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Revolutionizing visual merchandising: A study on the acceptance of digital signage in Indian fashion apparel stores

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Abstract

Competition and evolving customers motivate fashion apparel retailers to adopt new survival strategies and provide a memorable experience. This study investigates the acceptance of digital signage among Generation Z. The researchers surveyed 254 participants on the most noticeable change from traditional signage to digital signage. Based on the significant change, the adoption of digital signage was studied using the extended UTAUT framework with additional constructs of engagement, vividness, and relative advantage. Visual merchandisers should pay attention to the vividness of videos, ads, and promotions of fashion apparel.

Subject Classification: *C12, C83, M31.*

Keywords: *Digital signage, Fashion apparel, Retail technology, UTAUT 2, Relative advantage, Vividness, Engagement.*

1. Introduction

Fashion apparel brick-and-mortar retailers are facing the dilemma of either shutting down or evolving, primarily due to booming e-commerce which accelerated during the pandemic. The overall contribution related to online fashion apparel retailing in India was 2.4% in 2017, which reached 9.3 % in 2022 and is expected to improve to 14.3 % by 2027. On one side, where scholars are discussing: Is brick-and-mortar retailing at the threshold of the apocalypse? Conversely, online retailers like Pinklay, FabAlley, House of Pataudi, etc., are rolling out offline retail stores. In response to the challenges posed by e-commerce, fashion apparel brands are re-inventing the wheel of retail, spinning it three hundred and sixty degrees, and churning out the offline and online best practices (Gielens, 2022). In re-imaging business, brick-and-mortar retailers need to re-work their strategies. Further, the pandemic has allowed retailers to explore various engagement tools to attract individuals, especially at the pre-purchase stage. The individual identifies their needs and searches for the correct merchandise options and right information during their trip to a fashion apparel retail store. Visual merchandising provides individuals with information. Visual merchandising is a skill of merchandise presentation at its best to individuals to achieve the top line and improve the bottom line. Any retail store is incomplete without visual merchandising and is considered an essential facet of offline and online retail stores. Scholars emphasised the digital transformation of fashion apparel brick-and-mortar stores and its effect on visual merchandising. Basu et. al.,(2022). As part of the transformation journey, many fashion apparel brands- Shoppers Stop,

Arvind Fashions Ltd., Uniqlo, Marks & Spencer, and Raymond- adopted digital signages to provide information at the pre-purchase stage during the individual trip to fashion apparel retail store. We identified two gaps- the first is the theoretical gap – limited past digital signage studies capture behavioural intentions based on extended UTAUT (Kim et. al., 2021; Saini et. al., 2022). The second gap is the methodology gap – few studies have used Structural Equation Modelling. This study attempts to fill the above-mentioned gap by investigating the behavioural intentions to adopt digital signage in fashion apparel retail stores. The guiding research question is as follows: RQ: What are the main factors influencing the acceptance and adoption of digital signage as a new visual merchandising tool among Generation Z in developing countries such as India?

The study's main objective was to ascertain the determinants of behavioural intentions to use digital signages for fashion apparel retail stores. The study empirically applies extended UTAUT using variables- performance expectancy, hedonic motivation, social influence, effort expectancy, and habit with additional constructs of engagement, vividness, and relative advantage. This study has not included the constructs facilitating conditions and price value. Facilitating conditions is associated with resources and extra support to access a particular technology when encountered. However, individuals are confident about experiencing digital signage without any support. Price value means involvement of additional monetary cost, but digital signages are accessible without any additional charges in fashion brick-and-mortar stores.

2. Literature review and hypothesis formation

2.1 *Digital signages*

Digital signage displays multimedia content with LED, plasma, and LCD technologies. Scholars identified digital signage as one of the novel technologies for fashion retail stores. Varieties of text, still images, and video advertisements and information may be displayed on digital signages. Further, digital signage data can be uploaded remotely in real time. Digital signage has found space in fashion apparel brick-and-mortar retail stores like Tommy Hilfiger, lifestyle, being human, Levi's, unlimited, pantaloons, and Fabindia. In the path-to-purchase journey, customers look for digital signages that need recognition while evaluating the alternatives for merchandise in brick-and-mortar stores.

2.2 *Behavioural intentions*

Behavioural intentions refer to adopting technology in the future. The new technology can be a motivational factor that may influence an individual. For example, in past studies (Wu et. al., 2008, 2011; Yadav et. al., 2019) , behavioural intentions have been the widely used determinant of adopting diverse technologies conducted in different situations like online shopping, chatbots, mobile payment.

2.3 *Engagement*

It is defined as a display of discretionary actions by the viewers of digital signage that are either cognitive or emotional behaviour by the viewers. Past studies indicated that individuals tend to ignore or skip a video advertisement when encountered. The engagement has been widely studied in various technology settings like live streaming and instant mobile messaging. Increased engagement can create a more significant emotional association. The present study has employed media richness theory which describes how the type of media selected affects the richness of communicating information that influences behavioural outcomes. Thus, proposing the following hypothesis:

H1. Engagement is positively and significantly associated with behavioural intentions.

2.4 *Habit*

Habit can be defined as the extent to which individuals practice a certain involuntary behaviour. Prior experience using a technology reinforces the individual to display the same behaviour. Past exposure to a particular technology may foresee automatic actions. This paper focuses on college-going students (generation Z) who are digital natives. Generation Z has grown up with technology. Different types of screens: mobile phones, computers, tablets, video games, and television surround the digital natives and have the potential to make them habitual users. Habit creation is the outcome of prior frequent use of similar technology in the past, and digital natives have lived in an era in which technology is so readily accessible at such a young age. A recent study found habit as a significant indicator of behavioural intentions proposing the following hypothesis:

H2. Habit is positively and significantly associated with behavioural intentions.

2.5 *Hedonic motivation*

A scholar explained hedonic motivation as enjoyment, fun, and entertainment that individuals attain using technology. Hedonic motivation is an essential indicator in retail. A significant relationship was established between habit and behavioural intentions in a mobile health adoption study. A study highlighted that hedonic motivation was not a significant factor in behavioural intentions. Hence, the hypothesis as

H3. Hedonic motivation is positively and significantly associated with behavioural intentions.

2.6 *Social influence*

Social influence is explained as how individuals perceive the opinion of those people whom an individual considers important to adopt a technology. In the case of cashless payment, a significant relationship was found between social influence and behavioural intentions. Researchers examined the effect of social influence on behavioural intentions was found to be not significant when studied on British and Lebanese consumers for mobile banking. Hence, proposing the hypothesis as

H4. Social influence is positively and significantly associated with behavioural intentions.

2.7 *Vividness*

Vividness can be explained as the extent to which information displayed in the digital signage environment arouses the senses compared with the information shared in the traditional printed format. Moreover, the videos are vibrant and have the potential to provide more information about the product and the brand; in return, digital signage is likely to be enticing in less time. Jang et. al. 2019 found a non-significant relationship between vividness and behavioural intentions. In contrast, another investigation established the positive effect of vividness on behavioural intentions. Thus, proposing the hypothesis as:

H5. Vividness is positively and significantly associated with behavioural intentions.

2.8 *Effort Expectancy*

Venkatesh et. al. in 2012 defined effort expectancy as individuals' perceptions regarding the ease of use of recent technology (i.e., digital signage). Suppose the technology is complex; it will make the adoption process difficult and may delay its use. Rehmn et. al. in 2022 published the significant effect of effort expectancy on behavioural intentions. However, the researchers could not verify the positive effect of effort expectancy on behavioural intentions for a study on adopting digital voice assistants. Proposing the hypothesis:

H6. Effort expectancy is positively and significantly associated with behavioural intentions.

2.9 *Performance expectancy*

Performance expectancy can be defined as individuals' belief in using a particular technology that enhances their performance while selecting a specific product or service. Performance expectancy determines how technology helps complete a particular task effectively and efficiently, increasing the likelihood of adopting digital signages in fashion apparel retail stores. In this study, the assigned task is choosing the right merchandise within a stipulated time.

A study on physician rating websites in the Austrian population evaluated performance expectancy as a significant indicator of behavioural intentions . Similarly, the research findings on mobile payment adoption in Italy and China supported the results in both countries for performance expectancy and behavioural intentions (Migliore et. al., 2022). Thus, proposing:

H7. Performance expectancy is positively and significantly associated with behavioural intentions.

2.10 *Relative advantage*

Relative advantage explains the degree to which one considers new practice better than the old established practice and thus perceives it as a better choice. In other words, the relative advantage means using a new method of communication (e.g., digital signage) is relatively better than the traditional method of communication (e.g., printed signage) in fashion apparel stores. Wang et. al. (2008) argued that relative advantage and performance expectancy cannot be treated as the same because the

relative advantage is comparative. In contrast, performance expectancy concerns the new technology's perceived usefulness, expected outcome expectations, and extrinsic motivation.

Prior literature suggested relative advantage as a significant factor in adopting innovative technology. A study based on mobile banking established a significant relationship between relative advantage and behavioural intentions. The study on adopting cloud computing in India found a significant relationship between relative advantage, effort, and performance expectancy. Thus, proposing the following hypothesis:

H8. The relative advantage has a significant effect on behavioural intentions.

H9. The relative advantage has a significant effect on effort expectancy.

H10. The relative advantage has a significant effect on performance expectancy.

2.11 *The probable mediating role of performance expectancy and effort expectancy*

Individuals perceive relative advantage when encountering something innovative, leading to behavioural intentions. Research in the past explained the mediation effect of effort and performance expectancy. Further, the mediation effect of effort expectancy and performance expectancy between relative advantage and behavioural intentions to adopt new technologies was verified through a few studies (Sabi et. al., 2016). Thus, stating that

H11. The relationship between relative advantage and behavioural intentions faces mediation by effort expectancy.

H12. The relationship between relative advantage and behavioural intentions faces mediation by performance expectancy.

The research model has been depicted below, explaining all the relations (Figure 1).

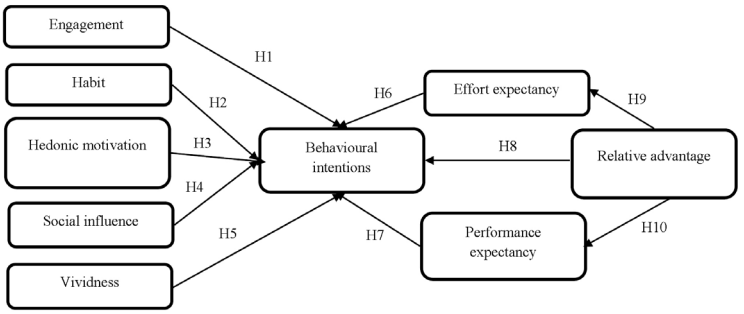

Figure 1
Proposed model

3. Research Methodology

3.1 *Data collection*

The data for this study exercised a cross-sectional method of survey. The undergraduate and postgraduate college students studying retail courses were selected, explained about the research study, and assigned to visit brick-and-mortar fashion stores that installed digital signages in their retail stores in malls around Delhi NCR region in exchange for extra credits. Each construct item was measured on seven points Likert scale where minimum (1) was designated as strongly disagree and maximum (7) as strongly agree. The questionnaire was divided into constructs-based statements and demographic characteristics-related statements. In the first segment, the six constructs were adapted from the extended UTAUT model, namely: behavioural intentions, social influence, effort expectancy, habit, hedonic motivation, and performance expectancy (Venkatesh et. al., 2012), relative advantage (Alghushami et. al., 2020; Wang et. al., 2008), engagement (Cher & Arumugam, 2019; Rodriguez, 2017), vividness (Bone & Ellen, 1992) and in the second segment gender, age, qualification, monthly household income, frequency of visit to fashion apparel stores, and frequency of fashion apparel purchase.

4. Analysis of data

4.1 *Assessment of the measurement model*

To validate the measurement model, researchers evaluated indicator loadings, mean, standard deviation, Cronbach alpha, composite relatability, and average variance extracted (AVE). All the item outer loadings values

were above the recommended value of 0.708. The mean and standard deviation values lie between (4.114 to 5.502) and (0.829 to 1.412). The internal consistency was measured through Cronbach alpha, where all the constructs' values exceeded 0.7. Further, average variance extracted (AVE) measured the convergent validity. The calculated AVE values were above 0.70 for all the constructs. Fornell-Lacker criteria with heterotrait-monotrait (HTMT) determined the discriminant validity. Fornell-Lacker was evaluated by comparing the oblique value with the rest of the column values, It is indicated that the oblique value was the highest. Similarly, the stated values of the HTMT ratio are below 0.85.

4.2 *Assessment of the structural model*

After evaluating the measurement model, researchers analysed the structural model to test the proposed hypothesis. The condition of multicollinearity statics was checked through VIF value. All the construct values of VIF were in the range of 1.448 to 2.482, indicating that VIF values were below the threshold value of 5. In addition, it was concluded that multicollinearity was not present. Table 1 shows the results related to the structural model. The direct effect of eight constructs, engagement, habit, hedonic motivation, social influence, vividness, effort expectancy, performance expectancy, and relative advantage with behavioural intentions was determined. Subsequently, the direct relationship of relative advantage with effort expectancy and performance was analysed. The proposed hypothesis was evaluated through the value of path coefficient, t-value, and p-value with bias-corrected value. The significant relationships for engagement (H1: β=0.149, t = 2.054, p < 0.05), habit (H2: β = 0.201, t = 3.008, p < 0.05), vividness (H5: β = 0.332, t = 4.262, p < 0.001), effort expectancy (H6: β = 0.134, t = 2.054, p < 0.05), performance expectancy (H7: β = 0.136, t = 2.314, p < 0.05) with behavioural intentions. Similarly, positive and significant relationship for effort expectancy (H9: β = 0.376, t =5.688, p < 0.001) and performance expectancy (H10: β = 0.530, t = 8.403, p < 0.001) with relative advantage. However, no association of hedonic motivation (H3: β = 0.012, t = 0.161, p > 0.05), social influence (H4: β = 0.004, t = 0.079, p > 0.05), and relative advantage (β = 0.005, t = 0.078, p > 0.05) with behavioural intentions.

Table 1:
Evaluation of the structural model

Hypothesis	Parameters	95% confidence interval (bias corrector)	P values	Remarks
H1	EN → BI	[0.017;0.301]	0.040	Supported
H2	HA → BI	[0.075;0.334]	0.003	Supported
H3	HM → BI	[-0.145;0.151]	**0.872**	Not supported
H4	SI → BI	[-0.089;0.104]	**0.937**	Not supported
H5	VV → Bl	[0.182;0.495]	0.000	Supported
H6	EE → BI	[0.000;0.260]	0.040	Supported
H7	PE → BI	[0.022;0.252]	0.021	Supported
H8	RA → BI	[-0.117;0.134]	0.938	Not supported
H9	RA → EE	[0.244;0.503]	0.000	Supported
H10	RA → PE	[0.403;0.650]	0.000	Supported
H11	RA→EE→ BI	[0.005;0.110]	**0.052**	Not supported
H12	RA→PE→ BI	[0.011;0.139]	0.020	Supported
Behavioural intentions = BI, Engagement = EN,Habit = HB, Hedonic motivation, HV, Social influence = SI, Vivideness = VV, Effort expectancy = EE, Performance expectancy = PE, Relative advantage = RA				

Mediation analysis

Researchers followed the approach proposed by Hayes and Scharkow to evaluate the indirect effect. This approach involves two steps to assess the mediation effect: (1) significant indirect effect (2) assessing the level of significant direct effect. Using 5000 subsamples for bootstrapping at 95 per cent following the confidence interval of the bias-corrected and accelerated method. Effort expectancy (H11: $\beta = 0.050$, t = 1.940, p > 0.05) no mediating between relative advantage and behavioural intentions. Performance expectancy (H12: $\beta = 0.072$, t = 2.330, p < 0.05) fully mediates relative advantage and behavioural intentions.

4.3 *Importance-performance map (IPMA) analysis*

The main objective of conducting IPMA is identifying relatively high-importance and low-performance antecedents for the target construct behavioural intentions. IPMA output for the dependent variable

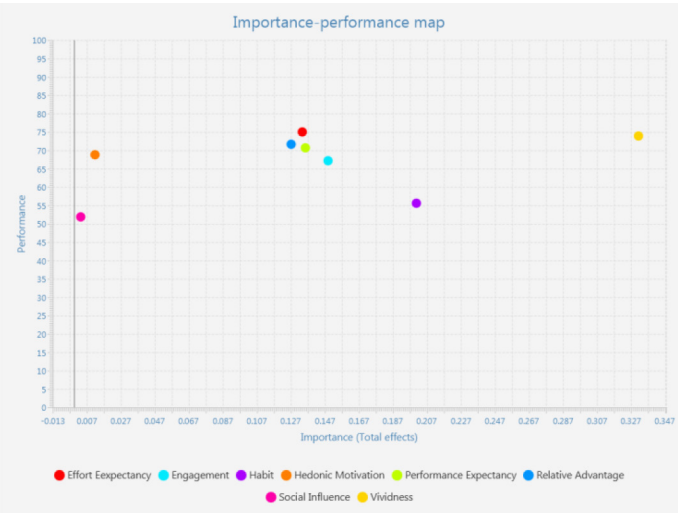

Figure 2

Importance-performance map analysis (IPMA) for behavioural intentions

behavioural intentions is determined at the construct level. In terms of importance, vividness (0.332) emerges to be on the top, then, habit (0.201), followed by engagement (0.149), performance expectancy (0.136), effort expectancy (0.134), relative advantage (0.128), hedonic motivation (0.012), and social influence (0.004). Effort expectancy appears to be the highest in performance at (75.004), followed by vividness (73.903), relative advantage (71.655), performance expectancy (70.681), hedonic motivation (68.797), engagement (67.167), habit (55.601), and social influence (51.880). More concentration should focus on vividness in importance as it is the highest but relatively low performance (Figure 2).

5. Discussion

This study was deliberated to analyse the effect of personal acceptance for digital signages in fashion apparel retail stores constructed on an extended UTAUT 2 model. The output corroborates the significant relationship between engagement, habit, vividness, effort, and performance expectancy with behavioural intentions for brick-and-mortar fashion apparel stores. However, hedonic motivation and social influence could not be established as significant predictors of behavioural intentions. More product-related information makes the digital signage information more engaging. Individuals feel more engaged with digital signage when

familiar with the brand. Thus, retailers are suggested to improve their brand awareness while installing digital signage. Visual merchandisers and marketers should design the display content carefully to make it look realistic, lifelike, clear, and colourful on digital signage to influence individuals. Habit is the second most crucial factor identified through IPMA. It indicates that digital signages are eye-catching for individuals, and digital natives may become addicted through UGC (user-generated content), hashtag promotions, and celebrity endorsements. Results clearly indicate that individuals repeatedly and continuously use digital signage during their trips to the store, so important information related to the product may be displayed on digital signage. Further, the paper provides insights regarding the mediating role of performance expectancy. Individuals will find the relative advantage of adopting digital signage when it improves the efficiency of choosing the right fashion apparel at the store.

6. Conclusion

The study extends to the existing knowledge on the extended UTAUT model was embraced by incorporating engagement, relative advantage, and vividness in the Indian context for fashion apparel retail stores in the context of new business scenarios among digital natives. Retailers and visual merchandisers must recognise the potential use of technology for in-store communication and promotion other than static images and posters and take the individuals on an immersive journey of dynamic communication during their trip to the fashion apparel brick-and-mortar store.

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