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Determinants of consumer behaviour towards technology enabled grocery shopping in Noida

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Abstract

The development of the internet and the post-Covid epidemic have greatly boosted e-commerce. Retailers need to constantly improve their services to meet the enormous demand

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for online purchases while planning for an appropriate quantity and variety of groceries for the clients. The study investigates how Noida (India) residents' e-grocery shopping is impacted by convenience, service quality, and social aspects. The study uses the snowball sampling technique (sample size: 220) to collect parameters using a Likert scale, and then evaluated using partial least squares structural equation modelling (PLS-SEM). The results indicate that service quality has the greatest influence on e-grocery shopping habit, followed by convenience, while social component has no significant impact. The service quality also includes the need for regular updation of the website and application to enhance the experience of the web-user interface by exploring the need for data science and artificial intelligence.

Subject Classification: *91C15, 62H15.*

Keywords: *Artificial intelligence, Customer behaviour, E-commerce, E-grocery, Online business, Online grocery shopping, Purchase behaviour, SEM-PLS, Technology adoption.*

I. Introduction- Towards growth in Indian Market

According to a report published by (Vayola Jocelyn, 2022), the expenditure of grocery in India accounts to 21% of India's growing economy. The days of standing in huge lines to buy groceries from a neighbouring store on a weekly or monthly basis with a long list of products to buy are long gone. The era of digitalization has brought a drastic leap in customer preferences in buying groceries online through various companies facilitating delivery at doorstep services. A gentle click on the app enables the delivery of the items at their destined location (Donbosco & Malarvizhi, 2022). India is a prime example of the transition, with the majority of urban middle-class families choosing online deliveries over in-person shopping. After the Covid-19 outbreak, ordering groceries online has become the new standard, and we continue to see tremendous expansion in both this industry and global e-commerce. Grocery expenditure accounted for about 20% of India's GDP in 2019. This was estimated to reach 23% by 2025 (Vayola Jocelyn, 2022). In 2019, the market for online groceries in India was worth more than 100 billion Indian rupees. In the year 2024, the market is projected to be worth 1,170 billion Indian Rupees. The ease of sitting in office/home saving time and energy and using online transaction methods are some of the benefits that comes with ordering groceries via internet. Online purchasing comes with an added advantage of attractive discounts on ordering some specific product or cashback or discounts on specific debit/credit cards. E-services are getting used to retain and maintain the loyalty of the customers (Ahmad et al., 2017).

With the development of technology, merchants are under pressure to provide enticing competitive alternatives to keep customers' loyalty

while also lowering costs (Weyer et al., 2020). Customers traverse to certain path while doing e-shopping of groceries, so their psychology predicts their purchasing behaviour on the website (Kulkarni et al., 2019).

II. Objective of The Study

The focus of this study is to explore the effect of convenience, service quality, and social factors influencing the online grocery shopping of the customers in Noida, India. This study will further enhance the online shopping experience considering the customer perspective by giving matter for strategic marketing to retail grocery companies who desire to improve their online reputation in e-commerce (Gomes & Lopes, 2022). The study provides an outlook where retailers are required to improve the customer experience using various upcoming digital technologies of artificial intelligence.

III. Research Problem

Every customer is different and has different expectations from the grocery items that are delivered. Some customers are concerned about the freshness of the ordered items and their price competitiveness, quality, and some are more concerned about the timely delivery of the products(Qin et al., 2019). On the other hand, there are few people who would like to meet people and decide upon the product they would like to choose. They would like to interact directly with the people and have a sense of taste/smell/vision and then choose what is best for them (Van Droogenbroeck & Van Hove, 2017). Online Grocery Shopping (OGS) is dependent upon online consumer decision process examining the services offered and delivery conditions (Bauerová, 2018). Modern marketing strategies that use text, image, sound, and video require the use of artificial intelligence, machine learning, and deep learning (Pearson, 2020). The usage of chatbots based on AI is getting used by many mobile applications (Adam et al., 2021). The grocery applications need to be smart enough to assess the needs of the customers based on their prior orders and should be able to suggest items based on the ordering behaviour of the customers.

Statista Research Department showed the statistics where supermarkets have 4% of the share of the total grocery and e-grocery are less than even 1% of the share. The rest of the share corresponds to Kirana's or a small grocery store. According to the estimate, 396 billion Indian rupees will make up the market value of e-groceries in India by 2022. So,

the penetration of online grocery market is still not at all good. The paper endeavours to find focus on the factors which can increase the online grocery shopping of the customers in Noida, India.

IV. Literature Review

The base of this study is the Theory of Planned Behaviour which is a broader form of Theory of Reasoned Action (TRA) (Vasudevan et al., 2022). It says that intentions lead to behaviour. Basically, it focuses on beliefs that lead behaviour. Most of the researchers use this theory to portray consumer specific behaviour (Ha et al., 2019). Theory of Planned Behaviour rightly recognize the ease of usage, trust and usefulness on online shopping behaviour of the customers (Ha et al., 2019). (Loketkrawee & Bhatiasevi, 2018) had concluded, "online shopping is both a technology decision and a consumer decision" and requires further examination. Timely delivery of the product, its quality, price, variety and the payment options determine the development e-commerce (Jayashree & Abirami, 2022).

Ease of online shopping behaviour- Usage of mobile phones have increased the usage of online orders of grocery through the coming up of the various applications like Blinkit, Jio Mart, Big Basket, etc. As of February 2022, the Indian e-grocery firm Swiggy had received funding totaling $3.57 billion USD. Additionally, Blinkit (formerly known as Grofers) received 692 million dollars in investment (Vayola Jocelyn, 2022).

In addition to convenience, aspects like security, trust, service support, flexible transactions, personalised attention, price discounts, etc. may also have a big impact on how clients shop for groceries online (Jayasankara Prasad et al., 2018). (SivaKumar & Gunasekaran, 2017) discusses the variables influencing millennial customers' online shopping behaviour based on four variables namely customer innovativeness, perceived benefits, perceived dangers, attitude, and intention. Transaction security, trust and subjective norm are some of the eminent factors that dominate customer shopping behaviour (Vo et al., 2022). (Kuswanto et al., 2019) concluded about the behaviour of the students is majorly directed by social influence. (Frank & Peschel, 2020) has identified various segments of consumers opting for buying groceries online based on preference for price, convenience, and service.

Web site's quality, interface, satisfaction and Web site experience, along with the ease in return of products are some of the factors that contribute towards the service quality of the e-grocery application (Martín

et al., 2019). Another aspect that influences how people shop for groceries online is social influence (Martín et al., 2019). This includes motive, values, lifestyle personality, culture, reference groups and family adaptiveness of e-commerce platform on the social engagements of customer.

Feelings, beliefs, opinions, and behavioural dispositions are predicting the willingness of the customers to opt for e-grocery shopping (Brand et al., 2020). (Morganosky & Cude, 2000) have concluded in their study that 70% of the people do online grocery shopping to save time and for convenience. They also said that demographic factors play the primary reason for opting online shopping. (Bauerová, 2018) mentioned that delivery time and delivery charges play a significant role in influencing customer's intention to buy online. (Rout et al., 2022) mention, "perceived ease of use, perceived usefulness, and customer perceived value, have positively and significantly predicted the online grocery shopping intention." (Rahman et al., 2018) have revealed that the consumers prefer shopping online to save time and seeking variety of products available. (Dziewanowska & Kacprzak, 2020) have concluded in their study that youngsters are the major contributors to the online shopping and their behaviour is regulated as per the prices and promotions/deals.

An e-commerce website is very much needed for the online grocery shopping as the way Amazon, etc. have started (Wangmo et al., 2018). The Grocery Management System, which consists of a Smart Refrigerator and a Smart Cabinet, uses the Internet of Things (IoT). Utilising such a system will allow consumers to limit food waste (M. A. Khan et al., 2019). This will help retailers in planning the grocery items at the store. Analysis and forecasting of the needs of the customers can be done by forecasting through Internet of things (IoT) (Koverman, 2016). Innovative services and digital initiatives need to be taken up to adapt to the growing demands of the online buyers (Weinstein et al., 2022). The e-shopping behaviour is also influenced by the technology acceptance theory in consumer context (Venkatesh et al., 2012). Ease in paying online, trust on the website, buying decision involvement, and preference for global products are some of the factors that influence the e-grocery shopping behaviour of the customers (Sowmyanarayanan et al., 2021). Artificial Intelligence has created a hype in every industry and same has been applied in e-commerce and online grocery sales (Vazquez-Noguerol et al., 2021a). Customers purchasing grocery items consider the recommendations made by the artificial intelligence (S. I. Khan, 2022). (Droogenbroeck & Hove, 2017) reveal that age is one of the prominent factors in the adoption of the technology and its usability in the household of the consumer. This will also strengthen supply chain performance for the logistics industry (Lin, 2008). The studies

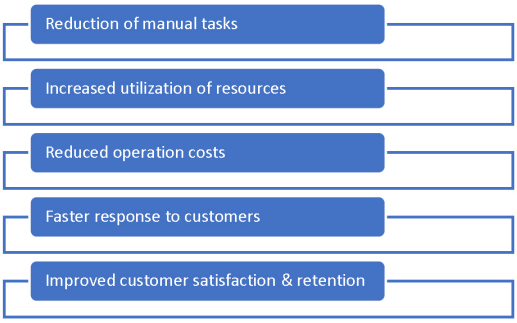

Figure 1

Benefits of Artificial Intelligence

Source: Authors' own

of (Cypryjański & Grzesiuk, 2015) revealed that consumers are more influence by "visual" signals in comparison to the signals requiring consumers to read any information (with extra involvement).

Figure 1 shows the benefits of the artificial intelligence that shows the need of automation in online grocery shopping (Pearson, 2020).

Many mobile applications use automatic speech recognition, text to speech and some are even providing multilingual content allowing users to convert text into speech in numerous languages. Neural networks identify the purchasing pattern of the customers based on their specific characteristics that can be used for predicting sales (Pearson, 2020).

As correctly noted in (Yin & Qiu, 2021), AI technology has a considerable favourable impact on consumers' perceived hedonic and utility value. This influences people's purchase intentions. (Krchova & Svejnova Hoesova, 2021) have demonstrated the viability of combining mobile applications with artificial intelligence to implement contemporary marketing communication tools.

(Shukla & Sharma, 2018) have provided the inference that usage of mobile applications for the purchase of grocery is limited by the consumers in comparison to general shopping. (Ahn et al., 2015) have developed augmented reality mobile grocery application that assists users in making healthy choices of products and raising health concerns. (Piroth, Rüger-Muck, et al., 2020) highlights the need of improvement through digitalization in service quality. This would surely be impacting the holistic experience of the consumers from ordering the items to receiving the orders.

V. Research Methodology

The data was assembled through an online questionnaire designed on Google Forms for the people in Noida region which corresponds to 5-point Likert scale from "strongly disagree" (1) to "strongly agree" (5). Snowball sampling method was selected for carrying out the online survey that was circulated through online platforms like mail, WhatsApp, and Facebook. Sample size for the study is 220. Each subject gave their consent after being fully aware of the study's goal. The data was evaluated using MS Excel.

The survey's demographic information is shown in Table I.

Table I

Respondents Profile

Demographic Characteristics		Frequency	Percentage
Gender	Male	120	54.5
	Female	100	45.5
Age Group	Less than 20 years	8	3.6
	21-30	79	35.9
	31-40	100	45.5
	41-50	18	8.2
	51 above	15	6.8
Education Level	Up to Intermediate	8	3.6
	Graduate	30	13.6
	Postgraduate	177	80.5
	Doctorate	5	2.3
Monthly Income	< ₹40,000	62	28.2
	₹40,000 - ₹80,000	90	40.9
	₹80,000 - ₹1,20,000	47	21.3
	> ₹1,20,000	21	9.5

Source: Authors' own

Figure 2 is showing the proposed research model .E-grocery shopping behaviour: Questionnaire comprised of following items like "I use mobile grocery app for fun and pleasure"; "I enjoy immersion in grocery shopping with mobile app"; "I prefer to order groceries online"; "I love to do grocery shopping online when prices are competitive"; "I like exploring new

Figure 2

Proposed Research Model

Source: Authors' own

products while shopping online groceries"; "I enjoy e-grocery shopping AI experience" (Vasudevan et al., 2022). Cronbach's alpha coefficient was .89.

Convenience: The following items were used: "reducing the hassle for parking or standing queue"; "reducing the effort of walking or travelling"; "online grocery shopping is the easiest way when delivery also comes in desired span of time"; "It saves my usual choices of products and provides suitable suggestions"; "I like the web interface of the website"; "I would love the innovation of Chatbot in grocery shopping apps" (Sulastri et al., 2017) (Abid Azhar & Adnan Bashir, 2018) (Angus Loten, 2023). Cronbach's alpha coefficient was 0.88.

Service Quality: The following items were used: "Online grocery delivery is on time"; "I receive a personalized touch on my orders and

Table II

Descriptive Statistics

Factors	Cronbach Alpha	Mean	Standard Deviation	Skewness
Dependent variable- E-grocery shopping behaviour	0.89	4.00	1.5	-0.13
Independent Variable 1-Convenience	0.88	3.91	1.46	-0.12
Independent Variable 2- Service Quality	0.85	4.13	1.54	-0.16
Independent Variable 3- Social influence	0.90	4.06	1.64	-0.15

communication(Boyer & Hult, 2006)"; "no issue in refunds/replacements"; "Website/Application used for ordering groceries doesn't crash at all"; "Payment gateway is safe and trustable" (Tzeng et al., 2021). Calculated Cronbach's alpha coefficient was 0.85.

Social influence: Following items were used: "my friends prefer to do online grocery shopping"; "my colleagues motivated me to use online grocery shopping"; "people around me think that online grocery shopping is a very good idea, and I should order groceries online" (Kim, 2021); "my family members don't want me to go outside so I shop groceries online"; "everyone in my society order groceries online". Cronbach's alpha coefficient was 0.90.

Table II shows that service quality has the lowest reliability of all, while social influence has the highest. The data has adequate internal consistency if all the aforementioned factors have reliability values greater than 0.7.

The lowest skewness is for convenience and highest skewness for service quality.

Test for convergent and discriminant validity of the model was conducted.

VI. Data Analysis

Table III shows the identified latent variables and factor loading, average variance extraction and composite reliability test results are as shown below.

Table III

Output of Measurement Model

Latent Variables	Items	Factor Loading	Average Variance Extraction (AVE)	Composite Reliability (CR)	Rho A
E-grocery shopping behaviour	ESB1	0.88	0.71	0.93	0.92
	ESB2	0.92			
	ESB3	0.87			
	ESB4	0.81			
	ESB5	0.79			
	ESB6	0.75			

Contd...

Convenience	CON1	0.75	0.65	0.9	0.87
	CON2	0.81			
	CON3	0.72			
	CON4	0.76			
	CON5	0.8			
	CON6	0.78			
Service Quality	SQL1	0.8	0.66	0.9	0.87
	SQL2	0.78			
	SQL3	0.79			
	SQL4	0.83			
	SQL5	0.83			
Social Factors	SFT1	0.78	0.73	0.93	0.91
	SFT2	0.85			
	SFT3	0.9			
	SFT4	0.87			
	SFT5	0.85			

Table III, factor loading, and composite reliability are greater than 0.7. Additionally, the average variance extraction is higher than 0.5. Applying the heterotrait-monotrait (HTMT) ratio establishes discriminant validity (Ghasemy et al., 2020). Discriminant validity under HTMT ratio is less than 0.85 as per the details shown Table IV

Table IV
HTMT Ratio

	Convenience	**E-grocery shopping behaviour**	**Service Quality**	**Social Factors**
Convenience				
E-grocery shopping behaviour	0.7			
Service Quality	0.7	0.7		
Social Factors	0.7	0.5	0.6	

In Table V, Variance Inflation Factor is below 5 so no collinearity exists among the predictors in the structural model. It is clearly seen from the below table that H1 and H2 are true highlighting that convenience and service quality have effect on the e-grocery shopping behaviour based on path coefficient.

Table V

Hypothesis Testing and Results

Hypothesis	Relationship	Beta	t-value	95% CI	R2	Results	Variance Inflation Factor (VIF)
H1	Convenience & E-Grocery Shopping Behaviour	0.3	4.063	(0.18, 0.53)	0.53	TRUE	2
H2	Service Quality & E-Grocery Shopping Behaviour	0.4	5.495	(0.28, 0.56)	0.55	TRUE	1.7
H3	Social Factors & E-Grocery Shopping Behaviour	0	0.49	(-0.16, 0.2)	0.2	FALSE	1.7
H4	Artificial Intelligence & E-Grocery Shopping Behaviour	0.6	7.023	(0.45, 0.82)	0.42	TRUE	1.8

Another hypothesis testing was done to check the relationship between artificial intelligence and customers behaviour for assessing the service quality parameter. Results are shown in the Table VI below.

Table VI

Relationship between artificial intelligence and customer behaviour

		Secured Payment Gateway	Service reliability
Secured Payment Gateway	Pearson Correlation (2- tailed)	1	0.94
	Covariance	1.59	1.72
	N	220	220
Service reliability	Pearson Correlation (2- tailed)	0.94	1
	Covariance	1.7	2.12
	N	220	220

VII. Discussion

Since H1 is True that means that people want to relax at home and get the groceries delivered at home by ordering online. People are too busy in their jobs as Noida is a hub of professionals and start-ups. Majority of the consumers are young and are tech-savvy which supports even the previous research papers published (Sulastri et al., 2017). This also highlights that this younger generation and working professionals have limited time and want to avoid queueing or traffic hassle. This also proves that people are more comfortable with the web user interface and prefer to do online grocery shopping.

H2 is True that supports the quality of the products delivered, user web interface, ease in returns and refunds etc. are some of the factors that contribute towards e-grocery shopping behaviour of the customers of Noida. This also reveals that the people are accepting the technology and are preferring to use websites/ specific grocery applications. Customers trust the return/refund process and safe payment gateway of the online grocery delivery companies.

H3 is false showing that there is no positive impact corresponding to social factors. One of the reasons could be because of the working professionals who are having less time to do physical shopping for the groceries and take out time friendly and economical ways of ordering groceries. With the advancement of the internet, all the individuals of Noida are equipped with smart mobile phones and due to pandemic, contactless deliveries and payments were at boom, leading to larger population adapted to online shopping. Thus, having lower impact of social factors.

H4 is True which proves that artificial intelligence has increased the usage of online grocery shopping. Grocery applications ask for the preferences, food habits etc. of the consumers when they sign up for the purchase, this helps the particular application to use smart algorithms for predicting the future needs of the customer. So, the grocery applications can further advance their algorithms adapting to new technological advancements of artificial intelligence.

VIII. Conclusion

The objective of the study was to analyse whether convenience, social factors and service quality contribute towards the e-grocery shopping behaviour among consumers in Noida. Service quality contributes

maximum in determining the behaviour of the customers whereas social factors prove to be not a significant factor in determining the behaviour of the Noida consumers towards e-grocery shopping.

Service excellence proves to be a major concern among the consumers where they wish to have flexibility in timing, safe payment gateway, easy user interface of the website, and ease in returns and refunds. Service excellence includes AI powered services that can win the loyalty of the customers. AI can bring personalized fun experience to the user apart from convenience so indeed it opens the doors for marketing agencies to come into play for enhancing the web user experience.

As per the results of Table VI, Pearson correlation value (0.94) is less than 1 so we conclude that Artificial Intelligence plays a significant role in determining customer behaviour through reliable payment gateways making it secure and trustable by reducing online threats. Ease in web-user interface and one click ordering has stressed on the usage of artificial intelligence making the mobile grocery applications, attractive, organized, efficient and user friendly as also been concluded in another research paper (MISHRA & MUKHERJEE, 2019).

IX. Limitations & Future Study

The study was carried out in the Year 2022 and the perception and behaviour of the customers may change with time. There is further scope to predict the future of online grocery shopping and a longitudinal design can be shown to highlight changes in the attitude of consumers towards online grocery shopping (Arora & Aggarwal, 2018). The study is based only upon the Noida region. Results may vary if the region changes, although for most of the metropolitan cities, findings may remain the same. More comparative study can be done across various regions in India and abroad that can give insights of the markets available and how economies of scale can be achieved by understanding the requirements and desires of the customers. There might be some biases and limitations because of the choice of the questionnaire and the data collection method used by the authors. However, based on the results, it can be concluded that the difference due to data collection is minimal.

Further, a mathematical model can be used to predict the consumers' behaviour depending upon the psychology and loyalty of the customers (Jandera & Skovranek, 2022).

The usage of online grocery shopping can be increased by making marketing strategies that are dependent on initial purchasing behaviour

incorporating the degree of experience with e-grocery system. Marketing service strategy adaptations by diversified age group of customers can be one of the targets to cater to the growing demands of the e-commerce (Piroth, Ritter, et al., 2020).

About 67% of India's population resides in rural areas that are largely unaffected by the modern retail forms (Vayola Jocelyn, 2022). So, the retailers can work further to improve customer experience by creating user friendly app interface and providing trustable delivery assurance. After the Covid pandemic, e-groceries had a great boom by around 50% (Chandra et al., n.d.). Retailers need to keep pace with the growing demands of the people. Lowering costs, minimum order requirements, enhancing quality and freshness of the perishable items will enhance e-commerce in groceries (Chandra et al., n.d.).

Technology acceptance by the customers is also one of the factors that corresponds to ordering grocery items online as only those people order online that are well-versed with the grocery application system (Bauerová & Klepek, 2018). Artificial intelligence can be implemented in online grocery sales although grocery sales are experiencing lot many logistic challenges (Vazquez-Noguerol et al., 2021b).

Customer loyalty can be tapped by retailers by providing membership schemes or coupons issued on every purchase that will be utilized for further shopping of groceries.

Internet-connected mobile devices like the smartphones, tablets, computers, smart digital watches and various mobile applications ('apps') have become ubiquitous parts of modern life, and the sales of these smart gadgets clearly indicate the inclination towards acceptance of the technology which in directly affects the e-grocery shopping as well (Doub et al., 2015). App development and digital advertising play a pivotal role in increasing the sales and choosing one app over the other for e-grocery shopping.

Augmented Reality applications can be developed by retailers that can help the customers in choosing healthier grocery options. This will enhance customer experience towards e-grocery shopping as customer can quickly select from the recommended products (Ahn et al., 2015b). Information and Communications Technology along with mobile applications can prove to be useful for e-grocery in smart cities (Tadei et al., 2016). With the launch of Chatbots and ChatGPT, artificial intelligence has opened the doors of technology to a new beginning for every field to flourish more. So, with their advancement, the popularity of online grocery shopping is going to increase manifolds.

The study can further be extended towards alternative logistics for e-grocery operations in an urban network (Leyerer et al., 2018). The online applications learn more about the attitude of the consumer depending upon the groceries ordered by them, which can be tapped for the marketing and designing innovative discounts and deals targeted over real time and can make huge profits (Chatty Garrate, 2022).

X. Compliance With Ethical Standards

Conflict of interest- The authors affirm that there is none.

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