



Major Insights, Value Orientation on Revolution of Retail Industry in Current Context from Perspective of Retail 1.0 to Retail 4.0

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ABSTRACT:

The retail sector entered the fourth revolution in 2010, the same year that Industry 4.0 was first announced. On the other hand, Retail 4.0 seems to be a brand-new idea for retailers everywhere. With the advent of hyper-marts, super-marts, and cash-and-carry stores, along with geographic growth beyond metro areas to Tier 1 cities, modern retail matured in Retail 2.0. Convenience has replaced a luxury shopping experience as the primary factor for consumers, and technology has hastened operations' modernization (backend). Players began using websites to disseminate information using technology. The phrase Retail 4.0 emerged from Industry 4.0 when Industry 4.0 technologies including Artificial Intelligence (AI), the Internet of Things (IoT), Cloud Computing, Big Data Analytical (BDA), and Augmented Reality (AR) were applied to the retail sector. This essay explores Retail 4.0 technologies and how they are used in the retail sector. This paper also discusses the revolution in the retail industry. The amount of retail 4.0 technology adoption across various countries is examined in the last section.

KEYWORDS: Retail 4.0; Revolution of Retail Industry; Internet of Things; Artificial Intelligent; Big Data Analytical; Cloud Computing; Augmented Reality

INTRODUCTION:

A total of four industrial revolutions have taken place throughout human history since the first, which occurred about 1760. Each industrial revolution advances production and enhances all facets of human lifestyle. The development of steam engines during the first industrial revolution decreased the demand for human labor and improved workflow efficiency. With the introduction of electricity and mass production assembly lines in the Industry 2.0 revolution, consumers profited from high-quality goods at cheaper prices. The development of electronics, telecommunications, and computers, which led to online shopping and globalization, was then witnessed by Industry 3.0. Industry 4.0, however, fundamentally changed humanity and focused more on connecting physical products with people online. The retail sector underwent significant change as a result of the industrial revolution. Regarding the industrial revolution, the retail sector saw tremendous change. First, in terms of Retail 1.0, as mass-manufactured goods were produced by steam engines, department shops also began to appear. Consumers enjoyed affordable goods as a result during the Retail 2.0, which led to the opening of more malls. Consumers like online shopping through the internet in Retail 3.0, which has revolutionized our buying habits because we can now buy anything without leaving the house. This demonstrates how Retail 4.0 makes our lives easier and better. In general, Retail 4.0 technologies include Augmented Reality (AR), Big Data Analytical (BDA), Cloud Computing, Internet of Things (IoT), Artificial Intelligence (AI), and Internet of Things (IoT). While IoT enables home and workplace applications to be operated via mobile apps, AI can replace workers in some everyday tasks. Our self-service kiosk-captured data is then kept and analyzed in the cloud. The combination of these technologies is known as retail 4.0. Data is then gathered and evaluated while IoT is in operation to ascertain customer preferences. After that, AI would identify the user through data analysis and offer specialized service. Additionally, these technologies have been used to improve the sustainability of the supply chain for agri-food retailing. Industry 4.0 essentially began in 2010, but "Retail 4.0" is a new name for retailers around the world. This means that in poorer nations, the adoption of Retail 4.0 technologies is still relatively low. The worst case scenario is found in the least developed nations. The COVID-19 epidemic, however, has accelerated the uptake of these technologies. People were able to do online transactions despite the coronavirus lockdown, demonstrating the effectiveness of Retail 4.0 in luring customers. The merchants had little choice but to use these technologies as well as a result. As a result of the foregoing justification, it can be inferred that retail 4.0 can support the new norm of requiring less interaction with other people, making its adoption by merchants imperative. The transformation in the retail sector, as well as retail technologies and their effects, are covered in this article. It has also been investigated how widely Retail 4.0 is being used in different countries.

REVOLUTION OF THE RETAIL INDUSTRY:

The way the world functions is altering for the fourth time in recorded history. The same is true of Industry 1.0, Industry 2.0, and Industry 3.0; their transformation affected not only how people conduct business but also how they live, work, and play. As a result of the industrial revolution, the retail

sector, on average, underwent a four-time revolution. Three phases of the retail revolution—Retail 1.0, Retail 2.0, Retail 3.0, and Retail 4.0—can be distinguished. In the section that follows, the retail industry's revolution will be covered.

RETAIL 1.0

The first retail revolution, or Retail 1.0, often referred to as mechanization, started in the middle of the eighteenth century and came to an end in the middle of the nineteenth century with the introduction of mass production and electrification. Most of human history has been devoted to people doing all of their labor with their hands. Every item used by humans, including tools, cooking utensils, musical instruments, clothes, and weaponry, was made by hand from raw materials that humans collected or domesticated on Earth. A new workforce was drawn to cities in the late 1700s as factories began to spring up, mass producing goods using machinery that ran on steam. Before the late 1800s, neighborhood shops dominated the retail industry. They offered a wide range of services to customers, including finance, repairs, and one-on-one assistance to explain the specifics and benefits of products. To keep the economy moving, people had to carry cash, and businesses had to physically deposit customers' cash and checks. Nevertheless, the industrial revolution saw a considerable increase in the supply of inexpensive, high-quality items as a result of technological developments. As increasingly affluent Americans develop broader interests, department stores like Bloomingdales, Sears, and Macy's have started to arise in Chicago and New York City.

Retail 2.0

The mass production of low-cost goods during the second industrial revolution, sometimes known as "Industry 2.0," allowed the automotive industry to advance quickly. More people started to commute from the suburbs as automobiles became widely available, which led to a concentration of suburban retail centers and malls in specific locations as the suburbs expanded.

Data marketing, which was only starting out a decade ago, was evolving at this point as retailers analyzed transactions and held focus groups to find out what customers were thinking and why.

Due to the fact that consumers like to spend more while using their credit cards, credit cards become convenient for users and advantageous for businesses. The use of loyalty cards, which offered incentives for buying and informed shops on their customers' behaviors, was also on the rise. The introduction of automation in the late 20th century marked the end of the period of electrification, often known as Retail 2.0.

Retail 3.0:

One of the biggest turning moments in the history of the retail business was the introduction of widespread online shopping. The development of the Internet, which made it possible for goods and services to be produced, marketed, and consumed globally as well as for digital technology to be used globally, marked the beginning of retail 3.0. As a result of the Internet, retailers and consumers now perceive the integration of product, place, price, and time differently than they did in the 1990s, when consumers had virtually unlimited access to an incredible variety of products and were less constrained by the physical store's location or hours of operation. The emergence of digital rivals—platform players like eBay, Taobao, Amazon, and Alibaba are upending established businesses in almost every sector. Consumers now have access to a wide variety of goods from overseas stores, frequently at prices that are lower than those of their local store, thanks to advancements in online banking and technology. Additionally, interstate highways permit gigantic establishments that cover much wider geographic areas, big-box companies, or no-frills self-service convenience stores. During the computerised, globalised Industry 3.0, many shops, including Aeon, Tesco, Auchan, and Walmart, offered a wide range of deeply reduced goods produced at low cost and effectively around the world. Retail 3.0, which begun in the late twentieth century when automation gave way to digitization, was succeeded by Retail 4.0 at the beginning of the twenty-first century.

Retail 4.0:

Sector 4.0 technologies; including artificial intelligence (AI), the internet of things (IoT), cloud computing, big data analytics (BDA), and augmented reality (AR), are being used in the fourth retail industry transformation, known as retail 4.0.(AR), in order to satisfy client needs. As a result, it is described as the fusion of technology, innovation, and people, with significant improvements in data analytics and production technologies, with a focus on artificial intelligence (AI) approaches and digital manufacturing systems that make systems intelligent and smart. The e-commerce business has seen a 45.8% increase in online sales globally during the last two years. The percentage of internet sales is expected to increase to 19.5% in 2021 from just 13.6% in 2019. The share of mobile e-commerce sales in overall e-commerce increased from 52.4% in 2016 to 72.9% in 2021. New data from IBM's United States Retail Index indicates that the COVID -19 pandemic has accelerated the transition away from brick and mortar stores and toward internet shopping by about five years. By providing grocery pickup and delivery alternatives, both Walmart and Target have benefited from omnichannel fulfilment, which has increased sales for both businesses. The COVID-19 epidemic has also contributed to the continued growth of the IoT sector. In 2020, there were more IoT connections than non-IoT connections (e.g., connected cars, smart home devices, and connected industrial equipment) (laptops and computers). Additionally, shops were compelled to put self-service kiosks in place as a practical way to reduce face-to-face interaction and safeguard customers from coronavirus. Self-service kiosks give customers more control over their purchasing selections while enabling them to manage a variety of services independently of any representatives. Customers can use self-checkout kiosks to pay for their purchases at any location within the store using a variety of payment methods, including credit card, debit card, mobile phone, Apple watch, or gift cards, thanks to a sophisticated combination of technological innovations like QR codes, RFID, and smartphone transactions. Due to the integration of online and offline shopping experiences via various technologies, consumers can now make purchases regardless of a crisis without realizing the difference between an

online store and a retailer's physical locations. These dynamic shifts in consumer behaviour have also made merchants aware of the potential of Retail 4.0 technology to enhance customer satisfaction and business performance while enabling them to compete. Regardless of the channel, customers may switch between them with ease and receive unified, consistent service (traditional store, online, or mobile). Additionally, Retail 4.0 prioritizes social media and digital marketing while also managing customer data to deliver a more individualized experience. However, a company that provides a personalized experience will draw in more clients and win their loyalty. The basis of Retail 4.0 is the integration of such systems with IoT, AI, wireless sensor networking technologies, big data analytics, and cloud computing. Utilizing emerging digital technologies like cloud computing, mobile, social, analytics, and the IoT can give businesses a competitive edge. Retail 3.0 to Retail 4.0's paradigm transition from general industrial digitalization to technologically advanced digitalization systems that interface with smart items and IoT, where products can choose their own production methods, is evidence of this paradigm shift. Figure 1 depicts the retail industry's revolution.



Above image showing technology trends driving Retail 4.0

Big Data:

Data, as the saying goes, is money because every time information is exchanged, data is created. Every department and supply network in a firm exchanges information, creating enormous amounts of data to gather and comprehend. Large-scale digital analysis of this data is referred to as "Big Data," and it is done in order to better comprehend trends and patterns than would otherwise be possible. Global businesses gain a deeper understanding of their customers' needs, actions, and preferences by processing "Big Data." This makes it possible to more accurately identify emerging trends and tailor products for specific customers. Internally, "Big Data" processing enables businesses to invest in new assets and technology with better-informed decisions.

Robotics:

Robots have long been a backbone of manufacturing facilities, but they are now rapidly entering new industries and developing autonomy. In-store customer assistance, product delivery to retailers, and warehouse management are all now being done by robots. Robotic in-store customer service, for instance, enables clients to instantly input a question via touchscreen; at that point, the robot can assist customers swiftly find the products they require without the need for human assistance.

Cloud Computing:

Transparent business models are necessary for Retail 4.0, and these models in turn depend on Cloud Computing. Retailers can connect vertically and horizontally more readily than ever before thanks to cloud computing, which makes it possible to share information easily and securely. Businesses that use cloud computing may track digital paperwork, shipments, inventory, and more to achieve unprecedented levels of accuracy and transparency. The on-demand delivery of computing power, data storage resources, software, and other information technology resources over the internet via a platform is defined as cloud computing. The pooling of computer resources for simultaneous use by numerous processes is known as cloud computing. Cloud computing also makes it possible to share resources within an organization. In addition, the system can be accessed from anywhere, regardless of where the administrator is. Users are now able to make informed decisions based on real-time data that is made available through remote solutions linked by virtual infrastructure and cloud computing. Customers' online or in-store movements are analyzed for transaction data, and retailers learn more about the choices and preferences of their customers. Retailers must invest in storage because of the enormous amount of data generated by Retail 4.0 that needs to be kept, analyzed, and shared throughout supply chains. Cloud computing is thought to be the best solution due to its accessibility and affordability. Big data analytics and cloud computing are used in a predictive manufacturing system to enable self-aware machines and systems, and CPSs will be applied in the future industry to boost productivity and efficiency. An interconnected cloud services platform for marketing management

that combines traditional and e-commerce business models has been established by integrating cloud computing, networks, databases, and marketing management systems. Businesses can outsource parts of their IT value chain thanks to cloud computing, which offers benefits like cost savings, flexibility, scalability, increased capacity utilization, increased efficiency, and mobility.

Industrial IoT:

Retailers are starting to understand how Internet of Things (IoT) technology, which was previously mostly employed in industry, can be very helpful in retail as a way to improve customer experiences. IoT sensors can give managers inventory updates, lowering the possibility that customers may be dissatisfied by shortages in-store. "Smart shelves" have the ability to weigh the things they hold, keep track of what is being taken off and put back on the shelf, and notify management of probable theft. Additionally, consumers can scan IoT-powered tags with their mobile phones at the register, speeding up and simplifying the checkout process. IoT technology can also help retail firms' executive staff. IoT sensors can help field devices communicate with one another and update stakeholders in real-time. IoT sensors can also be used to swiftly identify machine issues, and IoT-savvy shops may even go as far as to engage in predictive maintenance.

Additive Manufacturing:

The success of retail 4.0 is largely due to efficient and economical production methods. Additive manufacturing, best known as 3D printing and prototyping, is one of the main forces behind progress in this industry. After construction, a product must be refined according to traditional manufacturing methods; for example, something may need to be smoothed out or removed to make the product retail-ready. Without having to remove extra material, the product can be retail-ready thanks to the precision provided by 3D printing. This lowers the cost and material needs for manufacturing while also offering a backup strategy in case traditional equipment breaks down. The need for labor-intensive large-scale production is reduced as a result of additive manufacturing.

Augmented Reality:

A short scan of the market reveals that AR technology can provide value propositions in novel ways. This is why many companies have focused their R&D teams to investigate AR technology. Customers can simulate donning new clothes or bringing home new furniture, for instance, utilizing augmented reality (AR). AR is widely available and is expected to continue to expand in the future because to publicly accessible technology like Google Lens.

Adoption level of Retail 4.0 in Different Countries:

North America and Europe have economies that are most ready to use, implement, and somewhat adopt industry 4.0 technologies, according to a country's readiness index. The people who are least prepared are those in Sub-Saharan Africa and developing nations, which must work toward universal internet access and give all citizens a chance to learn the skills required to succeed in cutting-edge technologies. Non-store retail ranked third among industries in the United States for capital expenditures on robots, according to the 2018 Annual Capital Expenditures Survey. The majority of these organizations adopted digitalization, with older, larger businesses adopting it the most; cloud-based services, however, were not as widely adopted. The United States and China, which control more than 75% of the global public cloud market, 75% of all block chain patents, and 50% of global IoT spending, respectively, dominate the economic geography of the digital economy. In addition, they control about 90% of the market value of the 70 largest online platforms in the world, with Microsoft leading the pack and being followed by Amazon, Apple, Facebook, Google, Alibaba, and Tencent, which currently controls 2/3 of the market value. Alibaba was founded by Jack Ma in 1999, and since then it has developed into a market leader in China and across the globe, controlling 80% of the country's internet market. Alibaba introduced New Retail in 2017, which combines cloud computing, data analytics, digital retail applications, AI-enabled smart inventory systems, and the Internet of Things to create an integrated shopping experience tailored to each customer. China will account for 792.5 million (33.3% of all digital purchases) in 2021, will generate \$2.779 trillion in e-commerce sales (56.8%), and will be the first country in history to conduct more than half of its retail transactions digitally (52.1% of retail will be e-commerce). This is due to the combination of digital consumer maturity and digitally supported supply chains. According to research from Russia, 75% of retailers in developing nations agreed that using big data to develop a competitive marketing strategy is essential. Only 20% of retailers use big data in their operations, and 60% are unsure of the value of these data to their business. Malaysia scored between 2.0 and 3.0 on the adoption of Industry 4.0 technologies, falling short of other ASEAN nations like Singapore and Indonesia. In Malaysia, only 15-20% of businesses have adopted Retail 4.0 technologies. One of the main causes of this slow adoption is a lack of skilled labor to meet Retail 4.0 requirements. The Least Developed Countries (LDCs) have lagged behind in the global race for digital transformation because Internet access is still only available to a small portion of the population in these nations. LDCs run the risk of slipping further behind as the gap in technology between them and more developed nations widens. The UNCTAD-led eTrade for all initiative is a global helpdesk that helps developing countries close the knowledge gap in e-commerce information and resources. It is currently supported by Estonia, the Netherlands, and Germany. According to UNCTAD, more than 30 partners are cooperating to increase public awareness of opportunities and risks in developing and least developed countries in order to get around challenges brought on by the COVID-19 pandemic.

Conclusion:

The phrase "Industry 4.0" has been in use since 2010, but "Retail 4.0" is still a relatively new concept to the majority of retailers globally. Our way of life is now more convenient thanks to the retail revolution. Retail 4.0 presents a chance to help retailers survive the COVID -19 pandemic as it spreads and forces physical stores to close. Retail 4.0 can handle the COVID -19 pandemic's new norm, which necessitates less contact. On the other hand, there are differences in how Retail 4.0 is being adopted in least developed, developing, and developed nations. In developed nations like the United States, the United Kingdom, and Europe, Retail 4.0 is widely adopted. It seems difficult for them to adopt these technologies in the least developed nations, where there is little internet access. Due to persistent bottlenecks and barriers, such as expensive broadband services, an excessive reliance on cash, a shortage of skilled workers among the populace, and government indifference, consumers and businesses are unable to take advantage of emerging e-commerce opportunities. To encourage more small businesses to participate in the digital economy as producers rather than merely consumers, governments must place a high priority on national digital preparedness. Then, in order to maximize the benefits of digital commerce, digital entrepreneurship needs to take center stage. Future e-commerce trade norms should work to make it easier to gather more funding and technical assistance for these nations, increasing their ability to take part in and profit from Retail 4.0. This research adds to the body of knowledge about Retail 4.0 technology and the retail industry revolution. Despite the fact that our research is limited to conceptual and theoretical ideas, it can be used as a springboard to incorporate the cutting-edge digital technologies connected to Retail 4.0 into customer service management. Future research may examine how the adoption of Retail 4.0 affects e-loyalty, as doing so is currently lacking due to the difficulty of capturing and maintaining consumer loyalty in the rapidly evolving digital world of today.

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