disagree, 5= Completely agree)

The quality of the recommendations is the same as I wanted	1	2	3	4	5
My overall evaluation of the recommendations of this recommendation agent is superior					
Overall, the quality of the recommendations of this recommendation agent valuable					

Purchase intention towards recommended product. (1= Completely disagree, 5=Completely agree)

Recommendation system helps to decide the product which I am likely to buy.	1	2	3	4	5
Recommendation system guide about the product that I am likely to buy.					
Recommendation system help to ensure the right purchase					

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