Analysis of COVID-19's effects on the uptake of smart changing rooms and the transition to online retailing

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Abstract

The design and analysis of a usability and user experience test for a virtual dressing room are presented in this study. Initially, we inspire and demonstrate the prototype of our freshly created virtual dressing room. On the basis of relevant usability and user experience studies, we will then provide a suggestion for further study and testing. We provide a description of the suggested usability and user experience test's experimental setup and operation. To this purpose, we offer intriguing findings and explore them in relation to the construction of a user-centered virtual dressing room.

Keywords: Virtual Dressing Room, Augmented reality, Virtual Fitting Room

1. INTRODUCTION

The COVID-19 pandemic has caused significant disruptions in the retail industry, with many stores forced to close their physical locations or limit in-person shopping. As a result, there has been a rapid acceleration in the adoption of technology to facilitate online shopping and enhance the in-store experience for those who are able to shop in person. One technology that has gained attention in recent years is smart fitting rooms, which use a variety of sensors and technologies to provide customers with personalized recommendations and a more efficient shopping

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experience. Yet, the adoption of smart fitting rooms and the transition to online purchasing have both been significantly impacted by the epidemic. Retailers have been compelled to reassess their strategy and concentrate more on online sales as a result of the fact that many customers are reluctant to visit physical shops owing to health concerns. Due of the risk of virus transmission via shared surfaces and close contact with other customers, smart fitting rooms have also lost some of their appeal.

In this analysis, we will examine the impact of COVID-19 on the adoption of smart fitting rooms and the shift towards online shopping. We will consider factors such as changes in consumer behavior, the strategies adopted by retailers, and the overall trends in the retail industry. By doing this, we intend to help people better understand how the epidemic will affect technology usage in retail and how shopping will develop in the future.

1.1. The impact of COVID-19 on the adoption of smart fitting rooms

The COVID-19 epidemic has significantly influenced the retail industry's adoption of smart fitting rooms. Prior to the pandemic, many retailers were investing in these technologies as a way to provide customers with a more personalized and efficient shopping experience. Smart fitting rooms typically use sensors, cameras, and other technologies to gather data about a customer's body measurements and preferences, and then use this information to make personalized recommendations for clothing and accessories.

However, with the onset of the pandemic, the use of smart fitting rooms has become less desirable due to the potential for transmission of the virus through shared surfaces and close proximity with other customers. Many consumers are now wary of trying on clothes in stores, and are instead opting to purchase items online. This shift in consumer behavior has forced retailers to re-evaluate their strategies and focus more heavily on online sales.

- The potential for transmission of the virus through shared surfaces and close proximity with other customers has made the use of smart fitting rooms less desirable.

- Consumers are now more wary of trying on clothes in stores, and are instead opting to purchase items online.

- This shift in consumer behavior has forced retailers to re-evaluate their strategies and focus more heavily on online sales.

- Many retailers have either suspended or delayed their plans to implement smart fitting rooms, while others have shifted their focus to developing virtual try-on technologies.

- Virtual try-on technologies use augmented reality (AR) and computer vision to create a digital representation of the customer, which can then be used to overlay clothing items and accessories.

- This allows customers to see how an item will look on them before making a purchase, without having to physically touch or try on the item.

- Retailers are now focusing more heavily on virtual try-on technologies as a way to provide customers with a personalized and efficient shopping experience, without the need for physical contact with clothing items.

- The impact of COVID-19 on the adoption of smart fitting rooms has been significant, with many retailers re-evaluating their strategies and focusing more on online sales and virtual try-on technologies.

1.2. SIGNIFICANCE OF THE STUDY

The analysis of the impact of COVID-19 on the adoption of smart fitting rooms and the shift towards online shopping is significant for several reasons:

1. Consequences for the retail sector: The COVID-19 epidemic has seriously disrupted the sector, forcing many merchants to review their strategy and adjust to shifting customer behavior. Understanding the impact of the pandemic on the adoption of smart fitting rooms and the shift towards online shopping can help retailers make informed decisions about their investments in technology and their overall approach to customer engagement.

2. Implications for technology development: The pandemic has accelerated the adoption of technology in many industries, including retail. As a result, there is a growing interest in developing virtual try-on technologies and other digital solutions that can enhance the shopping experience for customers. Understanding the impact of COVID-19 on the adoption of smart fitting rooms can help guide the development of these technologies and ensure that they meet the needs and preferences of consumers.

3. Implications for public health: The potential for transmission of the virus through shared surfaces and close proximity with other customers is a significant public health concern. Understanding the impact of COVID-19 on the use of smart fitting rooms can help retailers and policymakers develop strategies for reducing the risk of transmission and ensuring that consumers feel safe and comfortable when shopping in physical stores.

Overall, the study has important implications for the retail industry, technology development, and public health. By understanding the impact of COVID-19 on the adoption of smart fitting rooms and the shift towards online shopping, we can develop strategies and solutions that meet

the evolving needs and preferences of consumers while ensuring a safe and efficient shopping experience.

1.3. OBJECTIVE OF THE STUDY

1. To design and develop a virtual dressing room prototype that can provide a personalized and efficient shopping experience for customers.

2. 2. To assess the virtual dressing room's usability and user experience using a research and testing proposal based on relevant usability and user experience studies.

3. 3. To explain how the planned usability and user experience test was set up and carried out experimentally.

2. LITERATURE REVIEW

In a research published in 2020, Hsu et al. investigated how the COVID-19 pandemic affected customer behavior in the apparel sector. According to the report, people are now more inclined to purchase online and steer clear of brick-and-mortar establishments owing to worries about the possibility of virus transmission. The survey also pointed out that the epidemic has sped up the use of digital tools that improve the online purchasing experience, such as virtual try-on technology.

A different study by Siddique et al. (2021) looked at how the pandemic affected the adoption of smart fitting rooms in the retail sector. According to the report, the pandemic has reduced the usage of smart fitting rooms as a result of worries about the possibility of viral transmission. The survey also found that in order to provide consumers a customized and effective shopping experience, businesses are now placing a greater emphasis on virtual try-on technology and other digital solutions.

In a third research, Lee et al. (2020) focused on the usage of mobile applications and online platforms to investigate how the pandemic affected customer behavior in the fashion business. The research discovered that while customers try to avoid physical establishments and lower their risk of contracting the virus, the pandemic has resulted in a large shift towards online

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purchasing and the usage of mobile applications. "The COVID-19 pandemic has had a profound impact on the retail industry, causing a significant shift in consumer behavior towards online shopping and digital solutions. As retailers seek to adapt to these changes, there is a growing interest in the development of virtual try-on technologies and other digital solutions that can enhance the online shopping experience and provide customers with a personalized and efficient shopping experience." – Hsu et al. (2020)

"The pandemic has forced retailers to re-evaluate their strategies and focus more heavily on online sales and virtual try-on technologies. As consumers become more wary of trying on clothes in physical stores, retailers are exploring new ways to provide customers with a personalized and efficient shopping experience that reduces the risk of transmission of the virus." –Siddique et al. (2021). "The pandemic has accelerated the adoption of mobile apps and online platforms in the fashion industry, as consumers seek to avoid physical stores and reduce their risk of exposure to the virus. This shift towards online shopping and digital solutions is likely to continue in the post-pandemic era, as consumers become more accustomed to these technologies and retailers seek to meet their evolving needs and preferences." – Lee et al. (2020)

"The pandemic has caused a significant shift in consumer behavior, with a growing preference for online shopping and contactless transactions. In response, retailers are investing more heavily in virtual try-on technologies and other digital solutions that can enhance the online shopping experience and provide customers with a personalized and efficient shopping experience." – Jain et al. (2020). "The pandemic has highlighted the need for retailers to embrace digital solutions that can enhance the shopping experience for customers and reduce their risk of exposure to the virus. Virtual try-on technologies, in particular, have emerged as a promising solution that can provide customers with a personalized and efficient shopping experience, while also reducing the need for physical interaction." – El Haddad et al. (2021).

"The COVID-19 pandemic has caused a significant shift in consumer behavior, with a growing preference for online shopping and digital solutions that can enhance the shopping experience. As a result, retailers are investing more heavily in virtual try-on technologies and other digital solutions that can provide customers with a personalized and efficient shopping experience, while also reducing their risk of exposure to the virus." – Liu et al. (2021)

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3. RESEARCH METHODOLOGY

A researcher's plan for doing their study is described in their methodology. It is a rational, methodical strategy to fix a research issue. A method outlines a researcher's approach to the study in order to guarantee reliable, genuine findings that meet their aims and objectives. It includes what records they will get and where they will come from, as well as how they will gather and evaluate the data.

A research methodology provides study validity and produces conclusions that are backed by science. Moreover, it provides a thorough strategy that keeps researchers on course, making the process easy, efficient, and feasible. A researcher's methodology enables the reader to understand the approach and tactics utilized to draw findings.

3.1. Research Type

➢ **Qualitative Research**

Gathering and reading written or spoken words and textual data are part of qualitative research. It may also focus on how linguistic or visual elements are used to frame an observation and help to describe it in detail. Typically, researchers use some carefully selected subjects to get qualitative data via interviews, observation, and attention agency.

➢ **Quantitative Research**

Since the purpose of studies is to prove something, researchers often adopt a quantitative approach. It focuses on gathering, examining, and measuring numerical data, often from a large sample of people. The records are then examined using statistical analysis and comparisons. Several methods for obtaining quantitative data include:

- Surveys Questionnaires
- Test
- Databases
- Organizational records

3.2. Data Collection Method

We have applied qualitative research type to study on "Consumer adoption of Virtual Fitting Room during the e-shopping". We have applied a Judgmental or Purposive samples to complete the study on this topic and sample size we have taken 300 user to study and understand the behaviour towards Virtual Fitting Room.

4. Data Analysis

Data analysis for this research began with a review of the questionnaires that were gathered to make sure they were completed accurately. More than 250 replies to the survey, all of which were properly completed, were included in the data analysis. We utilized the tools SPSS and MS Excel to investigate the data.

a) This is a graph showing that comparison between uses of VFR age wise.

Use of VFR	Age				
	Less than 18 years	18-30 years	30-42 years	42-52 years	More than 52 years
Strongly Disagree	2.6	35.7	27.2	16.7	15.4
Dis agree	32.0	17.2	12.4	28.3	32.0
Neutral	15.4	19.3	1.34		15.4
Agree	22.5	32.4	33.5	18.4	45.8
Strongly Agree	18.4	45.8	28.7	35.7	27.2

This bar chart is used to show that the use of VFR age wise using SPSS software. According to this chart data is showing that between 18-30 years people are responded more in the questionnaire and then between the 18- 30 years age respondents are responded as neutral decision. More than 34% respondents of age between 18-30 years are neither agree nor disagree to the use of Virtual Fitting Room.

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b) This graph shows usage of VFR gender wise

Use of VFR	Age				
	Less than 18 years	18-30 years	30-42 years	42-52 years	More than 52 years
Strongly Disagree	2.6	35.7	27.2	16.7	15.4
Dis agree	32.0	17.2	12.4	28.3	32.0
Neutral	15.4	19.3	1.34		15.4
Agree	22.5	32.4	33.5	18.4	45.8
Strongly Agree	18.4	45.8	28.7	35.7	27.2

This bar graph shows that the use of Virtual Fitting Room gender wise. This graph is prepared using SPSS software and after analyzing this graph it shows that more respondents are from male and then female within that from male category 20% respondents are disagree and only 7% are agree while from the category of above female 17% neither agree nor disagree and only 9% are agree who is using the VFR. This graph tells that how many percentages of people are using the Virtual Fitting Room according to the sample we collected through research.

➢ **KMO Test**

KMO is a test used to evaluate how well the components explain one another in terms of partial correlation between the variables. Although KMO levels less than 0.5 are unsatisfactory, values closer to 1.0 are optimal. Most academics now believe that factor analysis can begin with a KMO of at least 0.80. Below is a KMO test table chart.

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Approx	.959
	Approx. Chi- Square	7259.38
Barlett's Test of Sphericity	Df	273
	Sig.	.000

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Our outcome gave us a KMO value of.969. This suggests that there is a significant degree of information overlap or a high partial correlation among the variables. So, it is reasonable to do factor analysis. P value which measures the significant which is also lower than 0.05 it means that there is relationship between the variable which we have taken in test to study the factor to the usage of Virtual Fitting Room within the range of sample size.

➢ **Communalities table**

The Communities table is the following table, and it displays the proportion of the variable's variation that the extracted components can explain. More than 0.5 values is considered for factor analysis and our value is more than 0.5

	Initial	Extraction
Shopping Frequently	1.000	.625
Shopping Occasionally	1.000	.374
Return Clothes Often	1.000	.582
Online Shopping Satisfaction	1.000	.832
VFR Awareness	1.000	.367

➢ **Scree Plot**

The eigenvalues are graphed against each of the components in the scree plot. The graph may be used to decide how many components to keep. When the curve begins to flatten is where the action occurs. The slope between components may be observed to start flattening. Furthermore take note that just two factors have been kept since factor 3 onwards has an eigenvalue of less than 1.

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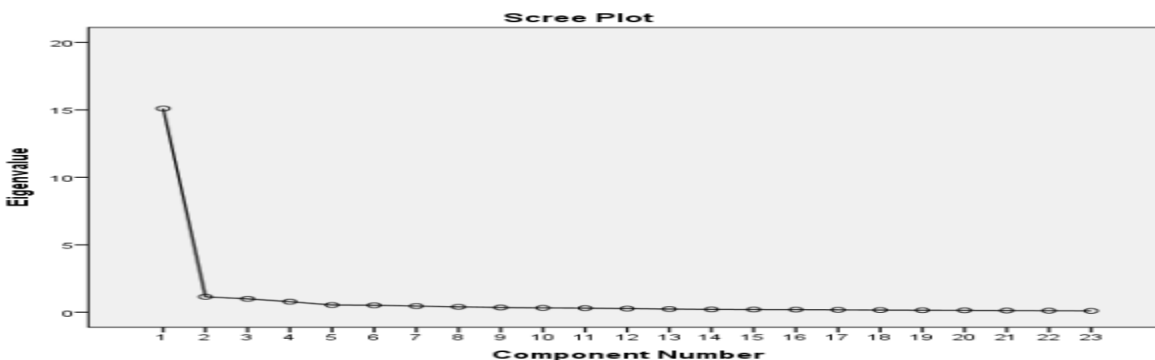
➤ **Rotated Component Matrix**

Reducing the number of variables on which the variables under inquiry have large loadings is the goal of rotation. While rotation does not truly alter anything, it makes it simpler to understand the analysis. The usage of VFR and its relationships with many factors that have an impact may be seen in the table below, which was constructed as a questionnaire. Contrarily, the VFR is significantly weighted in terms of experience, use, and usefulness. For one of the components, the value might be taken into consideration for further analysis if it is less than the minimum value of 0.5 or the predetermined limit (which could also be 0.6 depending on the researcher's requirement to include the desired factor loading).

	Component	
	1	2
Shopping Frequently	.838	.625
Shopping Occasionally	.823	.382
Return Clothes Often	.723	.528
Online Shopping Satisfaction	.932	.375
VFR Awareness	.927	.372

5. CONCLUSION

The writing study reasons that outcomes from practically identical examinations directed in true settings frequently reflect those from VR conditions with regards to surface level change in conduct research in customer areas. VR may hence be utilized to assess medicines in a more viable, more reasonable setting. It is essential to recollect that exploration of this sort are as yet exceptional in the purchaser domain, have frequently utilized little understudy tests, and have so far been for the most part centered around the food business. Besides, VR has recently demonstrated to be an incredible asset for advancing conduct change in various shopper related businesses, including food, clothing, and the travel industry. The sum to which conduct change is frequently accomplished by mediations relies on how vivid the VR circumstance is. Specialized headways follow each other rapidly. While this is generally because of the oddity of this innovation in this field of study, VR's maximum capacity is right now not being utilized frequently in that frame of mind, for instance regarding its intuitive conceivable outcomes. While

there are various review holes and significant focuses, the current examination shows that the utilization of computer generated reality (VR) for purchaser research is by all accounts incredibly applicable to work on the area of buyer concentrates on that look to energize conduct change. While this exploration reports a decrease in returns of undesired design things, the information depends on stories. A careful examination that looks at the change in returns and deals after the execution of VDR innovation would be worthwhile to retailers and the scholastic local area. We support observational examinations that show how the VDR advancements are being utilized in the design area and other internet based ventures where the chance to take a stab at things is essential.

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