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UNDERSTANDING THE ROLE OF CONSUMER BEHAVIOR IN FORECASTING THE IMPACT OF INDUSTRY 4.0 AND THE WAVE OF DIGITAL DISRUPTION DRIVING INNOVATION IN RETAILING

Review

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Abstract

Industry 4.0 technologies and business practices are expected to radically transform the competitive landscape and society. Retail industries which make up approximately one third of global GDP will be particularly affected by these changes. This paper, guided by the literature concerning the wave of digital disruption brought about by new technology, changes in consumer demand and new forms of business competition are discussed. The drivers of innovation in marketing and the critical role of understanding the consumer value chain. A model of consumer value and the impact of digital disruption and how retail impact can be better understood is discussed. Implications for industry and macroeconomic policy makers and calls for further research based on this research are discussed.

Keywords: *Industry 4.0, Digital Disruption, Macroeconomics, Retailing, Trends in Consumer Behavior.*

1. INTRODUCTION

Global retailing is expected to be a 28 trillion USD industry by 2020 and currently represents 31% of global GDP. (Berkshire Hathaway 2016) Currently, across a global landscape the retail sector is experiencing the effects of digital disruption stemming from new technologies, new business forms and new patterns of consumer behavior. This is perhaps the fourth major retail disruption in the last 150 years and arguably will be the most significant, Lewis & Dart (2014). Some analysts

have stated that retail is expected to change more in the next five years than in the last fifty (Davies 2017).

Some have stated that this new wave of digital disruption is the third wave of digital disruption to occur the effects will be much more significant than what industry has experienced to-date. Moeller et al. (2018) argue that, "Although many practices, products, and services have evolved...few enterprises have had their core businesses disrupted. But this is about to change." The coming wave of digital disruption brought about by this third wave of digital disruption (Teixeira 2019) represented by Industry 4.0 is expected to have a much more fundamental impact because of the degree of interconnectivity it will bring among new technologies, see Exhibit One: The third wave of disruption. Kagermann (2015) states that, "Digitization—the continuing convergence of the real and the virtual worlds will be the main driver of innovation and change in all sectors of our economy."

Moeller et al. (2018) have stated:

"During the next few years, the technologies associated with this wave — including artificial intelligence, cloud computing, online interface design, the Internet of Things, Industry 4.0, cyberwarfare, robotics, and data analytics — will advance and amplify one another's impact. Products and processes will routinely learn from their surroundings; markets will converge to an unprecedented extent. As electric power did, the new wave of technological advance is expected to alter a wide array of business practices, in nearly every sector, and in both business-to-business and business-to-consumer firms."

Projected impacts will ripple across not only the retail industry but across consumers, suppliers and impact the workforce of nations. In the USA some estimates have up to 25% of the workforce is employed in retail or supporting firms. Retail automation is expected to put 30% to 50% of these positions at risk. (World Economic Forum (2017). Today many of those jobs are in jeopardy as firms deploy new technology such as robots, AI, machine learning, digital, VR and new business models using these technologies. Globally these changes will affect both developed nations as well as the developing economies in fundamental ways. Along with disrupted jobs new opportunities are expected to be created that require skill sets that many workers are not currently prepared. Currently there are differing opinions among experts regarding the net, net employment impact of these new technologies.

The primary purpose of this research is to review the literature on digital disruption in retailing and its impact on this key global industry and to summarize implications for assessing and forecasting likely impacts on this key industry. Of particular interest is understanding which forces are key to driving digital disruption and innovation in retailing and develop managerial insights.

This research reviews the academic and practitioner literature on current and future projected technological, consumer, and business trends in retail and discusses implications for retail strategy and execution, and potential governmental policy implications. In addition to examining the literature we use exploratory interviews with retail leaders, leading suppliers, retail trade associations and technology service providers about their thoughts on the speed and impact of disruption on retail evolution/revolution. Analysis will use existing models of technology and business model diffusion, together a discussion of how the current disrupted environment is different and/or similar to past technology disruptions. The expected impacts of retail disruption will also be examined using Teixeira (2019) model of industry disruption and potential impact on industry innovation. This research focuses mostly in the food/CPG and apparel industries given past research and access opportunities with industry leaders.

1.1. Innovation and Drivers of Change in Retailing

Lewis & Dart (2014) in their book about the *New Rules of Retail* describe four major waves of change in retailing. The first wave of change they labeled "Producer Power," it developed in the mid-19th century and lasted until the 1920's. The time was characterized by the move from rural to more urban locations stemming from the industry revolution and new technologies such as the telegraph and railroads which spurred the development of the first large scale retail chains such as Sears. It was also characterized by fragmented markets and a limited production capacity relative to demand. The second wave, "Demand Creation" was from about the 1920s until the 1980s. This second wave was focused on marketing and demand creation and led to the development of branding, infrastructure for mass markets, and a consumer economy. The third wave, "Consumer power" which followed was driven by globalization and a proliferation of brands, products, media and new competitors. The fourth Wave, "Technology Explosion" began in the early 2000's and is accelerating today. It is characterized by oversupply, increased discounting, and increased diversity of the population. Additionally, it is characterized by technology that is embedded in every business process leading to Industry 4.0 where our world is increasingly digitally interconnected and markets are being disrupted. Rifkin (2015) notes that in 2007 there 10 million sensors connected to the web, by 2013 that number had grown to 3.5 billion and it is estimated by 2030 the number of web enabled sensors will exceed 100 trillion.

In looking at common threads across these four waves of change, three key factors or drivers of change emerge. First is the influence of new technology for communication, transportation & infrastructure and business processes. Deloitte (2017) in its Global Powers of Retailing report also found these three factors as the key drivers of change in retailing. For example, new communication technology driving change over this period includes the telegraph, telephone, radio, television, mobile phones and the internet. Transportation technology includes railroads, the internal combustion engines which lead to autos, trucks and aircraft using integrated transportation networks. Infrastructure includes warehouses, electrical grid, and climate control, mass and "mass" custom production. These new technologies have been characterized by increasing productivity of production and distribution and increased interconnections between technologies leading to lower costs and increased consumer convenience.

A second driver of retail innovation is new forms of competition that evolved to offer consumers better value. These new forms of retail enterprises include grocery stores/super markets, department stores, specialty stores, discount stores, convenience stores, big box stores and a growing myriad of online options with a growing role of Omni-channel distribution. Rigby (2011) describes Omni-channel in the December issue of the *Harvard Business Review*, entitled, "The Future of Shopping," which described Omni-channel distribution as a system where, "retailers will be able to interact with customers through countless channels, such as websites, physical stores, kiosks, direct mail, catalogs, call centers, social media, mobile devices, gaming consoles, televisions, networked appliances, home services, and more." Omni-channel relies on an integration on new technologies deployed in a manner to give consumer's 24/7 access to products, information and communication. Online shopping which is currently about 10% of retail has been estimated to be about 40% by 2027, World Economic Forum (2017). Thus business capability is tightly linked to technological capabilities and the development of business models that have a new customer centric focus as opposed to a product centric focus.

A third driver, is changing consumer preferences. Consumer demand conditioned by new technology, new competitive forms along with societal changes is evolving at a rapid pace. Here changing demographics and consumer values are key drivers of changing consumer preferences. Arguably, changes in consumer demand are the most important of these drivers of retail evolution. Teixeira (2019) notes that it's not new technology or startups that causes market disruption, but that the real cause of disruption is changes in consumer demand. Technological inventions or new business models must be accepted by the market to become successful innovations. Thus key to

successful innovation is understanding the nature of demand and the preferences of consumers. The World Economic Forum (2017) conducted research on the future of retailing and concluded, “Consumers will be central to shaping the future direction of the industry. As their expectations around cost, choice, convenience, control and experience continue to climb, they will challenge the industry to keep up. At the same time, new and disruptive technologies will fundamentally impact the end-to-end industry value chain, benefitting both the industry and consumers.”

1.2. Innovation in Marketing: Understanding Consumer Demand

Court et al. (2009) introduced a new conceptual model to study consumer decision making. They labeled this new model, “The consumer decision journey (CDJ).” Their conceptualization was in response to a growing recognition that previous models (the funnel model) increasingly failed to capture what they described as, “all the touch points and key buying factors resulting from the explosion of product choices and digital channels, coupled with the emergence of an increasingly discerning, well-informed consumer.” See Figure One: The Consumer Decision Journey. In the decade since it was introduced this model has been widely accepted both in academia and in industry. Hamilton & Price (2019); Lemon, K. N., & P. C. Verhoef (2016). Finneman, Bo & Dave Elzinga (2017) report that Mckinsey has developed a database of over 125,000 consumer decision journey for over 350 products in over 30 different industries. They found the CDC model reflects a more complex reality of shifting choices, decision criteria, digital touchpoints important to consumers and key triggers. In particular, its critical for brands to be in a consumers initial consideration set, provide digital touchpoints and information at the right moments and provide trust/quality experience with a product or service.

Innovation in marketing plays an increasingly important role in value creation in the economy. Value has migrated from physical assets to intangible assets among many corporate enterprises today. Marketing assets such as brand are growing as a percentage of company market value, reflecting the role that marketing has in a world that is becoming more customer centric as opposed to product centric. Indeed, when looking at the personal wealth of the world’s most successful business people such as Bill Gates and Jeff Bezos it appears the source of their success lies not in technical innovation but innovation in marketing. Ungerman et al. (2018) studied the impact of marketing innovation and report that, “Business considers the greatest impact of innovative marketing in the context of Industry 4.0 to be the increase in enterprise competitiveness.” Key to marketing innovation is an understanding of how customers perceived value and how products and services are adopted into their lives. These perceptions of value and lifestyle represent a moving target for marketers and we need better processes to understand the needs of the market.

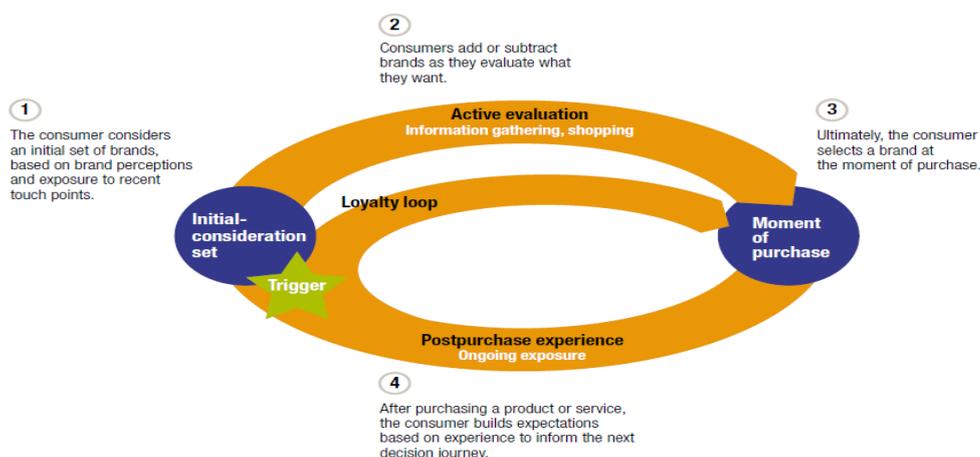


Figure 1 The consumer decision journey (McKinsey, 2009)

The stages of the CDJ (Awareness, evaluation, choosing, purchasing and consuming/experiencing) provide a rich framework which to study consumer processes throughout their journey experience. Increasingly firms develop detailed maps of the CDJ for different target customers and look to match marketing efforts (touch points) to guide and reinforce consumer associations of a positive experience with a brand. Insights from a better understanding of CDJ processes can be used to enhance the ability of a retailer to strengthen its business model to create, deliver and capture customer value.

Recently, Teixeira (2019) has created a process that builds on the framework of the CDJ that maps the “consumer value chain (CVC).” Where the value chain model developed by Michael Porter (1985) primarily targets a set of value creating activities of firms. Teixeira’s model is focused on understanding the value chain of consumers. For retailers, this approach offers the promise of a methodology to better understand how their customer receive value and the specific activities linked to value creation, delivery and capture. In Teixeira’s model he identifies (maps) all of the activities a consumer engages in during the entire consumption process journey and examines if these activities can be decoupled from each other. He argues that this decoupling of a consumer’s value chain has provided firms utilizing new technology and business models to disrupt incumbent firms and entire industries. An overview of this can be seen in Figure Two: A typical consumer’s value chain (CVC). Digital disruption has enabled new entrants in a market to unbundle, or decouple and recouple activities that contribute to consumer value in novel ways. Retailer value propositions that bundled activities across the CDJ process now face competitors whose business models have decoupled two or more of those customer value chain activities and re-coupled those activities into their own business models. An example of this using Figure Two is online retailers which target consumers who visit traditional bricks and mortar retailers (Best Buy) and use those stores as a showroom examining products, collecting information & sales advice and then finally purchasing products online from the disruptor retailer such as Amazon. Showrooming has become a major competitive threat for many traditional retailers given online business models that decouple the consumer value chain and consumer willingness to adapt their shopping behavior using digital tools. Another example, might be Uber where it has decoupled the consumer’s value chain (CVC) focusing on making it easy for consumers to purchase and then utilize its ridesharing service. Amazon provides another example, research shows that in the U.S.A. today more than 50% of consumer product searches begin on Amazon. Retailers would be well served to study consumer value chains for opportunities to create, deliver and capture customer value thus remaining relevant for consumers.

Teixeira (2019) below, describes this decoupling process as step three in the current wave a digital disruption which began with unbundling company value propositions leading to a second stage of disintermediation where new entrants eliminated intermediaries by going direct to consumers. Today, this third stage of **decoupling** of CVC activities allows new entrants the ability to create and capture customer value utilizing tools of disruption. It is critical for retailers to understand where opportunities to decouple and recouple consumer value exist.

1. “Unbundling, the first wave of digital disruption, began in about 1995. Newspapers, once a source for articles, classifieds, and restaurant reviews, saw readers slowly drift away to Google, Craigslist, and Yelp. “Start-ups at the time decided to unbundle the newspaper,” Teixeira said. “The product was unbundled, and the start-ups were offering their customers one part of the product.”
2. The second wave, disintermediation, began in the early 2000s and affected products that were a combination of digital and physical. Instead of going to a travel agent to book hotels, flights, and tour activities, consumers took the process into their own hands. “You, the consumer of travel services, started going directly to the providers,” he said.
3. Ten years later, it seems the third wave of disruption arrived. **Decoupling** is big, Teixeira explained, because it affects each step of the consumer’s purchasing process: evaluating, choosing, purchasing, and consuming.”

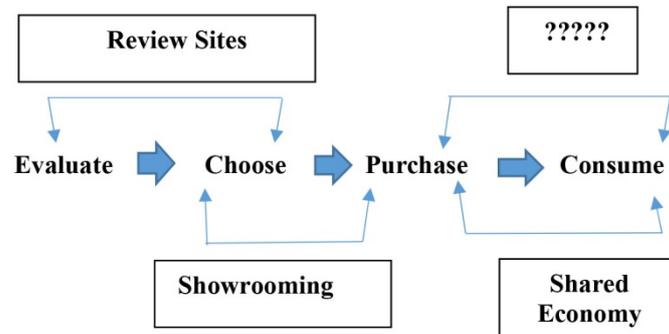


Figure 2 A Typical Consumers Value Chain (CVC): Digital Disruption enables firms to Decouple Customer Value Delivery, Teixeira (2019)

Retail examples of decoupling include, a woman walking the aisles of a Costco store in Portland, Oregon holding her smartphone to scan the products on the shelf while she narrates prices and opportunities to buy to thousands of online shoppers in China. In essence, she is providing a shopping service that has decoupled Costco's value proposition and recoupled it in a manner to provide value for consumers in China. How much value, this one woman has a million dollar per month business! Another example, is a retail company, also founded in Portland, called Hoopla Global which utilizes JD.com's shopping platform. Hoopla Global represents American manufacturers of CPG products wanting to sell in China, it maintains an online retail store on JD.com and actively promotes these products in China using a digital influencer strategy and ships using a "virtual free trade zone" model which in China features no tariffs, no special labeling, and direct delivery to Chinese customers from this virtual free trade zone. Additionally, Hoopla Global has created a backend digital supply chain using block chain technology that allows its vendors to easily prepare and ship their products to this virtual free trade zone in China. Thus it provides both demand-side and supply-side value to its customers. It has effectively decoupled CVC activities and recoupled them in a manner that provides greater customer value and greater operational efficiency.

Teixeira identified three types of decoupling:

- **Value-creating activity:** hearing a song you like on the radio.
- **Value-eroding activity:** hearing a song you don't like.
- **Value-capturing activity:** A promoted song or ad that the listener pays the station

The digital disruption stemming from Industry 4.0 largely comes from consumers adopting new technologies and new shopping behaviors from novel business models offered by both new market entrants and existing retailers with the foresight to reconfigure their business models in a customer centric manner. Yohn (2018) reports that a recent study among chief marketing officers (CMO's) found that only 14% believe that their companies are acting in a customer centric manner and even fewer of their customers (11%) would describe them as customer centric. She argues that company culture is critical to achieving a customer centric business and describes a process for building a customer centric culture. To understand and unlock the customer value chain a customer centric as opposed to a product centric or a sales centric orientation is critically important. Amazon is often used as an example of a customer centric business whose organization structure and culture is designed around providing customer value. Managing with a customer centric perspective views customers as a valuable firm asset and seeks to manage to maximize lifetime customer value.

Technology has become an important tool in driving CVC decoupling and allowing firms to recouple value producing activities in novel ways. We will now overview a number of technologies

that are having an impact or potential impact on the customer's value chain. Recently, many of the large technology companies such as Microsoft, IBM, Intel have created experience centers or divisions focused on providing examples of technology for retailers. Figure Three overviews some of the instore shopping technology from IBM. We visited Microsoft's Retail Experience Center which exhibits an array of retailer technologies using the CDJ process to organize. Recently, Microsoft has been forming alliances with retailers such as Kroger to speed the deployment of technology into the retailers and their customer's value chain.

Teixeira (2019) identified five steps that disruptors take to decouple the consumer journey:

1. **Identify the consumption chain.** "Look at their customers to see what they're doing to get these products."
2. **Look at the weak link.** "Where are customers satisfied with the activities?"
3. **Identify the type of the adjacent activities.** "Are these value-creating, capturing, or eroding activities?"
4. **Increase the force of specialization.** "Reducing the monetary the effort or the time cost for the customer."
5. **Anticipate the competitor response.**



Figure 3 Retail Changes coming from the IoT

<https://www.ibm.com/blogs/internet-of-things/iot-transforming-retail-industry/>

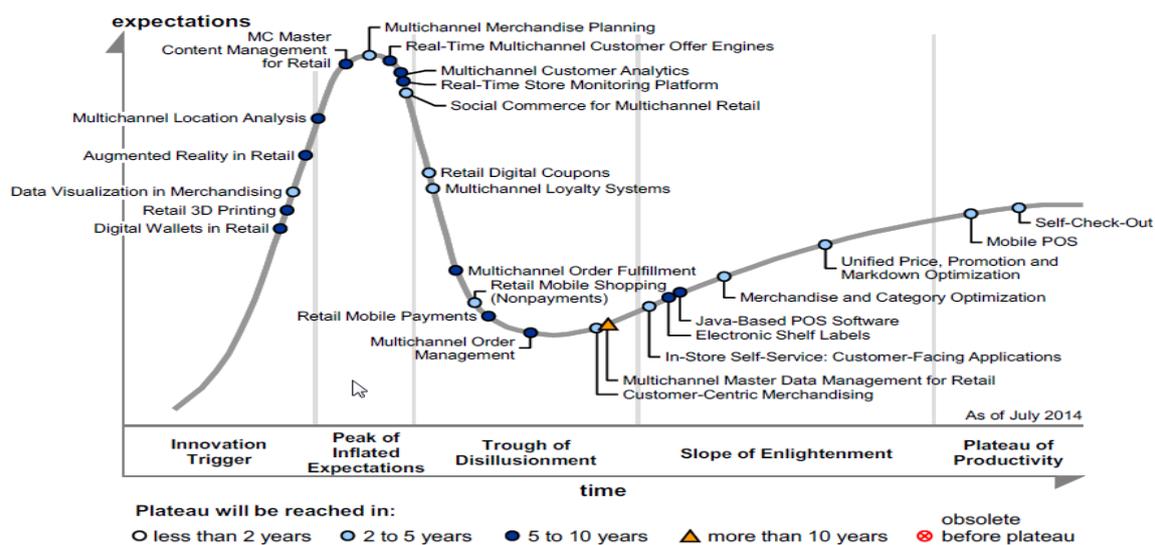
There are literally thousands of novel new technologies that are vying to create value for retailers and their customers. These technology stretch across both the retailers and the customers value chains. Examples include robotics deployed both in the supply chain and consumer facing in stores and online, data analytic models that use big data and machine learning, smart sensors and displays throughout the supply chain, AI deployed as management and customer interfacing tool. Gillpatrick and Blunck (2019) describe many of these technologies in a recent review. Key to whether these technologies can contribute value to consumer by ultimately lowering their costs or by improving the shopping experience. The Gartner group has developed a model that overviews new technologies and their stage of market acceptance, Figure Four overviews technology adoption in retail.

In the retail world new entrants have entered the market and have built share by lowering customer costs and providing customer convenience. New competitors like Bonobos and Warby Parker have offer customers value by providing convenience of in-home shopping, reducing shopper search costs and acquisition costs in the process. Disruptors often enter at the extremes of customer value perceptions by providing superior experiences or lower costs driving some traditional retailers to become, "stuck-in-the middle" as Porter (1985) would describe where their value propositions are diminished by passionate shoppers searching for lower costs or better

service experience or both. These “stuck-in-the-middle” retailers are disappearing from the competitive landscape at an increasing rate. An example is the struggles of the once might department stores such as Sears, Macy’s and JC Penny. In all cases the customer’s role in driving retail innovation through changing shopping behavior is critical. Following consumer trends has never been so important than it is today’s rapidly changing world of consumer preferences

Keeping up with consumer, technology and business model trends is a daunting task for retailers and all firms today.

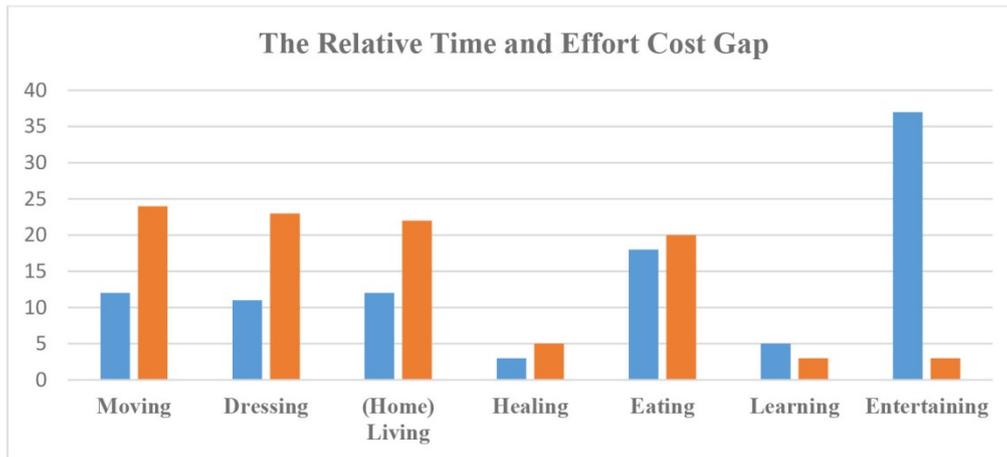
Teixeira (2019) proposes a novel way to monitor changes in the consumer value chain. While there are hundreds of industry market classifications detailed in census data, he observes only seven of these account for the vast majority of consumer consumption. Additionally, because of the size and prominence of these leading industry categories they impact most other industries as well. He believes that following current trends in these seven can provide an accurate barometer of how to prepare for future trends in consumer preferences and shopping behavior



source: Gartner (July 2014)

Figure 4 Gartner Group Hyper Cycle for new Retail Technologies (2014)
<https://www.gartner.com/en/documents/3883976>

So what are these key consumer industries? He identifies them in terms of categories that reflect the choices we make on how we live or lives. These include choices about where we live (housing and home goods), mobility (transportation), eating (food, drinks and preparation), what to wear (fashion, cosmetics and personal care), learning (education), entertainment (media, sports, electronics) and healthcare. In total, these seven categories make up 97% of consumption in America. He then uses U.S. Bureau of Labor Statistics data which has been collecting consumer data on how we consumer our time to determine an estimate of the amount of effort consumers expend each week in the seven consumption categories. Figure Five: below, describes how consumers spend their discretionary time after sleeping and working. The biggest allocation of times goes into entertainment about 39% of discretionary time allocation. However, effort spent to acquire this time for entertainment is relatively small as seen in the Figure below. Where there is a relatively high amount of effort required relative to the time spent in a category may be an indicator of potential for disruption according to Teixeira. For example, there is a large amount of effort required for moving about (transportation) he argues that business models that reduce consumer efforts (consumer costs) here may offer high potential for disruption.



Note: % Effort spent sums to 100 percent and % total time sums to 100 percent.

Source: Adapted from U.S. Bureau of Labor Statistics, darker bars represent total time, lighter represent effort.

Figure 5 Relative amount of time and effort spent in major consumer consumption categories, Teixeira (2019) p. 266.

2. DISCUSSION

In reviewing both the academic literature and the trade literature in retailing there is a general consensus that retailing is entering an era of profound change where existing business models and consumer habits are being disrupted by new technology and new retailers using innovative competitive formats. The World Economic Forum (2017) estimates that over the next decade that approximately over 90% of the growth in retail will come from online sales. That same research estimates that adaptation of Industry 4.0 technologies could unlock nearly three trillion dollars in value to retailers over that decade due to increased consumer benefits and business cost savings. Of that total amount it estimates that the consumer impact will comprise about 68% of the total benefits with the other 32% going to industry that amounts to over a two trillion dollar benefit to consumers over the next decade.

As shown in Figure Four above there are a plethora of new technologies that are expected to impact retailers and consumers. Among those technologies Accenture and the World Economic Forum (2017) estimate that four will have the greatest impact on retailers:

1. **Internet of Things** will drive a high business value as it secures proprietary consumer data to create personalized experiences in connected stores, and delivers cost efficiencies in inventory-management. It will revolutionize the in-store experience for both consumers and organizations, providing unparalleled insights based on the data collected. Shaping the Future of Retail for Consumer Industries
2. **Autonomous vehicles/drones** will bring cost savings from automated long-haul trucking of goods and last-mile delivery. These developments will also increase utilization, make deliveries faster and improve road safety.
3. **Artificial Intelligence/machine learning** can increase revenues through a deeper understanding of consumer behavior, while saving costs associated with supply chain optimization. In-store pricing and assortments will be optimized and, when combined with predictive recommendations, will clearly benefit consumers and the organization itself.
4. **Robotics** will drive cost savings through operational efficiencies, primarily in warehousing and distribution. Software bots can also work faster to complete simple and repetitive

tasks. Robotics will enable higher utilization, greater flexibility, improved accuracy and faster transaction times.”

Along with new technology the retail and entrepreneurial world is bubbling with new transformative business models that deploy new process and new technology to offer consumers greater value in their lives as well as to reduce retail costs. The merging of online and offline retail models with integration of technology from Industry 4.0 using Omni-channel and another innovative business models will have profound impacts on which retailers thrive and which vanish from the competitive landscape. Increasing firms are looking to decouple the consumer value chain through the use of shopping apps and retail models that disrupt the business models of retail incumbents and provide value enhancements for shoppers. *Bloomberg* (2019) reports that the company - which shook up the Swiss watch world years ago by creating an affordable, fashion-forward brand - “is setting up a drive-through store where it will sell products from its namesake label packed in burger boxes and brown paper bags.” The store will be next to the company’s headquarters in Biel, Switzerland, but “while Swatch plans just one drive-through site in the out-of-the-way city for now, the move shows how the brand is trying to inject novelty into the buying process. After years of insisting that customers prefer the boutique experience before splurging, Swiss watchmakers have been revamping retail networks as consumers increasingly search for and buy products online.” Other examples of the evolution of retail business were given the World Economic Forum report (2017) to impact three areas of retail most significantly. The customer experience, technology like AI/AR will enable a greater degree of personalization and there will be an increased focus instore on customer experience and as a showroom. A second trend will be a new era of consumer facing employees and technologies including the use of AI and greatly increased use of robots. And there is a good deal of discussion today about repurposing retail stores and malls as places of social interaction- lifestyle centers. Indeed recent research reports that in America Gen Z consumers, sometimes referred to as “Digital Natives” prefer in person retail encounters and shopping malls more than their parents. *Field Agent* (2019)

But while the trends of new technologies and business models in retailing are pervasive and indeed game-changing. This review of the literature on Industry 4.0 and retail innovation has identified that trends in buyer behavior are the most critical factor driving the evolution of retailing today and into the future. Innovations in marketing are the key value driver for business and for consumers. *Ungerma et al.* (2018) define “marketing innovation as doing something fundamentally new with ideas, products, services, or technologies based on market-based ideas that stem from a variety of customer desires.” The challenge for retailers, technology providers and investors as well as government policy makers is how to predict the evolving preferences and desires of consumers.

3. CONCLUSIONS

The stakes are big. In the USA fully a quarter of the workforce is tied to retailing and globally millions more. Retail real estate represents trillions of dollars in investment, just in America. In a recent interview with real estate investors regarding retail properties the number one topic of interest was better information about how consumer will adapt their shopping habits in the future. Market volatility of retail stocks has increased with winners and losers. Industry 4.0 initiatives have the likely potential to transform our lives and economy. Business and government has not well prepared for the impacts of Industry 4.0 according to surveys of executives and policy makers.

Traditional marketing models used to understand consumer behavior have proven to be less useful and have led to the development of new models such as the Consumer Decision Journal and Consumer Value Chain models. Consumer shopping and purchase behavior is rapidly evolving with increased preferences for shared consumption over ownership, use of mobile technology, consumer co-creation of value, online shopping and an increased preference for experiences over

material things among the many changes in preferences. Teixeira (2019) has presented an innovative marketing approach to estimating consumer preference trends and which type of innovation may be forecasted as most valuable for consumers. Moeller et al. (2018) state, "The constraint for your company will not be the technology. It will be your ability to bring the three drivers to bear: to lower costs, engage customers, and make better use of assets. If you can employ digital technology to do that effectively, you will be among the winners of the age of digital disruption." This research also calls for the development of new ways to understand consumer preferences and the evolution of those preferences. Initiatives such as MITs "Open Voice Network," which seeks to better understand technology, policy and consumer preferences for the use of voice technology (i.e. Alexa; Google Home) and engages both universities and industry should be encouraged. Organizations and policy makers need to address as well the impact of retail and society brought about from Industry 4.0. The World Economic Forum (2017) research found that over 68% of the nearly three trillion dollars of value created by Industry 4.0 in retail industries flows to consumers which demonstrates the need to better anticipate and understand how consumer receive value. Both companies and public policy makers need to "follow the consumer" to extract maximum value from new technologies, business forms and the evolution of buyer needs.

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