

The Impact of Robotics on E-commerce, and the Challenge of Delivering Great CX

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Abstract

As now is the real time to control and use effectively the full potential of Industry 4.0 and Industry 5.0, to consider Robotics, IoT and Artificial Intelligence, and the challenge of fulfilling extremely fast and with high precision the increasing ecommerce demand. Ecommerce sector growth is a driving force behind the obvious trend of embracing Robotics and Automation. It is important to better understand both how ecommerce impacted by robotic automation is engaging buyers in personalized digital experiences in a knowledgeable and insightful way, and the impact of developing and employing robotics on last-mile delivery. Considering both digital disruption and digital opportunities, now it's time to deliver a frictionless CX, based on CX solutions playing well in an API-first world.

Keywords: E-commerce; Robotics; Industry 4.0; Industry 5.0; Artificial Intelligence; Automation; CX

JEL Classification: D83; L81; L86; M15; M31; O32; O33

Industry 4.0 and Industry 5.0. Robotics, IoT and Artificial Intelligence, and the challenge of fulfilling extremely fast and with high precision the increasing ecommerce demand

In our last HMM issue we underlined the significant marketers' preoccupations represented today by ecommerce within the continuous digital transformation, including the pressure of seamlessly connecting the mobile customer experience (CX) with the in-store experience, combining personalization with automation (Purcarea, 2021). At the end of 2020, we approached the connection between the digital transformation and the impact on e-commerce of

the disruptive technologies which are the supporting structure of the Industry 4.0, highlighting the need of better understanding digital transformation (as a blending of process knowledge, intelligent automation, and data, valuing and mastering data and content through these disruptive technologies), showing not only that a growing trend in ecommerce is a level of automatic customization called personalization, but also both the increasing importance of robots enabling warehouses to scale operations in the e-commerce fulfilment market, and the opportunity of better answering the specific needs of ecommerce packaging with the help of new robot technology (Purcarea, 2020). At mid-February 2021, European Commission published the policy options to deal with “Industry 5.0. Towards a sustainable, human-centric and resilient European industry”, showing that Industry 5.0 (having its roots in the concept of Industry 4.0 and complementing the existing Industry 4.0 paradigm) makes the effort to complete the difficult task of capturing new technologies’ value (in close association with both providing prosperity beyond jobs and growth, respecting at the same time planetary boundaries, and placing at the center of the production process the wellbeing of the industry worker), technologies needing to serve people, and workers needing to be closely involved in the design and deployment of these technologies, including robotics and artificial intelligence (AI).

The obvious innovative evolution of robotics, automation, and the Internet of Things (IoT) is continuing to impact the Fourth Industrial Revolution also known as Industry 4.0 (Robotics & Automation News, 2021). The robotics industry is now revolutionized by the Industry 4.0 technology (new computer technology like industrial IoT devices and AI algorithms making possible: Real-Time Operational Monitoring, Predictive Maintenance, Collaborative Robots (Cobots), Machine Vision, Autonomous Robotics), enabling including new collaborative robotics technologies (Partida, 2021). Recently (Edwards, 2021), the Sales Manager at GreyOrange (a US global technology company unifying AI-driven software and mobile robotics to modernize order fulfillment and optimize warehouse operations in real time) told Robotics and Automation News (established in May, 2015, and covering the robotics and automation industries around the world) that: *“End customers are demanding more from their eCommerce engagements with our research revealing that almost half of consumers expect their online orders to be delivered within two days... Web shops and retail organisations can’t afford to fall behind when it comes to delivery times because if orders are late, customers will take their business elsewhere... GreyOrange’s multi-purpose robots empower Active Ants to deliver faster and more accurate e-fulfilment services for customers and adapt their processes as market dynamics change and consumer demands grow”*. The above statement was made within the context of the expansion by GreyOrange of its GreyMatter operating system and Ranger MoveSmart robots (see also the figure below) in Active Ants’ e-fulfilment centre in Willebroek, Belgium. Active Ants fulfilment center in The Netherlands (known as storing, packing and distributing goods for more than 5 million annual orders for over 250 retailers) was already using GreyOrange Fulfilment Operating System as fully integrated software and robots solution that has already proved its performance also in the provision by Active Ants of warehousing services to ecommerce companies across Europe.

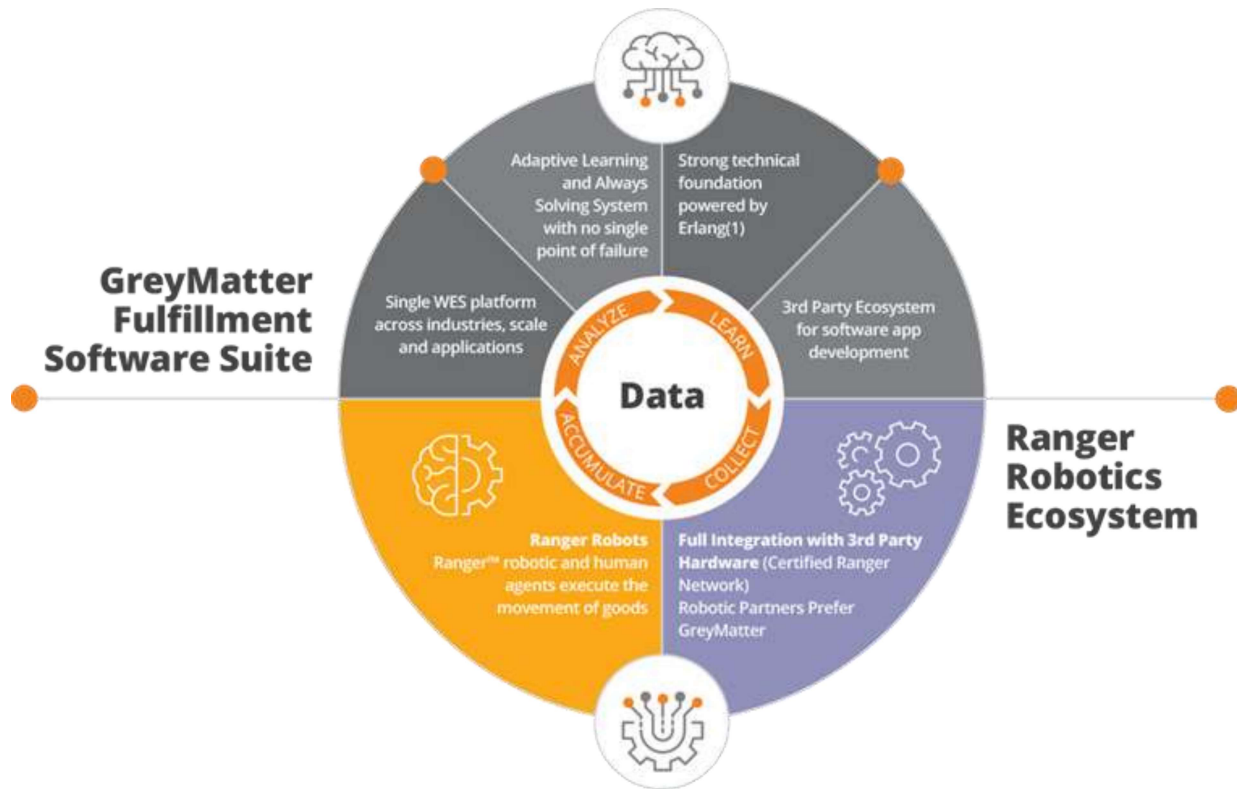


Figure no. 1: GreyOrange combined AI-driven cloud software and smart robotic automation. GreyMatter™ Software's real-time decisioning drives dynamic, responsive orchestration for faster speed to fulfill and promises made, promises kept. Advanced fulfillment science enables GreyMatter™ to instantaneously evaluate order data and compose best decisions in real-time to efficiently orchestrate people, processes, and robots.

Source: GreyOrange, 2021. Welcome to the age of immediacy. [online] Available at: <<https://www.greyorange.com/products/fos-overview/>> [Accessed 16 October 2021].

At the end of last year, Gheorghiu (2020) brought to other attention that within the extremely strong competition in ecommerce accelerated by COVID-19 pandemic CX is a differentiating factor, hence the need to hyper-personalization (in order to customize the buyer experience by AI), the proof in this regard being the significant increase in traffic in 2020 experienced by G2's E-commerce Personalization category (G2.com being the largest and most trusted software marketplace), also a significant traffic increase since April 2020 being experienced by G2's E-commerce Data Integration category, ecommerce data being critical for companies (to better track sales and identify new opportunities), and consumers (to make better decisions). As argued by Gheorghiu: the fact that the Drop Shipping software category experienced the highest increase in traffic in 2020 (see the figure below) shows that also the post-buying experience is essential when approaching personalization; the cost of the products and services (along with shipping, returns, exchanges etc.) is another CX factor needing to be treated rigorously (and not overlooked), hence the recommendation to use including advanced technology (comparing multiple options) to keep these costs low.

62 E-commerce Categories Traffic Growth in 2020

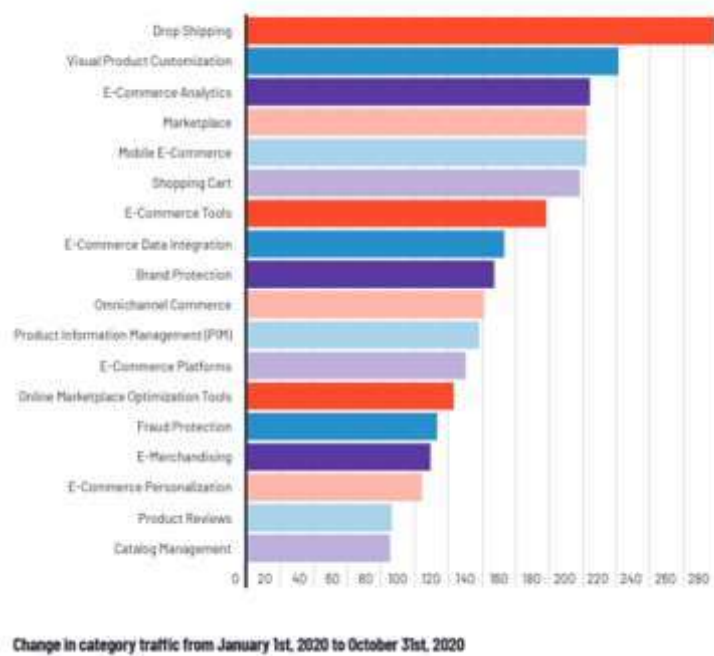


Figure no. 2: G2 E-commerce Categories Traffic Growth in 2020

Source: Gheorghiu, G. 2020. Trends in E-Commerce and Industry 4.0, G2, December 8 (work cited)

There is no doubt that today's e-commerce landscape forces supply chains to meet faster service levels and overcome labor challenges confronted with intense cost pressures (Mohan, 2021). According to an August 2021 white paper by Reuters Events (Hadwick, 2021) in partnership with A.P. Moller - Maersk (an integrated transport and logistics company), within the context in which the global retail ecommerce sales took on a stratospheric trajectory (increasing by 25.7% in 2020, and being expected to climb a further 16.8%, according to eMarketer estimates), while the global ecommerce logistics market is expected to grow at a compound annual growth rate (CAGR) of 8.6% between 2020-2025 (according to a report by Transport Intelligence/Ti, the leading provider of market research solutions to the global logistics industry, Ti also estimating that: costs of last-mile services are representing 53% of logistics costs, with fulfilment accounting for the other 47%; as customers are looking to get same or next day delivery, there is a significant need for investment driven by the costs of fulfilling ecommerce, mainly in the last mile), there is a real challenge to optimize omnichannel fulfilment processes (exceeding the current low levels recorded until now) even on the North American relevant competitive retail market (see the figure below), by deploying automated and collaborative systems that enhance the productivity of each distribution network facility (considering the more reduced cost for individual robotic systems over recent years, the systems better fitting into an operation, with the various solutions offered by more and more competitive third parties offering and the ascent of robotics-as-a-service), and fulfilling extremely fast and with high precision the increasing ecommerce demand.

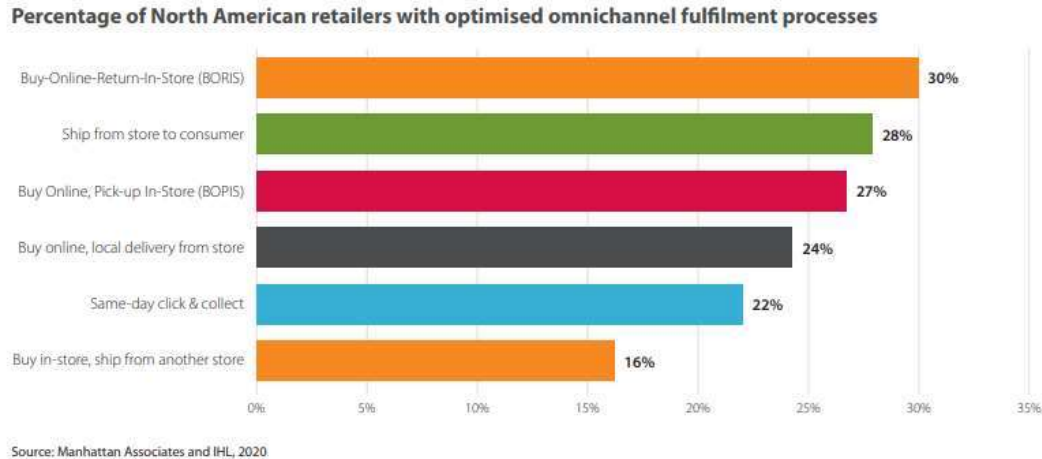


Figure no. 3: Percentage of North American retailers with optimized omnichannel fulfilment processes, Manhattan Associates and IHL, 2020

Source: Hadwick, A., 2021. Why is greater flexibility in warehouse and distribution operations so critical to omnichannel supply chain performance? [pdf], Reuters Events in partnership with AP Moller-Maersk, White Paper, p. 13 (work cited)

The above-mentioned white paper also highlighted the need of digitalizing inventory (seen in transition to storage facilities, being held here and heading towards the customer), and this way both increasing delivery estimates' accuracy, and enhancing CX, what involves prioritizing warehouse technologies for investment, as shown in the figure below.

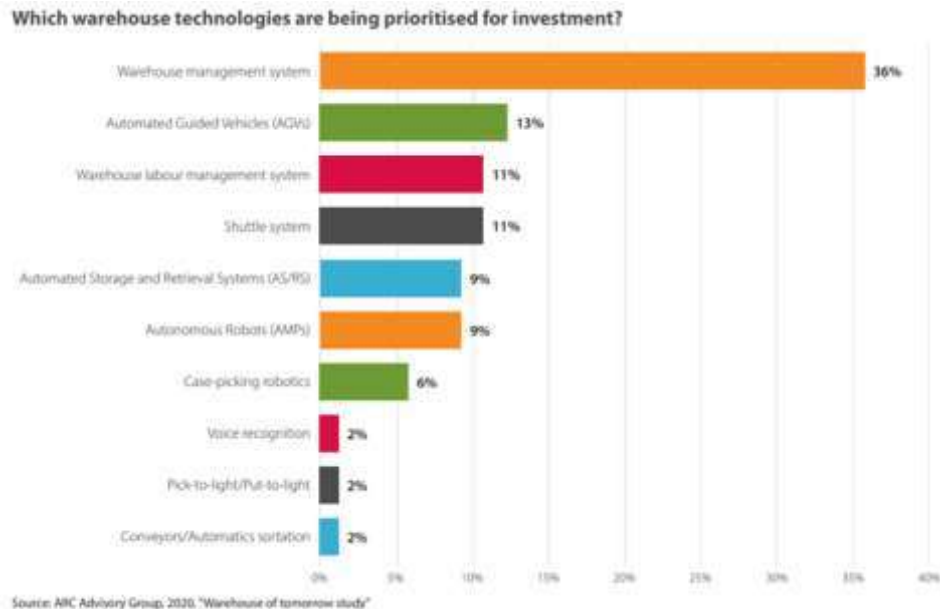


Figure no. 4: Which warehouse technologies are prioritized for investment, ARC Advisory Group 2020, "Warehouse of tomorrow study"

Source: Hadwick, A., 2021. Why is greater flexibility in warehouse and distribution operations so critical to omnichannel supply chain performance? [pdf], Reuters Events in partnership with AP Moller-Maersk, White Paper, p. 23 (work cited)

In September 2021, The Robot Report announced the partnership between Berkshire Grey, Inc. (recognized as having AI-powered robotic solutions which are setting the industry standard) and Advanced Handling Systems (AHS, an established leader in traditional material handling), in order to deliver the next generation warehouse robotics to the world's largest and best-known eCommerce and 3PL providers, confirming this way the continuous improvement across eCommerce and 3PL industries fulfillment.

Using ecommerce chatbots to create great CX. Ecommerce sector growth as a driving force behind the obvious trend of embracing automation. How ecommerce impacted by robotic automation is engaging buyers in personalized digital experiences in a knowledgeable and insightful way

At the beginning of the 2021, a Data Scientist underlined the increase in blending CRM software with AI-powered sales automation algorithms, illustrating by giving various examples including with AI algorithms running on online stores, and making reference to AI-powered chatbots (Muzamhindo, 2021). According to Engati, a leading CX platform powered by conversational automation & intelligence, as a type of software automating conversations and interacting with people through messaging platforms, chatbots (menu/button-based, linguistic based, keyword recognition-based, machine learning, voice bots) have endless capabilities (there are advanced capabilities such as: intelligent understanding, memory, sentiment analysis, personality, persistence, topic switching) and can benefit various industries as shown in the figure below (Engati Team, a 2021).

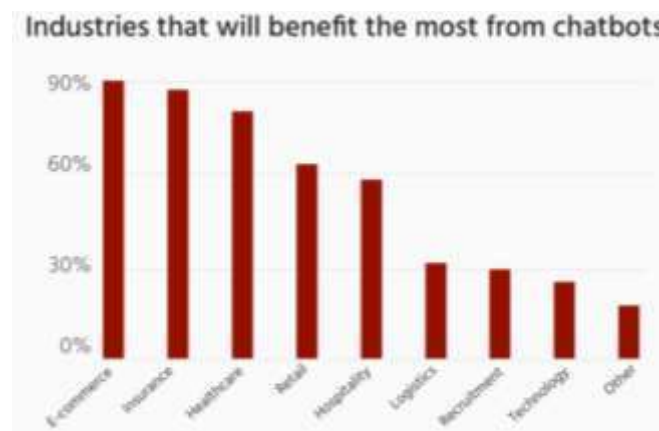


Figure no. 5: Industries that will benefit the most from chatbots

Source: Engati Team, 2021. What are Chatbots? How do Chatbots work? Top 10 applications, Jul 6 (work cited)

Also as demonstrated by Engati, in ecommerce there are both obvious chatbot functions (like finding products, sending offers, rescuing abandoned carts, sharing shipping information, customer service), and significant tasks for chatbots (like upselling products, conducting market research, handling transactions, providing information, advertising), a lot of reputed companies

being well-known also for how they are using ecommerce chatbots to create great CX (Engati Team b, 2021). There is also no doubt about the benefits for an eCommerce store provided by conversational AI (like personalizing services, recording real-time interactions, providing right customer support, acting as the perfect knowledge base, generating sales with story-telling, driving lead generation and email marketing, collecting feedback, providing metrics etc.), eCommerce platforms working better based on information collected with the help of an AI-based eCommerce chatbot with regard to the users' details utilized correctly and intensifying CX accordingly (Engati Team c, 2021). On the other hand, it is also worth mentioning within this framework the development by the reputed UPS of AI-powered chatbots to help their customers with simple requests for information (concerning parcel tracking, shipping rates, retail locations etc.), the data from these applications being fed directly into the so-called Network Planning Tools (NPTs, which are consisting of IoT sensors, cameras and a state-of-the-art big data solution), and after synthesis and analysis used in the end to optimize their customers' journey (Mixon, 2021).

In February 2021, Meili Robots let us know within the clear impact of digitalization reflected in the retail industry that: ecommerce sector growth is one of the driving forces behind the obvious trend of embracing automation at an increasing rate by warehouses and distribution centers; the largest market share in the material handling equipment industry is held by ecommerce, being expected that until 2025 the percentage of material handling equipment revenues for ecommerce applications will be at a compound annual growth rate (CAGR) of 8%. In May 2021, FANUC America Corporation (the leading supplier of robots, Computer Numerical Control/CNC systems and factory automation) remembered how ecommerce is impacted by robotic automation (McElmurry, 2021), starting from the linkage between the distribution channel and the specific application niche a robotic solution is designed to fill, and continuing, among other aspects, with: the increasing number of robots and other technologies used now in e-commerce (knowing that it includes currently picking, placing and other material handling processes) for a variety of fulfillment tasks, including, for example, the direct to customer ecommerce order (end-of-line, mixed-order or homogeneous robotic palletizing applications); the fact that some type of machine vision is required by most of the applications in ecommerce/fulfillment, more opportunities for both expanding companies' capabilities, and making the difficulty of dealing with high levels of product variability easier being provided by AI and its subset Machine Learning; some significant solutions offered by FANUC, namely FANUC's iRVision 3D Area Sensor which can provide very quick and reliable part detection for ecommerce applications such as de-palletizing (automated unloading of a loaded object in the reverse pattern, A/N) and bin picking (a robotic manipulation task involving removing individual parts from a container using sensors and a 3D camera, A/N).

According to 2021 Edison Trends U.S. Convenience Store Delivery Sales Report (which analyzed over 28,000 transactions in the U.S. from the top delivery apps), the overall online consumer spend at U.S. convenience stores (following the COVID-19 pandemic home delivery

become the norm) grew last year (in the on-demand delivery service market 2020 has been seen as a year of consolidation and convergence among top players) 346%, grocery 121% and restaurant 112%, the leader (in January 2021) in spending on convenience store delivery since September 2020 being DoorDash, as shown in the figure below (Edison Trends, 2021).

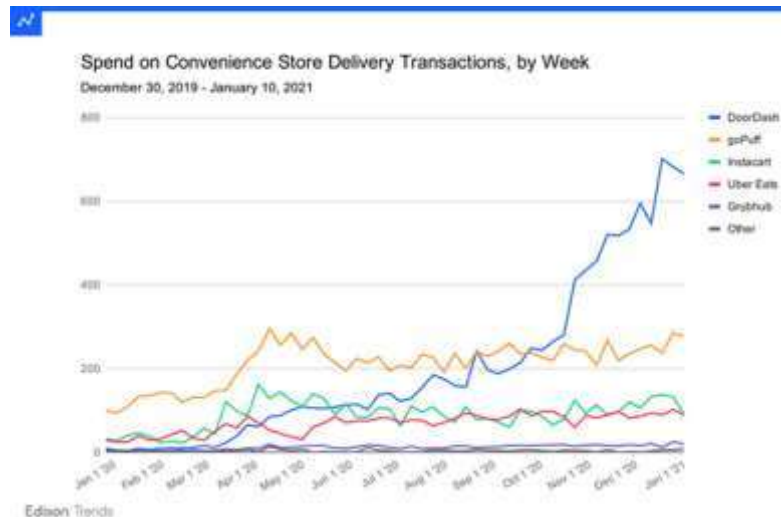


Figure no. 6: Spend on convenience store delivery transactions, by week, December 30, 2019 – January 10, 2021

Source: Edison Trends, 2021. 2021 Edison Trends U.S. Convenience Store Delivery Sales Report, January 28 (work cited)

At mid-April this year, Progressive Grocer (Troy, 2021) highlighted the beginning of the supermarket giant Kroger's first 2 robotic fulfillment centers operations within its new ecommerce ecosystem, after a 116% increase in 2020 (resulting in ecommerce sales of \$10 billion) Kroger expecting to double by the end of 2023 its e-commerce grocery sales, Kroger's technologically advanced grocery e-commerce infrastructure transforming its business model, including through the introduction of first-of-its-kind technology in the U.S. developed by Ocado, a technology-led global software and robotics platform business, which is providing a unique E2E solution for online grocery (considering the advantages of the network of large Ocado-powered automated customer fulfillment center fulfilling online grocer orders compared to already traditional pickers in stores). While more recently, at mid-September, Trend Hunter (Pajkovic, 2021) brought our attention to the alliance between Kroger and Instacart in order to make operational the launch of the so-called Kroger Delivery Now, an ultra-fast grocery delivery service promising to bring Kroger shoppers' orders in thirty minutes or less. On 20 September, 2021 we found out from Retail Brew - Morning Brew (Gray, 2021) that Locus Robotics (which makes autonomous mobile robots/AMR for fulfillment warehouses), is acquiring another industry leader in AMRs, Waypoint Robotics, this acquisition (made within the context in which robotic automation will be driven by the explosion of online ordering and supply chain challenges) strengthening Locus's ecommerce, case-picking (when product is picked in full case

or carton quantities from a variety of storage mediums), and pallet-picking (when product is stored in racks or sits on the floor) operations and tools.

At the end of September 2021, Supermarket News (Redman a, 2021) informed about Amazon move (as parent company which notified Whole Foods customers) of instituting the \$9.95 same-day, online grocery delivery fee across Whole Foods chain starting Oct. 25 (with additional rush fees for one-hour delivery orders from Whole Foods Market online shoppers). And at the beginning of October this year, TechCrunch (Bellan, 2021) made known Tortoise major shift toward robotic delivery, the expansion by Tortoise of its remote-controlled delivery robots (serving Tortoise's retail customers having access to its flexible APIs and web portals from urban to exurban, and from last-mile to middle-mile delivery) to convenience store chains (which are selling instant need common foods and general merchandise) across the U.S. being based on both new two-year strategic partnership with King Retail Solutions, and recent partnerships with AxelHire (a last-mile logistics supplier), Shoprite (a grocery chain) and Choice Market (a convenience store brand). While on October 12 this year, Supermarket News (Redman b, 2021) also showed how Kroger's products are expected to be expanded to a larger geographic market presence by bringing Ocado's world-leading technology to Kroger customers (who are placing their orders via Kroger.com or the Kroger mobile app) across the U.S. As revealed on the occasion of some recent traditional RetailWire's discussions:

- (Stern, 2021) In order to keep their convenience advantage the convenience stores need robots (like those for last-mile delivery) which are enabling both consumer demand for speed, and ease to drive online growth (as shown by L. Goller, Content marketing strategist); social acceptance, profitability, and logistics are representing real challenges with regard to this robotic delivery capability (as shown by A. Chakravarty, Retail thought leader);

- (Tenser, 2021) Kroger will be enabled to deliver on its promises of omnichannel fulfillment by the micro-fulfillment centers (also known as sheds) able to robotically pick, pack, and make ready pickup or delivery (automated fulfillment) solving the challenge of ensuring consumers' instant gratification (as shown by K. Morris, Managing Partner Cambridge Retail Advisors); as the fulfillment system is stressed by the increasing ecommerce (and also by both the necessary inventory's reallocation based on trembling supply chain structures, and pandemic uncertain environment), one of the key success factors at grocery retail will be the automated fulfillment system (as shown by M. Price, Managing Partner, Smart Data Solutions, ThreeBridge);

- (Anderson a, 2021): Successful omnichannel retailing can be approached by at least two paths, using to maximum advantage a big physical geographic market presence into ecommerce and related services like buy online, pick up in-store (BOPIS), one hand, and on the other hand, as in the case of the alliance between Kroger and Ocado (or in the case of Amazon and other websites opening storefronts) transitioning from online-only to physical stores (as shown by D. Seesel, Principal, Retailing In Focus LLC); Kroger set new benchmarks by partnering with

Ocado's robotics platform business, and combining their recognized competitive advantages, within the context in which the penetration of ecommerce is reaching more than 75 percent of U.S. shoppers in total, and approximately 80 percent young and affluent U.S. shoppers (as shown by Brian Cluster, Director of Industry Strategy - CPG & Retail, Stibo Systems).

Some of the retail industry's biggest players included in the 2021 U.S. NRF Top 100 list, like Walmart, Amazon, Kroger, Target, Best Buy etc. (NRF, 2021) are well-known as continuing to increase their healthcare offerings. Best Buy (2021), for instance, announced recently the signing of an agreement to acquire Current Health, a leading care-at-home technology platform which assembles remote patient (Intensive Care Unit-accurate wearable) monitoring, telehealth, and patient engagement into a single solution (ensuring precise early warning alerts and video visits) so as to manage all care in the patient home. This new acquisition made by Best Buy come after three (GreatCall, Critical Signal Technologies, and BioSensics) other acquisitions in recent times (Anderson b, 2021). In response to the COVID-19 pandemic, as demonstrated by McKinsey's representatives (Dörner et al., 2021), companies around the world were turning around e-commerce, for instance e-commerce sales increasing significantly in the United States, while in China being expected that the majority of the consumers will continue to buy groceries online after the maximal point of the current unprecedented crisis. In May 2021, eMarketer (Lebow, 2021) made a top list of (15) US companies ranked by retail ecommerce sales growth, as shown in the figure below:

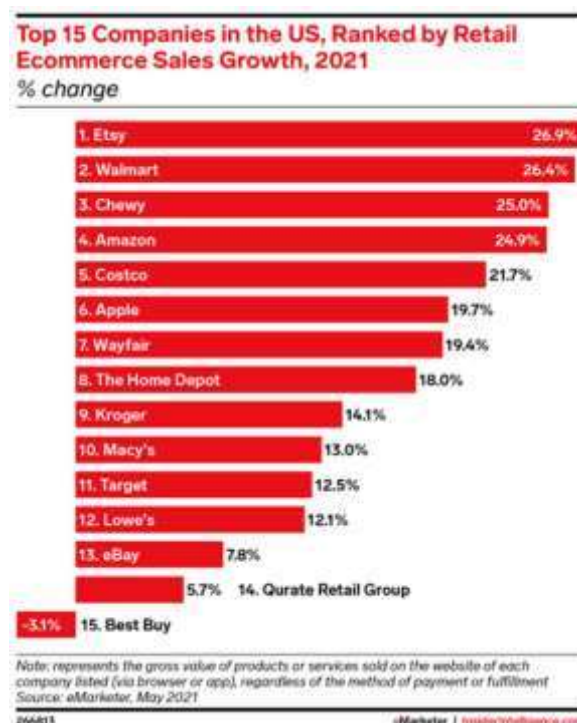


Figure no. 7: Top 15 Companies in the US, Ranked by Retail Ecommerce Sales Growth

Source: Lebow, S., 2021. The top 15 US companies in retail ecommerce sales growth, eMarketer, Jul 29 (work cited)

The world's largest online and mobile commerce company Alibaba Group considers that the fulfillment of the rapidly increasing demand, across the world's largest consumption market (China), for online shopping can be better addressed with the help of a fleet of robots, being known the deploying this year of 1,000 delivery robots so-called Xiaomanlv ("small donkey") across Chinese university campuses and urban communities (Tudor Ackroyd and Li, 2021). As shown by Tudor Ackroyd and Li (who are also underlining that most packages globally are still handled by delivery companies like FedEx and UPS), within the context in which ecommerce is facing this full of difficulties and complications problem of last-mile delivery, the solution represented by these performant Alibaba's robots (whose auto-driving algorithm allows managing without human intervention, the confirmation test result indicating Level 4, meaning a high degree of automation, on a scale of Levels 0 to 5) is in accordance with consumers' higher expectations concerning to not have to walk for miles to get a package that can be brought by autonomous mobile robots.

The impact of developing and employing robotics on last-mile delivery

On April 29, 2021, Madeleine Hillyer, Media Relations, World Economic Forum (WEF), highlighted the acceleration of the rise in online shopping and ecommerce deliveries caused by COVID-19 that shifted the way people buy goods, and made reference to the WEF new report ("Pandemic, Parcels and Public Vaccination: Envisioning the Next Normal for the Last-Mile Ecosystem"), in which was showed that: the above-mentioned impact led to a 25% rise in consumer ecommerce deliveries in 2020; the existing trends across the sector were accelerated by the impact of COVID-19 on the last-mile delivery, leading to structural changes, one of them being the fact that:

"Proven technologies are fueling the last-mile ecosystem revolution. While disruptive new technologies, such as drones and delivery robots, will continue to emerge, the last-mile revolution is happening now as proven technologies scale up. The likes of parcel lockers and data sharing for load pooling are being adopted around the world as the costs of implementation decrease".

The WEF report, entitled "The Future of the Last-Mile Ecosystem" presented an integrated perspective developed jointly by WEF, McKinsey & Company, the World Business Council for Sustainable Development (WBCSD), Leaseplan, and more than 20 public- and private-sector partners who contributed related data, expertise and case studies (Supply Chain 24/7, 2021), and described, among other aspects, seven different delivery networks for last-mile delivery, as shown in the figure below.

	Segment	Use cases		
Parcel size	Deferred delivery – arrives some day	Normal/express e-commerce shopping and returns	Small-scale B2B shipping	C2C shipping
	Time-definite delivery – arrival next/specific day/time	(Largely international) B2B reliability shipping		Express e-commerce shopping
	Same-day delivery – arrival on same day	E-grocery shopping and returns	Same-day e-commerce shopping	
	Instant delivery – delivered right away (less than ~2 hours)	Urgent document and item delivery	Prepared food delivery	Instant e-commerce shopping
Larger than parcel size	B2B store delivery	Store delivery and replenishment		
	B2B FTL/LTL carrier	Remaining full-truckload (FTL)/less-than-truckload (LTL) carrier (items >32 kg)		
	B2C LTL/two-person handling carrier	B2C LTL/two-person handling (esp. furniture)		

* Store replenishment and freight delivery out of scope for now, estimate in later stage

Figure no. 8: Seven different delivery networks for last-mile delivery

Source: Lebow, S., 2021. The top 15 US companies in retail ecommerce sales growth, eMarketer, Jul 29 (work cited)

According to Twilio (2021), it is crucial for business success to deliver personalization at consumer scale, any approach to building omnichannel engagement so as to provide a positive CX and build great relationships needing to be comprehensive in supporting sales, marketing, operations and fulfillment channels, while the last (but not least) element of an omnichannel engagement strategy (fulfillment) involving ensuring a seamless and effective last-mile delivery, using new channels to both mobilize workers, and serve customers faster and also increasing this way operational efficiency, as shown in the figure below.



Figure no. 9: The elements of an omnichannel engagement strategy

Source: Twilio, 2021. How to deliver true omnichannel engagement in retail. [e-book] Version: 1.0, Updated: 05.27.21, p. 8 (work cited)

It is interesting to note with regard to consumers' delivery expectations that according to a 2021 Global Consumer Survey Report by Astound Commerce, within the context of the supply chain disruption (which generated severe order delays and out-of-stock issues for consumers) caused by COVID-19 pandemic, consumers worldwide have experienced a delay in receiving their online order, and as a consequence shoppers were trying new brands, while delivery expectations were constantly rising (a constant increase of demands for both next-day, and same-day delivery), same being the case with their appetite for forward-thinking delivery methods. The table below presents the growth of consumers' comfort level with six stated distribution methods (delivery by a store associate, to an automated pickup locker, in-home/in-garage, by a driverless car, by a drone, and by a third-party service provider), from January last year to May this year.

Table no. 1: Growth in consumers' comfort with the following delivery methods from January 2020 to May 2021 (average; Very Comfortable)

	January 2020	May 2021	% Change
Delivery by a store associate	22%	35%	56%
Delivery to an automated pickup locker	20%	22%	12%
In-home/in-garage delivery	17%	22%	26%
Delivery by a driverless car	16%	22%	39%
Delivery by a drone	16%	21%	30%
Delivery by a third-party service provider	N/A*	30%	N/A

*No historical data available

Source: Astound Commerce, 2021. Preparing for an Ever-Evolving Holiday Season. A 2021 Global Consumer Survey Report [pdf] Astound, p. 43 (work cited)

As shown on Shiprocket Blog (Arora a, 2021), as part of an ecommerce business ecommerce fulfillment involves the operations post receiving the order (picking, packing, shipping, and delivery of products to the customer's doorstep), as shown in the figure below (see also types of ecommerce fulfillment models). Both *first-mile* (for instance, the process of transporting products from the retailer warehouse to the courier company warehouse to be delivered to the final buyer) and *last-mile* (for instance, the process of transporting packaged products from courier company warehouse to the buyer's doorstep) *deliveries*, are representing two major challenges faced by the sellers in eCommerce shipping as vital aspects which begin and end the process (responding to last-minute changes, alignment with warehouse operations, minimizing rebounds, reducing logistics costs, and on-time delivery representing here the biggest challenges, according to a report by Statista), as shown in the next figure below (Arora b, 2021).

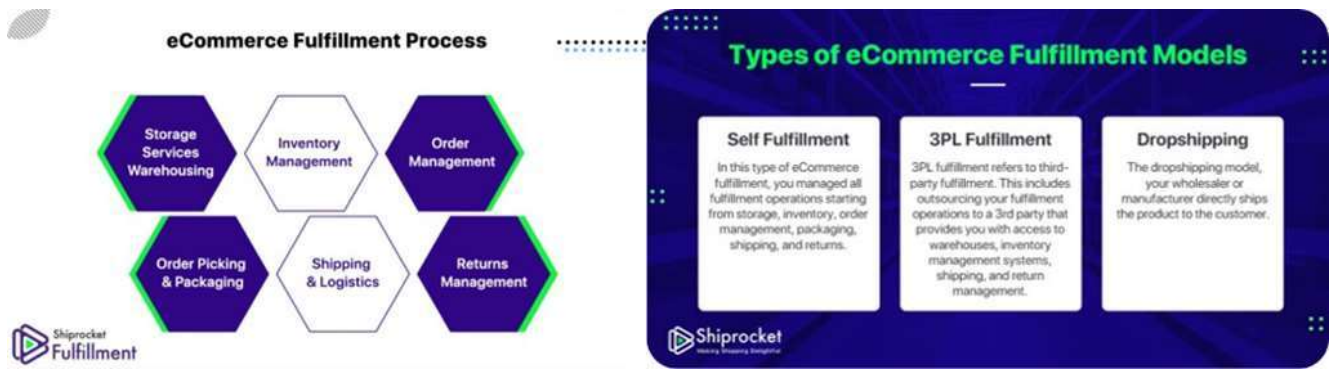


Figure no. 10: What is Included in eCommerce Fulfillment Operations (Order Fulfillment Steps), and Types of eCommerce Fulfillment Models

Source: Adapted from Arora, S., 2021. What is eCommerce Fulfillment & its Scope in 2021. Shiprocket Blog, September 16 (work cited)

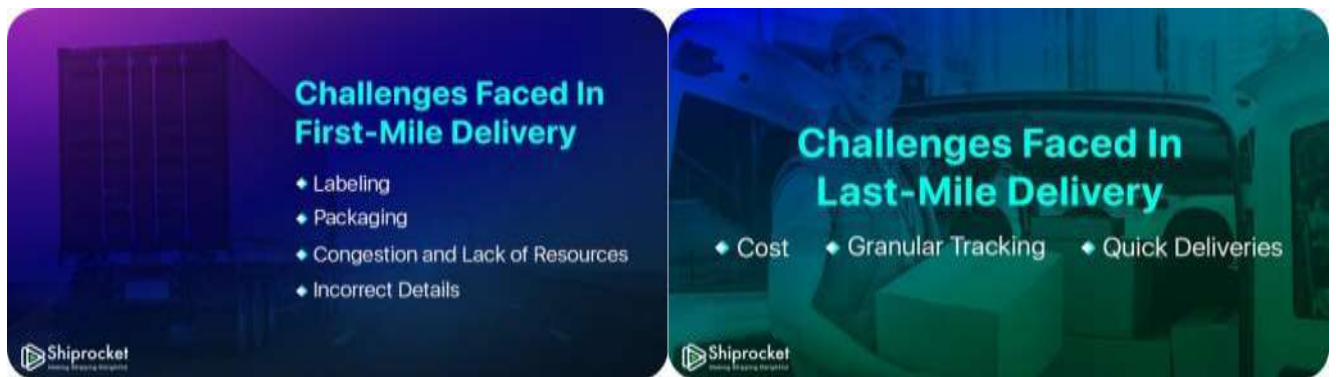


Figure no. 11: Challenges Faced in First-Mile and in Last-Mile Delivery

Source: Adapted from Arora, S., 2021. Key Challenges in First-Mile and Last-Mile Delivery for eCommerce. Shiprocket Blog, September 16 (work cited)

In a recent study entitled “The Last-Mile Economy: How New Delivery Platforms Are Saving Retailers from Profit-Killing Carrier Capacity Limit”, and sponsored by a leading enterprise-level delivery fulfillment company, OneRail (2021), it was highlighted that the no. 1 delivery pain point for over half of retailers is last-mile delivery, which represents, on average, 41% of the total shipping cost for most retailers, on the other hand last-mile delivery being considered a significant logistical problem by 42% of retailers (however full visibility into their last-mile delivery having only 12% of retailers).

In August last year, EU-Startups.com, the leading online publication with a focus on startups in Europe, let us know about Innoship (a Romanian startup, as an aggregator of multiple fast delivery options for retail and e-commerce companies, founded in 2019) continuous involvement in developing (based on an investment from GapMinder VC of €550K coming some months after the commercial launch of their SaaS solution enabling e-commerce businesses to integrate and orchestrate multiple such type of options) last-mile delivery solutions, its client

portfolio including already reputed brands on the local e-commerce market and distribution ecosystem (Tucker, C., 2020). And in October last year, Innoship announced that they signed a partnership with the 2nd place position holder on the DIY market in Romania, French retailer Leroy Merlin (Innoship, 2020). While in April 2021, Intermodal & Logistics Magazine (2021) made it known that Romanian online retailer evoMAG.ro integrated Innoship courier aggregator services (evoMAG joining this way the over 70 customers of medium and large retail, ecommerce and distribution companies which already chosen Innoship platform) since the beginning of 2021 as part of its strategy to improve CX and reduce order delivery times (Intermodal & Logistics, 2021), and managed to obtain during this period, through a dynamic allocation of orders to couriers, the efficiency of delivery costs by about 15%, the implementation of Innoship API aggregator, for instance, facilitating immediate access to any courier in the local or international market without additional interconnection or maintenance costs.

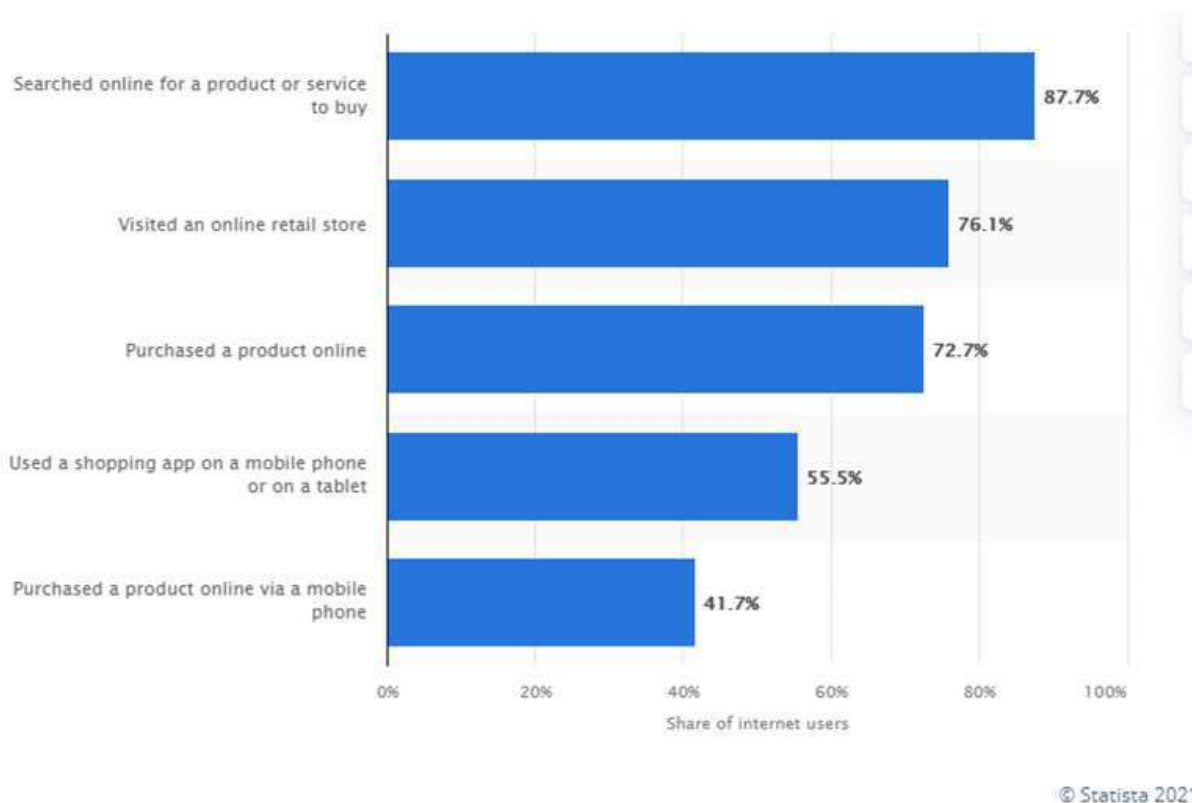


Figure no. 12: Distribution of internet users in Romania who shop online in 2020, by e-commerce activity

Source: Sava, J. A., 2021. E-commerce activities in Romania 2020, Statista, May 3 (work cited)

It is worth mentioning within this framework that: from the point of view of the digital shopping behavior in 2020 was a suggestive (confirming the great consumer shift: searching and buying online for a specific product or a service) distribution of internet users in Romania who

shop online in 2020, by e-commerce activity, as shown by Statista in the figure below (Sava, 2021); 45% of the Romanian internet users made at least one online purchase in the last 12 months, according to the Eurostat report published in January 2021; there is a significant development potential of the e-commerce sector which has experienced an accelerated growth in 2020; at the end of December 2020, more than 23,000 active online merchants were registered in the eMAG Marketplace platform, according to data provided by eMAG for GPeC; it was recorded a significant increased use of delivery applications for online shopping, according to studies for GPeC conducted during 2020 (May and October 2020) by the market research company iSense Solutions among internet users (Păunescu, 2021); according to ecommerceDB, this was the 2020 Top 30 online stores in Romania (first party net sales 2020): emag.ro (Dante International S.A.), fashiondays.ro (Dante International S.A.), altex.ro (Altex Romania S.r.l.), dedeman.ro (Dedeman S.r.l.), pccgarage.ro (PC Garage Srl), hm.com (H & M Hennes & Mauritz GBC AB), epantofi.ro (eobuwie.pl S.A.), elefant.ro (Elefant Online S.A.), carrefour.ro (Carrefour Romania S.A.), notino.ro (Notino s.r.o.), cel.ro (SC Corsar Online S.r.l.), amazon.com (Amazon.com, Inc.), sephora.ro (Sephora Cosmetics Romania S.A.), hornbach.ro (Hornbach Centrala S.r.l.), auchan.ro (Auchan Romania), drmax.ro (Dr.Max), zara.com (Zara USA, Inc.), farmacialapretmic.ro (Spring Farm S.r.l.), flanco.ro (Flanco Retail S.A.), ikea.com (Inter IKEA Systems B.V.), leroymerlin.ro (Leroy Merlin Romania S.r.l.), vivre.ro (Vivre Deco S.A.), evomag.ro (SC Evolution Perst Systems S.r.l.), decathlon.ro (Roumasport S.r.l.), answer.ro (Wearco S.A.), bricodpot.ro (Bricostore Romania S.A.), footshop.ro (Footshop s.r.o.), autopieseonline24.ro (Partex Global GmbH), autokarma.ro (Karma Crimpex S.r.l.), mediagalaxy.ro (Altex Romania S.r.l.); on the other hand, this was the Top 5 Online the Ecommerce Market Stores in Romania by Ecommerce Net Sales 2020 in Million US\$ (store rankings based on every store generating revenue in Romania, and considering only revenue created here): emag.ro (US\$830m), fashiondays.ro (US\$120m), altex.ro (US\$111m), dedeman.ro (US\$89m), pccgarage.ro (US\$79m); as pointed out by the Statista Digital Market Outlook, ecommerce market (US\$2,542m Revenue in 2020) expansion in Romania is expected to continue over the next few years, being predicted a CAGR 2020-2024 for the next four years of 14%; from the point of view of the Top 3 shipping service providers offered by online retailers in Romania, the most frequently offered delivery service provider among online stores is Fan Courier, followed by Urgent Cargus and GLS (ecommerceDB, 2021).

Prior to the GPeC SUMMIT, November 1-2, 2021 (considered to be the most important E-Commerce and Digital Marketing event in the region), GPeC informed, among others, that: Romanians' trust in online stores has increased significantly from 32% in 2020 to 41% this year (according to the study 'International eComm Pulse 2021' conducted by iSense Solutions for GPeC), a sign that online shopping is becoming a common way to shop; 20% of Romanians ordered online for the first time after the pandemic started, and 85% of those who buy online expanded the range of products purchased online with at least one new category (according to a study conducted by Nielsen Norman Group at the beginning of 2021); compared to last year, Romanian online commerce will increase this year by approx. 15% (GPeC estimates, together

with the main players), bringing the entire sector to approx. 6.5 billion euros generated by online sales, compared to 5.6 billion euros at the end of last year (Radu, 2021).

The 2021 Agility Emerging Markets Logistics Index (the report was created 12 years ago by Agility, one of the world's top freight forwarding and contract logistics providers, and a leader and investor in technology to enhance supply chain efficiency, with their above-mentioned research partners Transport Intelligence/Ti) revealed that the ecommerce revolution was accelerated by the COVID-19 pandemic in every region of the world, the pre-pandemic forecasts being eclipsed by the online sales growth, while a larger share of wallet was gained by the digital purchases. Allow us to also remember that we have seen above how Ti estimated the costs of last-mile services as representing 53% of logistics costs (with fulfilment accounting for the other 47%), and highlighted the significant need for investment driven by the costs of fulfilling ecommerce, mainly in the last mile.

Recently, Retail By the Numbers (2021) let us know the latest news concerning the last-mile delivery market, beginning with the in August 2021 launched Walmart's GoLocal last-mile delivery service (The Home Depot, ranked as no. 8 in the above-mentioned top list of 15 retailers, becoming the first retailer utilizing Walmart's network to make same- or next-day deliveries), which is reaching nearly 70% of the US population (by using drones, autonomous vehicles, and market fulfillment centers to scale delivery from more than 3,000 stores), US population being also served by both other major players in the last-mile category (like FedEx, UPS, XPO Logistics, the United States Postal Service, and Amazon), and new startups (such as FrontDoor Collective) seeking to provide alternatives to the mentioned logistics giants (according to Insider Intelligence). Within this framework, it was also underlined, among other aspects, that in order to help with last-mile delivery Alibaba is employing robotics, while Amazon, both to power the last mile and help increase delivery efficiency is developing robotic fulfillment centers throughout the whole nation.

As shown by the Editorial Director of Robotics (WTWH Media), and co-chair of the well-known Robotics Summit & Expo, a variety of robots were tested and used over time by Walmart, which confirmed their preoccupation with regard to the development of a fast, low-cost and scalable last mile delivery ecosystem, including valorizing autonomous vehicles (Crowe, 2021). Recently, as underlined by the Editor of WTWH's Robotics Group and founder of the Mobile Robot Guide (Oitzman, 2021), Walmart is investing in better digitizing its supply chain facilities and improving ecommerce fulfillment, including, for instance, by partnering with Symbotic (fully autonomous robots and proprietary software) to implement high-tech automation system into distribution network.

According to the CEO of Attabotics Inc. (which is well-known as providing robotics for: order fulfillment combining automated storage with ergonomic picking processes, retrieval, and real-time order fulfillment), ecommerce companies which were thinking about what will happen in the future already invested in robotics (Demaitre, 2020). More recently, at the Groceryshop

2021 Event (September 2021), the Chief Revenue Office at Attabotics stated that to stay competitive stores need a new business model for ecommerce (Gonzalez, 2021).

Instead of conclusions: *Considering both digital disruption and digital opportunities, now it's time to deliver a frictionless CX, based on CX solutions playing well in an API-first world*

A recent McKinsey analysis invited companies to see beyond the urgency of rapid digital transformations, and also reassessing their strategies by taking rigorously into consideration both digital disruption and digital opportunities, which implies, among other aspects, including a leadership enabled by technology, as shown in the figure below (Blackburn et al., 2021).

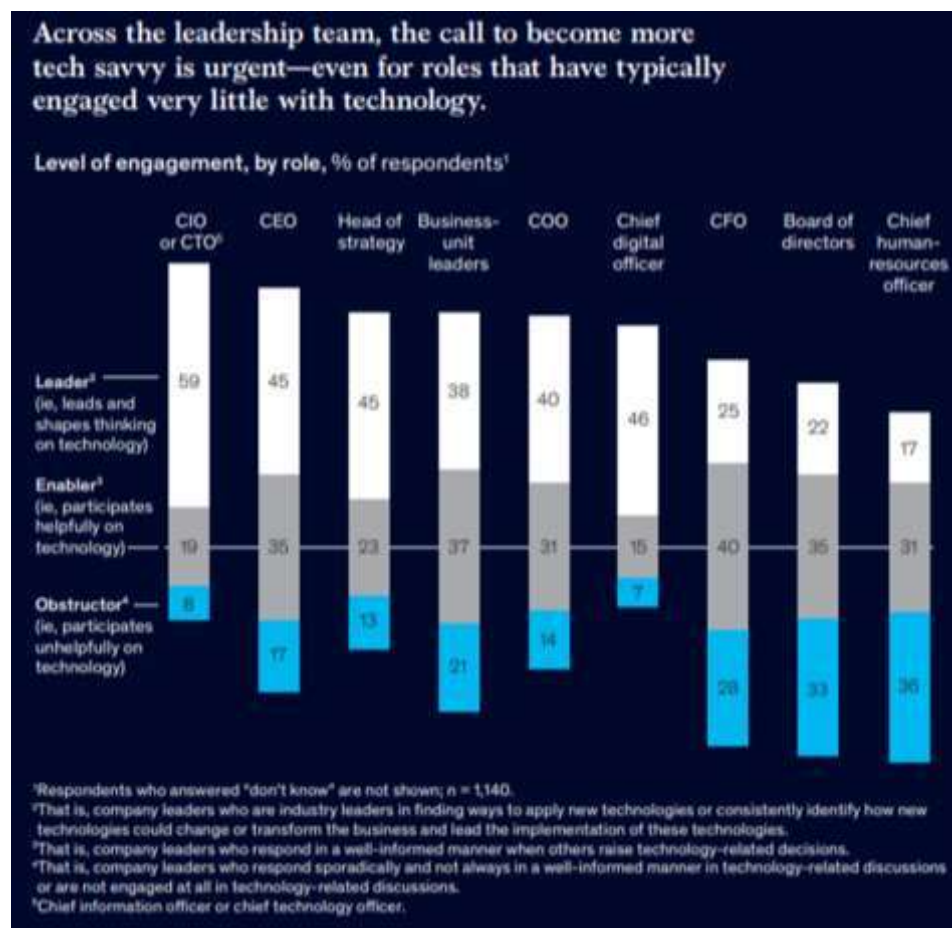


Figure no. 13: Level of engagement, by role, % of respondents (1)

Source: Blackburn, S., Galvin, J., LaBerge, L. and Williams, E., 2021. Strategy for a digital world. [pdf] McKinsey Quarterly, October, p. 8 (work cited)

Going back in time to different McKinsey analysis, it is worth remembering that five years ago it was shown that for most C-suite leaders data management has become a top priority (the role of data in launching companies' digital transformations being demonstrated by McKinsey already from 2011), being critical not only to build the right teams (cross-functional, or scrum), but also to adopt emerging technologies (such as data lakes allowing a faster data transmission to end users) and ensure agile data leadership, agile being seen a critical capability to both manage companies' data more strategically and deliver seamless multichannel CX (Brocchi et al., 2016). According to 2021 Verdana Research, in order to meet today's necessary new potential in a simplified data and technology infrastructure, companies are challenged to realign their marketing investments, being considered that the existing marketing technologies will be by the end of 2023 ineffective (for one-third of companies) to engage buyers in personalized digital experiences in a knowledgeable and insightful way, companies having now the opportunity to maximize their potential of valorizing data intelligence with the help of science and technological advancements.

With all this above-mentioned in mind, we can also add at the basis for the necessary actions three lessons to learn:

- The recommendations resulting from the Forrester report entitled *"The Future Of Commerce Technology: Commerce Platforms End With An Ecosystem On FIRE"*, where FIRE means Flexible, Inexpensive, Rapid to launch, and Easy to use (Pfeiffer et al., 2021). It was also used a significant subtitle, both providing context for the challenging above-mentioned report title, and adding explanatory substance, calling for immediate action: "Digital Acceleration Demands That Businesses Evolve Their Architecture To Survive". A confirmation of the meaning of this subtitle was given by the emphasis made by James Urbati, General Manager Of Commerce, Pivotree, on the occasion of a foreword to this valuable Forrester report, recalling that he is immediately thinking of the book written by Peter H. Diamandis and Steven Kotler (and entitled "The Future Is Faster Than You Think: How Converging Technologies Are Transforming Business, Industries, and Our Lives", Publisher: Simon Schuster, January 28, 2020) every-time when he is asked to predict where digital commerce is headed, and this because the pace of change itself is the only aspect changing faster than the technology within the context of the evolution of the digital commerce space. Urbati stated: *"A different architectural approach must be utilized to avoid the problems we're trying to leave behind. Many crucial factors — such as how APIs are connected, what underlying tools are used throughout the commerce ecosystem (Payment, Promotions, PIM, OMS, ERP), and how easily components can be added or replaced — could be impacted more by how you architect and deploy than by what software you chose... Shoppers want to start an experience online, visit a store, research products on their phone, digitally order items, and get their items in the store, at the curb, or delivered at home. And it's a journey that must be frictionless..."* This above-mentioned valuable recent Forrester report made it clear that the necessary personalized, relevant CX are enabled by leveraged customer data driven by the operations layer whose heart is the order management system struggling to be as

fresh and flexible as CX solutions managing to play well in an API-first world, maintaining the compatibility with the changing market needs, and enabling agility not only operationally, but also technically;

- The perspective presented at mid-June last year, by a Forbes contributor (CMO Network) who wrote an article entitled *“Marketing To Robots: Why CMOs Need To Start Thinking About Business To Robot To Consumer (B2R2C)”* (Hackl, 2020), starting from both, the global spending on robots by 2023 is expected to reach \$241.4 billion (according to IDC), and heavily investment made by major tech players in voice, AR & VR, hence the need to add B2R2C to marketers’ list of duties. Within this framework it was made reference to Kim Bates, Chief Futurist at Faith Popcorn’s Brain Reserve, who coined B2R2C: *“The customer journey of the future will begin to emerge as Business to Robot to Consumer (B2R2C) ... Search, lead generation, e-commerce, and programmatic buying will all morph into new sophisticated platforms and systems. A brand’s human connection becomes more magical and relevant as technology helps make people’s lives smarter, healthier, more personal, and meaningful through all these precise and seamless experiences”*;
- *“The new marketing model for growth: How CPGs can crack the code”* (Chen et al., 2021), this new marketing model, launched in September 2021 by McKinsey’s representatives, being introduced as a solution to unlock demand with the help of the next-level AI consumer intelligence, as shown in the figure below.

Winning CPGs use five ‘ingredients’ to unlock data-driven marketing impact at scale.

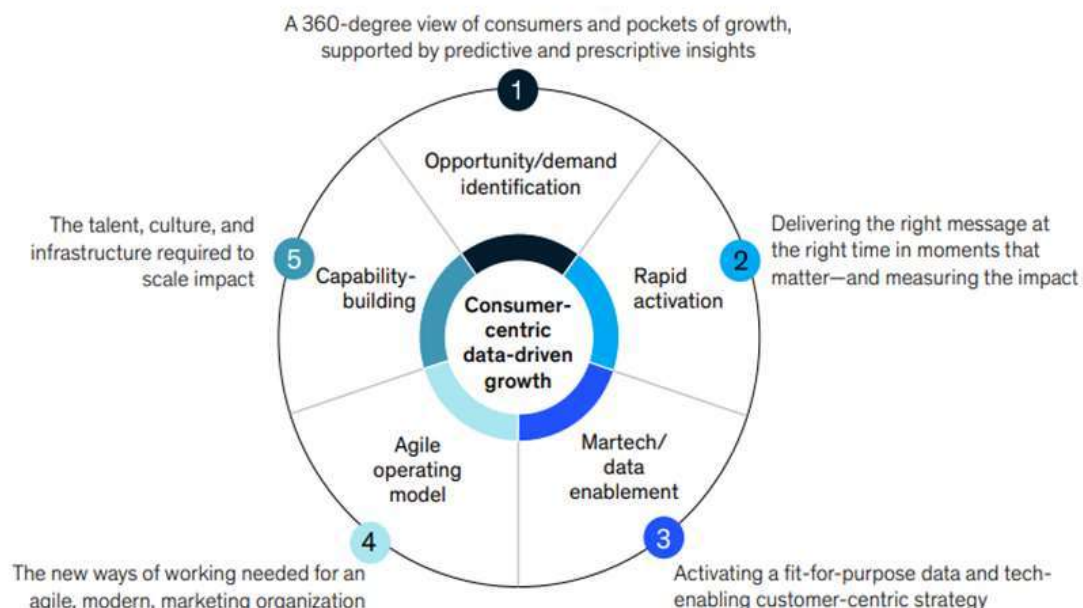


Figure no. 14: Winning CPGs use five ‘ingredients’ to unlock data-driven marketing impact at scale

Source: Chen, T., Choi, M., Henstorff, B., Jacobs, J. and See, E., 2021. *The new marketing model for growth: How CPGs can crack the code.* [pdf] McKinsey’s Marketing & Sales and Consumer Packaged Goods practices, September, p. 3 (work cited)

There is no doubt: *“Robotics represents a highly innovative domain encompassing physics, mathematics, informatics, and even industrial design as well as social sciences. The fascination for autonomous machines and the variety of fields and topics covered with this domain makes robotics a powerful idea to engage with”* (Merdan et al., 2020).

And allow us to end by reminding two quotes: *“Today, a group of 20 individuals empowered by the exponential growing technologies of AI and robotics and computers and networks and eventually nanotechnology can do what only nation states could have done before”* (Peter Diamandis); *“As more and more people are automated out of the economy through robotics and self-driving cars and other technologies, there will be a way to create value for other human beings online. There will be a virtual economy for exchanging value, goods and services, entertainment experiences, and all that”* (Tim Sweeney”).

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