Understanding user behaviour to use Virtual Reality in Shopping

Nermine Essawi

Assistant Professor
Business Information Systems Department
Arab Academy for Science and Technology and Maritime Transport Alexandria, Egypt
Nessawi@gmail.com

Abstract

The use of shopping online applications is increasing after the covid-19 pandemic since the users used to shop virtually instead of the physical activity. Virtual reality technology is spreading in different fields like education, government and shopping. The aim of the study is to understand the factors that affect the user behaviour to shop in the virtual reality environment is important.Since it will increase the shopping experience and reduce the cost of physical existence of customer in stores.

The model of the study was developed based on Technology Acceptance Model (TAM) and gratification theory including 7independent variables perceived usefulness, perceived ease of use, informativeness, entertainment, irritation, cost and Trustandpurchase intention in virtual realityas a dependent variable. An online questionnaire was developed with a convenient sample of317responseswere collected and analysed. The results showed that all 6hypothesized relationships were positively correlated(Perceived usefulness; Informativeness, Entertainment,Trust, and Cost) and one relationship is not

significantly correlated which is Irritation hypothesis. The results were presented, conclusions and recommendations were discussed.

Keywords: Augmented reality shopping, Shopping, Technology Acceptance, Gratification.

1. Introduction

Virtual Reality (VR) is considered as one of the important technologies in 20th Century.VR is a technology that provides practicethree-dimensional(3D)dynamic through computer simulation (Shin et al., 2019). The digitalization of all areas of human life helps the user to be engaged in the social media and the shopping applications. User Engagement increase in the existence of virtual reality (Slater, 2016; Mystakidis, 2022).

Augmented reality (AR) is a technology that improves the customerawareness anduses real world setting. Customers can control their presence in the real world (Azuma et al., 2001).Where customers in virtual reality were controlled by the system. Virtual reality is completely virtual.

Technology Acceptance model (TAM) identifies how persons use and perceive a new technology (Fatmawati, 2015; Davis 1989). TAM refers to how users can accept and use a technology. Variables that used to measure the user intention are perceived usefulness, perceived ease of use, and Trust. Previous researchers used TAM to understand the user behaviour (Davis,1989; Kumar et al., 2016 &Morotti et al.; 2020; Meyers-Levy and

Maheswaran, 1991.Meirinhos et al., 2022; Hassouneh and Brengman, 2020). Gratification theory is also used to understand the user behaviour and the selected variables are informativeness, entertainment, irritation, cost (Hsu et al. 2020).

TechnologyAcceptance model (TAM) is used to measure user acceptance towards new technologies accompanied with gratification theory (UGT). Gratification theory is used to measure the gender effect on purchase behaviour (Katz et al., 1974;Priya & Annapoorni, 2022).

Some brands make use of celebrity approvals to advertise their products and services through virtual reality stores. For example, celebrity endorsers in Pancoatbrand's in VR store help customers to choose the appropriate clothes (Yuan et al., 2022). The present study aims to identify the factors that affect customers purchase intention to use virtual reality in online shopping during COVID-19 pandemic.

2. Literature Review

Technology Acceptance model (TAM) identifies how persons use and perceive a new technology (Fatmawati, 2015). According to (Davis, 1989), TAM refers to how users can accept and use a technology. Also,it was noted that TAM is the best model to assess the use of information technology. Perceived usefulness and Perceived ease of use considered as an important factors in TAM as they affect the users attitude which leads to behavioural intentions as well as they are associated to intention to implement

Virtual Reality technology (Davis,1989; Kumar et al., 2016 &Morotti et al., 2020).

Furthermore the uses and gratification theory (UGT) is a centric approach, it is essential for recognising people's incentives for choosing media. According to (Katz et al., 1974) identifies that entertainment is an important variable for users; in other wordswhat do customers' do with the media. The joy that customers can have while shopping can be remarkably amplified by virtual reality shopping (Hsu et al. 2020).

Users in virtual reality feels as if they are engaged and behave as they exist in physical place located worldwide (Slater, 2016). Researchers have deployed Technology Acceptance model (TAM) to measure user acceptance towards shopping in virtual reality where other researchers' deployed user and gratification theory (UGT) to measure customers purchase intention towards shopping through virtual reality applications(Priya & Annapoorni, 2022).

Augmented reality is a new technology that can be adapted in virtual reality headset through presenting inputs from integrated camera sensors. So, the features of augmented realitythrough smartphones, tablets and glasses changed the online shopping users activities (Mystakidis, 2022).It allows customer to try cosmetics virtually;Anifa and Sanaji(2022)surveyed online users who bought cosmetics online using a survey questionnaire in Indonesia, they concluded that perceived ease of use had a significant effect on trust, customer experience affects customer

satisfaction. Moreover, perceived usefulness, and customer satisfaction had significant effect on repurchase intention and trust did not affect repurchase intention.

Zimmermann et al., (2022) investigated the effect of a smartphone-based augmented reality shopping assistant application, which uses personalized recommendations based on user shopping experiences. The authors did an online experiment and a survey. The results showed that augmented reality shopping assistant application affects customers' perception of brick-and-mortar shopping experiences.

Furthermore, a study done by Priya & Annapoorni (2022) used the use and gratification theory to determine customer engagement and purchase intention of customers. The results indicated that use and gratification had a positive impact on purchase intention and customer engagement.

Speicher and Cucerca(2017) conducted a case study on a Virtual Reality shop prototype. The results indicated that the usability and user experience of system is above average andvirtual reality output verified to be the best towards user performance and preference.

A study done by Lin et. al.:(2 019) identified that there is a difference between genders in e-commerce.Also, gender differ in what information they must know before choosing to purchase (Meyers-Levy and Maheswaran, 1991). Additionally, a study done by (Meirinhos et al., 2022) tested the effect of gender on users' intention to purchase with application as well as their

satisfaction. The result illustrated that gender had no effective impact on purchase intention, user satisfaction with the virtual reality experience.Althoutgh (Hassouneh and Brengman, 2020) examined role of gender in shaping the shopping behaviour on virtual products. They found that customers shopping behaviour in social virtual world appears to imitate the traditional shopping behaviour for real products in the real world.

In this study, the proposed model was constructed based on a combination of TAM and Gratification to predict the acceptance of shopping in virtual reality addition to cost and Trust variables. The significance of demographic variables (gender, age, income, education, and occupation)was also assessed regarding the model variables.

3. Research Model and Hypotheses

3.1. Overview of the Research Model

The suggested model incorporates 7independent variables namely perceived usefulness, perceived ease of use, informativeness, entertainment, irritation, cost and Trust. These variables affect purchase intention in virtual realityas a dependent variable (figure 1). Perceived ease of use and perceived usefulness are two main components in the Technology Acceptance Model (TAM) theory (Davis, 1989). Informativeness, entertainment, Irritation are powerful components in uses and gratifications theory (UGT) (Katz et al., 1973; Luo, 2002). According to (Baabdullah et al., 2022; Lee et

al., 2020; Pelletieret al., 2020; Qin, 2020) the user perception and behaviour of interactive and communication technology is explained by uses and gratifications theory. Cost and Trust variables were also added to the model. Finally, the demographic was also tested to identify whose have more intention to use virtual reality in shopping.
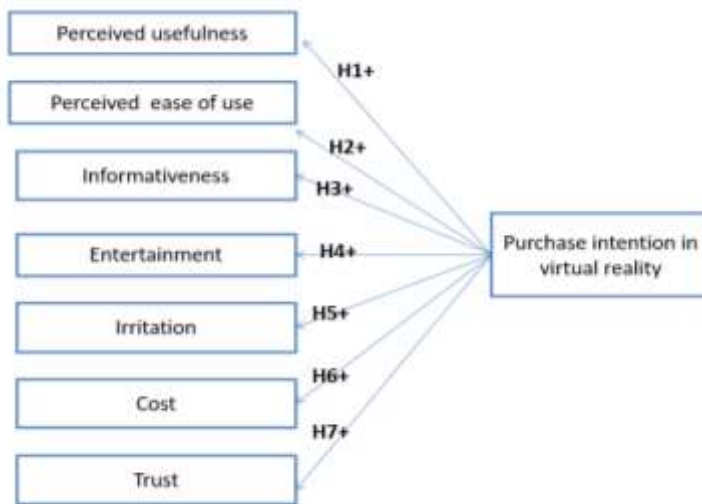

Figure 1: Research Model

3.2. Research hypotheses

A. Perceived usefulness (PU)

Perceived usefulness was referred by (Kahar et al, 2019) as the wide range of perks, services that a user observes may leads to transact in the application. Perceived usefulnessrefer to the degree that users believe inapplying a specific technology willimprove the user's performance. Davis (1989) illustratedthat

the high PU of applying a system will lead to users confidence in improving positive performance.So the user will implement a system if he believes that the system delivers the benefits needed (Purnama&Widiyanto,2012). Therefore, the hypothesis can be formulated as follow:

H1. Perceived usefulnessaffects customers purchase intention to usevirtual reality in online shopping.

 B. Perceived ease of use

Perceived ease of use (PEOU)was defined by (Davis 1989)as the users can accept using a system with lowest effort which leads to high level of confidence in system. In other words, how simple using a system or application. Also, PEOU referred to how easy and useful to use a specific site with the least effortsothe user can be motivated in using technology (Wiwoho, 2019). Where Wilson et al., (2021) explained PEOU asthe user's evaluation of using a new technology that had a positive or negative impact based on the neededefforts to learn the system. So the hypothesis can be formulated as follow:

H2. Perceived ease of use affects customers purchase intention to use virtual reality in online shopping.

C. Informativeness

Informativeness refers to the degree where the user receives usefulness and helpful information from media (Chen and Wells, 1999; Ducoffe, 1995). According to (Capgemini, 2020; Central Statistics Office, 2020; StatistischesBundesamt, 2020) the main reason that users use internet is collecting information about products and services. Therefore the hypothesis can be formulated as follow:

H3. Informativeness affects customers purchase intention to use virtual reality in online shopping.

D. Entertainment

Entertainment refers to thedegree to which media is enjoyable and amusing for users to fill the need for entertainment, amusement, dream and relief (Ducoffe, 1996; Luo, 2002).Users are prompted to utilize certain media more frequently than others if they have a higher enjoyment value. So,this will motivate their purchase decision(Huang, 2008).So the following hypothesis is suggested as follow:

H4. Entertainment affects customers purchase intention to use virtual reality in online shopping.

E. Irritation

Irritation refers to the degree to which media annoy users in terms of frustrating, aggressive, complex design choices (Chen and Wells, 1999; Ducoffe, 1996).Ducoffe (1996) identifies that annoying ads increase user worries, which results in dilute user shopping experience. As well as (Hausman and Siekpe, 2009) explain that disordered website leads to decrease in purchase intention and reduce value ads. So the following hypothesis can be as follows:

H5. Irritation affects customers purchase intention to use virtual reality in online shopping.

F. Trust

Trust can be referred as a realm of uncertainty overweighs the interpersonal connections to establish transaction value exceeds product expectations based on user perceptions (Anifa and Sanaji, 2022). As a result, there is an imbalance in the degree of trust needed to tolerate user expectation (Subagio et al., 2018).Febriani&Ardani(2021) explain trust as user believes in the organization, as well as quality of products during online transactions. Also user's confidence in meeting expectations by supplier who motivate them to accomplish their transactions online (Ali, 2016).

Trust is considered as a variable in purchase intention in using an online application so risk and delay will be reduced by customers (Afshan& Sharif, 2016).According to (Chopra and Wallace, 2003; Papadopoulou and Nikolaidou, 2010) trust can be defined

as the degree of information reliability of acquired like the data accuracy and information quality while using online service. Therefore the following hypothesis is suggested.

H6. Trust affects customers purchase intention to use virtual reality in online shopping.

G. Cost

Cost is referred to the amount to be paid to have something. Cost is considered as a vital variable when buying goods or service whether it is brick and mortar or using application. According to (Venkatesh et al., 2012) there is a relationship between the cost and the benefits that the user receives. Sothe following hypothesis is suggested as follow:

H7. Cost affects purchase intention in virtual reality.

H. Purchase Intention

Purchase intention is referred to the willingness of customer to buy goods and services (Armitage and Christian, 2003). The intention is a significant factor of implementation and actual usage of a system while applying on TAM (Turner et al., 2010).Purchase intention is dependent variable in the suggested model.

4. Research Methods

4.1. Development of Instruments

An online questionnaire was developed adopted from existing literature and refined based on the specific topic of this study.The questionnaire consisted of 29 items. All items in the survey were measured using a five-point Likert scale ranging from (1) strongly agree to (5) strongly disagree. The demographic characteristics of user was added namely age, gender education, occupation, and income to find whether there is a significant different among users' demographics with respect to independent and dependent variables. Past research also showed that moderators of age, gender, and income play a substantial role in predicting users' acceptance of technology (Sharma et al., 2013).

A statistical analysis for this study was done using the Statistical Package for Social Science (SPSS) software. Reliability analysis Cronbach alpha was conducted to measure the reliability of factors that affect customers' purchase intention to usevirtual reality in online shopping. the social construct could be considered reliable whenever Cronbach Alpha coefficient is 0.45 or more(Nunnally,1967). The conceptual and operational definitions of variables are shown in Table (1).

Table 1: Conceptual and Operational Definitions of the variables under study:

Variables under study	Conceptual definition	Operational definition
Perceived usefulness	Perceived usefulness refers to the degree to which a customer believes that using a system could improve his job(Davis et al., 1989)	Adopted from Zimmermann et al., (2022)
Perceived ease of use	perceived ease of use refers to the degree of trust in using a system without requiring a lot of effort consequently customers accept it (Daviset al., 1989).	Adopted fromPutri &Iriani, 2021
Entertainment	Entertainment refers to the degree to which the media is exciting and entertainment for customers to satisfying their need (Ducoffe, 1996; Luo, 2002).	Adopted from Zimmermann et al., (2022)
Informativeness	Informativeness refers to the degree to which media deliverbeneficial information to customers (Chen and Wells, 1999; Ducoffe, 1995)	Adopted from Zimmermann et al., (2022)
Irritation	Irritation refers to the degree to which using media upsetscustomers (Chen and Wells, 1999; Ducoffe, 1996).	Adopted from Zimmermann et al., (2022)
Trust	Trustrefers to customers trust in merchants who satisfies their expectations to promote them to complete online transactions(Ali, 2016).	Adopted from Zimmermann et al., (2022)
Cost	Cost refers to the amount of money paid in order to have something (Venkatesh et al., 2012)	Adopted from Venkatesh et al., 2012
Purchase Intention	Degree to which users intend to adopt the technology or increase their use of it in the future Liaw,2008; Ngai et al., 2007; Van Raaij&Schepers, 2008)	Adopted from Zimmermann et al., (2022)

4.2. The Developed Questionnaire

The questionnaire used in this survey was divided into 8 constructs based on the research variables as shown in table 2.

Table 2: List of Survey Statements / Items by Construct

Statement(s)	Related studies
Usefulness	
1. Virtual reality can improve my shopping performance.	Anifa&Sanaji, 2002, Liu &Napitupulu, 2020; Putri &Iriani, 2021, Hausman and Siekpe, 2009
2. Virtual reality can increase my shopping productivity.	
3. Virtual reality can increase my shopping effectiveness.	
Ease of use	
4. Virtual reality is easy to learn	Anifa&Sanaji,2002,Davis,1989, Putri &Iriani, 2021
5. Virtual reality is clear and understandable.	
6. Virtual reality is easy to use	
Entertainment	

7. Virtual reality is enjoyable. 8. Virtual reality is pleasing. 9. Virtual reality is entertaining.	Hausman and Siekpe, 2009
Informativeness	
10. Virtual reality offers a good source of product information. 11. Virtual reality supplies relevant information. 12. Virtual reality is informative concerning the shown products.	Hausman and Siekpe, 2009
Irritation 13. Virtual reality is annoying. 14. Virtual reality is frustrating. 15. Virtual reality is irritation.	Zimmermann et al., 2022, Hausman and Siekpe, 2009
Trust 16. I am confident in the application. I feel that it works well. 17. Virtual reality in shopping seems very reliable. 18. I feel safe that when I rely on virtual reality, I get the right information	Zimmermann et al., 2022, Hoffman, et al., 2018
`Cost 19. Shopping using Virtual reality reasonably priced. 20. Shopping using Virtual reality provide more cost than original shopping. 21. Shopping using Virtual reality are good value for money.	Venkatesh et al., 2012,
Purchase intention 22. I would definitely buy products in Virtual reality.	Zimmermann et al., (2022)

23. I wouldintend to purchase products in Virtual reality in the near future.
24. If it would exist today. It is likely that I would purchase products in Virtual reality in the near future.
25. I would expect to purchase products in Virtual reality in the near future if it would exist today.

4.3. Data collection

An anonymous online questionnaire was employed in English using Google Forms. A convenience sampling methodology was utilized (Raza et al., 2020) as the target population were from Alexandria, as it is considered a second capital of Egypt. 350 participants were invited by email, LinkedIn, and Facebook Messenger to participate in this survey. The Data collection lasted for 30 days. Of the 350 responses received, after revising and checking missing question responses, 317 responses wereconsidered valid for further analysis. Cronbach's alpha coefficient was conducted to determine the reliability of the questionnaire. The overall Cronbach's alpha coefficient showed that the scale is highly reliable, all items were equal or greater than 0.7 as shown in Table 3 (Kannan & Tan, 2005).Respondents' characteristics are presented in Table 4, where the majority of the sample were female (87.3%), 32.4% were aged above or equal40 and 60.8% are private employee. and 30.5% had a monthly income range between EGP 10,000 - EGP 15,000. Descriptive statistics showed that there is almost

increasein the rate of virtual shopping after COVID-19 pandemic.

Table 3: Cronbach's Alpha Coefficient

#	Construct	Cronbach's alpha	No. of items
1	Perceived Usefulness	0.968	3
2	Perceived ease of use	0.782	3
3	Informativeness	0.943	3
4	Entertainment	0.819	3
5	Irritation	0.802	3
6	Trust	0.972	3
7	Cost	0.931	3
8	Purchase Intention	0.933	4
	Total number of constructs' items		25

Table 4: Respondents' Profile

Attribute	Category	Frequency	Percent
Gender	Male	40	12.6%
	Female	277	87.3%
Age	18-24	51	16%
	25-30	61	19.2%
	31-39	102	32.1%
	>=40	103	32.4%
Occupation	Student	48	15.4%
	Private employee	193	60.8%
	Government employee	36	11.3%
	Entrepreneur	12	3.4%
	Other	28	8.8%
%Income	Less than 2000	45	14.19%
	2000-5000	39	12.3%

	5000-10000	54	17.3%
	10000-15000	97	30.5%
	More than 15000	82	25.8%
Total	Total	317	

4.4Testing of Hypotheses

Statistical Correlation test using SPSS software was employed to find the relationship strength between factors (Cronk, 2019). It obtained interrelationship type and direction, the intensity of relationship among factors as well.
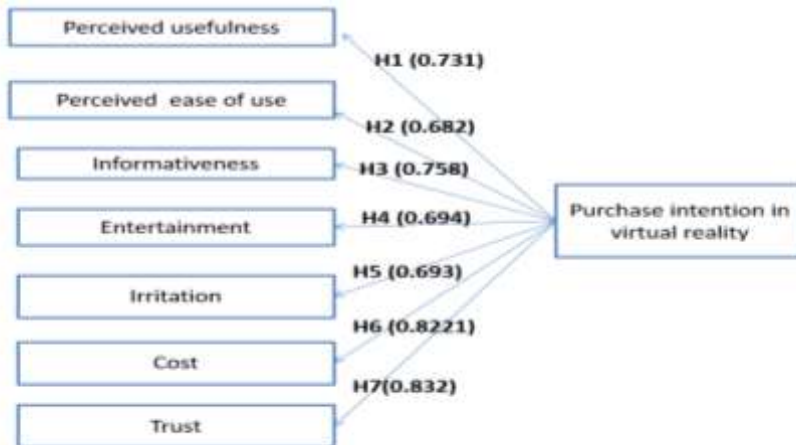
All seven hypotheses weresupported as shown in Figure 2.The results showed that Perceived usefulness has a significant positive effect on Behavioural intention (R = 0.682; P < 0.01), Informativeness has a significant positive influence on Behavioural intention (R = 0.758; P < 0.01), Entertainment has a significant positive impact on Behavioural intention (R = 0.694; P < 0.01), Irritation has a significant positive effect on

Behavioural intention (R = 0.693; P < 0.01), Trust value has also a significant positive effect on Behavioural intention (R = 0.832; P < 0.01), finally Cost has a significant positive effect on Behavioural intention (R = 0.8221; P < 0.05). Based on the results of the data analysis above, it is found that trust has the strongest influence of the behaviour in using virtual reality. While irritation value has the lowest effect on Behavioural intention of virtual reality.

In order to confirm the research aim; hypotheses were tested, it was important to test data obtained using different tests. For all questions in the questionnaire simple frequencies were derived. Chi-square test was used to test which are the main factors that affects behavioural intention. The chi-square significance tests, with value equal to 0.05 or less indicates that a dimension is significant, where we can reject the null hypothesis. On the other hand, if the value is larger than 0.05, it indicates that the result is not significant. In other words, we fail to reject the null hypothesis. The research assumes: If H0: μ1 = μ2 = μ3, accept H0 if significant of variance >0.05. If H1: μ1 ≠ μ2 ≠ μ3 accept H1 if significant of variance <0.05.

Logically and theoretically speaking, perceived usefulnessis an essential factor for virtual reality, but in order to test whether in reality, the perceived usefulness by users will affect purchase intention in virtual reality or not, chi square tests were used and the results obtained were as follows: Chi square = sig. = 0.000.

The researcher found that the value associated with the perceived usefulness is 0.000, by comparing the value to 0.05, we find that there is significant difference for perceived usefulness with purchase intention, H1 is accepted.

The researcher expectsthat perceived ease of use will not affect purchase intentionas Egypt is a developing country. In order to test thishypothesis, chi square test provided the following results: Chi square = sig. = 0.000. With these values, it has been found that the null hypothesis can be rejected andaccept H1. The interpretation is that perceived ease of use affectspurchase intention, H2 is accepted.

Gathering information for goods and service is a main reason to use internet. a chi square test is used to test this hypothesis. The results of Chi square are =sig. 0.000. With this result, it has been found that the null hypothesis can be rejected and accept H1. The interpretation is that informativeness affects purchase intention, H3 is accepted.

A higher entertainment value encourages customers to use certain media than other. To test this hypothesis a chi square test is used. The results of Chi square are =sig. 0.000. these explained, the null hypothesis can be rejected and accept H1. The interpretation is that entertainment affects purchase intention. H4 is accepted.

Purchasing from disorganised websites will lead to diminish purchase intention. So, the researcher expects that irritation affects purchase intentions. A chi square test is used. The result was Chi-square = sig. 0.531.By comparing the value to 0.05, we find 0.531 is

greater than 0.05. Therefore, H1 can be rejected and accept H0. The interpretation indicated that there are other aspects that need to be considered in virtual reality. It has been found that the irritation does not affect purchase intention, H5 is rejected.

Trust is an essential factor in online transactions. A chi square test has been used. Results were obtained as follows: Chi-square for employee's perception =sig.:0.00. The value associated with trust is 0.000, so it is smaller than 0.05, therefore Ho can be rejected. It has been found that trust affect purchase intention, H6 is accepted.

When cost of purchasing goods or service through using a technology is low; so, customers are willing to adapt the application. To test whether the cost will affect purchase intention in virtual reality or not, chi square tests were used and the results obtained were as follows: Chi square = sig. = 0.000. The researcher found that the value associated with cost is 0.000, by comparing the value to 0.05, we find that thecost affects the purchase intention in virtual reality, H7 is accepted.Table (5) below illustrates the summary to the tested hypothesis.

Table (5): Summary of tested hypothesis

Hypotheses	Dependent	Independent	Chi square Results
H1: Perceived usefulness affects purchase intention in virtual reality.	Purchase intention	Perceived usefulness	Accepted

H2: Perceived ease of use affects purchase intention in virtual reality.	Purchase intention	ease of use	Accepted
H3:Informativeness affects purchase intention in virtual reality.	Purchase intention	Informativeness	Accepted
H4:Entertainment affects purchase intention in virtual reality.	Purchase intention	Entertainment	Accepted
H5:Irritation affects purchase intention in virtual reality.	Purchase intention	Irritation	Not accepted, Irritation a purchase intention since value more than 0.05
H6:Trust affects purchase intention in virtual reality.	Purchase intention	Trust	Accepted
H7:Cost affects purchase intention in virtual reality.	Purchase intention	Cost	Accepted

5. Conclusion and Discussion

5.1. Conclusion

Results approved the acceptance of six hypotheses and reject one hypothesis, which proved that the research model is appropriate to explain the factors of purchase intention in virtual reality in Egypt during. Trust (H7)had the highest significant positive effect on users'of purchase intention in virtual reality. This highlighted that the accuracy and information quality of online shopping are vital to purchase intention. This finding was consistent with (Chen et al., 2019, Gefen et al., 2003, Kim and

Peterson, 2017& Priya & Annapoorni, 2022) who found that trust has a strong and positive influence on purchase intention in virtual reality. Since trust had the most significant positive effect on users' purchase intention in virtual reality. Accordingly, developers must seek to increase the level of trust by providing more accurate and trustworthy information and offer sophisticated systems to protect customer' information.

The second largest significant impact on users' purchase intentions in virtual reality is cost (H6). The results are in line with other study(Alpay et al., 2010 &Thusi and Maduk, 2020). This study confirms a positive and a significant relationship of cost with users' intention to adopt online system. Since cost was proved to have a great influence on purchase intention, thus, developers should promote to decrease the expenses that consumers have to bear to use virtual reality technology Additionally, marketers should motivate loyal users to add their friends and family members and award them by providing offers and discount coupons.

Furthermore, informativeness was found to be an important factor that impact users' purchase intention in virtual reality (H3). This result is well matched with previous studies (Priya & Annapoorni, 2022). This indicates that the information available in online shopping are significant and attractive which encourage them to purchase.

Research findings showed that Perceived usefulness (H1) has a positive effect on purchase intention in virtual reality. This result was consistent with to majority of previous studies, (Anifa, & Sanaji,2002, Puspitasari, &Briliana, 2018)). This proved the importance of minimal effort to access virtual reality; in other word thesimplest ways to access virtual reality will promote users to repurchase.

Furthermore, perceived ease of use (H2) had a significant impact on purchase intention in virtual reality.This supported by previous studies (Keni, 2020, Anifa, &Sanaji,2002&Aditya &Wardhana, 2016).This explains that the customer will repurchase the product or service if there is a clear perception of ease of use of technology free form obstacles when working;which will increase the trust. The more the customer can conduct any action with minimum effort, the more will be the purchase intention.

Also, entertainment (H4) had a positive impact on purchase intention in virtual reality. This supported by Zimmermann et al., 2022, this explains that the more the entertainment the more the customers will use the technology.

On the other hand, it was found that Irritation value (H5) has no significant impact on purchase intention in virtual reality,this result is well-matched with Zimmermann et al., 2022. So, virtual reality developers should work more on creating user friendly interface, reliable, efficient, and accessible system to enable

higher adoption rates. Finally, marketers also should focus on mid age group, with high in their marketing campaigns concerning virtual reality.

5.2. Theoretical and Empirical Contribution

This research demonstrated an extendedmodel of technology acceptance model and gratification theory in addition to two essential variables (cost and trust) to inspect the factors that determine customerpurchase intention in virtual reality COVID-19 pandemic. The proposed model was tested using Statistical Correlation test. The results showed that the 6 hypothesized relationships were all significant and 1 is insignificant.

5.3. Practical Implications

The results of this research can be used by marketers to take the opportunity and to promote more to virtual reality during Covid-19 pandemic particularly in Egypt.Virtual reality is more accessible in games , applying it in shopping will help in personalize the shopping experience. This helps stores to avoid customers cancellation of orders. As well as helps customers to take decision whether to purchase or not quickly. Also it allows customers to browse different items and fitting more by immersing customers in online shopping experience.

5.4. Future Recommendation

Sample used in this research is convenient and do not reflect the viewpoint of the entire population, as the survey was conducted in Alexandria only. For future research, this model may be

extended considering other cities in Egypt to generalize the results. Moreover, comparative analysis of developed and developing countries can be made to investigate the main difference in other cultural backgrounds. Also, other variables can be added such as cultural moderators.

References

1. Afshan, S., & Sharif, A. (2016). Acceptance of mobile banking framework in Pakistan. Telematics and Informatics, 33(2), 370–387.

2. Ali, T. (2016). Factors Deriving Consumers ' Repurchase Intention in Online Shopping : a Pakistani Consumer ' s Perspective. International Journal of Management Sciences and Business Research, 5(12), 261–270.

3. Armitage, C., & Christian, C. (2003). From attitude to behaviour: Basic and applied research on the theory of planned behaviour. Current Psychology: Developmental, Learning, Personality, Social, 22, 187–195. https://doi.org/10.1007/s12144-003-10155

4. Ali, T. (2016). Factors Deriving Consumers' Repurchase Intention in Online Shopping : a Pakistani Consumer ' s Perspective. International Journal of Management Sciences and Business Research, 5(12), 261–270.

5. Anifa, N. and Sanaji, (2002). "Augmented reality users: the effect of perceived ease of use, perceived usefulness, and customer experience on repurchase intention", Journal of Business and Management, Vol. 3 No. 3, pp. 252-274, doi: 10.47153/jbmr33.3462022

6. Aditya, R., &Wardhana, A. (2016). Pengaruh perceived usefulness dan perceived ease of use terhadapbehavioral intention denganpendekatan Technology Acceptance Model (TAM) pada pengguna Instant Messaging LINE di Indonesia. JurnalSiasatBisnis, 20(1), 24–32. https://doi.org/10.20885/jsb.vol20.iss1.art3

7. Alpay LL, Henkemans OB, Otten W, Rövekamp TA, Dumay AC. (2010). E-health applications and services for patient empowerment: Directions for best practices in The Netherlands. Telemed J E Health .16(7),787-791. http://doi.org/10.1089/tmj.2009.0156

8. Baabdullah, A.M., Alsulaimani, A.A., Allamnakhrah, A., Alalwan, A.A., Dwivedi, Y.K. and Rana, N.P. (2022), "Usage of augmented reality (AR) and development of e-learning outcomes: an empirical evaluation of students' e-learning experience", Computers and Education, Vol. 177, p. 104383, doi: 10.1016/j.compedu.2021.104383

9. Azuma, R., Baillot, Y., Feiner, S., Julier, S., & Blair, M. (2001). Recent Advances in Augmented Reality. Biomolecules, 11(2), 1–4. https://doi.org/10.3390/biom11020211

10. Capgemini (2020), "Share of global online population who say they are comfortable doing select activities online as of February 2020", Statista, available at: https://www.statista.com/statistics/ 1132228/share-offline-population-worldwide-comfort-using-internet/.

11. Central Statistics Office (2020), "Type of internet activities - CSO - Central Statistics Office", CSO, available at: https://www.cso.ie/en/releasesandpublications/ep/p-isshh/informationsocietystatistics - households2020/typeofinternetactivities/.

12. Chen, Q. and Wells, W.D. (1999), "Attitude toward the site", Journal of Advertising Research, Vol. 39 No. 5, pp. 27-38, available at: https://go.gale.com/ps/i.do?id5GALE%7CA111508662&sid5google Scholar&v52.1&it

13. Chen, Q. and Wells, W.D. (1999), "Attitude toward the site", Journal of Advertising Research, Vol. 39 No. 5, pp. 27-38, available at: https://go.gale.com/ps/i.do?id5GALE%7CA111508662&sid5 google Scholar

&v52.1&it5r&linkaccess5abs&issn500218499&p5AONE&sw5w&user GroupName5 anon~26a3659a.

14. Chopra K. and Wallace W. A., "Trust in electronicenvirnments," 36thAnnual Hawaii International Conference on System Sciences, 2003. pp. 10. doi: 10.1109/HICSS.2003.1174902.

15. Cronk, B.C., (2019). How to use SPSS: A step-by-step guide to analysis and interpretation. Pyrczak Pub. https://doi.org/10.4324/9780429340321

16. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008

17. Ducoffe, R.H. (1995), "How consumers assess the value of advertising", Journal of Current Issues and Research in Advertising, Vol. 17 No. 1, pp. 1-18, doi: 10.1080/10641734.1995.10505022.

18. Ducoffe, R.H. (1996), "Advertising value and advertising on the web", Journal of Advertising Research, Vol. 36 No. 5, pp. 21-32, available at: https://slidelegend.com/advertising-value-and-advertisingon-the-web-blog-management_5a85ffde1723dd53ce733391.html

19. Fatmawati, E. (2015). Technology Acceptance Model (TAM) untukMenganalisisSistemInformasiPerpustakaan. Iqra': JurnalPerpustakaan Dan Informasi, 9(1), 1–13. http://jurnal.uinsu.ac.id/index.php/iqra/article/view/66

20. Febriani, N. M. A., &Ardani, I. K. S. A. (2021). The Influence of Customer Experience, Ease of Use, and Trust on Repurchase Intention (Case Study of Tokopedia Consumers in Denpasar). Ajhssr.Com, 2, 378–383. https://www.ajhssr.com/wpcontent/uploads/2021/02/ZR2152378383.pdf

21. Gefen, D., Krahanna, E. and Straub, D.W. (2003), "Trust and TAM in online shopping: an integrated model", MIS Quarterly, Vol. 27 No. 1, p. 51, doi: 10.2307/30036519.

22. Hausman, A.V. and Siekpe, J.S. (2009), "The effect of web interface features on consumer online purchase intentions", Journal of Business Research, Vol. 62 No. 1, pp. 5-13, doi: 10.1016/j.jbusres.2008.01.018.

23. Hassouneh, d., Brengman, m., (2018). "Shopping for virtual products in social virtual worlds: does user gender matter?". 11th International conference on business, education, humanities and social sciences studies.
https://www.researchgate.net/publication/343127249_Shopping_for_Virtual_Products_in_Social_Virtual_Worlds_Does_User_Gender_Matter

24. Hoffman, R.R., Mueller, S.T., Klein, G. and Litman, J. (2018), "Metrics for explainable AI: challenges and prospects", available at: http://arxiv.org/abs/1812.04608.

25. Hsu, W. C., Chen, P. H., & Chen, C. Y. (2020). An Exploration of the Impact of Virtual Reality Interfaces on Online Shopping. Information Resources Management Journal, 33 (2), 19–39.

26. Huang, E. (2008), "Use and gratification in e-consumers", Internet Research, Vol. 18 No. 4, pp. 405-426, doi: 10.1108/10662240810897817.

27. Kahar, A., Wardi, Y., &Patrisia, D. (2019). The Influence of Perceived of Usefulness, Perceived Ease of Use, and Perceived Security on Repurchase Intention at Tokopedia.com. 64, 429–438. https://doi.org/10.2991/piceeba2-18.2019.20

28. Kannan, V. R., & Tan, K. C. (2005). Just in time, total quality management, and supply chain management: Understanding their linkages and impact on business performance. Omega, 33(2), 153–162. https://doi.org/10.1016/j.omega.2004.03.012.

29. Kim, Y. and Peterson, R.A. (2017), "A meta-analysis of online trust relationships in E-commerce", Journal of Interactive Marketing, Vol. 38, pp. 44-54, doi: 10.1016/j.intmar.2017.01.001

30. Kumar, A., Sikdar, P., &Alam, M. M. (2016). E-retail adoption in emerging markets: Applicability of an integrated Trust and Technology Acceptance Model. International Journal of E-Business Research, 12(3), 44–67. https://doi.org/10.4018/IJEBR.2016070104

31. Katz, E., Blumler, J.G., Gurevitch, M., 1974. Utilization of mass communication by the individual. In: Blumler, J.G., Katz, E. (Eds.), The Uses of Mass Communication: Current Perspectives on Gratifications Research. Sage, Beverly Hills, CA, pp. 19–32. https://www.worldcat.org/title/uses-of-mass-communications-current-perspectiveson-gratifications-research/oclc/1363444.

32. Katz, E., Blumler, J.G. and Gurevitch, M. (1973), "Uses and gratifications research", Public Opinion Quarterly, Vol. 37 No. 4, p. 509, doi: 10.1086/268109.

33. Keni, K. (2020). How Perceived Usefulness and Perceived Ease of Use Affecting Intent to Repurchase? JurnalManajemen, 24(3), 481. https://doi.org/10.24912/jm.v24i3.680

34. Lee, H., Jung, T.H., tom Dieck, M.C. and Chung, N. (2020), "Experiencing immersive virtual reality in museums", Information and Management, Vol. 57 No. 5, p. 103229, doi: 10.1016/j.im.2019. 103229.

35. Luo, X. (2002), "Uses and gratifications theory and E-consumer behaviors", Journal of Interactive Advertising, Vol. 2 No. 2, pp. 34-41, doi:10.1080/15252019.2002.10722060.

36. Lin, X., Featherman, M., Brooks, S. L., &Hajli, N. (2019) ''Exploring gender differences in online consumer purchase decision making: An online product presentation perspective,'' Inf. Syst. Frontiers, vol. 21, no. 5, pp. 1187–1201.

37. Liu, S., &Napitupulu, T. A. (2020). Analyzing factors affecting satisfaction and purchase intention towards mobile augmented reality e-

commerce applications in Indonesia. Journal of Theoretical and Applied Information Technology, 98(22), 3503– 3517

38. Liaw, S. S. (2008). Investigating students" perceived satisfaction, behavioral intention, and effectiveness of e-learning: A case study of the blackboard system. Computers and Education, 51 (2), 864–873.

39. Meyers-Levy, J., & Maheswaran, D ,(1991)''Exploring differences in males' and females' processing strategies'' J. Consum. Res., vol. 18, no. 1, pp. 63–70.

40. Meirinhos, g., Goncalves, g., Melo, m.,andBessa, m.," Using VR to demonstrate and promote products: the effect of gender, product contextualization and presence on purchase intention and user satisfaction". IEEE Acess, vol. 10, https://creativecommons.org/licenses/by/4.0/

41. Morotti, E., Donatiello, L., &Marfia, G. (2020). "Fostering fashion retail experiences through virtual reality and voice assistants", In Proceedings of the 2020 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW), IEEE.

42. Mystakidis, S. (2022)
Encyclopedia , 2(1),486497; https://doi.org/10.3390/encyclopedia2010031

43. Ngai, E. W. T., Poon, J. K. L., & Chan, Y. H. C. (2007). Empirical examination of the adoption of WebCT using TAM. Computers and Education, 48 (2), 250–267.

44. Nunnally, J. (1967), Psychometric Theory, N.y.: Mc Graw-Hill book company, pp. 241 Ortega, B. Martinez, J. and De Hoyos, M. (2007), ―An analysis of web navigability in Spanish internet banking‖, Journal of Internet banking and commerce, Vol. 3, No 2.

45. Putri, R. R. S., &Iriani, S. S. (2021). Pengaruh Perceived Ease of Use dan Perceived Usefulness Terhadap Keputusan PenggunaanAplikasi

Tokopedia Melalui Trust SebagaiVariabel Intervening. JurnalIlmuManajemen, 9(2), 708–722.

46. Papadopoulou P., Nikolaidou M. and Martakos D. (2010) "What Is Trust in E-Government? A Proposed Typology," 43rd Hawaii International Conference on System Sciences, 1-10, doi: 10.1109/HICSS.2010.49.

47. Pelletier, M.J., Krallman, A., Adams, F.G. and Hancock, T. (2020), "One size doesn't fit all: a uses and gratifications analysis of social media platforms", Journal of Research in Interactive Marketing, Vol. 14 No. 2, pp. 269-284, doi: 10.1108/JRIM-10-2019-0159.

48. Purnama, C. A., &Widiyanto, I. (2012). StudiTentangMinatBeli E-Toll Card Di Kota Semarang. 1, 1–11.

49. Putri, R. R. S., &Iriani, S. S. (2021). Pengaruh Perceived Ease of Use dan Perceived Usefulness Terhadap Keputusan PenggunaanAplikasi Tokopedia Melalui Trust SebagaiVariabel Intervening. JurnalIlmuManajemen, 9(2), 708–722

50. Priya, D. V., & Annapoorni, M. (2022). Impact of use & gratification theory and user generated content on purchase intention. International Journal of Health Sciences, 6(S3), 1274–1282. https://doi.org/10.53730/ijhs.v6nS3.5278

51. Puspitasari, I., &Briliana, V. (2018). Pengaruh Perceived Ease-of-Use, Perceived Usefulness, Trust Dan Perceived Enjoyment Terhadap Repurchase Intention (StudiKasus Pada Website Zalora Indonesia). JurnalBisnis Dan Akuntansi, 19(2), 171–182. https://doi.org/10.34208/jba.v19i2.270

52. Qin, Y.S. (2020), "Fostering brand–consumer interactions in social media: the role of social media uses and gratifications", Journal of Research in Interactive Marketing, Vol. 14 No. 3, pp. 337-354, doi: 10.1108/JRIM-08-2019-0138.

53. Raza, S.A.,Qazi, W., Umer, B., & Khan, K. A.kram (2020). Influence of Social Networking Sites on Life Satisfaction among University Students: A Mediating Role of Social Benefit andSocial Overload, Health Education, 120 (2), 141-164, Emerald Publishing Limited 0965-4283, http://DOI 10.1108/HE-07-2019-0034

54. Speicher, M., and Cucerca, S.,(2017). "VRShop: A Mobile Interactive Virtual Reality Shopping Environment Combining the Benefits of On- and Offline Shopping". Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, Vol. 1, No. 3, Article 102htt. DOI:http://doi.org/10.1145/3130967

55. Slater, M.; Sanchez-Vives, M.V. Enhancing Our Lives with Immersive Virtual Reality. Front. Robot. AI 2016, 3, 74. Mystakidis, S., (2022). "Encyclopedia",2(1), 486-497; https://doi.org/10.3390/encyclopedia2010031

56. StatistischesBundesamt (2020), "Share of internet users going online for the following activities in Germany in 2020", Statista, available at: https://www.statista.com/statistics/1188488/internetactivities-germany/.

57. Subagio, D. P. W., Mugiono, M., &Hadiwidjojo, D. (2018). Pengaruh Perceived Ease of Use Terhadap Repurchase Usefulness dan Trust SebagaiVariabelMediasi. JurnalManajemen Dan Kewirausahaan, 6(1), 35–44. https://doi.org/10.26905/jmdk.v6i1.2067

58. Shin, M., Song, S.W., Kim, S.J. and Biocca, F. (2019), "The effects of 3D sound in a 360-degree live concert video on social presence, parasocial interaction, enjoyment, and intent of financial supportive action", International Journal of Human-Computer Studies, Vol. 126, pp. 81-93, doi: 10.1016/j.ijhcs.2019.02.001

59. Turner, M., Kitchenham, B., Brereton, P., Charters, S., &Budgen, D. (2010). Does the technology acceptance model predict actual use? A

systematic literature reviews. *Information and Software Technology*, *52*(5), 463-479.

60. Thusi P. and Maduku D. (2020). South African millennials' acceptance and use of retail mobile banking apps: An integrated perspective, Computers in Human Behaviour 111 (2020) 106405. https://doi.org/10.1016/j.chb.2020.106405

61. Van Raaij, E. M., &Schepers, J. J. L. (2008). The acceptance and use of a virtual learning environment in China. Computers and Education, 50 (3), 838–852.

62. Venkatesh, V., Thong, J., & Xu, X. (2012). Consumer acceptance and use ofinformation technology: Extending the unified theory of acceptance and use oftechnology. MIS Quarterly, 36(1), 157–178. https://doi.org/10.2307/41410412

63. Venkatesh, V. and Morris, M.G. (2000), "Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior", MIS Quarterly, Vol. 24 No. 1, p. 115, doi: 10.2307/3250981.

64. Wiwoho, G. (2019). Pengaruh Perceived Usefulness Dan Perceived Ease of Use Terhadap Customer Satisfaction Dan Repurchase Intention PenggunaAplikasi Ovo. FokusBisnis : Media PengkajianManajemen Dan Akuntansi, 18(1), 53–61. https://doi.org/10.32639/fokusbisnis.v18i1.530

65. Wilson, N., Keni, K., & Tan, P. H. P. (2021). The role of perceived usefulness and perceived ease-of-use toward satisfaction and trust which influence computer consumers' loyalty in china. Gadjah Mada International Journal of Business, 23(3), 262–294. https://doi.org/10.22146/gamaijb.32106

66. Yuan, C., Wang, S., Liu, Y., &Ma, J. (2022). "Factors influencing parasocial relationship in the virtual reality shopping environment: the

moderating role of celebrity endorser dynamism". Asia Pacific Journal of Marketing and Logistics Emerald Publishing Limited 1355-5855. DOI 10.1108/APJML-06-2021-040

67. Zimmermann, R., Mora, D., Cirqueira, D., Helfert, M., Bezbradica, M., Werth, D., Weitzl, w., Riedl, R., and Auinger, A., (2022). "Enhancing brick-and-mortar store shopping experience with an augmented reality shopping assistant application using personalized recommendations and explainable artificial intelligence", Journal of Research in Interactive Marketing Emerald Publishing Limited 2040-7122 DOI 10.1108/JRIM-09-2021-0237