THE FOURTH INDUSTRIAL REVOLUTION: EMBRACING DIGITAL DISRUPTION IN RETAIL

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ABSTARCT

Purpose – *This research intends to analyse how different aspects of digital disruption are affecting Vietnam's retail consumer goods market. Furthermore, the conceptual method suggested the analysis of relationships and Industrial Revolution Impact 4.0 on the intention to purchase retail consumer products in Vietnam and thus affect retail corporations' brand equity.*

Design/methodology/approach – *The study involved 284 consumers in Vietnam and explored their buying intentions in consumer goods in retail. This research utilises multiple regression, Correlation analysis and Structured Equation Modelling (SEM) to generate findings.*

Findings – *Many regression analyses have shown that digital disruption measurements have good predictors of purchasing intentions. In addition, the dimension of digital disruption purchasing intentions could have a significant effect on the retail dimensions of consumers' products.*

Practical implications – *This paper can allow marketers to recognise how Vietnamese customers assess purchase of consumer goods in retail and what competitors think to boost purchase intentions of prospective consumers.*

Originality/value – *The outcomes of the purchase intentions are significant since they can be used to identify market retailing sectors that seem to be the most important to clarify consumer preferences.*

**Keywords:** Brand Equity, Consumer Goods, Digital Disruption, Fourth Revolution 4.0, Retail.

INTRODUCTION

Access to international markets, comfort habits and varied customer options have led to rapid retail innovations in India(Conger, 2011). In addition, technical advancements, higher household wages, different retail channel choices, varying product types, customised service, etc., improved retail environment for customers (Ashodian, 2016). In order to keep up with this exponential growth, retailers can be leveraging digital technology for their roles and operations (Salam, 2019). Process technology can contribute to cooperation between cross-functional interdisciplinary participants, fostering iterations for the best-case adaptive process (Glas & Kleemann, 2016). The fourth industrial revolution is another term that seeks to capture this phenomenon of the profound and systemic transition that modern media has brought on (Stock & Seliger, 2016). The proponents of the word fourth industrial revolution vary from the electronic or digital revolution of the modern day, started with the semiconductor advances in the sixties and was further catalysed by mainframe computing spread, Private PCs and the Internet respectively in the 1970s, 1980s and 1990s (Stock & Seliger,

2016). The first industrial revolution mechanised manufacturing using water and steam; The second industrial revolution saw the introduction of mass electricity and the assembly line; the third saw the automated growth of electronics and communication technology (Glas & Kleemann, 2016).

Beginning at the turn of the 21st century, the fourth technological revolution brought with it a significantly more pervasive and mobile internet; "smaller, more powerful, and cheaper sensors; and AI, particularly machine learning(Zhou & Le Cardinal, 2019). Klaus Schwab, author of the 2016 book," The 4th Industrial Revolution stressed that the fourth industrial revolution is not just a plurality of modern innovations that varies from the previous digital revolution, namely, Third-party printing, genome sequencing, nanotechnology, renewables, and quantum computing — Yet convergence and interaction between these innovations through physical, interactive and biological realms (Gabriel & Pessl, 2016). The digital disruption principle will both roles be utilised to maximise production and performance and to minimise costs and efforts. Technology was the pioneer in driving companies and increases customer loyalty and experience. In comparison to customer awareness (Handfield, Jeong, & Choi, 2019). Advanced computer science behavioural insights, new technology, such as "internet of things (IoT), augmented reality (AR) and virtual reality (VR), artificial intelligence (AI), bots and drones, beacons, and cloud platforms", more than ever, they played a vital role in enhancing customer involvement (Li, 2020). User engagement by immersive innovations, custom solutions and targeted marketing is projected to greatly improve the chance that new-age consumers will be drawn and held (Tjahjono, Esplugues, Ares, & Pelaez, 2017). Various new ideas are proposed to woo customers by existing businesses and start-ups(Tjahjono et al., 2017). These techniques also involve the potential of a digital environment to produce optimal results (Zheng, Ardolino, Bacchetti, & Perona, 2020). In this "Digital Disruption in Retail" study we present facets of resilience in operations of retail organisations (Fatorachian & Kazemi, 2020). The study then explores the effects of technology which contributes to interruptions across the whole retail supply chain and the transformation at any point of value of customer buying, rendering things more convenient (Preindl, Nikolopoulos, & Litsiou, 2020). Inter-functional networking has been a central feature of the period of digital marketing and omnichannel products (Tripathi & Gupta, 2020). With blurring of offline and online platforms, communication between physical space and digital space is the perfect way to step in the right direction, i.e., 'phygital'. Such an interconnected model will guarantee customers in all types of retail a smooth experience (Ghadge, Er Kara, Moradlou, & Goswami, 2020). Since the platform's overall stability is enhanced by the benefits of individual versions, this is a win-win situation for both traditional and online players (Kiel, 2017).

If we reach a new decade, distributors have to take stock of their existing demand and business positioning (Patil, 2020). They will need to be mindful of the consumers they represent and handle activities to satisfy the constantly shifting demands(Lin, Lee, Lau, & Yang, 2017). Retailers have spent time and money in technologies routinely. In the last decade, they have established modern supply chain operations of far more variety and a product portfolio for more customers(Ghadge et al., 2020). Though, the rivalry for customers acquisition has only intensified with major multinational retail companies entering Indian markets (Kiel, et al. 2017). Consequently, retailers continually recognise the need to reinvent. The availability of advanced resources moves retailers from completely integrated networks towards procurement networks, allowing them to pick suppliers (Souza, 2020). The digital consumer never had a great opportunity to shop with businesses embedded in their processes (Figures 1-5).
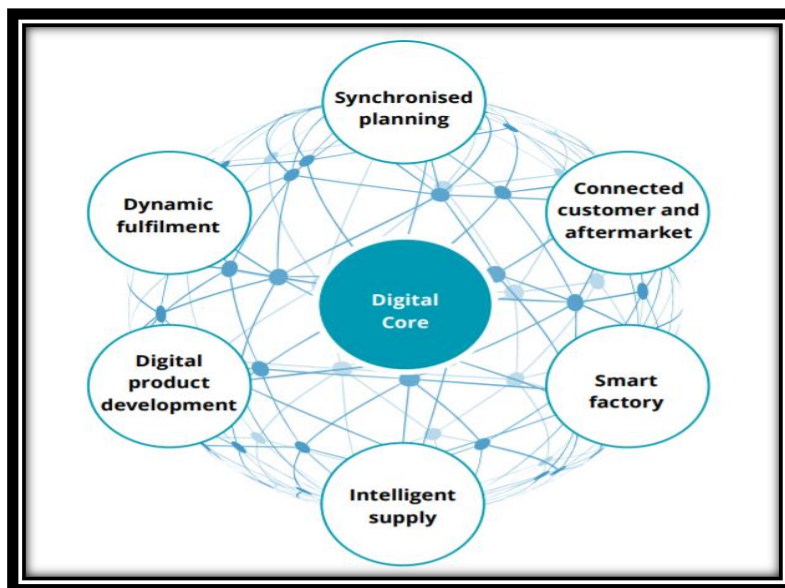
FIGURE 1
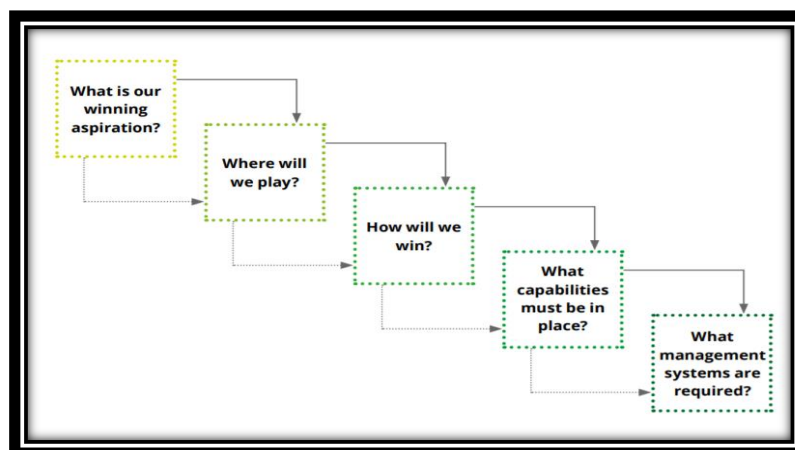**THE BIRTH OF THE DIGITAL DISRUPTION IN RETAIL SECTOR**

Industry 4.0: Digital adoption technology pyramid in retail sector

Digital adoption technologies pyramid Software transformation is a revolutionary method that hires from the ground up technical frameworks focused on a single pool of data that can be processed and utilised to make business decisions(Nicoletti, 2017). Opening from the bottom of the pyramid, the new technology integration process should be a lasting and centred effort. It should be part of the long-term plan of any company(Kersten, Kersten, Blecker, Ringle, & epubli GmbH, 2018). This will in fact contribute to a shifting strategic edge for the game. See the diagram for the four digital adoption processes in the retail market(Vaidya, Ambad, & Bhosle, 2018).
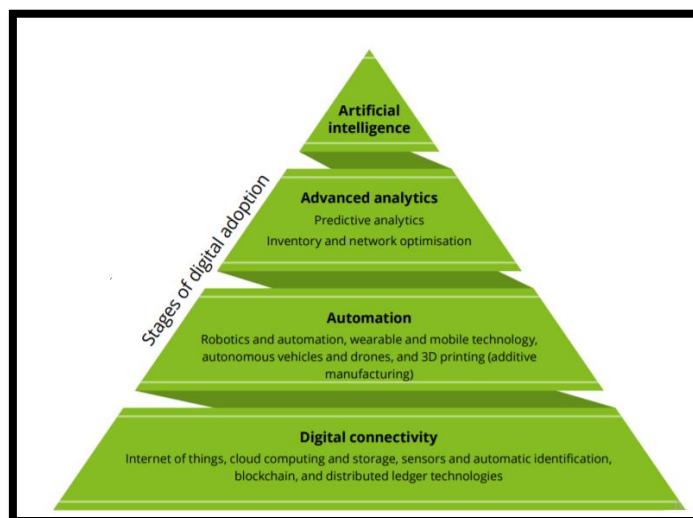
FIGURE 2
STAGES OF DIGITAL ADOPTION

Step-wise Digital Disruption in Retail Sector

FIGURE 3
STEP-WISE DIGITAL DISRUPTION IN RETAIL SECTOR

Objectives

- To determine the elements that affect industry 4.0 and brand equity in the consumer goods retail sector.
- To analyses how the retail sector of consumer goods relates to industry 4.0 and brand equity.

Problem Statement

This research aims to identify a more cohesive and accountable relationship of advertisers with the customer in the fourth industrial revolution. Digital innovation has therefore opened up various new approaches to market and give businesses the ability to establish stronger ties between customers and their brands. Companies will build brand value with the customer through digital breakdown through a number of methods as it provides advertisers with the latest channel. Sensing, convincing and developing a lasting two-way partnership are often a task, which not only helps quantify customer interaction, but also helps them achieve their preference and grow a powerful brand. Building a high brand value is important when in the midst of global competition, the brand with the strong effect persists for an infinite period of time, consumer satisfaction needs to be built by whatever technologies hits customers. Therefore, it is important to concentrate on digital disruption.

Research Questions

- Does industry 4.0 and retail sector of consumer goods have some association?
- Which digital disruption in industry 4.0 impacts consumer goods of brand equity of retail sector?
- How business 4.0 innovations are utilized by the consumer goods retail industry to create strategic brand equities by offering an unprecedented consumer experience?

REVIEW OF LITERATURE

(Jin & Shin, 2020) carried out a research and stated that in recent years, unprecedented rivalry and new technology have been daunting for many major retailers. Yet new creative market concepts have prospered and effectively disturbed the sector in this dynamic climate. We explore the essence of disruptive market structures and how the apparel retail industry disrupts them. In that respect, we look at three industrial disruptors: "born-digital brands, AI-enabled market forecasts and product design and cooperative consumption. After incorporating the idea of disruptive disruption in the business model, we analyse the impact of three disrupters on the fashion industry." Both models were found to be very responsive to the study's specified conditions that are not fulfilled by traditional market models like

delivering premium goods at affordable costs, curated products and sustainable consumption. The three disruptors also recommend powerful models to handle demand volatility, resource control and prompt business responses, both of which are challenges inherent in modern supply chains and inventory-driven processes focused on prediction. On the basis of this research, we address significant ramifications for both scholars and professionals.

(Gillpatrick, 2019) carried out research and stated that Industry 4.0 innovations and corporate processes are set to change the competitive climate and culture dramatically. Retail sectors that make up about one third of the world's GDP will suffer from these shifts in particular. The paper will be driven by literature on the surge of digital transformation triggered by emerging technologies, shifts in market behaviour and different modes of market rivalry. The drivers of marketing creativity and the essential purpose of knowing the supply chain for customers. A model of market value and the effects of digital disruptions and a deeper view of the retail impact are addressed. The consequences of this study are explored for the industry and macroeconomic policymakers and calls for more research.

(Min et al., 2019) carried out a research and stated that the "Fourth Industrial Revolution" is an era of modern information and communication-based innovations. Fourth Industrial Revolution had a greater economic influence than in the past. However, the forecast for the working climate remains unclear. The purpose of this paper is to predict and plan for the issues of workplace health and safety (OHS). Unusual jobs would be normal in FIR. As a consequence, OHS facilities and rewards are impossible to obtain. Excessive faith in emerging technology may contribute to large-scale or new injuries. Global business networks would destroy the biorhythms of employees, certain cancers, overwork, and duties. The psychological disconnection from self-employment is a challenge to the mental wellbeing of workers. Union bonds are undermined and uniform OHS rules are challenging to implement to foreign corporations. In order to deal with modern OHS problems, we must establish new definitions of "decent work" and standardise rules for businesses in each region, develop public health initiatives as track evolving OHS activities and networks between self-employed citizens and cultivate experts responsible for OHS new problems as an OHS operation.

Carvalho et.al. (2018) carried out a research and stated that throughout history, industrialisation has been one of the biggest contributors of emissions, independent of environmental concerns, this contributes to an unsustainable model of output. The impending modern business paradigm dubbed the 4th Industrial Revolution or Industry 4.0 was a shift from this sense, targets for a viable and sustainable production environment. This paper attempts to identify the key ways of partnership in sustainable growth for Industry 4.0. Scientific analysis illustrates the benefits of the modern manufacturing paradigm, such as better product life cycles, Development operates in an automated manner for the usage of cyber-physical structures allied to business principles, this involves decentralisation, virtualization, interoperability, which contribute to greater adaptability to the abundance of natural capital and to environmental costs. Smaller lots will contribute to a more specific response to demand curves and thereby minimise output waste.

(Hirschi, 2018) carried out a research and stated that the rapid digitization and outsourcing of jobs, recognised as the fourth industrial revolution, would have an immense influence on the work environment of individuals. However, scholarly work in clinical psychology and job studies has so far remained strikingly quiet. This paper summarises some of the most significant topics relevant to job growth in the fourth industrial revolution. The author then explores objectively how existing professional planning models and structures are appropriate for meeting these new problems. Opportunities for potential professional advancement are outlined for study and practise.

Cantemir (2016) carried out a research and stated that the article presents the key characteristics of the fourth industrial revolution based on the views of certain specialists, the main papers on the topic of this movement introduced and addressed at the Davos World Economic Forum in 2016 and any calculation of the impact/effects of this last period of global industrial growth. The literature included stages or periods of industrial revolution, as the first, second, third industrial, including those features relating to the predominance of particular energy supplies and scientific advances of significant economic consequences.

Research Gap: To date, there has been minimal study to determine the effect of Industry 4.0 on consumer products in the retail sector in the quantitative review. Present study has also made an attempt to resolve this void.
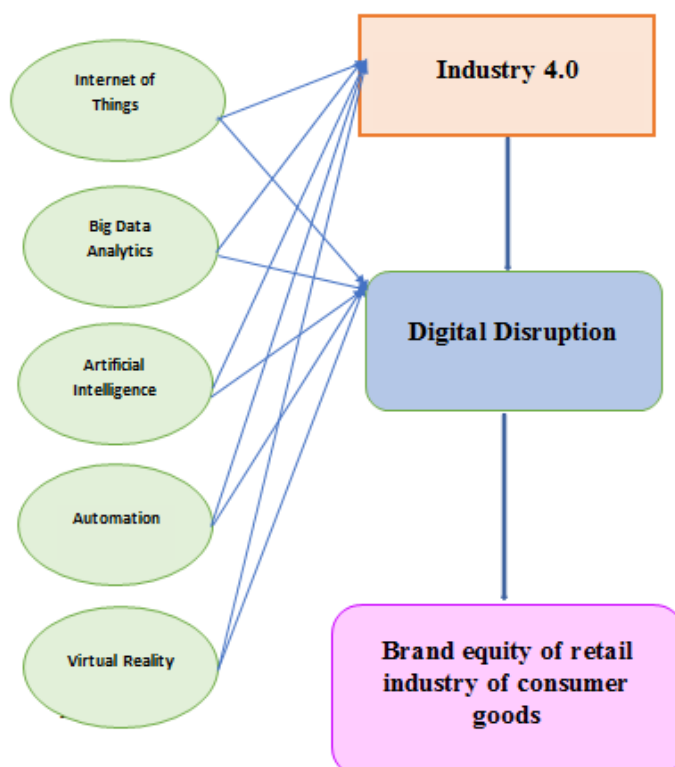
FIGURE 4
CONCEPTUAL FRAMEWORK OF INDUSTRY 4.0 AND BRAND EQUITY

Hypothesis

H01: There is no significant association among factors influencing digital disruption of industry 4.0 and brand equity in consumer goods of retail industry.

Ha1: There is significant association among factors influencing digital disruption of industry 4.0 and brand equity in consumer goods of retail industry.

RESEARCH METHODOLOGY

Dimensions Chosen for this Study

This study attempted to investigate how various aspects of digital disruption have affected the sale of consumer goods in Vietnam's retail sector. As a further step, the conceptual approach recommended looking into how the Fourth Industrial Revolution will

affect the brand equity of retail businesses in Vietnam by studying its effects on the country's consumer spending habits Tables 1-3.

Table 1 SELECTION OF VARIABLES UNDER STUDY		
S.No.	Variables of Digital Disruption	Variables of Brand equity in retail
1.	Internet of Things	Brand Awareness
2.	Big Data Analytics	Brand Loyalty
3.	Artificial Intelligence	Perceived Quality
4.	Automation	Proprietary Assets
5.	Virtual Reality	Brand Associations

Collection of Data

This investigation is based on an early evaluation. Use of a predesigned questionnaire to gather information. Customer reactions to buying goods and services from a shopping mall or department store. The present sample size was 322. However, during the responses in the questionnaire, the respondents made some errors. Therefore, the final sample size was 284 for review. Multiple Vietnamese supermarkets and department stores were surveyed for this article: AEON, Vinmart, and Lanchimart. a representative sample from each of the Vietnam-based stores listed below:

Table 2 NAME OF THE RETAIL STORES SELECTED FOR RESEARCH		
S.No.	Name of the Retail Store	Sample size
1.	AEON	99
2.	Vinmart	89
3.	Lanchi Mart	96

RESULTS AND DISCUSSION

Table 3 RELIABILITY STATISTICS	
Reliability Statistics	
Cronbach's Alpha	**N of Items**
0.875	5

Cronbach's alpha and other reliability statistics for evaluating the internal consistency of the variables were presented in Table 4 and "discovered a value of 0.875, which is higher than the minimum required value of 0.60." Therefore, there is presence of internal consistency among the variables.

Table 4 DESCRIPTIVE STATISTICS				
One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
Internet of Things	284	4.63	0.519	0.139
Big Data Analytics	284	4.50	0.650	0.174
Artificial Intelligence	284	4.07	0.917	0.245

| Automation | 284 | 3.71 | 0.825 | 0.221 |
| Virtual Reality | 284 | 4.25 | 0.917 | 0.245 |

Tables 5-8, indicated the descriptive statistics of the present study and stated that "Internet of Things" (n=4.63, std dev= 0.519) found to be the most important component among the disruptive technologies among the all-other components in the study followed by "Big Data Analytics" (n= 4.50, std dev= 0.650) also to be important to influence the retail sector of consumer goods. The component of "Automation" found to be the least important component to impact the retail sector of consumer goods.

Table 5 T -STATISTICS						
One-Sample Test						
	Test Value = 0					
	t	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Internet of Things	32.450	13	0.000	4.500	4.20	4.80
Big Data Analytics	25.886	13	0.000	4.500	4.12	4.88
Artificial Intelligence	16.615	13	0.000	4.071	3.54	4.60
Automation	16.837	13	0.000	3.714	3.24	4.19
Virtual Reality	25.886	13	0.000	4.071	4.10	4.60

Table 6, conducted the t test and found the "internet of Things" (t = 32.450) "to be the most important variable" followed by the "Big Data Analytics" and "Virtual Reality" among other components to impact the retail industry of consumer goods.

Table 6 REGRESSION ANALYSIS									
Model Summary									
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.242[a]	0.358	0.357	1.015	0.058	51.347	1	829	0.000
a. Predictors: (Constant), Internet of Things, Big Data Analytics, Artificial Intelligence, Automation, Virtual									

Reality

Table 7 ANOVA ANALYSIS						
ANOVAª						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	42.811	1	42.811	76.347	.000[b]
	Residual	854.247	829	1.030		
	Total	708.158	760			
a. Dependent Variable: Brand Equity						

Tables 7 & 8 depicted that regression analysis and one-way ANOVA analysis and stated that R square valued at 0.358 (35.8%) and adjusted R square to be (0.357) 35.7%, where significance at 0.000 which is less than the acceptable limit of 0.05. Therefore, Brand Equity is influenced by all the components of digital disruption, namely, "Internet of Things", "Big Data Analytics", "Artificial Intelligence", "Automation" and "Virtual Reality."

Table 8 KMO AND BARTLETT'S TEST		
KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.824
Bartlett's Test of Sphericity	Approx. Chi-Square	1046.855
	Df	26
	Sig.	.000

The sample adequacy, as shown in Table 8, was determined using the KMO and Bartlett's tests. 824, which is quite close to 1. The.000 value obtained in the Bartlett test is significantly lower than the minimum detectable value of 0.05. Therefore, there is strong presence of internal consistency among the variables. Then study performed Exploratory Factor Analysis (EFA) and found the three main dimensions of Brand Equity influenced by the majority of the components of Industry 4.0 (Digital Disruption). Then research further performed "Partial Least Square and Confirmatory Factor Analysis (CFA)" to validate the outcome of the EFA Table 9 & 10.

Table 9 EXPLORATORY FACTOR ANALYSIS-A			
Component Matrixª			
Industry 4.0 (Digital Disruption)	Component		
	Brand Awareness	Brand Loyalty	Perceived Quality
Internet of Things	0.769	-0.334	-0.002
Big Data Analytics	0.576	0.003	-0.343
Artificial Intelligence	0.717	-0.459	0.537
Automation	-0.168	0.847	-0.343
Virtual Reality	-0.269	0.867	0.537
Extraction Method: Principal Component Analysis.			
a. 3 components extracted.			

Table 10

EXPLORATORY FACTOR ANALYSIS-B			
Component Matrix[a]			
Industry 4.0 (Digital Disruption)	**Component**		
	Brand Awareness	**Brand Loyalty**	**Perceived Quality**
Internet of Things	0.769		
Big Data Analytics	0.576		
Artificial Intelligence	0.717		0.537
Automation		0.847	
Virtual Reality		0.867	0.537
Extraction Method: Principal Component Analysis.			
a. 3 components extracted.			

Table 11 ad 12 stated the EFA results and indicated that the values below 0.40 were suppressed and found Brand awareness to be strongly related to "Internet of Things, Big Data Analytics and Artificial Intelligence." Brand Loyalty found to be correlated with two components namely, Automation and Virtual Reality and Perceived quality to be positively correlated with Artificial Intelligence and Virtual Reality.
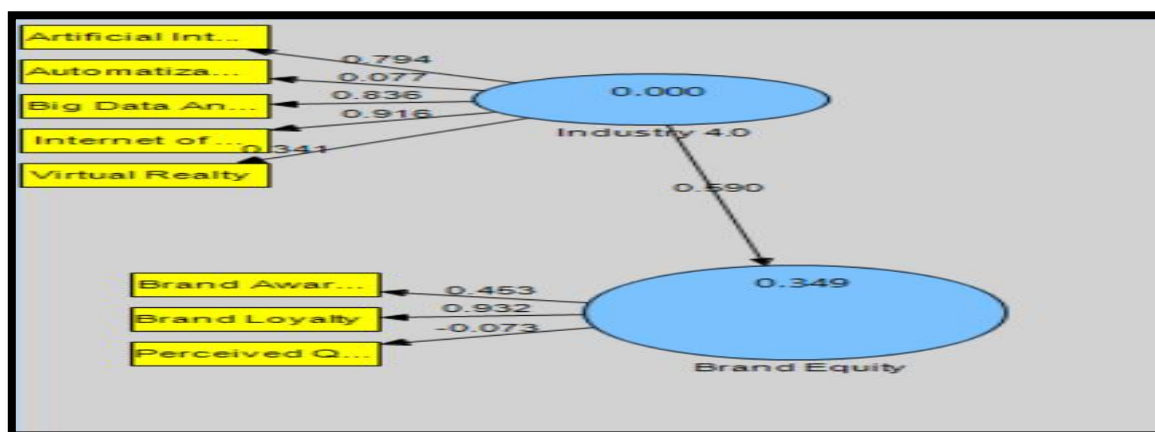
FIGURE 5
PARTIAL LEAST SQUARE (STRUCTURED EQUATION MODELLING)

The Figure 5, also depicted the Partial Least Square (SEM) analysis and indicated the strong influence of components of digital disruption on the dimensions of brand equity.

Table 11			
CONFIRMATORY FACTOR ANALYSIS-A			
Industry 4.0 (Digital Disruption)	**Brand Awareness**	**Brand Loyalty**	**Perceived Quality**

Internet of Things	0.6318	0.9006	0.6992
Big Data Analytics	0.3354	0.3949	-0.2404
Artificial Intelligence	0.5602	1	0.7709
Automation	0.746	0.2312	-0.0333
Virtual Reality	-0.0553	0.7709	1

Table 12 CONFIRMATORY FACTOR ANALYSIS-B			
Industry 4.0 (Digital Disruption)	**Brand Awareness**	**Brand Loyalty**	**Perceived Quality**
Internet of Things	0.6318	0.9006	0.6992
Big Data Analytics			
Artificial Intelligence	0.5602	1	0.7709
Automation	0.746		
Virtual Reality		0.7709	1

Table 13 ad 14 stated the CFA results and indicated that the values below 0.50 were suppressed and found Brand awareness to be strongly related to "Internet of Things", "Artificial Intelligence" and "Automation." Brand Loyalty found to be correlated with two components namely, "Internet of Things, Artificial Intelligence and Virtual Reality and Perceived quality" to be positively correlated with "Internet of Things, Artificial Intelligence and Virtual Reality."

Table 13 COMPOSITE RELIABILITY AND CRONBACH'S ALPHA		
	Composite Reliability	**Cronbach's Alpha**
Industry 4.0	0.7731	0.6496
Brand Awareness	0.7645	0.7331
Brand Loyalty	0.8600	0.6486
Perceived Quality	0.8585	0.7456

Table 14, the study further analysed the internal consistency among the explored or derived variables by applying Cronbach Alpha and Composite reliability and found that all the variables in case of composite reliability is above than 0.70 (acceptable threshold limit) and also in case of Cronbach Alpha the estimated value to be above 0.60. Therefore, internal consistency among the formed variables existed.

Table 14 DESCRIPTIVE STATISTICS			
Descriptive Statistics			
	Mean	Std. Deviation	N
Brand Awareness	2.40	1.935	284
Brand Loyalty	2.37	1.072	284
Perceived Quality	2.62	0.056	284

In table 15, the study found the descriptive statistics and found the perceived quality (n=2.62, standard deviation=0.056) to be the most important dimension to be influenced by components of digital disruption.

Hypothesis Testing

Table 15 HYPOTHESIS TESTING RESULT		
Hypothesis Result		
S.No.	Statement of Hypothesis	Results of Hypothesis testing
1	There is no significant association among factors influencing digital disruption of industry 4.0 and brand equity in consumer goods of retail industry	Ho Rejected

Findings of the Study

- The findings indicate that Vietnam's study respondents are mostly female.
- The findings revealed that the respondent from Vietnam is married mostly.
- The findings revealed that customers in Vietnam who purchase consumer items are mostly 18-25 years old.
- The demographic statistics of the report suggest that post-graduates are the bulk of customers who purchase consumer products.
- Demographic profiles show that several clients are working.
- The results reveal that the components of Industry 4.0 indicated the least relation with Automation and Virtual Reality.
- According to the findings, there is a robust correlation between the "Internet of Things" and "perceived quality."
- According to the findings, "Industry 4.0 aspects" have a significant impact on "Perceived Quality."

Limitations of the Present Research

- Recent research focuses on Industry 4.0 in five fields, namely, "Internet of Things", "Big Data Analytics", "Artificial Intelligence", "Automation" and "Virtual Reality." while many other components all impact retail sector of consumer goods. Therefore, the present study permitted limited use of Digital disruption only in consumer goods brand variables.
- The latest study involved only 284 researchers to do comprehensive review for the existing studies.

Technology has brought a fundamental change in the handling and transformation of retailers' whole shopping experience (Julian M. Müller & Voigt, 2018b). Traditional supply chains have become an interdependent and multifunctional digital network with supply ties (Luthra & Mangla, 2018). Advanced technology such as cloud storage, IoT, blockchain, robots, automation, 3D printing, ML and AI can be required to simplify diverse back-end/front-end processes (Julian M. Müller & Voigt, 2018b). Therefore, retailers must invest in these innovations to stay competent and prosperous in the fast-moving and disruptive

market world (Luthra & Mangla, 2018). In addition, there is an imminent widespread confluence of online and offline networks in the region (Julian M. Müller & Voigt, 2018a). Prioritizing each other runs the risk of alienating a growing number of consumers who are keenly aware of the holders' interdependence (Ojo, Shah, Coutroubis, Jimenez, & Ocana, 2018). Retailers can continue to engage their shoppers in any shopping platform. Globalization, connectivity to the Internet, product supply, etc., have led to the Retailers can continue to engage their shoppers in any shopping platform (Julian Marius Müller, Kiel, & Voigt, 2018). Globalization, connectivity to the Internet, product supply, etc. Brands make tremendous efforts to evaluate and investigate shopping and behaviour data and to create insights that promote customer shopping loops and translate footfall and clicks into sales (Bienhaus & Haddud, 2018). In this era of digital change and technology, data has become increasingly important and crucial; nevertheless, it may also be misused (Bag, Telukdarie, Pretorius, & Gupta, 2018). The greatest danger to a developed world with massive customer details is data theft or looting, which can disrupt the digitisation initiatives of the country (Bär, Herbert-Hansen, & Khalid, 2018). Taking into consideration the criticality of data privacy, the Indian government should propose safety measures before they are passed into legislation (Barata, Rupino, Cunha, & Stal, 2018). Around the same period, retailers and brands must accept growing their data protection policies and maintaining zero leakage in order to win customer interest and trust (Ivanov, Dolgui, & Sokolov, 2019).

CONCLUSION

The financial performance of Industry 4.0, in order to broaden the reach of the retail market for other things, should also be addressed.

Any countries can also be considered as more reliable data collection results.

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